Scoped Environmental Impact Study

Doug Tarry Limited
Acorn Valley Subdivision, Dorchester

Revised December 2025

1.0 INTRODUCTION

1.1 Scope

This Environmental Impact Study (EIS) is being prepared for Doug Tarry Limited. (the proponent) relating to the property located at 83 Christie Drive and a portion of 2648 Harris Road, Dorchester, ON, in the County of Middlesex, and the Municipality of Thames Centre (Figures 1 & 2).

This EIS is being prepared to satisfy provincial and municipal requirements as part of a Draft Plan of Subdivision application. This work program is triggered by municipal and provincial requirements related to the proposed development occurring on or within 120 m of Lands designated "Protection Area" as depicted on the Municipality of Thames Center Official Plan (OP), Schedule "B-1" Dorchester Land Use Plan (Figure 3). The Municipality of Thames Centre OP, Appendix 1 (Part A) Natural Heritage Features depicts that the subject lands are also within 120 m of the Tamarack Swamp (UT 22) Provincially Significant Wetland, which is considered a "Life Science site and wetland" (Figure 4).

The subject lands are located in the Municipality of Thames Center ("the municipality") in Middlesex County ("the county') and lie within the jurisdiction of the Upper Thames River Conservation Authority (UTRCA). This Environmental Impact Study is being sent to the Municipality of Thames Center and may be circulated to other regulatory agencies for their review.

This report follows the municipal and provincial guidelines for an Environmental Impact Study, found in Appendix B and further described in Section 6.1.

1.2 Proposal Description

This parcel is located in central Dorchester (Figure 1). More specifically, the subject lands are located west of the Mill Pond, south of the Thames River, and east of Harris Road. The subject lands include two parcels separated by the unopened Christie Drive right of way (ROW) (Figure 2).

The subject lands occupy ± 100 ac/ 40.5 ha. According to the municipal OP, Schedule "B-1", the parcels are designated as Residential lands and lie within the urban settlement area of Dorchester. Current land use is primarily agricultural, with a single-family dwelling and adjacent maintained lawn in the southeast. Surrounding land use are urban residential areas to the northeast, rural residential areas to the northwest, and agricultural areas to the south. The study area extends 120 m from the legal parcel into the vegetated continuums for floral and faunal investigations consistent with the Significant Wildlife Habitat Technical Guide, OMNR 2000.

Concerning Natural Heritage, there is a Provincially Significant Wetland (PSW) directly north of the subject lands within a "Significant Woodland" (Figure 2, Feature B). "Significant Woodlands" also border the west and southeast property boundaries. Within the southwest (Figure 2, Feature A) and southeast (Figure 2, Feature C) Natural Heritage features, there are unevaluated/regionally significant wetlands. The small isolated patch of Woodland in the center of the subject lands is not designated Natural Heritage, nor is the vegetation within the Christie Drive roadway extension.

The designated Natural Hazard lands on the OP (Appendix 1 (Part 1) Natural Heritage Features, Figure 4) consist of very strong to extreme slopes among the Natural Heritage features to the north (Figure 2, Feature B) and southeast (Figure 2, Feature C), and a gentle slope to the southwest (Figure 2, Feature A).

Development involves transitioning the subject lands into residential use. The residential use includes a combination of freehold dwellings, multi-family townhouse block development, and apartment dwelling units. A stormwater management (SWM) pond will be constructed in the southeast, and the existing southeast pond will be removed as the Municipality of Thames Centre has concerns regarding maintenance and public safety, as it is an irrigation pond that was not designed to their standards. Additionally, a meandering engineered watercourse will traverse the subject lands parallel to Christie Drive, carrying surface flow from the lands in the west to the SWM pond in the southeast.

The Draft Plan of Subdivision is shown in Figure 5.

1.2.1 Natural Features

Significant Woodlands

Woodlands are treed areas that provide environmental and economic benefits such as erosion prevention, hydrological and nutrient cycling, provision of clean air and long-term storage of carbon, wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of woodland products (PPS 2024).

The "Significant Woodlands" designated in the Thames Centre OP Schedule "B-1" and Middlesex County OP Schedule "C" are located to the north, west, southwest, and southeast of the subject lands. Based on the Ontario Natural Heritage Mapping and UTRCA Mapping, the "Significant Woodland" is almost exclusively on adjacent lands with minimal extensions into the development envelope.

Provincially/Regionally Significant Wetlands

Wetlands are lands that are seasonally or permanently covered by shallow water and where the water table is close to or at the surface. In either case, the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water-tolerant plants. Wetlands are among the most productive and biologically diverse habitats on the planet. By protecting wetlands, we contribute to protecting plant and animal species as well as surface water and groundwater resources (MNRF, Natural Heritage Reference Manual [NHRM], 2010).

"Wetlands provide important habitat for plants, fish, and wildlife. They also function as headwater areas and provide water storage to offset peak flows associated with storm events" (Thames Centre OP, Appendix 4 Glossary).

A number of wetland & terrestrial communities are present within the riparian corridors of the Mill Pond. These include open water, wetlands, meadow marsh, thicket swamp, cultural meadow, cultural thicket, and deciduous forest. A PSW, known as the Tamarack Swamp (UT 22), is immediately north of the subject lands.

Fish Habitat

The southeast lands form both a drainage and natural heritage continuum with the Dorchester Mill Pond. The original watercourse of the pond was dammed in 1810 and is now known as Dorchester Swamp Creek. The Mill Pond outlets into a channelized watercourse, which passes through a culvert under a municipal road before outletting into the south branch of the Thames River several hundred meters north of the Mill Pond dam, thus extending the drainage and natural heritage continuum.

The Mill Pond Dam was constructed by 1810. During the nineteenth century, the dam and its associated structures were used as both a sawmill and a grist mill. Extensive studies over the years led to significant remediation of structural constraints with the dam. Remediation was required due to the heightened sediment loads containing excess nutrients and heavy metals it retained prior to the construction of the adjacent residential development during the 1980s and, most recently, within the last 5 years. The current development exhibits setbacks ranging from 1-4 m from the dripline.

Both the Rath-Harris and Shaw municipal drains are considered Fish Habitat.

Significant Valleylands

Valleylands act as the natural drainage system for watersheds, playing an important role in surface water conveyance, attenuation, storage, and release. Valleylands can often be areas where groundwater is released as seepage or springs. Valleylands are a significant landscape feature and are relatively undisturbed, having a greater degree of naturalness. These landforms allow for a diverse array of microclimatic conditions and, therefore, the potential for diverse and rare flora and fauna communities. Additionally, they often connect natural heritage systems and provide migration and dispersal corridors for terrestrial, aquatic, and avian species. (Natural Heritage Reference Manual, 2010).

The Significant Woodlands to the north and southeast (Figure 2; Feature B and C, respectively) are present in the surrounding valleylands.

1.2.2 Activities Associated with the Proposal with Environmental Impacts: Tree-Cutting and Removal of Vegetation, Grading, Post-Development Activities

The following areas will experience vegetation removal, broken down by geographical area:

West (Figure 2; Feature A):

a) The small isolated cultural woodland patch in the center of the site, along with the cultural thicket and meadow surrounding the proposed ±20 m wide Christie Drive roadway (Figure 10, community A5) (± 3 ac/ 1.34 ha). This vegetation is not considered Natural Heritage on the municipal OP nor ecologically significant on the UTRCA mapping.
b) A portion of the FOD5 (Figure 10, community A2) (± 0.21 ac/0.08 ha) and SWM2 (Figure 10, community A1) (± 0.86 ac/0.35 ha) surrounding the proposed ±20 m wide Christie Drive roadway. This roadway is not considered Natural Heritage on the municipal OP or ecologically significant on the UTRCA mapping.
c) The western agricultural pond and surrounding vegetation in the west (Figure 10 community A6) (± 1.18 ac/ 0.48 ha) is proposed to be filled in and used as part of

the development envelope. This pond is an open water feature, but the surrounding vegetation is not considered Natural Heritage on the municipal OP or ecologically significant on the UTRCA mapping.

Southeast (Figure 2; Feature C):

d) The cultural Woodland (Figure 10, community C3) (±0.91 ac/0.37 ha) and planted trees in the maintained lawn will be removed in the southeast portion of the subject lands. This vegetation is not considered Natural Heritage on the municipal OP nor ecologically significant on the UTRCA mapping.
e) The Municipality has requested that the online pond in the southeast be removed.

The Concept Plan (Figures 5 & 6) demonstrates the development envelope and driplines of vegetation.

A geotechnical investigation determined that a 6 m setback from the top of stable slope is required from slopes in the southwest, north, and southeast.

With respect to grading, the development's rear yards and open space areas are proposed to be graded towards the properties adjacent to the northerly and southwesterly wetland features to encourage sheet flow toward the existing wetlands. Other rear yards that abut existing development or driplines are proposed to be graded down towards these features, including rear yard swales to intercept flows and carry runoff towards the storm sewer system.

1.2.3 Timing of Site Alterations

It is our understanding that construction will occur in multiple phases following the approval of this EIS and other required document approvals. Timing mitigations are required by the Migratory Bird Convention Act 1994 for any vegetation removal required (Section 4).

1.2.4 Servicing

The subdivision will be developed on full municipal services. The sanitary services are proposed to be accommodated by connecting to Mill Rd or potentially going below the Rath-Harris Drain in the southeast.

1.2.5 Stormwater Management

A Stormwater Management (SWM) facility is being proposed in the form of a SWM pond within the subdivision in the southeast, along with potential Low Impact Development (LID) features promoting infiltration and groundwater recharge. An engineered meandering stream running west to east parallel to Christie Drive will carry all flows from the west to the SWM pond in the southeast while promoting infiltration. As noted, the SWM pond will be on the subject lands in the southeast and will be outletd to the Rath-Harris Drain before reaching the Mill Pond. This outlet will include erosion protection in the form of a plunge pool and/or other slope protection. Emergency overflow from the SWM pond will be provided for overland flow directed towards Rath-Harris Drain, which will feature erosion protection provided down the slope to the existing ravine bottom.

LID features are currently proposed as a main open channel across the site and would provide groundwater recharge towards the northerly wetland. Further LID features may be required in other locations, subject to the results of the final water balance calculations.

1.3 Planning Considerations

1.3.1 Federal Planning Considerations

The Department of Fisheries and Oceans Canada (DFO) is responsible for the conservation, management, and protection of fish and Fish Habitat. The DFO is given the authority to achieve this under the Federal Fisheries Act 2019. Fish habitat is defined in the Fisheries Act 2019 as "water frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply and migration."

According to the current DFO aquatic SAR mapping, both the Rath-Harris and Shaw drains do not contain "any critical habitat of aquatic SAR, nor have any SAR been found/are likely to be found." The Rath-Harris Drain flows ~380m southeast to the Mill Pond, where Wavy-rayed Lampmussel [SC] and Northern Sunfish [SC] "are found or are potentially found".

The Rath-Harris Drain is rated by the DFO as Class F, meaning there is intermittent flow with a restricted activity timing window during periods of flow. Shaw drain is rated by the DFO as Class E, meaning there are sensitive fish species present; in-water work would be subject to a spring-restrictive timing window.

1.3.2 Provincial Planning Considerations

The Provincial Planning Statement (PPS) 2024 states that "Natural Heritage features and areas shall be protected for the long term" (PPS, 2024, 4.1). Additionally, Section 4.1 states that "The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and groundwater features."

Several stipulations are outlined by the Provincial Policy Statement (PPS, 2024) regarding development within 120 m of a Natural Heritage area. The PPS defines seven natural heritage features where development and site alteration are not permitted in or within 120 m unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions. These seven natural heritage features and their applicability to the proposed development include:

Significant Wetlands and Significant Coastal Wetlands	Provincially Significant Wetlands present north of the subject lands. Unevaluated wetlands are present to the southwest and southeast of the subject lands.
Significant Woodlands	Present on-site and in adjacent lands.
Significant Valleylands	Present in adjacent lands.
Significant Wildlife Habitat (SWH)	To be discussed in this study.
Significant areas of natural and scientific interest (ANSI's)	Not present.
Fish Habitat	Present on-site and in adjacent lands.
Habitat of endangered or threatened species	To be discussed in this study.

The Tamarack Swamp to the north is a Provincially Significant Wetland (PSW). No ANSI's occur within 120 m of the subject lands. The widely known Dorchester Swamp is present 2 km to the southeast; it is considered both a Life Science ANSI and a PSW despite being divided in two by Highway 401.

The related PPS stipulations are fully outlined in Appendix A and are discussed in Section 5.1 of this report.

Our reporting will be consistent with the 2024 Provincial Planning Statement, the Natural Heritage Reference Manual (Ontario Ministry of Natural Resources & Forests ..." MNRF"), and the Ecological Land Classification for Southern Ontario (MNRF..." ELC").

The PPS 2024 states that development and site alteration shall not be permitted in Natural Heritage features and areas or adjacent lands unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

The Ministry of Environment, Conservation, and Parks (MECP) has taken over the responsibility of the Endangered Species Act (ESA), 2007. The MECP protocol consists of conducting a self-screening and submitting an Information Gathering Form (IGF) if a project is likely to contravene the ESA and require permitting.

1.3.3 Municipal Planning Considerations

The Municipality of Thames Centre regards the on-site and adjacent woodland/wetlands as Natural Heritage features (Appendix 1, Figure 4). With respect to the Municipality's goals concerning Natural Heritage features, Section 3.2.2 of the Municipality of Thames Centre OP states,

"The goal for the Natural Heritage "Green-Space" System is to achieve an overall improvement in the extent, ecological condition and diversity of the green-space system's components during the life of this Plan. Achieving this goal will contribute to quality of life and environmental improvements, help protect groundwater areas and enhance the appearance of the Municipality's landscape."

As stated in Section 3.2.1 of the Municipality of Thames Centre OP,

"The Thames Centre green-space system includes a combination of significant natural areas, their functions, and the corridors that connect them. The system includes:

Group A features:

_ Provincially significant wetlands
_ Habitats for endangered and threatened species
_ Fish habitat

Group B features:

_ Regionally significant wetlands
_ Significant woodlands and woodland patches identified by the Middlesex Natural Heritage Study
_ Significant valley lands
_ Significant wildlife habitat

_ Provincially significant areas of natural and scientific interest (ANSIs)
_ Regionally significant ANSIs & environmentally significant areas (ESAs)

Group C features:
_ Stream-bank corridors and flood plains along creeks and tributaries
_ Natural hazard lands, including flood plains and flood-prone areas, areas within the 100 Year Erosion Limit, and areas susceptible to erosion."

Group A Features

Group A features are present on-site and in the 120 m study area in the form of Fish Habitat within Rath-Harris and Shaw Municipal Drains as well as a Tamarack Swamp PSW immediately north of the subject lands. Additionally, the OP depicts "Environmental Area" lands surrounding the Rath-Harris Drain in the southeast.

In compliance with Section 3.2.3.1 and 3.2.2 of the municipal OP regarding development adjacent to Group A features, an EIS must be undertaken to demonstrate "there will be no negative impacts on the natural features and their sustaining ecological or hydrologic functions" and that the proposed development "will not cause harmful alteration, disruption or destruction of fish habitat and will not cause deposition of any deleterious substances in fish habitat" (Section 3.2.2).

Group B Features

Group B features are also present within the study area in the form of regionally significant/unevaluated wetlands, Significant Woodlands, and Significant Valleylands. The north, west, and southwest deciduous forests and a small patch in the southeast are considered "Significant Woodlands" on the Thames Centre OP, Schedule B-1.

Section 3.2.1 of the municipal OP states that "development and site alteration may be permitted [within or adjacent to Group B features] if it can be demonstrated, through environmental studies conducted by qualified individuals, that no negative impacts on the features or their associated ecological functions will result."

We understand that the tablelands are designated for intended use by the Thames Centre OP Schedule B-1. However, in accordance with Sections 3.2.1, 3.2.2, and 3.2.3.1 of the municipal OP, the Natural Heritage designated areas must be further investigated to demonstrate the proposed development will not negatively impact these features and/or their functions.

Again, it is important to note that the vegetation surrounding Christie Drive is not considered Natural Heritage under the municipal OP (Figure 3).

1.4.4 Conservation Authority Planning Considerations

The subject lands include portions of lands that are regulated by the Upper Thames River Conservation Authority (UTRCA) (Figure 8).

UTRCA jurisdictional mapping demonstrates wetlands are present on adjacent lands (Figure 8), including a Provincially Significant Wetland (Tamarack Swamp) to the north and unevaluated wetlands in the southwest and southeast. The UTRCA mapping demonstrates the southwest wetland boundary ranges from 0-75 m from the field edge. The UTRCA mapping

also indicates the southeast wetland is >30 m from the development envelope.

Additionally, Erosion Hazard lands surround the Rath-Harris Drain, Tamarack Swamp (North), Shaw Drain, and the Woodland in the southwest.

> "Development is prohibited in wetlands and other areas where development could interfere with the hydrologic function of a wetland, including areas within 120 metres of all provincially significant wetlands and wetlands greater than 2 hectares in size, and areas within 30 metres of all other wetlands, but not including those where development has been approved pursuant to an application made under the Planning Act or other public planning or regulatory process." O. Reg. 157/06, s. 2 (1).

The UTRCA regulation limit is 30 m from wetland boundaries and watercourses (in this case municipal drains). Any proposed development within the 30-meter setback is subject to CA review and approval.

> "The Authority may grant permission for development in or on the areas described in subsection 2 (1) if, in its opinion, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land will not be affected by the development." O. Reg. 157/06, s. 3 (1).

2.0 PHYSICAL ATTRIBUTES

The following information and analysis are based on literature review as well as site visits by the authors, completed during the 2019 and 2022 field seasons.

The UTRCA 2023 Watershed Report Card states that the Dorchester watershed has fair (C) surface water quality and that most remaining wetlands in the watershed are groundwater-dependent.

2.1 Soils

According to the OMAFRA AgMAPS database, there are two soil associations on-site. The northern parcel consists of Fanshawe soils, whereas the southern parcel is Wattford soils. With reference to the Soils of Middlesex County (Vol. 1 & 2, 1992), Fanshawe soils have high-water holding capacities and are moderately permeable in the loamy overburden. Subsoil horizons may become compacted and demonstrate low permeability when this occurs. During wet periods, Fanshawe soils become temporarily saturated. Wattford soils have slow to moderate moisture-holding capacities and are usually rapidly to moderately permeable.
Englobes' Geotechnical Investigation Report (February 2024) states that topsoil was encountered at all borehole locations 230-550 mm thick, consisting of moist silty/sand silt with some gravel. A range of very loose to dense sand deposits that were moist to saturated were captured in all boreholes except the southeast borehole. Native silt deposits were also discovered scattered throughout the field and were moist to very moist.

2.2 Slopes and Surface Drainage

According to the DRAFT SWM Report (CJDL 2024), surface grades demonstrate rolling topography with contours ranging from 254.00 – 267.00±m with localized ravine contours extending down to 251.00±m.

. Under pre-development conditions, there are four main outlets for surface drainage,

including Rath-Harris Drain, the northern wetland (Tamarack Swamp), Shaw Drain and the westerly wetland. Pre-development surface flow conditions are depicted in Figure 9 and are as follows:

_23.65 ha / 51.2% of the subject lands flow southeast to the Rath-Harris Drain,
_8.64 ha / 18.7% of the subject lands flow north to the Tamarack Swamp,
_9.69 ha / 21% of the subject lands flow to the Shaw Drain, and
_4.24 ha / 9.1% of the subject lands flow southwest to the westerly unevaluated wetland.

As previously mentioned, there are "Natural Hazard" lands to the southwest, north, and southeast. These slopes require erosion hazard setbacks. A geotechnical study (Englobe 2024) demonstrated that a 6 m setback from top of stable slope is recommended in all areas.

2.3 Hydrogeology and Groundwater Conditions

The MECP Source Protection Information Atlas provides the following conditions for the subject lands:

"Source Protection Area: **Upper Thames River**
Wellhead Protection Area: **No**
Wellhead Protection Area (WHPA-E): **No**
Intake Protection Zone: **No**
Issue Contributing Area: **No**
Significant Groundwater Recharge Area: **Yes** ; score is **N/A**
Highly Vulnerable Aquifer: **Yes** ; score is **6**
Event Based Area: **No**
Wellhead Protection Area Q1: **No**
Wellhead Protection Area Q2: **No**
Intake Protection Zone Q: **No**"

Groundwater observations to date appear to be shallowest in the central high ground of the field (3.23-4.44 m at Boreholes 4, 5, and 10), and up to 11.42 m was observed at the northeast boundary.

As stated, there are no wellhead protection zones on the subject lands; however, most of the lands are designated Highly Vulnerable Aquifer and approximately ½ the lands are designated Significant Groundwater Recharge Area in the northern and southeastern portions of the subject lands. Groundwater recharge will need to be taken into consideration in impacts and mitigation (Section 4).

2.4 MNRF Wetland Evaluation & Wetland Drivers

MNRF Wetland Evaluation

The Tamarack Swamp (UT22) Wetland Evaluation was initially completed in 1985 and was updated in 2014 to achieve provincial significance. This wetland is comprised of one individual wetland unit measuring 17.89 ha in size.

The Tamarack Swamp Wetland Evaluation notes that 95% of the wetland unit is swamp type with 5% marsh type. The wetland is entirely palustrine (17.89 ha) on 100% sandy soils.

According to the wetland evaluation, the wetland achieved a 100% flood attenuation score, 53% short-term water quality improvement score, 47% groundwater recharge score, 3% long-term nutrient trap score, and 0% carbon sink score.

Wetland Drivers
The wetlands associated with the Acorn Valley lands are influenced by different combinations of surface runoff, shallow groundwater, landscape position, and regional drainage context. These drivers vary by feature and have been evaluated based on field investigations and the Hydrogeological Assessment (Englobe HydroG Study Report, 2025).

The *northerly wetland* (Tamarack Swamp) is supported by a combination of surface runoff from the Acorn Valley lands and shallow groundwater discharge. The Hydrogeological Assessment (Englobe Hydro-G, 2025) confirms that groundwater flow paths from the site contribute toward this wetland, indicating reliance on a stable subsurface component in addition to surface inputs. Given the presence of hydrologic specialist vegetation and the confirmed groundwater contribution, the Tamarack Swamp is considered hydrologically sensitive, and maintaining both surface-water and groundwater inputs is important for preserving its ecological function. Accordingly, a feature-based pre- and post-development water balance assessment is recommended for this wetland at the detailed design stage to confirm that groundwater discharge and surface flow timing remain within acceptable tolerances.

This northern wetland boundary was observed to follow the toe of slope to the north. This was reviewed and confirmed on-site with UTRCA Ecologist Tara Tchir (May 2020).

The Hydrogeological Assessment (Englobe Hydro-G, 2025) states that the *southwest wetland* is not driven by surface runoff or groundwater contributions originating from the Acorn Valley lands. This feature appears to function independently of site-derived hydrologic inputs, with its water regime governed by localized precipitation, internal storage, and broader landscape conditions. As a result, the southwest wetland is not considered dependent on maintaining a pre- to post-development water balance from the subject lands, and a feature-based water balance assessment is not warranted for this feature. Protection measures for this wetland are therefore focused on avoiding and reducing direct disturbance, maintaining appropriate buffers, and ensuring that grading and servicing do not introduce localized drainage alterations or erosion.

This western wetland boundary was determined through soil sampling (Oakfield tube) and vegetation analysis by an ELC-certified ecologist Paul O'Hara along with the author (Paige Vroom). The flagged boundary was then reviewed and confirmed on-site with UTRCA Ecologist Tara Tchir (May 2020) and represents the agreed-upon delineation based on OWES criteria.

The southeast wetland forms part of the broader Rath-Harris Drain system and is influenced by a large regional catchment. The Hydrogeological Assessment did not include feature-specific groundwater monitoring within this corridor, and groundwater dependence was not confirmed. The subject lands represent a small proportion of the total contributing drainage area, and stormwater management design directs site runoff to this system in a controlled manner consistent with pre-development conditions. Hydrologic protection is addressed through SWM quantity and quality controls and avoidance of direct disturbance.

2.5 Aquatic Attributes

In the southeast corner of the subject lands, a municipal drain known as the Rath-Harris Municipal Drain flows east towards Mill Pond. The drain extends onto the subject lands, where it passes through an agricultural pond. Additionally, there is an agricultural pond by the western border of the northern parcel. The pond outlets to a second municipal drain, known as the Shaw Municipal Drain, located west of the subject lands. The Shaw drain flows north, outletting into the South Thames River 285 m north of the subject lands.

The Rath-Harris Drain collects surface flow from surrounding agricultural lands and is within a heavily vegetated floodplain 20-75 m in width in the study area. An online agricultural pond 25 x 70 m in size exists in the southeast corner of the subject lands. The drain flows east, where it empties into the Mill Pond via a 3 ft corrugated steel pipe that is raised from the surface level of the Mill Pond, making it a potential barrier to fish movement.

The westerly pond within the subject lands drains into Shaw Drain. Flow is directed west for >200 m before heading north to the Thames River through private properties. There is no channel/permanent watercourse at the west end of the pond where the mapping shows it connects to the Shaw drain.

According to the current DFO aquatic SAR mapping, both municipal drains adjacent to the subject lands do not contain "any critical habitat of aquatic SAR, nor have any SAR been found/are likely to be found." The Rath-Harris Drain flows ~380m southeast to the Mill Pond, where Wavy-rayed Lampmussel [SC] and Northern Sunfish [SC] "are found or are potentially found."

There is no MNRF Aquatic Resource Area data available for either drain, but data for the Thames River in the area demonstrates there are many common warm and cool water fish species with intermediate tolerance levels present north of the subject lands.

3.0 BIOLOGICAL ATTRIBUTES

The following information and analysis are based on site visits during the 2019, 2022 and 2024 field seasons by the authors and their related subconsultants.

According to the 2023 UTRCA Watershed Report Card, the Dorchester Corridor watershed has fair forest conditions and poor wetland cover.

3.1 Flora

The plant assessment and reporting was conducted by Paul O'Hara of Blue Oak Native Landscapes. Twelve visits were conducted to survey the study area for species at risk and significant wildlife habitat, including three spring, seven summer, and two fall visits. A number of ELCs were identified on the subject lands. Much of the tablelands consist of agricultural fields and a number of culturally influenced communities.

According to the provincial Ministry of Natural Resources and Forests (MNRF) Ecological Land Classification (ELC) system, the following sixteen vegetation communities exist on-site and in the 120 m study area (Figure 10). For ease of review, the ELC communities are discussed by geographic area: southwest, north, and southeast. Additionally, full plant lists for each community are given in Appendix 2.

Anthropogenic Communities
Open Agricultural Fields

A4/A5/C6	CUM1– Mineral Cultural Meadow Ecosite (x3)
A5/B8/C3	CUW1 – Mineral Cultural Woodland Ecosite(x3)
A5/C4	CUT1 – Mineral Cultural Thicket Ecosite (x2)
A7/B4	CUP – Cultural Plantation (x2)
A6/C5	DUG POND (x2)

Naturally Occurring Communities:

A2/B7	FOD5 – Dry-Fresh Sugar Maple Deciduous Forest Ecosite
(x2) C2	FOD – Deciduous Forest
B1	SWC4-2 – Tamarack Organic Coniferous Swamp
Type A1	SWM2 – Maple Mineral Mixed Swamp Ecosite
B2	SWD3-2 – Silver Maple Mineral Deciduous Swamp Ecosite
B6	SWD7-2 – Yellow Birch Organic Deciduous Swamp Ecosite
B5/B9	SWT3– Organic Thicket Swamp Ecosite (x2)
C1	SWT2 – Mineral Thicket Swamp Ecosite
A3	MAM2 – Mineral Meadow Marsh Ecosite
B3	MAM3 – Organic Meadow Marsh Ecosite

The cultural communities are considered low to medium quality and contain many early successional species or were planted in the last 60 years. They contain a mix of native and non-native species, and many are threatened by invasive species such as Glossy Buckthorn, Multiflora Rose, Garlic Mustard, and Honeysuckle.

Southwest:

Seven ELC communities exist within the southwest vegetation patch adjacent to Harris Road. See Table 1 below for each community's Floristic Quality Assessment (FQA) results, where CC indicates the average Coefficient of Conservatism and CW indicates the mean Coefficient of Wetness for each community.

Table 1: Southwest Vegetation Patch FQA Results Per ELC Communities

ELC Community	Feature	Size	S-rank	Species Richness	Percent Non-native	Average CC	Average CW
SWM2 – Maple Mineral Mixed Swamp Ecosite	A1	6.23 ha	S4	138	15%	4.15	-1.24
FOD5 – Dry-Fresh Sugar Maple Deciduous Forest Ecosite	A2	East 2.98 ha, West 0.62 ha	S5	105	16%	4.16	1.69
MAM2 – Mineral Meadow Marsh Ecosite	A3	0.61 ha	Not Ranked	93	20%	3.55	-1.01
CUM – Mineral Cultural Meadow Ecosite	A5	2.34 ha	Not Ranked	36	56%	1.94	2.17
CUW1/CUT1/CUM1 – Mineral Cultural Meadow, Thicket and Woodland Ecosites	CUW1 - A5 CUT1 - A5 CUM1 - A4/A5	1.49 ha	Not Ranked	88	36%	2.83	1.87
Dug Pond	A6	0.1 ha	Not Ranked	19	26%	2.38	-0.41
CUP – Cultural Plantation	A7	0.59 ha	Not Ranked	21	33%	4.62	1.75

The SWM2 (Community A1) is a medium to high-quality swamp with 138 species recorded, including many Black Ash. It is separated from the development envelope by the FOD5 (Community A2) community, which is of medium quality with a disturbed ground layer and evidence of logging in the past. Invasive Buckthorn threatens both of these communities.

Additionally, south of the swamp is a high-quality, highly diverse meadow marsh (Community A3), which has been subject to agricultural practices.

Culturally influenced communities (A5-7) surround the Christie Drive extension and the dug pond (Community A6). These cultural communities exhibit low diversity, and no rare or uncommon floral species were recorded in these polygons.

On the west side of the northern parcel, the field is bordered by primarily White Cedar trees separating the agricultural field from the rear yards of single-family homes.

<u>North:</u>
Nine ELC communities exist within the northern Tamarack Swamp vegetation patch south of Hamilton Road. See Table 2 below for each community's Floristic Quality Assessment (FQA) results.

Table 2: Northern Vegetation Patch FQA Results Per ELC Community

ELC Community	Feature	Size	S-rank	Species Richness	Percent Non-native	Average CC	Average CW

SWC4-2 – Tamarack Organic Coniferous Swamp Type	B1	9.72 ha	S5	105	2%	4.91	-2.15
SWD3-2 – Silver Maple Mineral Deciduous Swamp Ecosite	B2	0.59 ha	S5	43	12%	3.74	-2.21
MAM3 – Organic Meadow Marsh Ecosite	B3	1.24 ha	S4S5	107	12%	4.28	-2.82
CUP – Cultural Plantation	B4	North 0.79 ha, West 3.69 ha, East 1.18 ha	Not Ranked	77	13%	4.11	0.65
SWT3-WEST – Organic Thicket Swamp Ecosite	B5	0.66 ha	S4	58	7%	4.67	-2.20
SWD7-2 – Yellow Birch Organic Deciduous Swamp Ecosite	B6	1.7 ha	S4	69	4%	4.68	-1.32
FOD5 – Dry-Fresh Sugar Maple Deciduous Forest Ecosite	B7	1.27 ha	S5	74	14%	4.51	2.27
CUW1 – Mineral Cultural Woodland Ecosite	B8	0.41 ha	Not Ranked	31	23%	3.88	0.97
SWT3-EAST – Organic Thicket Swamp Ecosite	B9	0.51 ha	S4	72	11%	4.56	-3.33

Three cultural plantations (CUP – Community B4) and one cultural Woodland (CUW1 – Community B8) community are present bordering the wetland communities. These cultural communities are of lower quality, with more disturbed ground layers and invasive species present.

The Provincially Significant Wetland (PSW) is made up of SWD7-2 (Community B6), SWT3 (Community B5), SWC4-2 Community (B1), and MAM3 (Community B3). These are all high-quality communities with a range of floral species. These communities are separated from the development envelope by a medium-quality FOD5 (Community B7).

According to the MNRF Wetland Evaluation, there are two Provincially Tracked species noted in the wetland evaluation: Snapping Turtle [SC] and Butternut (Juglans cinerea) [END]. Several locally significant species are also known to occur, including Purple Meadow Rue, Rush Aster,

Virginia Mountain Mint, American Burreed, Red-tinge Bulrush, Green Sedge, Water Sedge, and Poison Sumac.

Southeast:
Six ELC communities exist within the southeastern vegetation patch south of Christie Drive. See Table 3 below for each communities' Floristic Quality Assessment (FQA) results.

Table 3: Southeastern Vegetation Patch FQA Results Per ELC Community

ELC Community	Feature	Size	S-rank	Species Richness	Percent Non-native	Average CC	Average CW
SWT2 – Mineral Thicket Swamp Ecosite	C1	2.1 ha	S5	96	9%	4.05	-1.89
FOD – Deciduous Forest	C2	Northwest 1.22 ha, Southeast 0.38 ha	S5	76	20%	3.95	2.37
CUW1 – Mineral Cultural Woodland Ecosite	C3	0.35 ha	Not Ranked	47	47%	2.08	2.29
CUT1 – Mineral Cultural Thicket Ecosite	C4	North 0.34 ha, Southwes 0.8 ha, East 1.21 ha	Not Ranked	38	21%	3.93	1.24
Dug Pond	C5	0.1 ha	Not Ranked	57	32%	3.23	-0.21
CUM1 – Mineral Cultural Meadow Ecosite	C6	North 1.47 ha, South 0.49 ha	Not Ranked	51	33%	2.64	2.10

The shrub thicket (SWT2 – Community C1) along the drain is a medium to high-quality community with some Black Ash documented. The surrounding vegetation is primarily cultural thicket (Community C4) and cultural meadow (Community C6), with two naturally occurring FOD (Community C2) patches off-site on tablelands and slopes leading down to the drain. There are a few large Oak trees >1 meter in diameter at breast height (dbh) on the field edge.

As previously noted, the vegetation communities are shown in Figure 10 (Appendix 1), and detailed plant lists are given in Appendix 2.

3.2 Fauna

Faunal inventories were completed for the property to assist in the assessment of the direct and indirect impacts that may possibly occur as a result of the proposed development.

Data Collection Methodologies

Surveys were undertaken in the spring and summers of 2019 and 2022. For the purpose of wildlife surveys, the study area is composed of 3 habitat zones:

1) the open agricultural fields, edges and hedgerow/trail running east-west (including the southeast dug pond),
2) the southwest and west woodlands (including the west dug pond), and
3) north wetland/woodlot.

Birds: Five days of breeding surveys were completed. These were thoroughly covered by walking random transects and recording presence, abundance, and level of breeding evidence using Ontario Breeding Bird Atlas (OBBA) protocols. Additionally, three Bobolink and Eastern Meadowlark surveys were carried out in suitable habitat in the study area.

Mammals: surveyed as part of 'general' wildlife surveys. These surveys involved general coverage, recording all species observations and signs (e.g. tracks/trails, scat, burrows, dens, browse, vocalizations).

Herptiles. Searches for herptiles were conducted throughout the study site, primarily as incidental observations. In addition, focused amphibian calling surveys per the Marsh Monitoring Protocol (MMP) standards and turtle basking surveys were also conducted.

Amphibian Calling Surveys: James Holdsworth and Vroom + Associates conducted amphibian calling surveys using the MMP amphibian calling survey protocol (Bird Studies Canada 2003). Surveys were completed on May 14th and June 9th, 2019, by faunal specialist James Holdsworth. The typical first spring survey when night time temperatures are >5°C was missed due to the timing of our retainment on the project. UTRCA noted that the early visit must be completed in the June 24 2019 TOR review. Vroom & Associates completed an early spring amphibian calling survey on April 14th 2022 to ensure no early breeding species were missed and complement the 2019 data.

The suitability of timing for amphibian calling was confirmed by referencing other local sites with known amphibian populations and/or liaising with other researchers. Following the guidelines of the MMP, nighttime air temperatures were greater than 5°C for the first survey, greater than 10°C for the second survey, and greater than 17°C for the third survey. Each calling station was surveyed for 3 minutes between a half-hour after sunset and midnight. Calling survey stations are shown in Figure 11.

Turtle Basking Surveys: Given the proposed removal of the western pond, both ponds were inspected for turtle activity. Searches for turtles were conducted by Don Graham (Consulting Biologist) under suitable weather conditions during the summer period when turtles are active. Ponds were examined from all sides by circumnavigating each pond while visually searching for turtles from each site. Both ponds were searched twice on July 30th and August 8th, 2022.

Lepidoptera and Odonata: surveys were completed on all field visits.

<u>Species Presence</u>
Species presence and rankings are fully described in the attached appendix 2.

Species at Risk

Birds: eighty-five species evident; five species listed as Species at Risk (SAR) in Canada and Ontario by COSEWIC and COSSARO were present (Barn Swallow [THR/THR], Bank Swallow [THR/THR], Eastern Wood-peewee [SC/SC], Wood Thrush [THR/SC], and Bobolink [THR/THR]), and one species (Bald Eagle [SC]) is listed by Ontario but not Canada. These species are discussed below.

Mammals: twelve species evident; no COSSARO nor COSEWIC species were present.

Herptiles: eight species evident; two COSSARO and COSEWIC species were present (Common Snapping Turtle [SC/SC] and Midland Painted Turtle [SC/SC]). These species are discussed below.

Lepidoptera and Odonata: Twenty-four Lepidoptera species evident; one species listed as a Species at Risk (SAR) in Canada and in Ontario by COSEWIC and COSSARO was present (Monarch [END/SC]) and is discussed below. Seventeen Odonata species evident; no COSSARO nor COSEWIC species were present. However, two S-ranked species were present (See discussion below).

Fauna Discussion

Birds:

One adult Bald Eagle (COSSARO: Special Concern) was observed flying over the site. Although the mature woodlots may support nesting, no nests were detected. The study area does not provide suitable habitat for hunting/foraging; therefore, the individual was likely only a visitant. The individual likely uses the Dorchester Mill Pond or the Thames River for foraging.

Thirteen Barn Swallow (COSEWIC: Threatened, COSSARO: Special Concern) individuals, including fledged young, were observed aerial foraging over the agricultural fields. The site does not possess the necessary natural or anthropogenic habitat for nesting. These individuals should be referred to as "foraging visitants."

Six Bank Swallow (COSEWIC: Threatened, COSSARO: Threatened) individuals were observed aerial foraging over the agricultural lands. The site does not contain suitable breeding habitat for this species in the form of steep sand or earth banks. These individuals should be referred to as "foraging visitants."

A single Wood Thrush (COSEWIC: Threatened, COSSARO: Special Concern) was observed singing in the southwest woodlot. Habitat is suitable, and the individual is likely a breeding resident.

Six Eastern Wood-peewees (COSEWIC: Special Concern, COSSARO: Special Concern) were recorded throughout the study area. Their recorded locations are depicted in Figure 11. One Eastern Wood-Pewee was recorded in the small woodland patch in the middle of the fields. This observation should be considered an anomaly given the small, isolated, and poor-quality nature of the patch, suggesting it is not part of their primary breeding grounds. The remaining five

Eastern Wood-Pewees [SC] were observed in the north and southwest woodlots within suitable habitat.

Six Bobolink (COSEWIC: Threatened, COSSARO: Threatened) individuals, four males and two females, were observed within the agricultural crop. Although no nesting indicators were observed, the behaviour was indicative of nesting birds. However, the ESA (2007) O. Reg. 242/08 states that "Clause 9 (1) (a) the Act does not apply to a person who kills, harms or harasses a bobolink or an eastern meadowlark while carrying out an agricultural operation."

Herptiles:

One Common Snapping Turtle (COSEWIC: Special Concern, COSSARO: Special Concern) and nine Midland Painted Turtles (COSEWIC: Special Concern, COSSARO: Not at Risk) were observed in the southeast pond in 2019.

Lepidoptera/Odonata:

Two Monarch Butterflies (COSEWIC: Endangered, COSSARO: Special Concern) were observed on the subject lands within the field edges. The study area does possess life-cycle habitat for the Monarch, as the host plant [Milkweed] is present in small numbers among the edges of the field and woodlot.

One Lilypad Clubtail (S3) was recorded in the agricultural field. There is no suitable habitat for the species on site or in the adjacent lands. It is likely a visitant from the Mill Pond. Additionally, a single Swamp Darner (S2/S3) was observed in the southwest Woodland, where it relies on the wetland habitat.

Significant Wildlife Habitat:

The Eastern Wood-Pewee and Wood Thrush observations qualify the following communities as Habitat for Species of Conservation Concern according to the MNRF Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (2015):

_SWM2 (Community A1)
_FOD5 (Community A2)
_CUW (Community A5)
_CUP (Community A7 and B4)
_FOD (Community C2)

Additionally, the Lilypad Clubtail qualifies the northern Tamarack Swamp as SWH, and two Monarch butterflies qualify the field edges as Special Concern and Rare Wildlife Species SWH.

Given the breeding bird data collected, there is no SWH for Woodland Area Sensitive Breeding Bird Habitat. To the north, there was one individual of Yellow-bellied Sapsucker, Red-Breasted Nuthatch, and Pileated Woodpecker species. If breeding pairs or evidence of nesting was recorded, that community could qualify for SWH. The data only demonstrated possible nesting behaviour, being observed during the breeding season in suitable habitat rather than confirmed breeding behaviour.

The Special Concern turtle records qualify the pond in the southeast as Special Concern and Rare Wildlife Species SWH. Additionally, amphibian breeding surveys confirmed amphibian breeding wetland SWH in the southeast pond as well.

The pond to the west also detected amphibian breeding (wetland) SWH, but no SAR turtles

were noted.

2022 Turtle Basking Surveys, completed by faunal specialist Don Graham, recorded the presence of one or two Midland Painted Turtles within the southeast pond on both survey dates. No turtles were observed within the pond east of Harris Road on either survey date.

Good quality turtle habitat includes wetlands and waterbodies that have little or no current, are relatively shallow, have extensive floating vegetation, have abundant basking sites and feature deep, soft, muddy bottom substrates (>100 cm depth) (COSEWIC, 2018). Both ponds appear to be dug below the water table to provide water for agriculture. Neither pond had abundant basking sites, which are important for thermoregulation in turtles. Neither pond had extensive floating vegetation, which is important for feeding and protection from predators. Given the relatively short period in which these ponds have existed, neither likely has a deep, soft, muddy bottoms that would provide superior overwintering sites relative to waterbodies without a muddy bottom.

Although these ponds are considered poor-quality turtle habitat the Midland Painted Turtle and other turtles are known to occupy farm ponds (COSEWIC, 2018).

Amphibian calling surveys concluded that the woodlands to the north and southwest did not meet the requirements for SWH. However, it is the opinion of the faunal biologist that there is still excellent amphibian breeding habitat.

The MNRF wetland evaluation states that there is no suitable habitat present that would support colonial waterbird nesting, winter cover for wildlife, waterfowl staging/moulting or breeding, migratory passerine, shorebird or raptor stopover area, or fish or amphibian habitat.

No other Significant Wildlife Habitat exists within the Natural Heritage features.

The Provincial Planning Statement 2024 (PPS) states that development and site alteration is not permitted in SWH unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

3.3 Significant Species

The following background information is provided in relation to the discussion of significant species provided in the text below.

_ Any Species at Risk (SAR) listed as endangered (END) or threatened (THR) are protected from killing, harming, or harassment under the Endangered Species Act 2007 (ESA).

_ Additionally, their habitat is protected from damage or destruction.

_ The ESA 2007 Ontario Regulation 242/08 dictates exemptions applicable to different species and the course of action for exempting these SAR species. With respect to those species not under the exemption, definitions for the habitat to be protected are defined.
_ Species listed as Special Concern or Rare Species (S1-S3) are not protected under the ESA 2007.

_ However, their presence qualifies the community as Habitat for Species of Conservation

Concern according to the MNRF Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (2015) (SWHCSE 7E).

_ The Committee on the Status of Species at Risk in Ontario (COSSARO) provides the provincial rankings on species at risk (SAR). The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) provides the federal rankings of SAR.

Significant Floral Species

One potential Butternut [END] was observed northwest of the subject lands. The tree is ±20 m from the forest edge beyond the toe of the slope, outside of the development envelope, and therefore, will not be directly impacted by the proposed development. Under the ESA 2007, a 50 m buffer is required to protect their habitat, based on research suggesting that squirrels may move the nuts an average of 50 m distance. However, the current agricultural land use is not suitable habitat, and the tree exhibits evidence of mordancy (canopy decline and cankers present). Given the lack of direct impact on potential Butternut habitat in this area and its inevitable demise, a 50 m buffer is not required.

Numerous Black Ash [END] were recorded in the southwest Woodland. Black Ash was listed as a Endangered species in Ontario by COSSARO in 2022, and due to a Minister's regulation, ESA protection and enforcement did not come into effect for this species until 2024. The new regulations prohibit the following as per Section 9(1):

"*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;"*

and Section 10(1):

"*No person shall damage or destroy the habitat of,*

> *(a) a species that is listed on the Species at Risk in Ontario List as an endangered or threatened species; or*
>
> *(b) a species that is listed on the Species at Risk in Ontario List as an extirpated species, if the species is prescribed by the regulations for the purpose of this clause. 2007, c. 6, s. 10 (1)."*

As per Ontario Regulation 6/24 concerning Black Ash, exemptions to the prohibition outlined in Section 9(1)(a) of the ESA include:

1) in municipalities and territorial districts not currently listed under Schedule 1 of the regulation,
2) Black Ash that have a stem height of <1.37 m or is <8 cm diameter at breast height (dbh) at 1.37 m, or
3) Black Ash is determined to be unhealthy in a report in accordance with the regulations and submitted to the Ministry prior to the commencement of activity that may harm Black Ash.

Given Middlesex County is listed under Schedule 1 of O.Reg 6/24, Black Ash protection regulations as per the ESA are in effect for this region for Black Ash trees >1.37 m or ≥8 cm dbh at 1.37 m height. Under the ESA, Black Ash habitat is as a radial distance of 30 m from the

stem of every of size Black Ash.

During 2024 field investigations, a total of over 27 Black Ash trees were recorded however only 14 of those were ≥8 cm dbh adjacent to the proposed development envelope. Seven of these were recorded north and south of the pedestrian walking path to the west (TREE ID #2, 9-15) and the remaining 7 were observed in the Tamarack Swamp north of the proposed development (TREE ID #21-27). See Appendix 3for an assessment of these trees. See Figure 12 for the locations of the Black Ash on or adjacent to the proposed development envelope.

We are in discussions with the MECP regarding an Overall Benefit permit in relation to the Black Ash on-site.

Although not protected under legislation, 48 regionally rare or uncommon floral species (in Middlesex County and/or the Carolinian Zone) were documented throughout the site, with the majority occurring in the northern Tamarack Swamp to the north.

Significant Faunal Species

As noted, the life science inventories observed the following SAR and S-ranked species in the study area:

_Eastern Wood Pewee [COSEWIC:SC/COSSARO:SC] (x6)
_Wood Thrush [COSEWIC:THR/COSSARO:SC] (x1)
_Common Snapping Turtle [COSEWIC:SC/COSSARO:SC] (x1)
_Midland Painted Turtle [COSEWIC:SC/COSSARO:Not listed] (x9)
_Monarch Butterfly [COSEWIC:END/COSSARO:SC] (x2)
_Swamp Darner [S2/S3]

Since all of the above species are designated Special Concern in Ontario by COSSARO, as noted, they do not require an ESA permit or special mitigation under the legislation.

3.4 Significant Vegetative Communities

One Provincially Rare Habitat Type inclusion was documented on the property, SWT3-13 Poison Sumac Organic Thicket Swamp Type in the northern PSW. This is considered an inclusion because it is <0.4 ha in size. Two patches of this ELC community within communities B5 and B9 are listed as S3 in Ontario (SWHTG- Appendix J). There will be no direct impact on these communities, given they are outside the development envelope.

3.5 Diversity

Diversity is low among the cultural ecosites (CUM/CUT/CUW/CUP) and high among the natural communities on-site.

Diversity within the natural communities adjacent to the development is high. Three hundred ninety-four vascular plants were documented in the natural areas in and around the subject lands, with 84 (22%) of those being non-native. One SAR and 48 regionally rare species were recorded.

3.6 Landforms and Soils

The landforms on-site are typical of the regional landscape. The subject lands include tableland fields, surrounded by "Natural Hazard" slopes in the southwest, north, and southeast.

3.7 Presence/Absence of Disturbance

Concerning naturalness and disturbance, the subject lands have experienced many impacts over the years;

_The Mill Pond to the east acts as a sediment trap containing excessive nutrients and heavy metals,
_ Construction of Hamilton Road,
_ Exposure to agricultural practices,
_ Residential development in the general area, and
_ Logging in the southwest FOD5 community.

As noted, many cultural communities are present within the subject lands, and most are subject to invasive species. The cultural communities consist of a high proportion of non-native/invasive species and have less diversity than the higher quality southwestern swamp, northern Tamarack Swamp, and shrub thicket in the floodplain of the Rath-Harris Drain.

3.8 Linkage and Size

_The northern vegetation is part of a larger continuum along the Thames River. The Tamarack Swamp and surrounding vegetation are large enough that interior habitat for area-sensitive species is present (380m x 640 m).

_The southwest Significant Woodland Patch connects with the Woodland on the west side of Harris Road as well as north through private properties. The southwest patch also contains interior habitat (410 m x 275 m); however, it is transected by the municipal road.

_The southeast Natural Heritage feature connects to the Mill Pond to the east, which ultimately connects to the Dorchester Swamp. No interior habitat is present in the southeast Natural Heritage feature.

3.9 Representativeness

There were eight SAR noted in Section 3.3, a S3 ranked vegetation community (Section 3.4), and many regionally rare species noted in the study area. As previously noted, species listed as Special Concern or ranked S4/S5 or regionally rare require no protection or mitigation by law.

4.0 IMPACT ASSESSMENT AND MITIGATION

As previously noted, this EIS is triggered by provincial, municipal and conservation authority requirements related to the proposed development occurring on or adjacent to the Natural Heritage features noted below.

Significant Wetlands and Significant Coastal Wetlands	The Tamarack Swamp PSW is present north of the subject lands. Unevaluated wetlands are present to the southwest and southeast of the subject lands.
Significant Woodlands	Present on-site and in adjacent lands.
Significant Valleylands	Present in adjacent lands.

Significant Wildlife Habitat (SWH)	To be discussed in this study.
Significant areas of natural and scientific interest (ANSI's)	Not present.
Fish Habitat	Present on-site and in adjacent lands.
Habitat of endangered or threatened species	To be discussed in this study.

4.1 Direct Impact: Within the Development Envelope

The following areas will experience direct impacts from the proposed development. These direct impacts are broken down by geographical area for ease of review.

4.1.1 Vegetation Removal

The Draft Plan of Subdivision (Figures 5 & 6) demonstrates the development envelope and driplines of vegetation. The following areas are proposed for vegetation removal, depicted in Figure 13.

West (Figure 2; Feature A):

a) The small, isolated, cultural woodland patch in the center of the site, along with the cultural thicket and meadow surrounding the proposed ±20 m wide Christie Drive roadway (Figure 10 community A5) (± 3 ac/ 1.34 ha). This vegetation is not considered Natural Heritage on the municipal OP, nor is it considered ecologically significant on the UTRCA mapping.
b) A portion of the FOD5 (Figure 10, community A2) (± 0.21 ac/0.08 ha) and SWM2 (Figure 10, community A1) (± 0.86 ac/0.35 ha) within the proposed ±20 m wide Christie Drive roadway. This roadway is not considered Natural Heritage on the municipal OP, nor is it considered ecologically significant on the UTRCA mapping.
c) The western agricultural pond and its surrounding vegetation in the west (Figure 10, community A6) (± 1.18 ac/ 0.48 ha) is proposed to be filled in and used as part of the development envelope. This pond is not considered Natural Heritage on the municipal OP, nor is it considered ecologically significant on the UTRCA mapping.

North (Figure 2; Feature B):

The future development in this area meets a 30 m wetland setback and 6 m dripline setback along the edge of the northern feature.

Southeast (Figure 2; Feature C):

d) In the southeast portion of the subject lands, the cultural Woodland (Figure 10 community C3) (±0.91 ac/0.37 ha) and planted trees in the maintained lawn will be removed. This vegetation is not considered Natural Heritage on the municipal OP, nor is it considered ecologically significant on the UTRCA mapping.
e) The Municipality has requested that the existing online pond is removed and a channel is created to maintain flow in the Rath-Harris Drain.
f) A new sanitary servicing pipe is proposed to cross the Rath-Harris Drain corridor within a SWT3 Mineral Thicket Swamp community. A detailed Letter of Opinion prepared by Vroom + Associates (Nov 2025) provides a full impact assessment, mitigation plan, and restoration strategy (Appendix 5). The evaluation included a review of existing vegetation community structure, soil conditions, hydrologic function, corridor width

requirements, installation methods, and invasive species risk.

The analysis concludes that the crossing represents a temporary and low-intensity disturbance (approx. 0.13 ha). Potential impacts include temporary vegetation removal, soil compaction, sedimentation risk, and minor short-term hydrologic disruption. However, the LOP identifies a suite of mitigation measures—including seasonal timing constraints, strict erosion and sediment control, topsoil segregation, equipment containment, hydrology protection measures, invasive species prevention protocols, and native revegetation—that will avoid long-term ecological impact to the SWT2 community and the Rath-Harris Drain.

The LOP also recommends narrowing the clearing corridor to the minimum safe width (4–6 m), and confirms that trenchless installation (e.g., directional drilling or auger boring) is the preferred method to avoid in-wetland disturbance.

There will be ±2.5 ha of vegetation removal on areas not designated Natural Heritage. The removals include 1.05 ha of within the highly disturbed cultural communities, and 0.46 ha of the FOD5 (Community A2) and SWM2 (Community A1) in the southwest for the widening of Christie Dr., again not designated natural heritage.

4.1.2 Vegetation Removal Mitigation

In compliance with relevant federal, provincial and municipal legislation and mitigation for potential impacts, we offer the following recommendations concerning proposed vegetation removals.

Migratory Birds Convention Act 1994: The Migratory Breeding Bird Act (MBCA, 1994) protects 386 migratory bird species in Canada. It states, "No person shall disturb, destroy, or take a nest, egg," (SOR/80-577, s. 4.). Birds protected under the MBCA 1994 may be present on-site since they can occur nearly anywhere in southern Ontario. Tree cutting should occur outside of nesting season for the region (March 31 – August 25).

> Recommendation #1: Tree-cutting should not occur between March 31st and October 31st to avoid the risk of removing trees used by migratory birds and potentially roosting SAR bats.

Vegetation removal required for piped service connections in the northeast and southeast may result in disturbance to the ground layer's floristic quality. Additionally, where the existing online pond in the southeast corner of the site will be removed, the surrounding vegetation will be impacted.

> Recommendation #2: Following construction, careful retention and sorting of soil for replacement should provide natural regeneration of groundlayer vegetation and mycorrhiza. Specifically in the northeast transect, the groundlayer quality could be improved by this, given its highly disturbed state from human encroachment and the introduction of non-native plants.

4.1.3 Vegetation Protection Setbacks

Direct impact on rooting zones of adjacent trees from grading and construction activities could include the removal of fibrous root tissue and the compaction of soils in residual rooting zones.

There is a distance ranging from 0-6 m between the development envelope and the dripline of the Significant Woodland features on the periphery of the site. The agricultural use of the tablelands has created a continuous disturbance to rooting zones, and roots tend to extend to cooler and moister soils. Given this information, it's unlikely that there would be direct impacts on the rooting zones of vegetation within the agricultural fields.

Where the proposed development abuts or encroaches within the dripline of the surrounding Natural Heritage features, much of it consists of young transitional vegetation. Additionally, as noted, it is unlikely that the rooting zone extends into the agricultural field, given the historical disturbance from tillage on these soils. In our opinion, dripline setbacks are not required in order to protect adjacent vegetation from the removal and disturbance of fibrous root tissue. Section 4.2.1 provides best practice recommendations relating to tree protection.

The PSW to the north and the unevaluated wetland to the southeast, along with Natural Hazard lands and aquatic habitat, will not experience direct impact as they remain outside the development envelope. The concept plan maintains a 30 m setback from Tamarack Swamp boundary. Additionally, the northern Tamarack Swamp has undergone the construction of Hamilton Road and residential development to the east. Regardless of these changes, the wetland remains of high quality, including a high-quality meadow marsh abutting Hamilton Road. The proposed residential development will not impose any challenges on the features it hasn't experienced before as long as flows are maintained to the northern community.

4.1.4 Recreational Trails

A low-intensity, multi-use trail network is propose: (i) along the north edge of the plan area adjacent to the Tamarack Swamp, generally outside the treed dripline with two short encroachments and one location where the trail passes through previously disturbed upland within the broader wetland complex (outside the PSW and 30 m buffer); (ii) along the west side, following the woodland dripline and property boundary; and (iii) along the south, skirting the upland cultural meadow with treed edge, and coinciding with the sanitary servicing corridor through the southern SWT2 wetland.

Potential impacts of trails adjacent to natural heritage features may include localized root-zone disturbance or compaction, increased edge effects from noise/ human, and pet activity, soil erosion or channelized runoff, encroachment pressure or informal off-trail access, and increased establishment of invasive species.

For trails on the periphery of natural heritage features, we offer the following recommendations:

_Maintain a minimum 3 m vegetated buffer between the trail tread and the woodland or valley dripline wherever feasible.

_ Route trails along existing disturbed upland edges and avoid grading or widening within the dripline.

_Use a narrow tread width (2.0–2.5 m) with natural or granular surfacing; avoid paved or heavily compacted surfaces.

_ Manage drainage with broad cross-fall or shallow swales so that runoff is dispersed away from valley slopes and wetland boundaries.

_Install split-rail fencing, post-and-rope, or low visual barriers in portions where encroachment risk is high.

_Implement invasive species monitoring (Years 1, 3, 5) along edges where soil disturbance is unavoidable.
_Avoid lighting along natural heritage edges; if lighting is needed near residential blocks, it must be down-shielded and directed away from features.

For localized areas where the trails encroach into the dripline of the adjacent features:
_ Limit vegetation removal to the minimum needed for safe passage; prune selectively rather than removing mature trees.
_Avoid excavation within major structural root zones; use hand tools where feasible.
_Use a boardwalk, raised tread, or turnpike construction if soils are unstable or prone to rutting.
_Clearly delineate the trail edge using natural barriers to prevent widening.
_Replant disturbed margins with native woodland edge species to stabilize soils and maintain shade.

Potential impacts of trails traversing through natural heritage features may include direct disturbance of understory vegetation, leaf litter and root systems, compaction of saturated soils affecting infiltration and microtopography, higher potential for sediment transport, increased risk of hydrologic alteration if trails alter surface drainage patterns, and greater vulnerability to invasive colonization along disturbed trail routes.

Where the proposed trails traverse the northeastern woodland:
_Confine the trail to the existing disturbed gaps where dumping and invasive species are already present, avoiding removal of any established trees.
_Keep the tread to a maximum 2.0–2.5 m and maintain natural soil profiles where possible.
_Conduct garbage removal, debris clean-up, and invasive species control before trail establishment and re-establish native understory vegetation on both sides of the tread to reinforce a defined corridor and improve ecological conditions in the disturbed patch.
_If slope stability is a concern, consult geotechnical guidance and avoid cuts/fill within the stable slope + erosion access allowance limits.

Where the proposed trail overlaps the southeast servicing corridor:
_Integrate trail development with the sanitary servicing construction following the Servicing Letter of Opinion (Vroom + Associates 2025 – Appendix 5).
_Use the same minimized disturbance corridor (preferred width 4–6 m) identified for the servicing works; no additional clearing beyond that footprint.
_During wetland crossing, employ trenchless installation where feasible and place the trail on raised tread or boardwalk to avoid compaction of hydric soils.
_Apply all construction timing restrictions (e.g., low-flow or frozen-ground conditions, amphibian timing windows) already recommended for servicing.
_Restore the corridor using the native sedge/forb assemblage recommended in the Servicing LOP, ensuring compatibility with trail edges.
_Implement long-term monitoring for invasive species, hydrologic function, and erosion, with adaptive management if issues arise.

4.1.5 Flora

As noted, Black Ash were listed as a Endangered species in Ontario by COSSARO in 2022. Seven trees >1.37 m height or 8 cm dbh are within the proposed road construction area, only two were

noted to be healthy in their current state. Again, although the proposed development will require authorizations under the Endangered Species Act, including an C- Permit for impacts to a species at risk, these provincial approvals are pursued independently and do not preclude or delay the issuance of municipal planning approvals.

4.1.6 Fauna

All but two of the faunal SAR observations were discovered outside the development envelope and will, therefore, experience no direct impact. The following species were observed within the proposed development envelope.

Eastern Wood-pewee: As noted in Section 3.2, one Eastern Wood-pewee was observed in Community A5. Again, the faunal specialist stated that this observation should be considered an anomaly given the patch's small, isolated, and poor-quality nature, suggesting it is not considered primary breeding ground for this species. No mitigation is required for the removal of the small isolated vegetation patch, given there is sufficient more suitable habitat in the surrounding wooded features.

Monarch Butterfly: Individuals were observed within the agricultural fields where there is Milkweed present along the field edges.

> Recommendation #3: Incorporate Milkweed into plantings along the LID channel, SWM block, and any other naturalization areas to ensure Monarch habitat remains in the landscape. The species is generally urban tolerant as long as the host plant Milkweed is present.

Amphibians & Reptiles: Both the agricultural pond in the west (Community A6) and the southeast are proposed to be removed in and used as part of the development proposal.

In the western pond no turtles were observed in the 2019 or 2022 surveys in this pond. Furthermore, turtle habitat is poor within this pond as noted by faunal specialist Don Graham. Amphibian calling surveys confirmed amphibian breeding habitat in this pond with the presence of American Toads, Spring Peepers, and Green Frogs. None of these species are listed as Species at Risk (SAR) and, therefore, do not require protection or mitigation under the ESA 2007.

In the southeastern pond, a single Common Snapping Turtle (SC) and Midland Painted Turtles (SC) were observed in 2019 with only the Midland Painted Turtles noted in two 2022 basking surveys. Amphibian calling suverys confirmed amphibian breeding habitat in this pond as well.

Both ponds were confirmed Amphibian Breeding Habitat SWH, and Midland Painted turtles were observed in both. However, Faunal Biologist Don Graham stated that the ponds are artificial and lacked abundant basking sites for turtle thermoregulation and floating vegetation for feeding and protection. Additionally, amphibian breeding (wetland) habitat will remain in the general area of the ponds off-site along the drain and in the Mill Pond, ensuring there will not be a significant loss of amphibian breeding habitat in the gerneral area if the ponds are removed.

We provide the following recommendations to reduce impacts on the local wildlife, especially

reptiles and amphibians.

> Recommendation #4: Pond filling should occur outside of the breeding season (spring and summer, March - August) to protect as many amphibians as possible during a vulnerable time.
>
> Recommendation #5: if feasible, gradually reduce the water level overs several weeks instead of removing it all at once to allow animals to migrate to nearby habitats.
>
> Recommendation #6: Keep heavy machinery and disturbances away from adjacent habitats as much as possible during the removal process.
>
> Recommendation #7: Ensure proper sediment and erosion control measures are in place prior to pond removals.
>
> Recommendation #8: Amphibian salvage should be conducted during pond removal. This would include a pre-removal survey, and pre-determined suitable habitat to relocate any animals found.

4.2 Indirect, Secondary and Temporal Effects

Life science inventory data demonstrates that high-quality habitats for flora and fauna exist on adjacent lands. Potential indirect impacts on these habitats associated with the proposed development include the following.

Typically, a 10 m buffer is required for significant woodlands. However, a reduced buffer size is possible if a net ecological gain can be shown for the Study Area (i.e. compensation, invasive species removal, habitat creation, enhancements, etc.). For the reasons noted in Section 4.2.2, 4.2.3, and 4.3 enhancement, we feel that this can be reduced to ensure that the Critical root zone is protected.

4.2.1 Construction impacts

Construction of the subdivision and infilling of washouts may indirectly impact adjacent natural heritage via the following:

_ Sedimentation and erosion from disturbed soils;
_ Fuel or chemical spills;
_ Improper waste disposal; and
_ Tree and root disturbance.

Vegetation Disturbance: As noted, sanitary and water pipes connecting the subject lands to services off-site may require vegetation removal. Potential indirect impacts from this include a diminished groundlayer floristic quality post-construction.

> Recommendation #9: The disturbed area should be revegetated immediately with native species that complement the surrounding Woodland. This is further addressed in Appendix 5.

Vegetation protection: The indirect impact of soil compaction and sedimentation from the proposed construction could cause damage to adjacent trees in the southwest, north and

southeast in reduced soil oxygen levels.

The following practical recommendations are provided to enhance the survival potential of the vegetation that will be retained on site:

> Recommendation #10: Prior to any construction operations, the limit of development adjacent to vegetation to be preserved should be clearly marked, and protective fencing should be installed. Best practices set out by provincial and federal agencies, including silt fence barriers, sediment traps, and seeding and mulching, should be followed to ensure Natural Heritage areas are protected from sedimentation and erosion.
>
> Recommendation #11: All protective fencing should be maintained until the time of seeding.
>
> Recommendation #12: The grading plan should be reviewed at the time of detailed design approval with respect to Tree Preservation.
>
> Recommendation #13: If any roots are encountered or disturbed in excavation, they should be cut clean with hand tools prior to infilling.
>
> Recommendation #14: After all work is completed, but before protective fencing and other barriers are removed, the site should be examined to identify any trees adjacent to the development parcel that should be removed due to hazard tree status. These opinions on specific stems should be based on the International Society of Arboriculture's "Guide for Plant Appraisal, 10th edition" and include the following constraint descriptions: Crown condition, tree structure, canopy decline symptoms and stem decline symptoms. Hazard tree assessment should also take into account the potential to support any rare or endangered faunal species, such as SAR bats.
>
> Recommendation #15: Monitoring of tree health is recommended in the summer or fall season at least nine months following the completion of construction to identify any problems that may surface following construction.
>
> Recommendation #16: All disturbed areas on-site should be re-vegetated with native species in order to stabilize soils and reduce sediment and erosion.

4.2.2 Abiotic

Hydrology/Stormwater Management:

The hydrology of the subject lands and adjacent natural features is driven by a combination of surface-water drainage patterns and shallow groundwater contributions. The Tamarack Swamp (northern wetland) receives both local runoff and groundwater discharge from slopes to the south, while the Rath-Harris Drain, Shaw Drain, and the westerly wetland receive varying proportions of surface flows from the Acorn Valley lands and extensive off-site catchments.

Wetland Sensitivity Assessment: Based on hydrologic source, vegetation composition, disturbance level, and landscape position, the three wetlands associated with the Acorn Valley lands exhibit varying sensitivity to hydrologic change. The Tamarack Swamp is classified as high sensitivity, based on its reliance on shallow-groundwater discharge and hydrologic specialist vegetation. The SWT2 wetland along the Rath-Harris corridor is assessed as moderately

sensitive, with tolerance for modest changes in surface-water inputs but requiring protection from direct construction disturbance. Although sensitive flora are present within the western wetland, the Hydrogeological Assessment (Englobe, 2025) confirms that this feature is not driven by site-derived surface or groundwater inputs; therefore, it is not considered dependent on maintenance of a site-specific water balance. Hydrologic modelling confirms that predicted changes in peak flow are small in magnitude and fall within tolerance ranges appropriate to each wetland type.

Hydrological impacts and are discussed below and the Christie Drive road construction is further discussed in Section 4.2.3 below.

Groundwater: According to the OMAFRA AgMaps, there are no wellhead protection zones on the subject lands; approximately 50% of the subject lands are considered a significant groundwater recharge area, and approximately 80% of the lands are designated "Highly Vulnerable Aquifer."

The altered land use creates opportunities for potential groundwater contamination via road salts, household fertilizers, and sanitary sewer lines. Additionally, conversion of the agricultural lands into impervious surfaces (i.e. houses, driveways, and roadways) would reduce groundwater recharge.

Given the confirmed shallow groundwater flow paths from the development area toward the northern wetland (Englobe Hydrogeology Study, 2025), maintaining infiltration is essential. The conversion of agricultural lands to urban land uses will increase impervious area, which reduces shallow groundwater recharge unless compensated through Low Impact Development (LID) features.

Per the Functional Servicing Report (CJDL 2025), groundwater recharge will be maintained through a vegetated open channel north of Christie Drive that promotes infiltration before flows enter the storm system and Rear-yard infiltration swales behind lots abutting the northern wetland to ensure that shallow recharge contributions to the Tamarack Swamp and adjacent wetlands are maintained.

> Recommendation #17: Given significant groundwater recharge areas on the subject lands, Low Impact Development (LID) features should be targeted to those lands to promote infiltration and maintain existing groundwater recharge.
>
> Recommendation #18: A feature-based groundwater assessment at detailed design shall be undertaken for the northerly wetland (Tamarack Swamp) to verify and, if necessary, refine LID and grading measures so that shallow groundwater contributions are maintained within an acceptable tolerance.

Surface runoff quality and quantity: The surrounding Natural Heritage features require specific abiotic conditions. Maintaining those conditions will ensure that there will be no negative impact on the habitat for the floral and faunal communities they support. Indirect impacts on these wetlands include an alteration of the pre-development pattern or timing and delivery of stormwater. This could potentially result from the redirection of surface runoff to the proposed stormwater management (SWM) facility or the change in runoff rate caused by the asphalt roadways in the proposed development. Additionally, although the flow into the north is small, those flows still need to be maintained. In the north, one particular area collects flow from the

southern agricultural lands as a small rivulet.

> Recommendation #19: Water balance studies should ensure that this draw maintains the same proportion of surface flow into the northern wetland. Detailed water balance calculations are being carried out, and post-development timing and delivery should match pre-development conditions within acceptable tolerance thresholds.
>
> Recommendation #20: Future development abutting the northern feature should incorporate the collection of roof and rear yard drainage from a portion of the catchment to be directed to the woodlots. Additionally, rear yards adjacent to the features should be graded to maintain sheet flow over the slopes to support the wetland communities without creating erosion.
>
> Recommendation #21: Given the proposed high-density block abutting the southwest feature, any runoff surface flows to the western feature should pass through a grassed buffer strip a minimum 4 m in width as a good practice to provide extra filtration benefits.

Table 2 of the CJDL SWM Report shows that the Acorn Valley lands comprise only 12% of the total contributing drainage area to the Southeast Ravine, 18.7% of the drainage area to the Tamarack Swamp, and 9.1% of the drainage area to the westerly wetland. The majority of drainage to these receiving systems originates from external lands (70–81%) outside the subdivision.

As a result, any changes to peak flow or runoff volume from the Acorn Valley site represent only a very small fraction of the hydrologic inputs to the receiving features. Even a 10–20% shift within the Acorn Valley component translates to only ~1–3% change at the watershed scale, which is below thresholds generally considered ecologically meaningful for wetlands or watercourses.

Stormwater modelling indicates flows to the northern Tamarack Swamp will receive slightly higher flows post-development for the more frequent 2-5 year storm, and slightly less for the 10-250 year storms. The west wetlands will receive less surface runoff post-development, and the Rath-Harris Drain in the southeast will receive approximately the same flows post-development.

Aquatic: Potential impacts include increased erosion and sedimentation within the Rath-Harris Drain and aquatic habitat from the construction and use of the SWM outlet. Indirect impacts could include the potential increase in nutrient, pollutant, and sediment levels from the SWM discharge.

The SWM pond will outlet to Rath-Harris Drain, a small watercourse with a wide (20-75 m) and heavily vegetated (SWT2) wetland floodplain. The SWM outlet construction and use will not negatively impact aquatic habitat as it will not result in any barriers to fish habitat, removal of fish habitat or cause fish death.

> Recommendation #22: Proper Sediment and Erosion Control (SEC) measures should be implemented prior to construction and maintained throughout.

Water quality and quantity exiting the SWM facility are required to match pre-development conditions by provincial and federal standards. The SWM pond is designed to provide enhanced (80% TSS removal) quality controls and have energy dissipation at the outlet. No further mitigation relating to water quality and quantity in the Rath-Harris Drain is required.

4.2.3 Construction of Christie Drive:

While the Hydrogeological Assessment (Englobe, 2025) confirms that this wetland is not driven by site-derived groundwater or surface runoff, localized shallow interflow and soil moisture continuity along the wetland margin may still be affected by road construction activities if not properly mitigated. Construction of a new road across this wetland can result in the following impacts:

_granular road base materials and subdrains may intercept or redirect shallow groundwater that would otherwise move laterally across the slope toward the wetland, causing localized desiccation of wetland soils.

_Roadside ditching, grading, and storm sewer infrastructure can concentrate or divert flows away from the wetland, potentially altering the soil moisture regime.

_Soil moisture drawdown ("wicking") during construction as granular materials absorb water from adjacent saturated soils.

_Road salt and splash/spray effects, which may cause foliar desiccation or physiological stress in salt-intolerant woody species along the wetland margin.

_Edge alteration due to tree and shrub removal required to establish the road footprint.

Given the Crown Patent of the road designation, protection of the unevaluated wetland bears no legal precedence over its construction. We provide the following recommendations to reduce the impacts of the road construction on the adjacent wetland feature:

Recommendation #23: A culvert and permeable road base layers should be incorporated into the road design to ensure lateral flow is maintained along the length of the feature that abuts Christie Drive.

Recommendation #24: Road construction should be completed in a timely manner to reduce wicking during construction. Where possible, install a separation layer or geotextile between wetland soils and the road base to limit hydraulic wicking.

Recommendation #25: Approved salt tolerant native species should be established along the edges of the newly constructed Christie Dr. This buffer will reduce foliar burn and maintain vegetative cover adjacent to the wetland.

Recommendation #26: Ensure roadside grading and storm sewer placement do not divert natural sheet flow away from the wetland. Any existing microtopography contributing to the wetland's moisture regime should be preserved or replicated.

Recommendation #27: At detailed design, the civil engineer and hydrogeologist shall confirm that road grading and drainage details do not create localized barriers to lateral soil moisture movement along the wetland margin. If impacts are

detected, additional infiltration or subdrain modifications shall be incorporated.

With the above mitigation and design refinements, including permeability measures to maintain lateral flow, careful construction sequencing, salt-tolerant buffers, and a feature-based groundwater assessment at the detailed design stage, Christie Drive can be constructed without causing measurable long-term impacts to the hydrologic regime or vegetation structure of the adjacent wetland (Community A1). The road allowance status does not negate the need for environmental protection, and the measures above have been developed to ensure no negative impact to wetland function.

4.2.4 Significand Species and Wildlife Habitat

With respect to SAR, the following species were observed in the outside of the development envelope:

_Black Ash [COSEWIC:**THR**/COSSARO:**END**] (x7)
_Eastern Wood Pewee [COSEWIC:SC/COSSARO:SC] (x5)
_Wood Thrush [COSEWIC:THR/COSSARO:SC] (x1)
_Common Snapping Turtle [COSEWIC:SC/COSSARO:SC] (x1)
_Midland Painted Turtle [COSEWIC:SC/COSSARO:Not listed] (x9)
_Monarch Butterfly [COSEWIC:END/COSSARO:SC] (x2)
_Swamp Darner [S2/S3]
_Butternut [**END**]

As noted, one potential Butternut [END] was observed northwest of the subject lands. The tree is ± 20 m from the proposed development limit and forest edge. The development will not directly impact the tree or its habitat as long as abiotic conditions remain the same. Additionally, the tree exhibits evidence of mordancy (canopy decline and cankers present).

Significant Wildlife habitat assessments concluded the presence of
_Habitat for Species of Conservation Concern,
_amphibian breeding in the two ponds, and
_potential SAR bat roosting in the adjacent features.

Additionally, although not significant, there is amphibian breeding in the southwest and north wetland features, and some area-sensitive breeding birds were observed in the northern Woodland.

In our opinion, the vegetation and faunal species adjacent to development will easily adapt to the post-development conditions given the historical disturbance of the tablelands and the urban tolerant nature of those species. As long as abiotic factors are maintained, the habitat will remain suitable for the noted SAR and wildlife habitat.

Corridor Size and Connectivity: The proposed development will have no impact on the size and connectivity of the Natural heritage features as a whole, given the marginal intrusion on the very edge of the communities and no disconnect of habitat.

Disturbance: The surrounding communities will easily adapt to the post-development conditions

given the historical uses of the subject lands.

Human Encroachment:
With the change in land use from agricultural to residential, there is potential for the following impacts to occur:

_ Dumping of vegetative waste and/or garbage into adjacent Natural Heritage features;
_ Reclamation of land or expansion of lot size by placing fill or buildings at rear yard limits:
_ Introduction of plant species for landscape purposes that pose a risk of invasive potential into Natural Heritage areas
_ Vegetation and tree removal
_ Creation of trails within adjacent Natural Heritage areas that destroy vegetation, compact soils, and increase the risk of erosion and sedimentation.
_ Alteration to natural light regimes resulting from the residential attendant lighting.

Recommendation #28: Generally, a 1.2 m high chain link fence along rear lot lines adjacent to Natural Heritage areas is requested by municipalities to restrict potential human encroachment impacts. Ecological shrub buffers may be used as a supplementary to a chain link fence. Ecological shrub buffers at proper density can mitigate the spread of invasive species, deter human access into the natural heritage area and block residential attendant lighting. The adjacent features would benefit from a minimum of 3 m wide, dense shrub plantings to create a dense shrub layer within the dripline of the forest edges, if no fencing proposed.

Grading: A slope stability assessment has been conducted and has provided a 6 m wide geotechnical setback from the top of stable slope (Englobe 2024). This setback ensures the stability of the Natural Hazard lands. The setback will be unoccupied by structures in the rear yards.

4.3 Need, if any, for natural area enhancement

Given the disturbed cultural history of the vegetation on the tablelands, none are required. No designated Natural Heritage features are being removed to accommodate the proposed subdivision. Aside from the western Christie Drive road construction all vegetation removal includes marginal habitat that is anthropogenically impacted or created.

As previously noted, a 10 m buffer is typically required for significant woodlands. However, a reduced buffer size is possible if a net ecological gain can be demonstrated for the Study Area (i.e. compensation, invasive species removal, habitat creation, enhancements, etc.). The proposed development included 4-6 m dripline setbacks from the Significant Woodlands. It is our opinion that, given the following enhancements, habitat creations, invasive species removal, and the mitigation in Sections 4.2 and 4.3, these proposed development limits are acceptable.

Given the presence of medium-high quality features in the adjacent lands, enhancement via removals of invasive species such as Buckthorn, Multiflora Rose, invasive Honeysuckle, and Autumn Olive should be conducted. These species are well known for out-competing native species and altering the soils with allelopathic properties, which prevents the regeneration of native flora.

Recommendation # 29: Targeted basal bark spray by a qualified individual of the invasives in the adjacent natural areas between November and March should be completed by a qualified professional.

Historic farming practices in the southwest have reclaimed a portion of what was likely a continuation of the high-quality meadow marsh. On-site investigations lead us to suspect the soil and hydrological components still exist to rehabilitate this area into a continuation of the meadow marsh, a wetland community.

Recommendation #30: The 0.77 Ha in the southwest should be rehabilitated into a continuation of the adjacent meadow marsh in the lowlands as floral and faunal habitat creation.

Recommendation #31: A planting plan should be prepared for the proposed engineered infiltration trench north of Christie Drive and the SWM facility, incorporating both functionality and aesthetics.

5.0 CONSIDERATIONS AND CONCLUSIONS

5.1 Considerations

Federal Considerations:

As previously mentioned, according to the current DFO aquatic SAR mapping, the Rath-Harris Drain to the southeast does not contain any critical habitat of aquatic SAR, nor have any SAR been found/are likely to be found. As long as the recommended mitigation measures are followed, we do not anticipate any harm to fish or aquatic habitat.

Provincial Considerations:

It is our opinion that the proposed development will not contravene the ESA, 2007, nor the PPS, 2024.

With reference to Section 4.1 of the PPS, the subject lands are located within the listed Ecoregions (7E-2).

Sections 4.1.4 and 4.1.5 of the PPS are not applicable. Development is proposed within the agricultural tablelands where there are no PSWs, coastal wetlands, significant valleylands, or ANSIs. The adjacent lands feature a PSW to the north, as well as significant valleylands, Significant Wildlife Habitat, and Significant Woodlands; however, with the exception of the slight intrusion into the surrounding Significant Woodlands (FOD5), all development remains outside of these features and will not be directly negatively impacted as a result.

In regards to SWH, the only Endangered or Threatened SAR discovered in the study area was a single potential Butternut [END]. However, this tree remains 20+ m outside of the development envelope and exhibits evidence of mordancy. Its demise is inevitable and any future development will remain outside of the wooded feature therefore will not require permitting or review under the ESA.

There is confirmed Special Concern and Rare Wildlife Species SWH for Monarch Butterfly along the field margins of the proposed development envelope with the presence of Monarch individuals and its host plant, Milkweed. Mitigation has been provided, including milkweed

planting, to ensure its habitat remains in the landscape.

Additionally, there are confirmed SWH for Special Concern and Rare Wildlife Species within the SWM2 (Community A1), FOD5 (Community A2), CUW (Community A5), CUP (Community A7 and B4) and FOD (Community C2) ecosites in the 120 m study area confirmed by the presence of Eastern Wood-pewee and Wood Thrush. These communities lie outside of the proposed development envelope and will not be directly impacted.

Regarding Section 4.1.6, Section 4 provides mitigation strategies to ensure no direct impact on Fish Habitat.

Section 4.1.7 of the PPS is not applicable because no SAR are anticipated that cannot be avoided within the development envelope.

With reference to section 4.1.8 of the PPS, we do not anticipate any direct negative or unalterable impacts to the Natural Heritage feature on-site or its ecological functions as the vegetation on site is low quality, and for reasons noted in Section 4, there will be minimal direct or incidental impacts on the surrounding Natural Heritage area.

Conservation Authority Considerations:
As previously mentioned, the Upper Thames River Conservation Authority (UTRCA) regulates the lands within 30 m of a wetland or watercourse. The UTRCA may grant permission to develop within 30 m if it is demonstrated that the development will not negatively impact these features. The UTRCA will review this document as part of its approval process.

Below, we've addressed the UTRCA comments from the ISR:

Please provide dates for all references listed in Section 1.0 and ensure the most recent study is being reviewed (e.g. 2014 Middlesex Natural Heritage Systems Study as opposed to 2003 Middlesex Natural Heritage Study).

The 2014 Middlesex Natural Heritage Systems Study was used, and references are available below.

Evaluation of the PSW will require:

a. Feature-based hydrogeological and water balance for the wetland. We require the consultants and the developer to attend a meeting to scope this requirement. This will require a full year of monitoring to capture high and low groundwater.

The hydrogeological study and water balance studies have been completed by Englobe, 2024.

MNFR-certified wetland evaluators to conduct boundary delineation and evaluation of all wetland features and functions and review the wetland evaluation of the PSW.

The wetland boundaries have been delineated by us and reviewed by UTRCA staff on-site. We and the staff agreed on the final wetland boundary, which is altered from the original mapping in a couple of locations.

Evaluation of all watercourses/drains for **fish species, mussel species** and their respective

habitat.

Given the current land use, distance from development, riparian buffer, and SWM design, no impact on aquatic habitat is anticipated.

Evaluation of SWM requirements, **including Low Impact Development** opportunities as well as traditional methods.

Addressed by CJDL Stormwater Management Report and Englobe Hyrdogeology Study Report.

Floral inventories must be **summarized for each ELC community** and plant inventory must be **3 seasons** (spring, summer and fall)

These have been completed and are given in Appendix 2.

Please use text based definitions of features (e.g. wetlands, significant woodlands), rather than mapping (Section 3.5).

Noted.

Please explain the purpose of the hydrogeological studies mentioned in Section 3.6 and provide methodology. Ensure methodology is consistent with CO Guidelines.

Hydrogeological studies have been scoped with the UTRCA by Englobe.

Please provide CVs of all consultants contributing information to the EIS.

Given in Appendix 4.

Please provide a map that demonstrates what is referred to as the "vegetated corridor" in Section 3.8.

There are no impacts on connectivity by the proposed development.

The UTRCA will seek to conduct a site walk in late summer 2019 and again in spring 2020 to verify the wetland boundaries. Please ensure the wetland is staked for these site visits.

UTRCA staff member Tara Tchir conducted both a summer 2019 and a spring 2020 site visit. Wetland boundaries were flagged, and final boundaries were agreed upon between Tara and us. The UTRCA maps depicting wetland boundaries should be updated based on the work we have provided in this EIS.

Municipal Considerations:

The north, west, and southwest deciduous forests and a small patch in the southeast are considered "Significant Woodlands" on the Thames Centre OP, Schedule B-1. Additionally, the Thames Centre OP depicts "Environmental Area" lands surrounding the Rath-Harris Drain and behind the cultural pond in the west. This document will be submitted to the Municipality for its review in assessing the natural heritage features in the study area.

See Appendix B for the municipal stipulations regarding an EIS (Thames Centre OP, Section 3.2.3.1).

In compliance with the Municipality of Thames Centre's guidelines,

1) A description of the development and its purpose is found in Section 1.2. The natural

heritage features and their functions present within the proposed development envelope as well as the 120 m study area are described in Sections 1.1, 1.2 and 1.2.1. The nature and duration of potential impacts to the site, adjacent lands and ecological processes are noted in Sections 1.2.2-1.2.5 and are further described in Section 4.0. Cumulative effects of the proposed development is addressed in Section 4.0.

2) The specific location of the boundaries of the natural features are depicted in the attached figures, as well as the location of the proposed development with respect to these boundaries. See Figure 5 for the draft Concept Plan.

3) A statement of rationale for the proposed development is discussed in Section 1.2. Alternative methods and mitigation strategies are outlined in Section 4.0.

4) Descriptions of the abiotic environment are noted in Section 2.0. Flora and fauna inventories, as well as Significant Wildlife Habitat and other ecological features/processes, including disturbance, linkage, representativeness, and significant habitat, are examined in Section 3.0. See Section 4.0 for descriptions of potential impacts resulting from the proposed development, both direct and incidental.

5) Mitigation strategies for the noted potential impacts are also outlined in Section 4.0.

6.2 Conclusions

With respect to natural heritage considerations, it is the opinion of the writers that, given the final development plans follow the recommended mitigation measures in this document, and water balance is maintained into the Natural Heritage features on adjacent lands, the proposed development will be consistent with the Provincial Planning Statement 2024 as well as policies of the Municipality of Thames Centre.

For the reasons outlined above, based on the data presented within this report and the resultant analysis, it is our opinion there are no potential issues nor potential cumulative effects of the proposed development. Consequently, there is no need for additional information or studies relating to the natural heritage component of this application.

The conclusion of this report is that there are no negative or adverse, unalterable impacts on the natural heritage features of the subject land and the natural heritage landscape identified in the OP as long as the mitigative measures noted in this report are followed.

Mike Leonard O.A.L.A. C.S.L.A.
Shae-Lynn Dehens B.Sc.
Paige Vroom M.Sc (Aquatic)

Paige Vroom

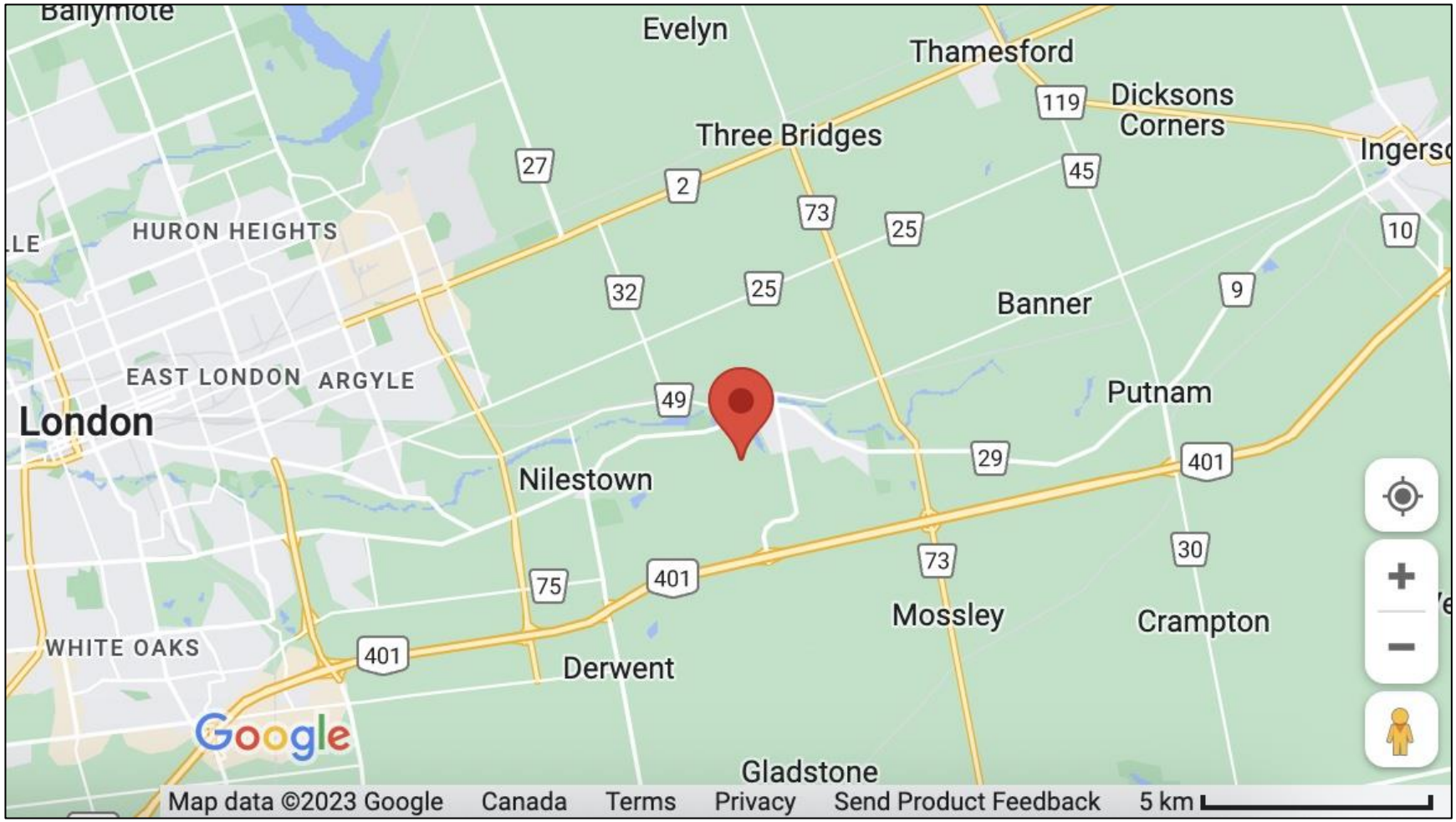

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Figure 1: General Site Location

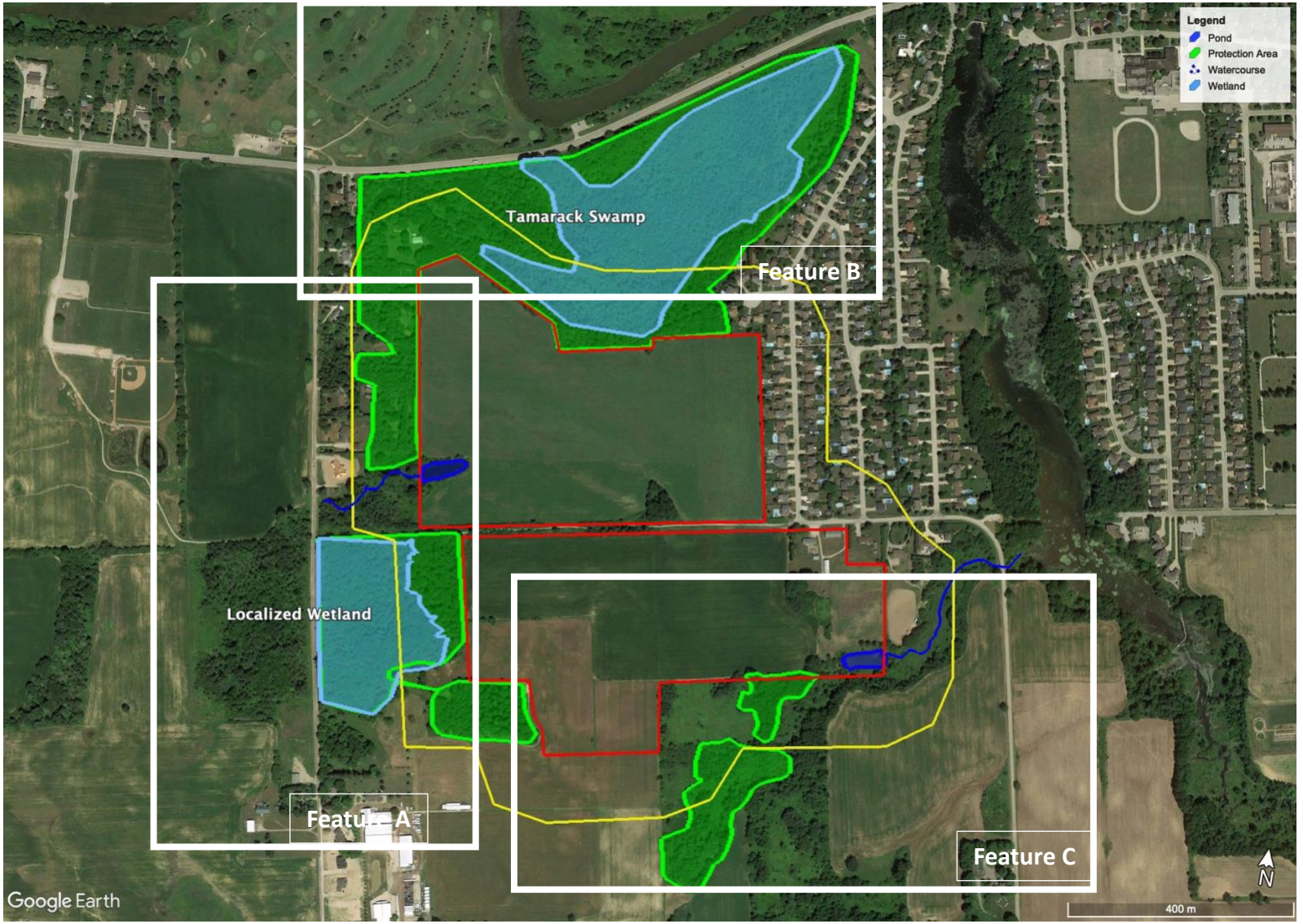

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Figure 2: Specific Site Location and Natural Heritage Features

Red=Legal Parcel
Yellow= 120 m Study Area
Dark Blue = Aquatic Features (Pond & Watercourse)
Light Blue = 2019 V+A Confirmed Wetland Limits & 30 m buffer

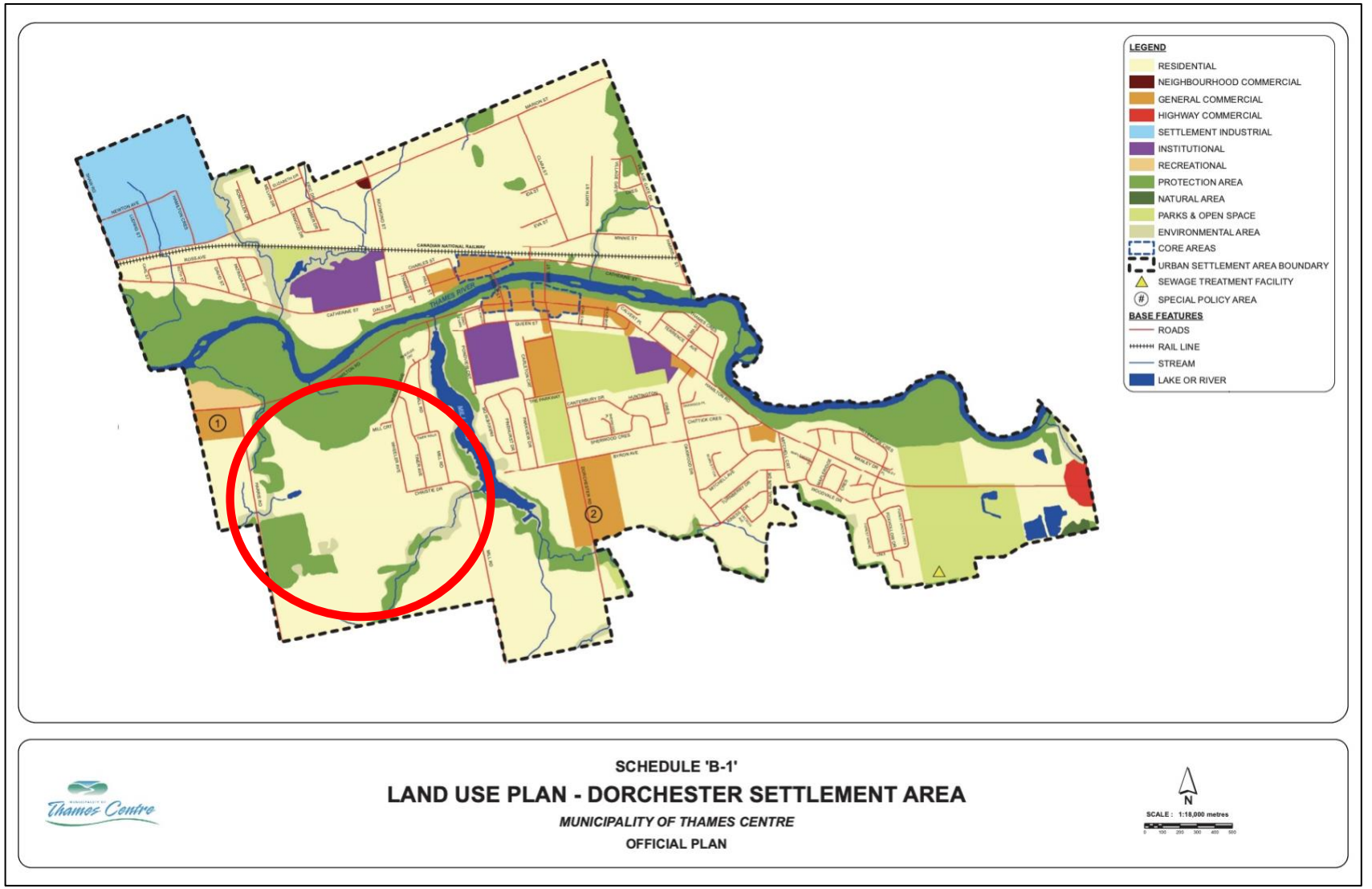

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Figure 3: Municipality of Thames Centre OP (2022), Schedule "B-1" Dorchester Settlement Area

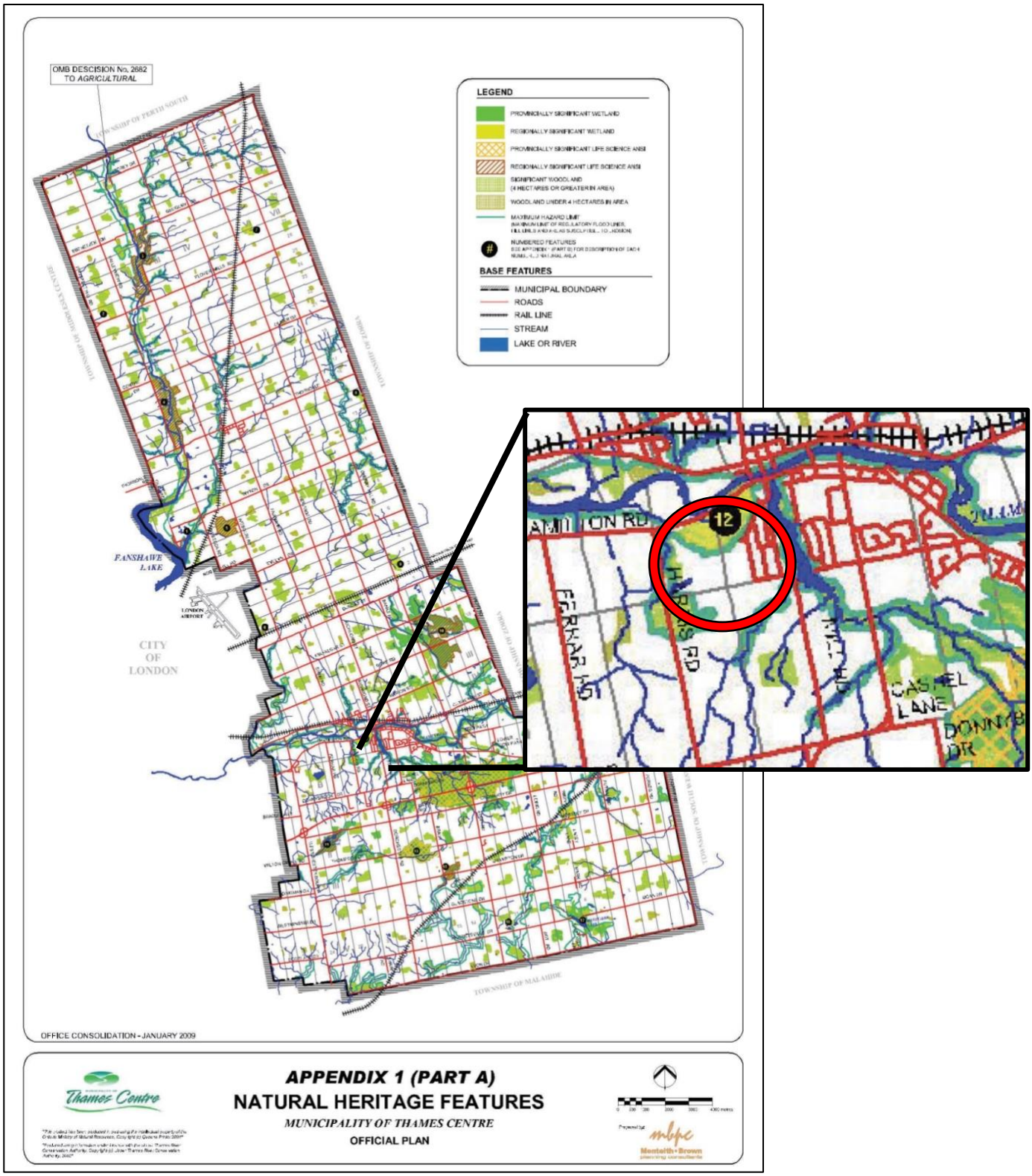

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Figure 4: Municipality of Thames Centre OP, Appendix 1 (Part A) Natural Heritage Features

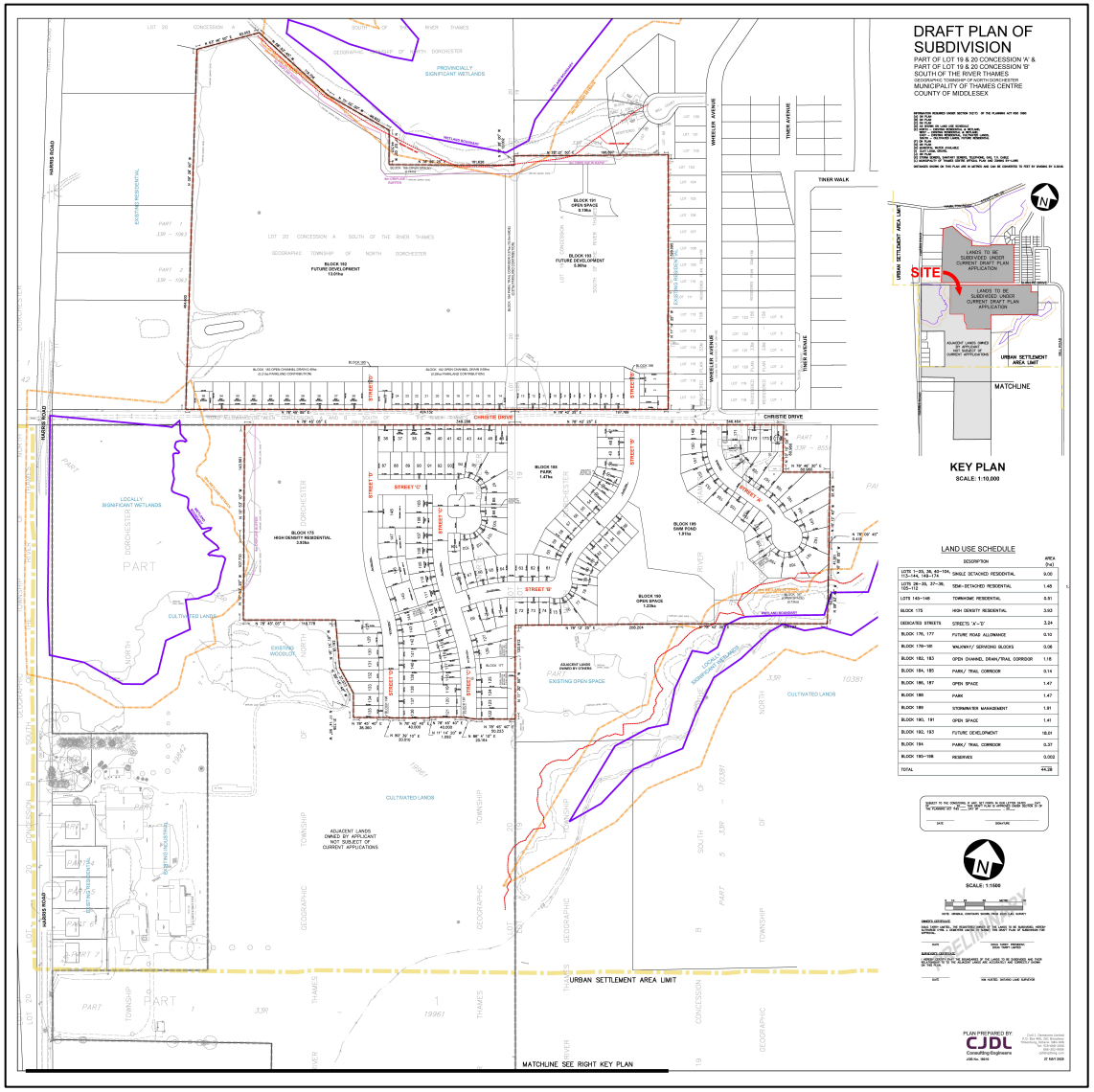

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Figure 5: CJDL Draft Concept Plan (June 2025)

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Figure 6: Draft Plan of Subdivision Overlay

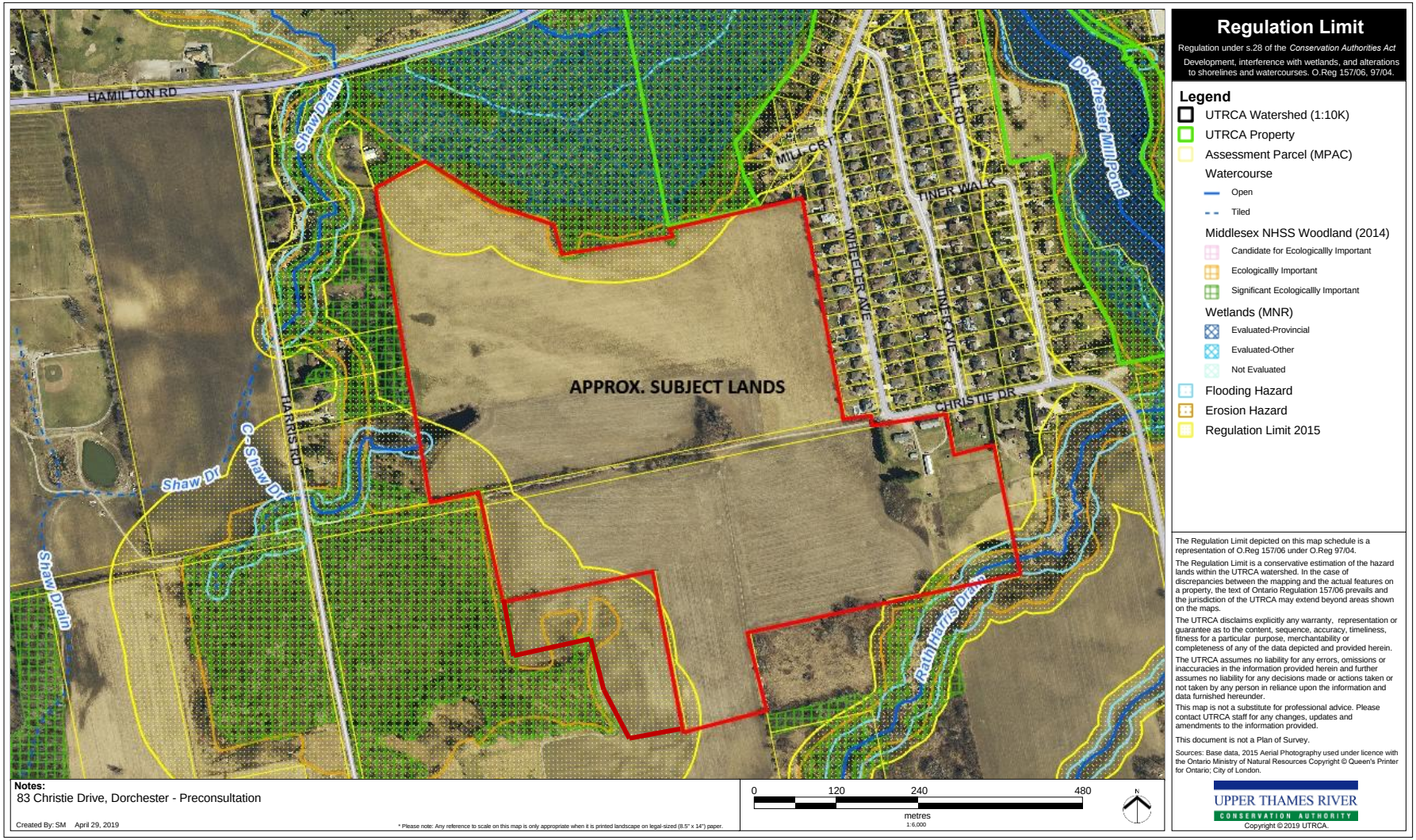

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Figure 7: UTRCA Regulated Areas Mapping

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Figure 8: UTRCA Wetlands Mapping

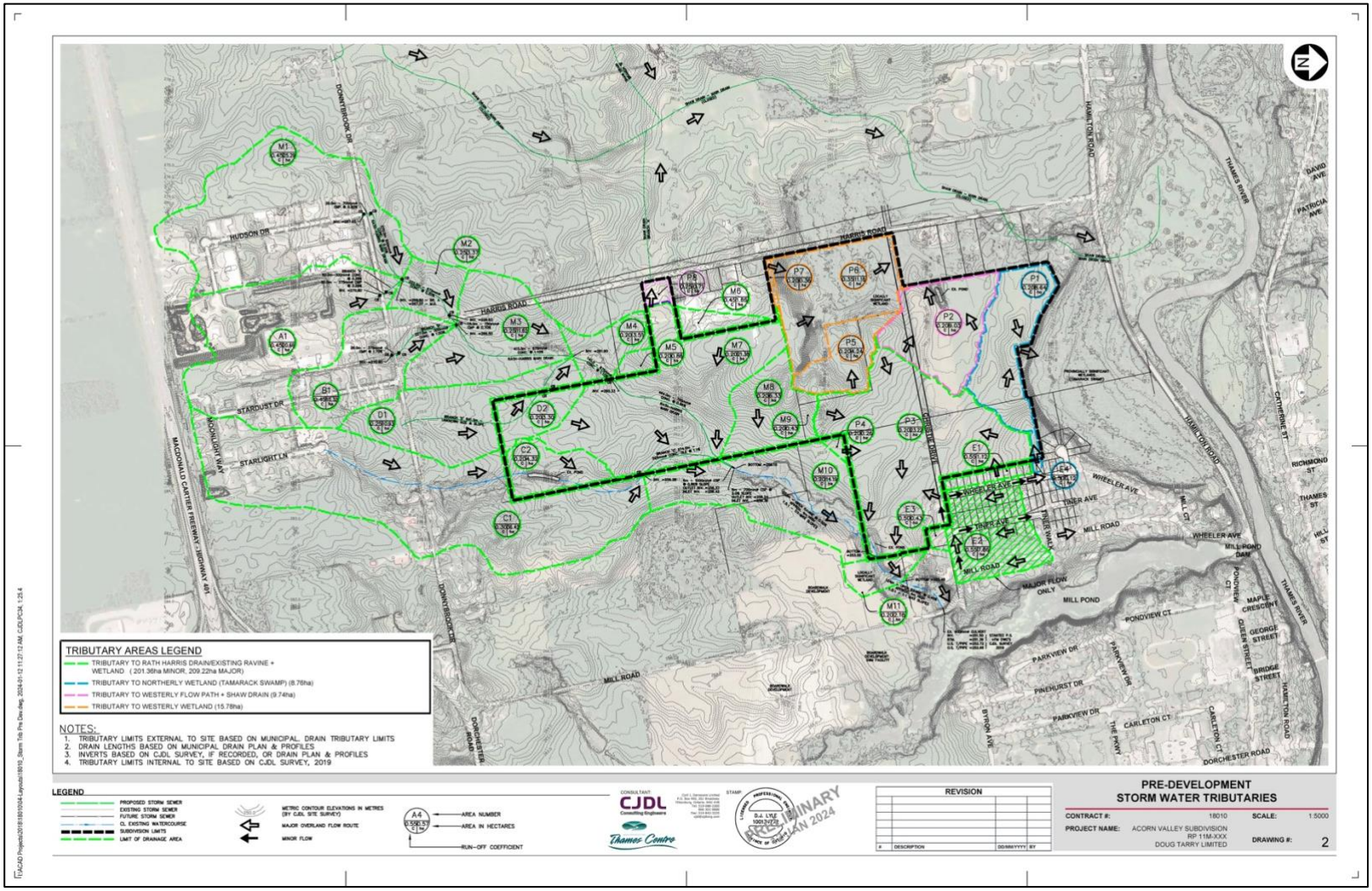

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Figure 9: CJDL Pre-Development Conditions (2024)

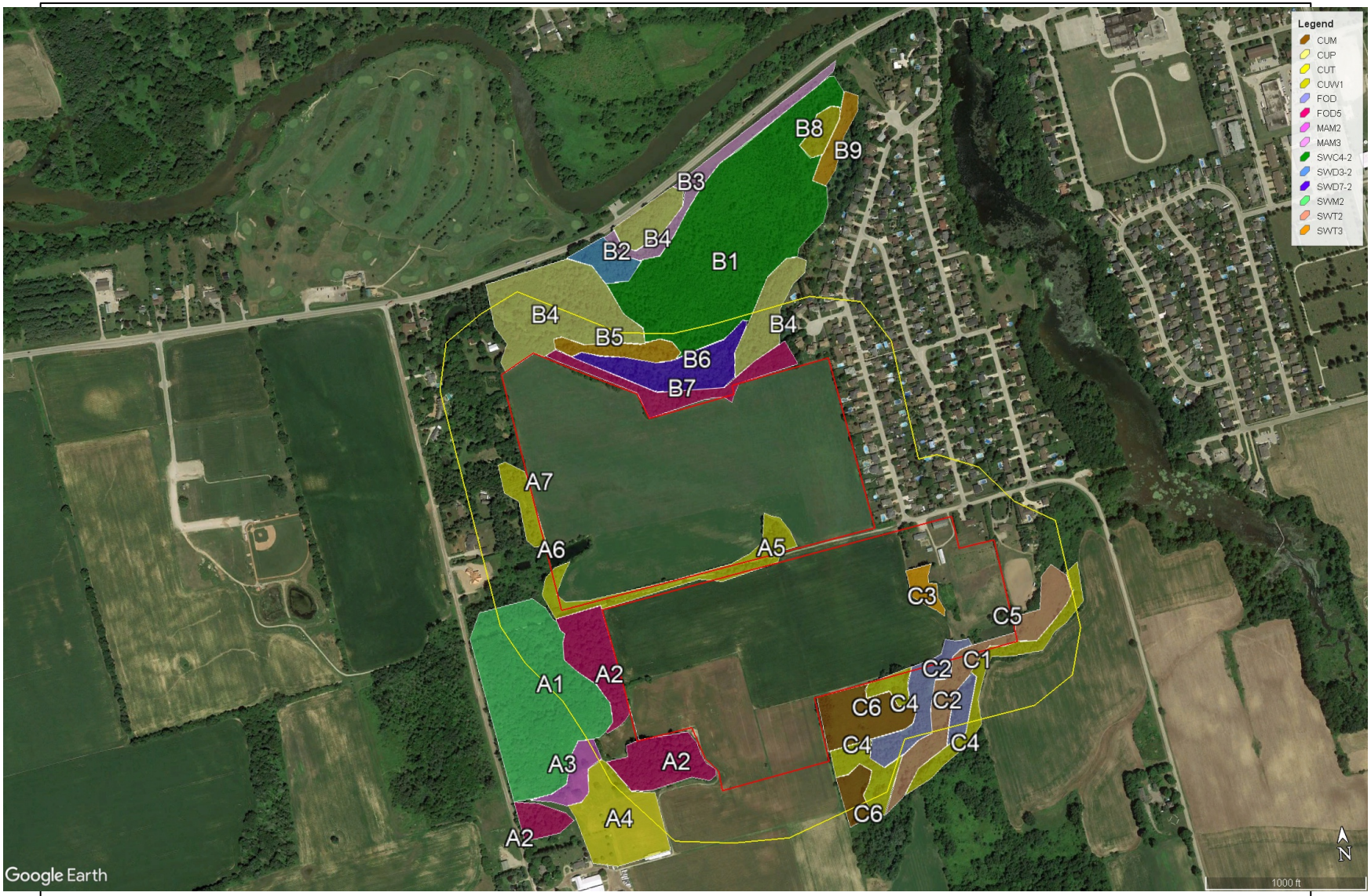

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Figure 10: Ecological Land Classifications

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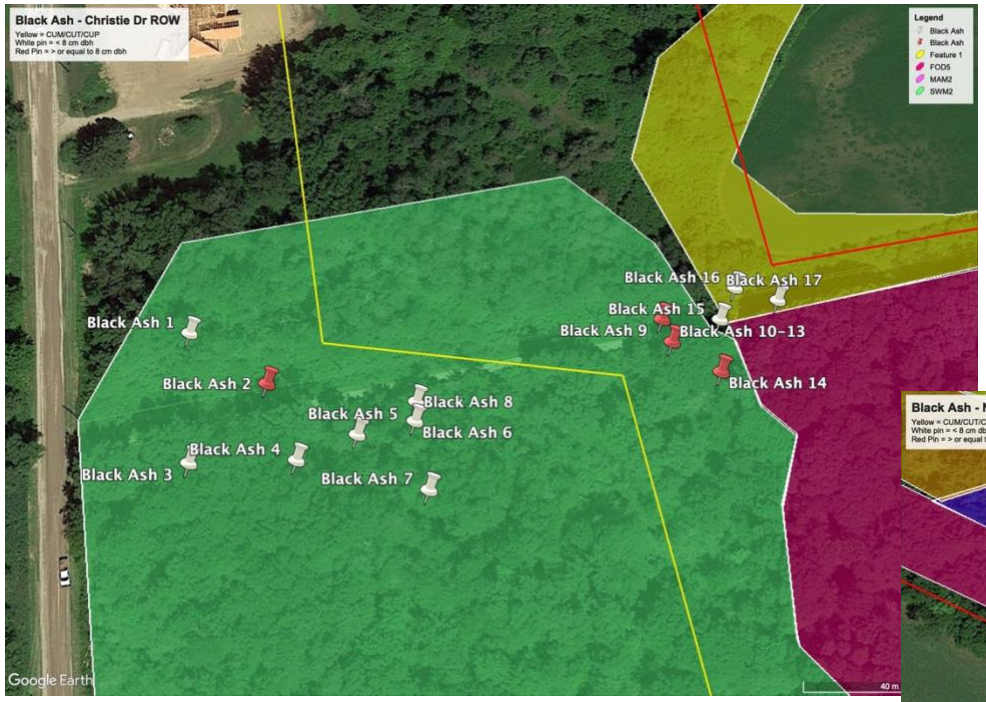
Figure 11: Species At Risk and MMP Survey Locations
AC= Amphibian calling survey location
BA= Black Ash



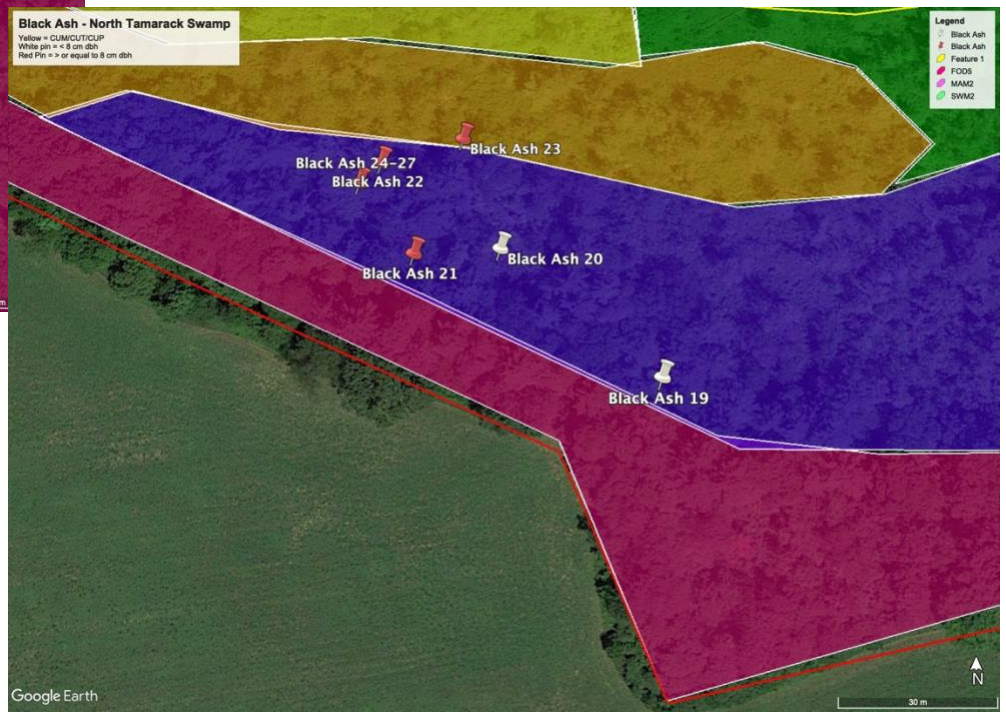


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Figure 12: Black Ash Locations

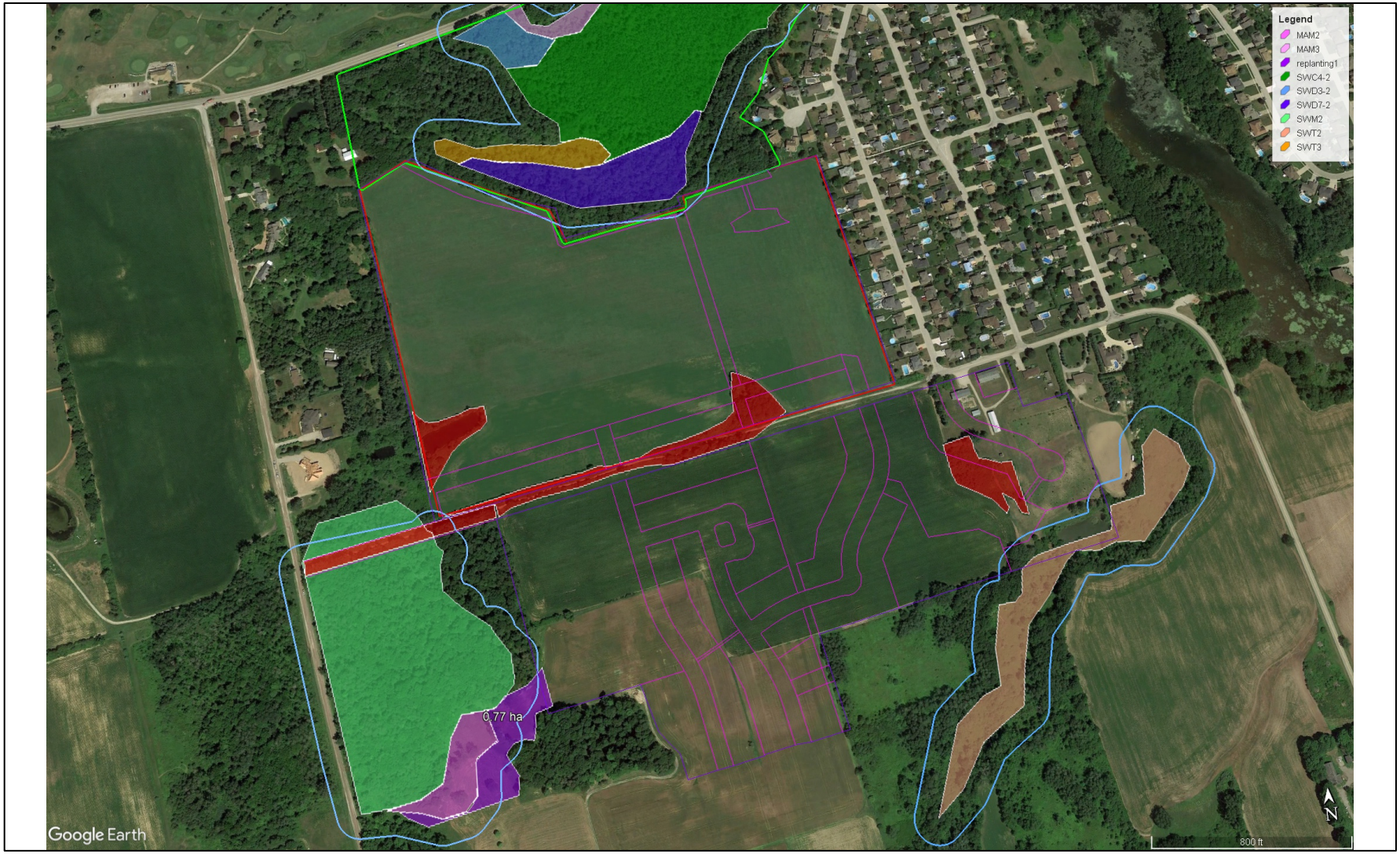

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Figure 13: Wetland Buffer, Proposed Vegetation Removals and Replanting

Red=removals
Purple=replanting areas
Blue = 30 m Wetland buffer

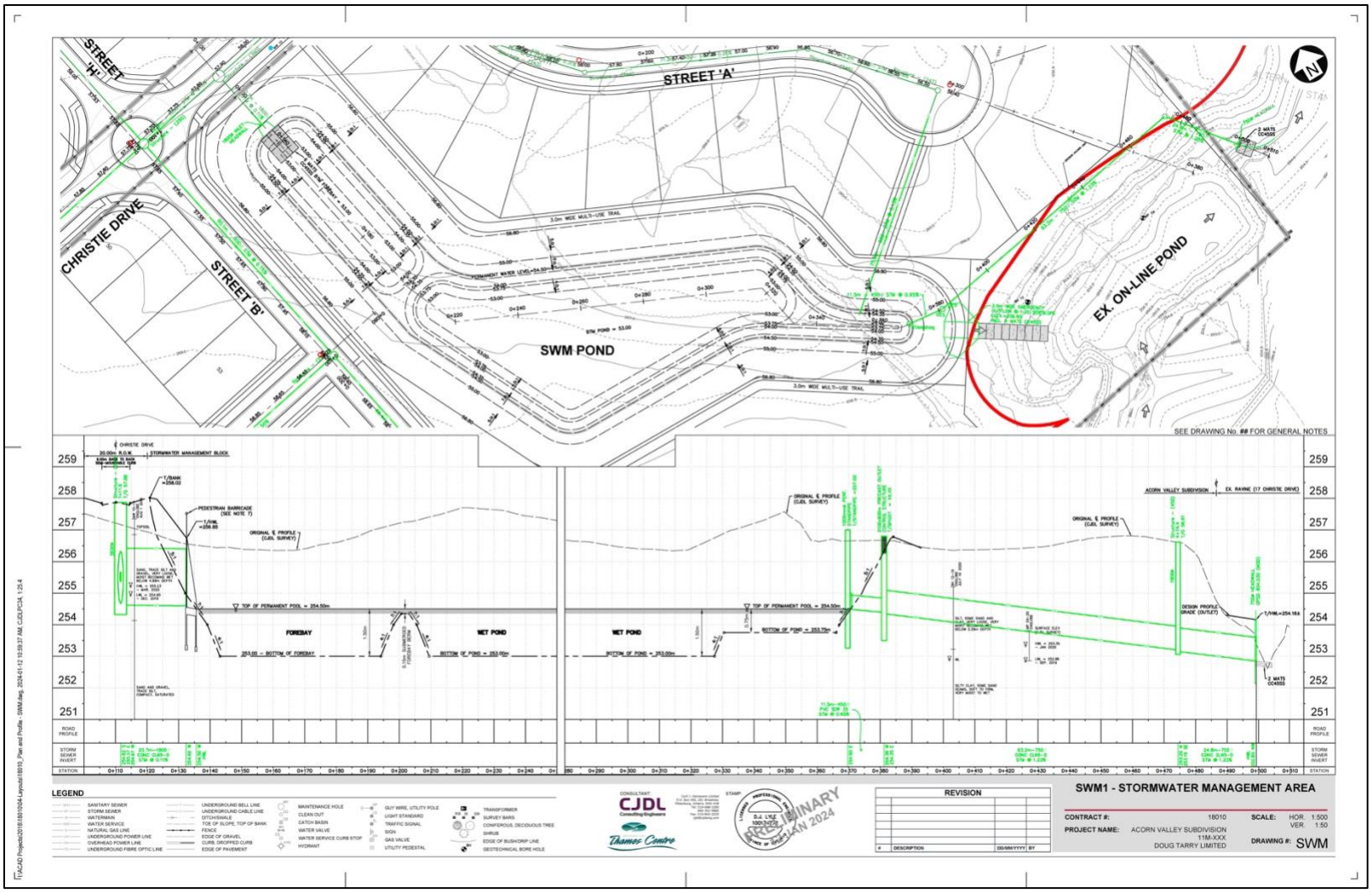

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Figure 14: Draft Stormwater Management Area Plan (January 2024)

APPENDIX 2: FLORAL AND FAUNAL DATA AND FUTURE WORK

2.1 FLORAL SCREENING

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11 November, 2019.

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RE: Botanical Summary for the Doug Tarry Ltd. Property in the Town of Dorchester, ON

Dear Mike and Paige,

This letter summarizes my botanical findings for the Doug Tarry Ltd. property on the west side of the Town of Dorchester, Ontario at 83 Christie Drive. I made 12 visits to the site: May 9th, May 27th, June 6th, June 19th, July 18th, July 22nd, August 1st, August 7th, August 22nd, September 7th, September 20th and September 24th, 2019.

The subject lands are an approximately 100 acre agricultural field with a couple dug ponds on the margins. A public walking path, surrounded by cultural meadows, thickets and woodlands, bisects the property. The subject lands are surrounded by a variety of natural and cultural habitats. The soils on the subject lands are well to imperfectly drained silty and sandy loams (The Soils of Middlesex County).

The subject lands lie within the Thames River watershed. On the west side of the subject property is the Shaw Drain, which flows north to the Thames River. On the southeast side is the Rath Harris Drain, which flows north into the Dorchester Mill Pond and into the Thames River. On the north side of the subject property is a large Tamarack (Larix laricina) swamp (A Provincialy Significant Wetland), which is also hydrologically connected to the Thames River to the north.

The botanical survey was divided into 3 main sections:

A. SOUTHWEST SWAMP – the swamps, uplands woods, wet meadows, dug pond and cultural habitats adjacent to Harris Road on the southwest side of the subject lands. (Section divided into 7 Ecological Land Classification polygons)
B. NORTH TAMARACK SWAMP – the treed swamps, thicket swamps, meadow marshes, upland woods, and cultural habitats and plantations on the north side of the subject lands. (Section divided into 9 Ecological Land Classification polygons)
C. RATH HARRIS DRAIN – the thicket swamps, meadow marshes, upland woods, dug pond and cultural meadows, thickets and woodlands along the Rath Harris Drain on the southeast side of the subject lands. (Section divided into 6 Ecological Land Classification polygons)

As noted above, each section was divided into Ecological Land Classification (ELC) polygons. The borders of the ELC polygons are defined in the maps that accompany this report. At the request of the Upper Thames River Conservation Authority, a separate plant list was made for each individual ELC polygon. These plant lists are detailed in the EXCEL file entitled *Botanical Survey of Dorchester (Doug Tarry Ltd.) Property – Paul G. O'Hara - 2019* that accompanies this report.

Approximately three hundred and ninety (390) vascular plants were documented in the natural areas in and around the subject lands. Approximately eighty-four (84) of the vascular plants were non-native.

One Species At Risk was documented in the natural areas around the subject lands. One mature Butternut (Juglans cinerea) was found on the southwest side of Section B (North Tamarack Swamp). Butternut is listed as Endangered by the Committee on the Status on Endangered Wildlife in Canada (COSEWIC). The tree is marked with blue vinyl flagging tape.

As well, hundreds of Black Ash (Fraxinus nigra) trees were noted in the natural areas around the subject property. While Black Ash is not an official Species At Risk in Ontario, it has been tentatively assessed by COSEWIC as Threatened (https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/black-ash-2018.html). As a precaution, the locations and attributes for Black Ash were recorded and are listed in Appendix 2 at the end of this report. The Black Ash trees were marked with blue flagging tape. At the beginning of the survey I was using blue biodegradeable flagging tape to reduce plastic waste but I found it too weak, and that it frayed easily. So I switched back to blue vinyl flagging tape by late summer. Therefore, the flagging tape on some of the Black Ash trees that I marked at the beginning of the study may have fallen off.

Besides the one Butternut (S2?), no other Provincially Rare Species were documented on or around the subject property.

One Provincially Rare Habitat Type was documented on the property. Some areas in the North Tamarack Swamp (Section B) can be described as a Poison Sumac Organic Thicket Swamp Type, a habitat type listed as S3 in Ontario (Bakowsky 1997).

A few dozen Regionally Rare Species were noted on the property and are listed in Appendix 1 at the end of this report.

A. SOUTHWEST SWAMP

This section occurs southwest of the subject lands and is divided into 7 ELC polygons.

1. SWM2 – Maple Mineral Mixed Swamp Ecosite

This is the largest polygon in the southwest corner of the subject lands. It is a mixed mineral swamp dominated by Silver Maple (Acer saccharinum), Yellow Birch (Betula alleghaniensis), White Cedar (Thuja occidentalis), Black Ash (Fraxinus nigra) and willows (Salix spp.). This same habitat is also found on the west side of Harris Road south of the public walking path/boardwalk.

Habitat Quality: Medium to High

SAR: None. Hundreds of healthy pole-size, sapling and seedling Black Ash trees are found throughout the swamp. Most larger trees are snags (sometimes with living suckers) or are in decline from by EAB. Black Ash is also found in the swamp on the west side of Harris Road. Black Ash trees were also documented along the public walking path in the north end of the polygon.

Provincialy Rare Species: None

Threats: Emerald Ash Borer present. Problematic invasive species includes Glossy Buckthorn (Frangula alnus), Buckthorn (Rhamnus cathartica), and Multiflora Rose (Rosa multiflora). Many weedy non-native woody and herbaceous species are found on the west side of the polygon bordering Harris Road. The Black Ash trees along the walking path will be affected by the proposed extension of Christie Drive through the subject lands.

2. FOD5 – Dry-Fresh Sugar Maple Deciduous Forest Ecosite

This polygon lies to the east of the Maple Mineral Mixed Swamp Ecosite detailed above. This habitat type also includes the small deciduous forest bordering Harris Road. These polygons are upland deciduous forests dominated by Sugar Maple (Acer saccharum), Red Oak (Quercus rubra), White Pine (Pinus strobus), Black Cherry (Prunus serotina) and Yellow Birch

(Betula alleghaniensis) among others. The shrub and ground layers in these polygon are disturbed and the woods show evidence of past logging. A skid trail runs north-south through the largest deciduous forest polygon.
Habitat Quality: Medium
SAR: None. A few scattered Black Ash trees occur on the border between the large FOD5 polygon and the SWM2.
Provincialy Rare Species: None
Threats: Emerald Ash Borer present. Problematic invasive species includes Glossy Buckthorn (Frangula alnus), Buckthorn (Rhamnus cathartica), Multiflora Rose (Rosa multiflora) and Garlic Mustard (Alliaria petiolata).

3. **MAM2 – Mineral Meadow Marsh Ecosite**

This small polygon lies to the south of the Maple Mineral Mixed Swamp Ecosite. It is a rich meadow marsh with dozens of native graminoids and forbs. This polygon has high value for native pollinators and meadow nesting birds.
Habitat Quality: High
SAR: None
Provincialy Rare Species: None
Threats: Problematic invasive species includes Glossy Buckthorn (Frangula alnus), Multiflora Rose (Rosa multiflora), and Honeysuckle (probably Lonicera tatarica).

4. **CUM1 SOUTH – Mineral Cultural Meadow Ecosite**

This polygon occurs in the southern end of this section. It is a cultural meadow dominated by forage grasses and a mix of common native and non-native forbs.
Habitat Quality: Low-Medium
SAR: None
Provincialy Rare Species: None
Threats: Problematic invasive species include Multiflora Rose (Rosa multiflora), Field Sow-thistle (Sonchus arvensis) and White Sweet-clover (Melilotus albus).

5. **CUM1/CUT1/CUW1 – Mineral Cultural Meadow, Thicket and Woodland Ecosites**

This long, thin polygon is a mix of cultural meadow, thicket and woodland habitats in the central part of the subject lands bordering the public walking trail. The polygon includes small early successional forests, Gray Dogwood/Staghorn Sumac thickets and meadows dominated by non-native forage grasses. As well, a few native trees and shrubs were found planted along the public walking trail.
Habitat Quality: Low to Medium
SAR: None
Provincialy Rare Species: None
Threats: This polygon lies on the main access road (Christie Road) for the proposed development.

6. **DUG POND**

This small dug pond is found in the west central part of the subject lands. It is surrounded by a mix of native and non-native woody trees and shrubs (mostly willows (Salix spp.)) and a few herbaceous species growing on the exposed mineral soils.
Habitat Quality: Low to Medium
SAR: None
Provincialy Rare Species: None
Threats: The pond is marked as a Storm Water Management Area for the proposed development.

7. **CUP – Cultural Plantation**

This polygon includes the planted coniferous and deciduous trees along the west border of the subject lands. These trees are planted on the residential properties on Harris Road.
Habitat Quality: Medium
SAR: None
Provincialy Rare Species: None
Threats: None

B. NORTH TAMARACK SWAMP

This section occurs to the north of the subject lands and is divided into 9 ELC polygons. This section has been previously evaluated as a Provincially Significant Wetland.

1. SWC4-2 – Tamarack Organic Coniferous Swamp Type

This is the dominant habitat type in this section. Tamarack (Larix laricina) is found throughout the polygon, where it grows with White Elm (Ulmus americana), Black Ash (Fraxinus nigra), Silver Maple (Acer saccharinum) and White Cedar (Thuja occidentalis) among other trees. White Pine (Pinus strobus), Yellow Birch (Betula alleghaniensis), Red Maple (Acer rubrum) and Bur Oak (Quercus macrocarpa) grow on the hummocks that dot the swamp. The shrub layer is dominated by Poison Sumac (Toxicodendron vernix) and the non-native Glossy Buckthorn (Frangula alnus). Skunk Cabbage (Symplocarpus foetidus) and a rich variety of native wetland grasses, sedges, ferns and forbs dominate the ground layer.
Habitat Quality: High
SAR: None. Several dozen Black Ash (Fraxinus nigra) trees were observed in this polygon. Most of the pole or seedling size trees were relatively healthy; the larger Black Ash were dead or in poor health from EAB.
Provincialy Rare Species: None
Provincially Rare Habitat Types: Poison Sumac was observed mostly growing in the understorey of the Tamarack and other trees listed above. However, in the canopy openings, some areas in this polygon could be described as Poison Sumac Organic Thicket Swamp Types. The Poison Sumac Organic Thicket Swamp Type is listed as S3 in Ontario (Bakowsky 1997).
Threats: Thousands of Glossy Buckthorn trees and seedlings are growing in this polygon. In time, they will shade out many of the conservative native species. Emerald Ash Borer is also present. The proximity of Hamilton Road exposes this polygon to blowing weed seed and splashing road salt.

2. SWD3-2 – Silver Maple Mineral Deciduous Swamp Ecosite

Silver Maple is the primary canopy tree in this small polygon adjacent to Hamilton Road. Some of the soils in this polygon are organic in nature, particularly in the south end bordering the Tamarack Organic Coniferous Swamp Type.
Habitat Quality: Medium
SAR: None
Provincialy Rare Species: None
Threats: Glossy Buckthorn (Frangula alnus) dominates the shrub layer in this polygon. The proximity of Hamilton Road exposes this polygon to blowing weed seed and splashing road salt.

3. MAM3 – Organic Meadow Marsh Ecosite

This long meadow marsh is found in the north end of the section bordering Hamilton Road. Water flows east-west through this polygon towards the culvert under Hamilton Road and into the Thames River. The marsh is dominated in varying degrees by Cattails (Typha spp.), Broad-fruited Burreed (Sparganium eurycarpum) and sedges (mostly Carex stricta and C. lacustris). A high diversity of wet meadow and marsh forbs are found in this polygon, many of them regionally rare or uncommon (See Appendix 1).
Habitat Quality: High
SAR: None
Provincialy Rare Species: None
Threats: Glossy Buckthorn (Frangula alnus) is also found in this polygon. The proximity of Hamilton Road exposes this polygon to blowing weed seed and splashing road salt.

4. CUP – Cultural Plantations

Cultural plantations are found in the north central, northwest and southeast areas of this section. White Pine (Pinus strobus) is the dominant planted tree in these polygons. Some planted Black Walnut (Juglans nigra) and White Poplar (Populus alba) are found in the northern cultural plantations. The shrub and ground layers are highly disturbed. The trees in the northern polygons were planted sometime after 1954 as the trees are not visible in the 1954 aerial photo. However, the White Pine in the southeastern plantation may have been planted before 1954; the trees in this polygon are larger and are visible in the 1954 aerial photo.
Habitat Quality: Low to Medium

SAR: None
Provincialy Rare Species: None
Threats: Glossy Buckthorn (Frangula alnus) is also well established in these polygons. The proximity of Hamilton Road exposes this polygon to blowing weed seed and splashing road salt.

5. **SWT3 WEST – Organic Thicket Swamp Ecosite**

This polygon lies in the southwest side of this section. It is a rich thicket swamp dominated by Gray Dogwood (Cornus racemosa), Silky Dogwood (Cornus obliqua) and Common Elderberry (Sambucus canadensis). The thicket swamp supports a wide variety of native graminoids and forbs. The leaves of the dogwood species were almost completely defoliated by Dogwood Sawfly (Macremphytus sp.) by late summer.
Habitat Quality: High
SAR: None. Black Ash is found in this polygon.
Provincialy Rare Species: None
Threats: Glossy Buckthorn (Frangula alnus) is also found in this polygon.

6. **SWD7-2 – Yellow Birch Organic Deciduous Swamp Ecosite**

This treed swamp is located in the south end of the section at the base of the deciduous forest slope. It is dominated by Yellow Birch (Betula alleghaniensis) with White Pine (Pinus strobus), White Elm (Ulmus americana), White Cedar (Thuja occidentalis), Red Maple (Acer rubrum), Basswood (Tilia americana), Black Walnut (Juglans nigra), Tamarack (Larix laricina), ashes (Fraxinus spp.) and aspens (Populus spp.). The shrub and ground layers support a wide variety of small native trees, shrubs, ferns, sedges and forbs. As well, there seems to be an active spring along the southern boundary of this polygon where it meets the deciduous forest slope (UTM 493977 4758744).
Habitat Quality: High
SAR: None. Black Ash is also found in this polygon.
Provincialy Rare Species: None
Threats: Emerald Ash Borer and Glossy Buckthorn (Frangula alnus) are also found in this polygon. This high quality habitat lies within just a few metres of the proposed residential development.

7. **FOD5 – Dry-Fresh Sugar Maple Deciduous Forest Ecosite**

This polygon is a shallow wooded slope populated by a range of native forest trees including White Pine (Pinus strobus), Sugar Maple (Acer saccharum), Beech (Fagus grandifolia), Red Oak (Quercus rubra), Bur Oak (Quercus macrocarpa), Black Cherry (Prunus serotina), Bitternut Hickory (Carya cordiformis), and Largetooth Aspen (Populus grandidentata) among others. The shrub and ground layers are very patchy in their quality and compositon. Thickets of hawthorn and woody invasive species (as well as non-native forage grasses and forbs) dominate the southern edge of the polygon bordering the agricultural field. A walking path/deer trail runs east-west through this polygon.
Habitat Quality: Medium
SAR: One mature Butternut (Juglans cinerea) was found on the border of this polygon at the base of the deciduous forest slope (on the edge of polygon B6 – SWD7-2). See section on Species At Risk below for more details about this record. Butternut is listed as Endangered in Ontario by COSEWIC. A few young Black Ash trees were found growing on the deciduous forest slope.
Provincialy Rare Species: None
Threats: Several woody invasive species grow on the wooded slope including Buckthorn (Rhamnus cathartica), Multiflora Rose (Rosa multiflora), Autumn Olive (Elaeagnus umbellata), English Ivy (Hedera helix) and non-native Honeysuckles (Lonicera spp.). The proposed residential development will make this polygon much more susceptible to dumping, habitat encroachment and the spread of invasive species.

8. **CUW1 – Mineral Cultural Woodland Ecosite**

This small cultural woodland is found in the northeastern corner of the section. This is an early successional forest as the 1954 aerial photo shows that this area was not wooded at the time. The shrub and ground layers are highly disturbed and include many invasive species including Glossy Buckthorn (Frangula alnus), Buckthorn (Rhamnus cathartica), Multiflora Rose (Rosa multiflora), non-native Honeysuckle (Lonicera sp.) and Garlic Mustard (Alliaria petiolata).
Habitat Quality: Low to Medium
SAR: None

Provincialy Rare Species: None
Threats: The invasive species listed above.

9. SWT3 EAST – Organic Thicket Swamp Ecosite

This marsh/thicket swamp is found in the northeastern corner of the section. It is dominated by a rich assemblage of native wetland shrubs, graminoids, ferns and forbs, many of them Regionally Rare or Uncommon in Middlesex County and/or the Carolinian Zone (see Appendix 1).
Habitat Quality: High
SAR: None
Provincialy Rare Species: None
Threats: This polygon is being encroached upon by residents on Wheeler Avenue. There is evidence of dumping and some residents have extended their properties into the wetland habitat with areas of turf, veggie gardens and walking paths with wooden bridges. Glossy Buckthorn (Rhamnus frangula) is also well established in this polygon.

C. RATH HARRIS DRAIN

This section occurs to the southeast of the subject lands and is divided into 6 ELC polygons.

1. SWT2 – Mineral Thicket Swamp Ecosite

This polygon runs along the length of the Rath Harris Drain. It is a made up of a mosaic of shrub willow (Salix spp.) thickets, dogwood (Cornus sp.) thickets, drifts of Reed Canary Grass (Phalaris arundinacea) and wet meadow forbs, as well as some small sedge meadows (mostly Carex stricta and C. lacustris).
Habitat Quality: Medium to High
SAR: None. A few Black Ash trees were found in this polygon.
Provincialy Rare Species: None
Threats: Utility services for the residential development on the subject lands are proposed to be put across the Rath Harris Drain. These actions may disturb the quality of this wetland habitat.

2. FOD – Deciduous Forest

A couple small patches of deciduous forest are found along the upland banks of the Rath Harris Drain. Canopy trees include Black Cherry (Prunus serotina), Trembling Aspen (Populus tremuloides), Red Maple (Acer rubrum), Basswood (Tilia americana), Shagbark Hickory (Carya ovata), Red Oak (Quercus rubra), White Oak (Quercus alba), Yellow Birch (Betula alleghaniensis) and Black Maple (Acer nigrum) among others. The shrub and ground layers in these deciduous forests are largely disturbed, but an assortment of native woodland shrubs, sedges and forbs are present. Some large, original forest trees (mostly Quercus alba and Quercus rubra) over a metre dbh are located on the northern edge of this polygon bordering the proposed residential development (UTM 494514 4758215). It is highly recommended that these heritage trees be retained.
Habitat Quality: Medium
SAR: None
Provincialy Rare Species: None
Threats: Utility services for the residential development on the subject lands are proposed to be put across the Rath Harris Drain. These actions may disturb the quality of these forested habitats depending upon their placement. Invasive species include Glossy Buckthorn (Frangula alnus), Buckthorn (Rhamnus cathartica) and Honeysuckle (Lonicera spp.). The proposed residential development will make this polygon much more susceptible to dumping, habitat encroachment and the spread of invasive species.

3. CUW1 – Mineral Cultural Woodland Ecosite

This small cultural woodland lies in the east central area of the subject lands near Christie Drive. It is composed of planted and early successional trees including Black Walnut (Juglans nigra), White Mulberry (Morus alba), White Spruce (Picea glauca), White Pine (Pinus strobus), Trembling Aspen (Populus tremuloides), Black Cherry (Prunus serotina), White Cedar (Thuja occidentalis) and Cottonwood (Populus deltoides). To the east of this cultural woodland is a mown meadow with

some small trees planted in rows; species include White Spruce (Picea glauca), Red Oak (Quercus rubra), Chinquapin Oak (Quercus muhlenbergii), White Cedar (Thuja occidentalis), Largetooth Aspen (Populus grandidentata) and Red Ash (Fraxinus pensylvanica).
Habitat Quality: Low to Medium
SAR: None
Provincialy Rare Species: None
Threats: The cultural woodland and mown meadow to the east are proposed to be developed.

4. **CUT1 – Mineral Cultural Thicket Ecosite**

Cultural thickets dominate the upland edges along much of the length of the Rath Harris Drain. Native woody species include aspens (Populus spp.), Hawthorns (Crataegus spp.), Gray Dogwood (Cornus racemosa), Common Prickly Ash (Zanthoxylem americanum) and brambles (Rubus spp.). Non-native species include Buckthorn (Cornus racemosa), White Mulberry (Morus alba), Common Privet (Ligustrum vulgare) and Honeysuckle (Lonicera sp.). The leaves of the gray dogwood were almost completely defoliated by Dogwood Sawfly (Macremphytus sp.) by late summer.
Habitat Quality: Medium
SAR: None
Provincialy Rare Species: None
Threats: The invasive species listed above. The proposed residential development will make these polygons much more susceptible to dumping, habitat encroachment and the spread of invasive species.

5. **DUG POND**

This small dug pond is found in the east central part of the subject lands. It is surrounded by a mix of native and non-native woody trees and shrubs as well as some wetland herbs and graminoids. The pond also supports some native submergent vegetation.
Habitat Quality: Medium
SAR: None
Provincialy Rare Species: None
Threats: The pond is marked as a Storm Water Management Area for the proposed development.

6. **CUM1 – Mineral Cultural Meadow Ecosite**

A couple large cultural meadows are found on the western end of this section. They are composed of a range of native early successional trees and shrubs, as well as many native and non-native herbs and grasses (including native asters and goldenrods as well as Common Milkweed (Asclepias syriaca)). These meadows support pollinators and meadow-nesting birds as well as the Monarch Butterfly (Danaus plexippus), which is listed as Special Concern in Ontario.
Habitat Quality: Medium
SAR: None
Provincialy Rare Species: None
Threats: The proposed residential development will make this polygon (particularly on the northern edge) more susceptible to dumping, habitat encroachment and the spread of invasive species.

Species At Risk

One Species At Risk was documented on the subject property during the survey.

One mature Butternut (Juglans cinerea) was found at the base of the deciduous forest hill in the southwest area of the North Tamarack Swamp (UTM 493822 4758804). The tree is ~35cm dbh and 18m in height. The tree has cankers but some are healing well. About 40% of the crown has living branches and leaves on it. Butternut is listed as Endangered by the Committee on the Status of Endangered Wildlife in Canada (Oldham 2017).

Locations for Black Ash (Fraxinus nigra) were recorded in the event that the tree is listed as a Threatened species in Ontario because of Emerald Ash Borer. That data is included in Appendix 2 at the end of this report. Evidence of Emerald Ash Borer was present in all three sections around the subject lands, including the swamp on the west side of Harris Road south of the walking trail/boardwalk.

Provincially Rare Vegetation Types
Poison Sumac was observed mostly growing in the understorey of the Tamarack in polygon B1 (Tamarack Organic Coniferous Swamp Type – SWC4-2). However, in the canopy openings, some areas in this polygon could be described as Poison Sumac Organic Thicket Swamp Types. The Poison Sumac Organic Thicket Swamp Type is listed as S3 in Ontario (Bakowsky 1997).

Provincially Rare Species
No Provincially Rare Species were found on or adjacent to the subject property.

Regionally Rare Species
Forty-eight (48) regionally rare or uncommon species (in Middlesex County and/or the Carolinian Zone) were documented on the property and are listed in Appendix 1 below (Oldham 2017).

Sincerely,

Paul O'Hara, Field Botanist
Blue Oak Native Landscapes

Appendix 1 – Regionally Rare and Uncommon Species on or around the Subject Lands

Species	Ontario S-Rank	Middlesex County	Carolinian Zone	ELC Polygons
WOODY PLANTS				
Speckled Alder (Alnus incana)	S5	Uncommon	Uncommon	B1
Smooth Serviceberry (Amelanchier laevis)	S5	Uncommon		B1
Beaked Hazel (Corylus cornuta)	S5		Uncommon	B1, B4, B6
Cockspur Hawthorn (Crataegus crus-galli)	S4	Rare	Uncommon	C6
Alder-leaved Buckthorn (Endotropis alnifolia)	S5		Uncommon	A2, B1, B6, C1
Butternut (Juglans cinerea)	**S2?**		**Uncommon**	**B7**
Tamarack (Larix laricina)	S5		Uncommon	A1, B1, B3, B4, B6, B9
Balsam Poplar (Populus balsamifera)	S5		Uncommon	B1, B9
Smooth Gooseberry (Ribes hirtellum)	S5		Uncommon	B3
Swamp Red Currant (Ribes triste)	S5		Uncommon	B1, B3, B5, B6
Shining Willow (Salix lucida)	S5		Uncommon	B1, C1
Autumn Willow (Salix serrisima)	S5	Rare	Rare	B9
Poison Sumac (Toxicodendren vernix)	S4	Rare	Rare	B1, B3, B9
HERBACEOUS PLANTS				
Fringed Brome (Bromus ciliatus)	S5		Uncommon	B1, B3, B5
Marsh Bellflower (Campanula aparinoides)	S5	Rare	Rare	B3
Yellow Sedge (Carex flava)	S5		Uncommon	A1, B1, B3
Finely-nerved Sedge (Carex leptonervia)	S5	Uncomon	Uncommon	B1
Prairie Sedge (Carex prairea)	S5	Rare	Rare	B3, B9
Tender Sedge (Carex tenera)	S5	Uncommon		A2, C2
Three-seeded Sedge (Carex trisperma)	S5	Rare	Rare	B1
Northern Beaked Sedge (Carex utriculata)	S5	Uncommon	Rare	B3, B9
American Golden-saxifrage (Chrysoplenium americanum)	S4		Uncommon	B1
Swamp Thistle (Cirsium muticum)	S5		Rare	B1
Yellow Lady's Slipper (Cypripedium parviflorum)			Uncommon or Rare	B1, B3, B5, B6
Broad-leaved Panicgrass (Dichanthelium latifolium)	S4		Uncommon	A2
Crested Wood Fern (Dryopteris cristata)	S5		Uncommon	A1, B1, B3, B5, B6, B7, B9, C1
Three-way Sedge (Dulichium arundinaceum)	S5	Rare	Rare	B3
Linear-leaved Willowherb (Epilobium leptophyllum)	S5		Uncommon	B3, B9
Water Horsetail (Equisetum fluviatile)	S5	Uncommon	Uncommon	B1, B3
Woodland Horsetail (Equisteum sylvaticum)	S5	Rare	Uncommon	B5, B6
Marsh Bedstraw (Galium palustre)	S5		Rare	A1, B1, B2, B3, B5, B9
Tall Mannagrass (Glyceria grandis)	S5		Uncommon	A1, A3, B3, C1
Canada Rush (Juncus canadensis)	S5		Rare	A3
Tall Blue Lettuce (Lactuca biennis)	S5		Uncommon	C2
Canada Lettuce (Lactuca canadensis)	S5		Uncommon	A3, C6
Michigan Lily (Lilium michiganense)	S4	Uncommon		A1
Water Loosestrife (Lysimachia thrysiflora)	S5		Uncommon	A1
Naked Mitrewort (Mitella nuda)	S5		Uncommon	B1, B3
Marsh Muhly (Muhlenbergia glomerata)	S5		Rare	B9
Golden Ragwort (Packera aurea)	S5		Uncommon	A1, A3, B1, B8
Virginia Creeper (Parthenocissus quinquefolia)	S4?		Uncommon	B8
Ninebark (Physocarpus opulifolius)	S5		Uncommon	A2, B1-5, B9, C1
Virginia Mountain-mint (Pycnanthemum virginianum)	S4	Rare	Uncommon	B1, B3
Swamp Dock (Rumex verticillatus)	S4	Rare	Uncommon	B1, B3, B5, B9, C1
Red-tinged Bulrush (Scirpus microcarpus)	S5	Rare	Uncommon	B3
Carpenter's Square (Scrophularia marilandica)	S4		Rare	C2, C5
Orange-fruited Horse-gentian (Triosteum aurantiacum)	S4S5		Uncommon	B7
Sweet White Violet (Viola blanda)	S5		Uncommon	B1

Source: Oldham 2017

Appendix 2 – Black Ash Locations and Attributes

Species	Easting	Northing	Notes
SOUTHWEST SWAMP			
Fraxinus nigra	493515	4758281	Sapling 2m ht. along the north side of the boardwalk.
Fraxinus nigra	493540	4758275	Relatively healthy tree 6cm dbh/10m ht.
Fraxinus nigra	493537	4758275	Two trees 3cm dbh/5cm ht. and 7cm dbh/7m ht with epicormic shoots.
Fraxinus nigra	493543	4758276	Tree 8cm dbh/8m ht. plus 2 saplings.
Fraxinus nigra	493546	4758272	Two trees 10cm dbh/10m ht. and 11cm dbh/10m ht. with epicormic shoots.
Fraxinus nigra	493545	4758266	Five pole-size trees 5-8cm dbh plus 2 saplings.
Fraxinus nigra	493540	4758276	One pole-size tree 6cm dbh/6m ht. plus one sapling.
Fraxinus nigra	493545	4758252	One healthy sapling.
Fraxinus nigra	493538	4758245	Two pole-size trees 6cm dbh/6m ht. and 4cm dbh/5m ht.
Fraxinus nigra	493551	4758241	Six pole-size trees 4-8cm dbh.
Fraxinus nigra	493550	4758236	Three trees 4-7cm dbh.
Fraxinus nigra	493563	4758235	One tree 4cm dbh/4m ht.
Fraxinus nigra	493571	4758242	Five trees 1-6cm dbh.
Fraxinus nigra	493576	4758239	Two trees 9cm dbh/9m ht. and 5cm dbh/5m ht.
Fraxinus nigra	493579	4758251	Three trees 5-9cm dbh.
Fraxinus nigra	493572	4758255	Three seedlings 1 to 1.5m ht.
Fraxinus nigra	493843	4758137	Two trees with EAB 20cm dbh/14m ht. and 11cm dbh/8m ht.
Fraxinus nigra	493822	4758141	Three snags 15-22cm dbh.
Fraxinus nigra	493800	4758163	Large snag ~25cm dbh.
Fraxinus nigra	493782	4758187	Two snags 12 and 18cm dbh.
Fraxinus nigra	493562	4758256	Five healthy trees 2-7cm dbh.
Fraxinus nigra	493562	4758260	Four stems 3-6cm dbh.
Fraxinus nigra	493561	4758265	Tree 10cm dbh/12m ht. plus a dozen or more saplings and numerous seedlings.
Fraxinus nigra	493558	4758269	Three pole-size trees 3-4cm dbh/3-5m ht. plus some seedlings.
Fraxinus nigra	493558	4758275	Relatively healthy tree 11cm dbh/10m ht.
Fraxinus nigra	493568	4758273	Snag with 2 living suckers ~2m ht.
Fraxinus nigra	493535	4758325	Sapling 2.5cm dbh/2m ht.
Fraxinus nigra	493518	4758269	Relatively healthy tree 11cm dbh/15m ht.
Fraxinus nigra	493519	4758259	About two dozen sapling, seedling and pole-size trees. Many small trees in this area.
Fraxinus nigra	493627	4758289	Healthy sapling 1.5m ht.
Fraxinus nigra	493642	4758258	Four healthy saplings <4m ht.
Fraxinus nigra	493634	4758255	Five stems < 5cm dbh.
Fraxinus nigra	493638	4758247	About a dozen healthy seedlings and saplings.
Fraxinus nigra	493639	4758236	About a dozen healthy pole-size trees.
Fraxinus nigra	493644	4758231	About two dozen healthy pole-size trees.
Fraxinus nigra	493657	4758228	About 50 trees pole-size and smaller.
Fraxinus nigra	493663	4758243	About 75 pole-size stems.
Fraxinus nigra	493671	4758253	About 80 pole, sapling and seedling stems.
Fraxinus nigra	493683	4758258	About two dozen pole-size trees.
Fraxinus nigra	493700	4758244	About 50 pole-size trees.
Fraxinus nigra	493693	4758236	About 50 pole-size trees.
Fraxinus nigra	493677	4758226	About 50 pole-size trees.
Fraxinus nigra	493667	4758222	About two dozen pole-size trees.
Fraxinus nigra	493663	4758207	About 50 pole-size trees.
Fraxinus nigra	493668	4758194	About two dozen pole-size trees.
Fraxinus nigra	493659	4758186	About 50 pole-size trees.
Fraxinus nigra	493645	4758187	About 100 pole-size trees.
Fraxinus nigra	493638	4758173	About a dozen pole-size trees.
Fraxinus nigra	493632	4758159	About 75 pole-size trees near Harris Road.
Fraxinus nigra	493630	4758142	About 30 stems along Harris Road.
Fraxinus nigra	493628	4758196	About two dozen pole-size stems near road.
Fraxinus nigra	493650	4758314	Two saplings ~2m ht. along southside of trail.
Fraxinus nigra	493690	4758314	Tree 7cm dbh/6m ht. along southside of trail.
Fraxinus nigra	493746	4758327	Two pole-size trees along southside of trail.

Fraxinus nigra	493751	4758325	Six pole-size trees along southside of trail.
Fraxinus nigra	493755	4758316	Three sapling size trees and one pole-size trees.
Fraxinus nigra	493759	4758313	Four saplings and some seedlings <1m ht.
Fraxinus nigra	493760	4758320	About a dozen seedlings <0.5m ht.
Fraxinus nigra	493761	4758330	One sapling along path plus some seedlngs 5-10m to the south.
Fraxinus nigra	493743	4758333	Two saplings on northside of path.
Fraxinus nigra	493711	4758329	One sapling about 2.5m ht. on southside of path.
Fraxinus nigra	493678	4758315	One sapling about 3m ht. on southside of path.
Fraxinus nigra	493631	4758310	Three stems < 3.5m ht.
Fraxinus nigra	493758	4758339	Tree about 2m ht. beside pathway.
NORTH TAMARACK SWAMP			
Fraxinus nigra	494019	4758911	Snag ~23cm dbh; no living suckers.
Fraxinus nigra	494077	4758857	Half dozen living suckers from dead pole-size tree <15cm dbh.
Fraxinus nigra	493863	4758805	Five healthy sapling trees < 5m ht. More trees to north.
Fraxinus nigra	493882	4758802	About a dozen healthy seedlings and saplings < 3m ht. More trees to north.
Fraxinus nigra	493888	4758795	Seven healthy saplings and seedlings < 3m ht. More trees to north.
Fraxinus nigra	493897	4758800	Snag 13cm dbh with living suckers plus half a dozen other healthy smaller trees. More trees to north.
Fraxinus nigra	493900	4758789	Four trees on the deciduous forest hill; trees are healthy and 1.5 to 6m ht.
Fraxinus nigra	493911	4758786	Healthy sapling 4.5 m ht plus a seedling ~8m to north east.
Fraxinus nigra	493931	4758773	Healthy sapling 2.2m ht on the deciduous forest hill.
Fraxinus nigra	493951	4758765	Healthy seedling 1.5m ht.
Fraxinus nigra	493955	4758751	Relatively healthy sapling 6cm dbh/7m ht; tree has epicormic shoots; tree located on deciduous forest hill.
Fraxinus nigra	494143	4758879	Two small trees; 1 healthy sapling; 1 pole-size snag with suckers.
Fraxinus nigra	494147	4758887	Healthy tree 6cm dbh/7m ht.
Fraxinus nigra	494140	4758887	Two healthy saplings <4m ht.
Fraxinus nigra	494129	4758890	Dead pole-size tree with living suckers.
Fraxinus nigra	494125	4758909	Healthy sapling 2m ht.
Fraxinus nigra	494121	4758914	Healthy sapling 1.5m ht.
Fraxinus nigra	494098	4758931	Healthy sapling 3.5m ht.
Fraxinus nigra	494080	4758971	Five saplings <5m ht.
Fraxinus nigra	494066	4758966	Six trees < 6m ht.
Fraxinus nigra	493876	4758809	About a dozen seedlings <3m ht.
Fraxinus nigra	493912	4758790	Damaged suckering tree with epicormic shoots <5m ht.
Fraxinus nigra	493926	4758801	About 30 mostly healthy trees < 8m ht over 20m by 20m area.
Fraxinus nigra	49946	4758789	Three trees < 5m ht.
Fraxinus nigra	494055	4758785	Healthy seedling <1.5m ht.
Fraxinus nigra	494054	4758789	Healthy sapling ~2.5m ht.
Fraxinus nigra	493998	4758955	Half a dozen healthy saplings <8m ht.
RATH HARRIS DRAIN			
Fraxinus nigra	494408	4758002	14cm dbh/7m ht.; relatively healthy; epicormic shoots present
Fraxinus nigra	494416	4758003	Healthy sapling 4.5m ht.; four more small black ash ~20m to NW.
Fraxinus nigra	494396	4758010	2 healthy pole-size trees ~6-7m ht.
Fraxinus nigra	494378	4758001	Healthy 4m tall sapling.
Fraxinus nigra	494381	4757994	Healthy seedling 2m ht plus healhty sapling 10m to east in thicket swamp.
Fraxinus nigra	494389	4758037	Healthy tree 9cm dbh/10m ht in upland thicket on north side of drain.
Fraxinus nigra	494396	4757982	Fallen snag with half a dozen living pole size suckers < 4m ht.
Fraxinus nigra	494395	4758009	Healthy seedling 1.5 m ht.
Fraxinus nigra	494388	4758015	Healthy tree 9cm dbh/8m ht.

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SCIENTIFIC NAME	COMMON NAME	S RANK	COSEWIC_STATUS	SARA_SCHEDULE1_STATUS	SARO_STATUS	COEFF_CONSERVATISM	COEFF_WETNESS	A. SOUTHWEST SWAMP							B. NORTH TAMARACK SWAMP								C. RATH HARRIS DRAIN					
								1. SWM2	2. FOD5	3. MAM2	4. CUM-S	5. CUW1/CUT1/CUM1	6. POND	7. CUP	1. SWC4-2	2. SWD3-2	3. MAM3	4. CUP	5. SWT3-WEST	6. SWD7-2	7. FOD5	8. CUW1	9. SWT3-EAST	1. SWT2	2. FOD	3. CUW1	4. CUT1	5. POND	6. CUM1
Abutilon theophrasti	Velvetleaf	SNA					3	x																					
Acalypha rhomboidea	Common Three-seeded Mercury	S5				0	3					x																	
Acer negundo	Manitoba Maple	S5				0	0	x	x			x	x		x							x				x	x	
Acer nigrum	Black Maple	S4?				7	3																	x				
Acer platanoides	Norway Maple	SNA					5											x										
Acer rubrum	Red Maple	S5				4	0		x						x			x		x				x				
Acer saccharinum	Silver Maple	S5				5	3	x		x				x	x	x	x	x	x										
Acer saccharum	Sugar Maple	S5				4	3		x			x									x	x		x					
Achillea millefolium	Common Yarrow	SNA					3					x																	
Actaea pachypoda	White Baneberry	S5				6	5		x																				
Actaea rubra	Red Baneberry	S5				6	3		x																				
Agrimonia gryposepala	Hooked Agrimony	S5				2	3	x	x	x								x		x	x			x					
Agrostis gigantea	Redtop	SNA					-3			x	x		x											x					x
Agrostis stolonifera	Creeping Bentgrass	SNA					-3	x												x				x					
Alisma triviale	Northern Water-plantain	S5				1	-5																					x	
Alliaria petiolata	Garlic Mustard	SNA					0		x			x										x		x		x			
Alnus incana ssp. rugosa	Speckled Alder	S5				6	-3								x														
Amaranthus sp.	Amaranth	SNA					3																			x			
Ambrosia artemisiifolia	Common Ragweed	S5				0	3	x		x	x														x	x			

Ambrosia trifida	Great Ragweed	S5	0	0	x				x						x											
Amelanchier sp.	Serviceberry								planted						x								x			
Amelanchier laevis	Smooth Serviceberry	S5	5	5								x														
Amphicarpaea bracteata	American Hog-peanut	S5	4	0	x		x					x	x	x		x	x									
Anemonastrum canadense	Canada Anemone	S5	3	-3																				x		
Anemone quinquefolia	Wood Anemone	S5	7	0		x																				
Anemone virginiana	Tall Anemone	S5	4	3		x	x											x					x			x
Angelica atropurpurea	Purple-stemmed Angelica	S5	6	-5			x					x		x							x					
Apios americana	American Groundnut	S5	6	-3										x		x					x		x		x	
Apocynum androsaemifolium	Spreading Dogbane	S5	3	5	x				x						x											
Apocynum cannabinum	Hemp Dogbane	S5	3	0										x												
Aquilegia canadensis	Red Columbine	S5	5	3		x																				
Aralia nudicaulis	Wild Sarsaparilla	S5	4	3	x	x										x		x								
Arctium lappa	Great Burdock	SNA		3		x		x	x																	
Arctium minus	Common Burdock	SNA		3																			x	x	x	
Arisaema triphyllum	Jack-in-the-pulpit	S5	5	-3	x	x									x										x	
Asarum canadense	Canada Wild-ginger	S5	6	5	x																					
Asclepias incarnata	Swamp Milkweed	S5	6	-5	x		x							x						x	x					
Asclepias syriaca	Common Milkweed	S5	0	5			x	x	x					x							x		x			x
Asparagus officinalis	Garden Asparagus	SNA		3					x																x	
Athyrium filix-femina	Common Lady Fern	S5	4	0	x	x									x	x	x	x								
Betula alleghaniensis	Yellow Birch	S5	6	0	x	x						x			x	x	x				x	x				
Betula papyrifera	Paper Birch	S5	2	3					planted	x		x														
Bidens cernua	Nodding Beggarticks	S5	2	-5										x												
Bidens tripartita	Three-parted Beggarticks	S5	5	-3	x				x			x		x						x	x					

Bidens frondosa	Devil's Beggarticks	S5	3	3	x																	x					
Boehmeria cylindrica	False Nettle	S5	4	5	x								x	x	x												
Bromus ciliatus	Fringed Brome	S5	6	3								x		x		x											
Bromus inermis	Smooth Brome	SNA		5					x					x					x				x	x		x	
Calamagrostis canadensis	Bluejoint Reedgrass	S5	4	5										x							x						
Caltha palustris	Yellow Marsh Marigold	S5	5	5	x							x				x					x	x					
Calystegia sepium	Hedge False Bindweed	S5	2	0										x													
Campanula aparinoides	Marsh Bellflower	S5	7	5										x													
Cardamine douglassii	Limestone Bittercress	S4	7	3	x																						
Cardamine pensylvanica	Pennsylvania Bittercress	S5	6	3																		x					
Carduus nutans	Nodding Thistle	SNA		3										x												x	
Carex arctata	Drooping Woodland Sedge	S5	5	5	x	x												x									
Carex bebbii	Bebb's Sedge	S5	3	5			x																				
Carex blanda	Woodland Sedge	S5	3	0																					x		
Carex bromoides	Brome-like Sedge	S5	7	3								x				x	x										
Carex comosa	Bristly Sedge	S5	5	5										x							x						
Carex crinita	Fringed Sedge	S5	6	5	x																						
Carex cristatella	Crested Sedge	S5	3	3	x		x		x																		
Carex flava	Yellow Sedge	S5	5	5	x							x		x													
Carex gracillima	Graceful Sedge	S5	4	3	x	x											x	x				x	x				

Carex granularis	Limestone Meadow Sedge	S5	3	-3		x	x																			
Carex hirtifolia	Pubescent Sedge	S4S5	5	5																		x		x		
Carex hystericina	Porcupine Sedge	S5	5	-5	x		x					x		x						x						
Carex lacustris	Lake Sedge	S5	5	-5								x	x	x		x	x				x					
Carex laxiflora	Loose-flowered Sedge	S5	5	0		x																				
Carex leptonervia	Finely-nerved Sedge	S5	5	0								x														
Carex lupulina	Hop Sedge	S5	6	-5	x																					
Carex pedunculata	Long-stalked Sedge	S5	5	3		x											x	x								
Carex pensylvanica	Pennsylvania Sedge	S5	5	5		x			x						x			x				x		x		
Carex prairea	Prairie Sedge	S5	7	-3										x						x						
Carex radiata	Eastern Star Sedge	S5	4	0	x													x								
Carex retrorsa	Retrorse Sedge	S5	5	-5	x		x																			
Carex rosea	Rosy Sedge	S5	2	5		x												x				x				
Carex stipata	Awl-fruited Sedge	S5	3	-5	x							x														
Carex stricta	Tussock Sedge	S5	4	-5	x							x	x	x		x	x			x	x				x	
Carex tenera	Tender Sedge	S5	4	0		x																x				
Carex trisperma	Three-seeded Sedge	S5	9	-5								x														
Carex utriculata	Northern Beaked Sedge	S5	7	-5										x						x						
Carex vulpinoidea	Fox Sedge	S5	3	-5			x																		x	
Carpinus caroliniana	Blue-beech	S5	6	0	x	x						x			x	x	x	x				x				
Carya cordiformis	Bitternut Hickory	S5	6	0		x			x									x				x				
Carya ovata	Shagbark Hickory	S5	6	3														x				x				x
Celastrus scandens	Climbing Bittersweet	S5	3	3																		x				
Celtis occidentalis	Common Hackberry	S4	8	0		x	x		planted						x				x			x				

Chamaecyparis sp.	False Cypress	SNA								planted																
Chelone glabra	White Turtlehead	S5	7	-5			x					x		x			x			x						
Chenopodium album	White Goosefoot	SNA		3		x			x														x			x
Chrysosplenium americanum	American Golden-saxifrage	S4	8	-5								x														
Cichorium intybus	Chicory	SNA		5				x																		
Cicuta bulbifera	Bulb-bearing Water-hemlock	S5	5	-5								x		x						x	x					
Cicuta maculata	Spotted Water-hemlock	S5	6	-5	x							x	x	x		x					x					
Cinna arundinacea	Stout Woodreed	S4	7	-3	x																					
Circaea canadensis	Broad-leaved Enchanter's Nightshade	S5	2	3	x	x			x			x			x	x	x	x				x	x	x		
Cirsium arvense	Canada Thistle	SNA		3		x	x	x	x							x									x	
Cirsium muticum	Swamp Thistle	S5	8	-5								x														
Cirsium vulgare	Bull Thistle	SNA		3					x														x			x
Clinopodium vulgare	Field Basil	S5	4	5														x								x
Coptis trifolia	Goldthread	S5	7	-3													x									
Cornus alternifolia	Alternate-leaved Dogwood	S5	6	3	x	x					x	x			x		x	x								
Cornus obliqua	Pale Dogwood	S5	2	-3	x					x		x		x		x				x	x				x	
Cornus racemosa	Gray Dogwood	S5	2	0	x	x					x	x		x	x	x	x					x	x		x	x
Cornus sericea	Red-osier Dogwood	S5	2	-3	x		x			x		x		x		x	x			x	x				x	
Corylus cornuta	Beaked Hazelnut	S5	5	3								x			x		x	x								
Crataegus sp.	Hawthorn					x												x								
Crataegus sp.	Hawthorn								x																	
Crataegus crus-galli	Cockspur Hawthorn	S4	4	0																						x
Crataegus macrosperma	Big-fruited Hawthorn	S5	4	5																		?				

Crataegus punctata	Dotted Hawthorn	S5	4	5		x			x							x			x			x	x		x	x	
Crataegus succulenta	Fleshy Hawthorn	S5	4	5																		x					
Cuscuta gronovii	Swamp Dodder	S5	4	-3	x																	x					
Cyperus esculentus	Perennial Yellow Flatsedge	S5	1	-3			x																				
Cypripedium parviflorum	Yellow Lady's-slipper	S5	5	0								x		x		x	x										
Dactylis glomerata	Orchard Grass	SNA		3	x	x		x	x									x						x			
Danthonia spicata	Poverty Oatgrass	S5	5	5		x																					
Daucus carota	Wild Carrot	SNA		5	x		x	x	x	x								x					x	x		x	x
Dianthus armeria	Deptford Pink	SNA		5			x																				
Dichanthelium implicatum	Slender-stemmed Panicgrass	S5	3	0			x																				
Dichanthelium latifolium	Broad-leaved Panicgrass	S4	6	3		x																					
Digitaria sp.	Crabgrass	SNA			x				x															x			
Dryopteris carthusiana	Spinulose Wood Fern	S5	5	-3	x	x											x										
Dryopteris cristata	Crested Wood Fern	S5	7	-5	x							x		x		x	x	x		x	x						
Dulichium arundinaceum	Three-way Sedge	S5	7	-5										x													
Echinochloa crus-galli	Large Barnyard Grass	SNA		-3	x																						
Echinocystis lobata	Wild Mock-cucumber	S5	3	-3		x			x						x							x			x		
Elaeagnus umbellata	Autumn Olive	SNA		3														x									
Eleocharis sp.	Spikerush						x			x										x							
Elymus repens	Creeping Wildrye	SNA		3				x	x					x								x		x			x
Elymus virginicus	Virginia Wildrye	S5	5	-3								x		x								x					
Endotropis alnifolia	Alder-leaved Buckthorn	S5	7	-5		x						x					x					x					
Epilobium sp.	Willowherb															x						x					
Epilobium ciliatum	Northern Willowherb	S5	3	-3	x									x													

Epilobium coloratum	Purple-veined Willowherb	S5	3	-5																	x					
Epilobium hirsutum	Hairy Willowherb	SNA		-3																x						
Epilobium leptophyllum	Linear-leaved Willowherb	S5	7	-5										x						x						
Epilobium parviflorum	Small-flowered Willowherb	SNA		3																x						
Epipactis helleborine	Eastern Helleborine	SNA		3	x	x						x					x		x			x				
Equisetum arvense	Field Horsetail	S5	0	0	x				x			x	x	x			x		x	x	x		x			x
Equisetum fluviatile	Water Horsetail	S5	7	-5								x		x												
Equisetum hyemale	Common Scouring-rush	S5	2	0											x											
Equisetum sylvaticum	Woodland Horsetail	S5	7	-3												x	x									
Erigeron annuus	Annual Fleabane	S5	0	3	x		x	x	x														x			x
Erigeron canadensis	Canada Horseweed	S5	0	3					x													x	x			x
Euonymus alatus	Winged Euonymus	SNA		5					x																	
Euonymus obovatus	Running Strawberry Bush	S4	6	5		x																		x		
Eupatorium perfoliatum	Common Boneset	S5	2	-3	x		x	x				x		x		x	x			x	x				x	
Eurybia macrophylla	Large-leaved Aster	S5	5	5														x								
Euthamia graminifolia	Grass-leaved Goldenrod	S5	2	0			x	x	x																	x
Eutrochium maculatum	Spotted Joe Pye Weed	S5	3	-5	x		x					x	x	x		x	x			x	x				x	
Fagus grandifolia	American Beech	S4	6	3																				x		
Fragaria virginiana	Wild Strawberry	S5	2	3			x		x													x	x			x
Frangula alnus	Glossy Buckthorn	SNA		0	x		x		x		x	x	x	x	x	x	x		x	x		x			x	
Fraxinus americana	White Ash	S4	4	3		x			x						x			x				x		x	x	
Fraxinus nigra	Black Ash	S4	7	-3	x	x						x				x	x	x			x					
Fraxinus pennsylvanica	Green Ash	S4	3	-3	x	x			x			x	x	x	x	x	x				x	x		x	x	x
Galium aparine	Cleavers	S5	4	3	x										x											
Galium asprellum	Rough Bedstraw	S5	6	-5								x		x		x	x				x					

Galium palustre	Marsh Bedstraw	S5				5	-5	x							x	x	x		x				x						
Geranium maculatum	Spotted Geranium	S5				6	3	x	x						x					x	x				x				
Geranium robertianum	Herb-Robert	S5				2	3											x											
Geum sp.	Avens																										x		
Geum aleppicum	Yellow Avens	S5				2	0	x	x								x			x									x
Geum canadense	White Avens	S5				3	0	x	x			x						x		x	x	x			x			x	
Geum laciniatum	Rough Avens	S4				4	-3			x																			
Glyceria grandis	Tall Mannagrass	S5				5	-5	x		x							x							x					
Glyceria striata	Fowl Mannagrass	S5				3	-5	x	x	x						x	x						x	x			x		
Hackelia virginiana	Virginia Stickseed	S5				5	3		x									x						x	x				
Hamamelis virginiana	American Witch-hazel	S4S5				6	3		x						x			x			x				x				
Hedera helix	English Ivy	SNA					3														x				x				
Hepatica americana	Round-lobed Hepatica	S5				6	5														x								
Hesperis matronalis	Dame's Rocket	SNA					3																			x			
Hieracium sp.	Hawkweed	SNA																											x
Hypericum perforatum	Common St. John's-wort	SNA					5		x		x	x									x				x	x			x
Hypericum punctatum	Spotted St. John's-wort	S5				5	0		x	x																			
Ilex verticillata	Black Holly	S5				5	-3	x										x											
Impatiens capensis	Spotted Jewelweed	S5				4	-3	x				x			x	x	x	x	x	x	x		x	x				x	
Iris versicolor	Harlequin Blue Flag	S5				5	-5	x							x	x	x						x						
Juglans cinerea	Butternut	S2?	END	END	END	6	3														x								
Juglans nigra	Black Walnut	S4?				5	3	x	x	x	x	x		x	x			planted		x	x	x		x		x		x	
Juncus canadensis	Canada Rush	S5				6	-5			x																			

Juncus dudleyi	Dudley's Rush	S5	1	-3			x																				
Juncus effusus	Soft Rush	S5	4	-5	x		x															x				x	
Juncus tenuis	Path Rush	S5	0	0			x																				
Juniperus virginiana	Eastern Red Cedar	S5	4	3					x																		x
Lactuca biennis	Tall Blue Lettuce	S5	6	0																			x				
Lactuca canadensis	Canada Lettuce	S5	3	3			x																				x
Larix decidua	European Larch	SNA		5		x																					
Larix laricina	Tamarack	S5	7	-3	x							x		x	x		x			x							
Leersia oryzoides	Rice Cutgrass	S5	3	-5	x									x		x	x			x	x					x	
Lemna minor	Lesser Duckweed	S5?	5	-5			x					x								x							
Leonurus cardiaca	Common Motherwort	SNA		5		x			x														x	x			x
Leucanthemum vulgare	Oxeye Daisy	SNA		5		x	x	x																			
Ligustrum vulgare	European Privet	SNA		3																					x		
Lilium michiganense	Michigan Lily	S4	7	-3	x																						
Linaria vulgaris	Butter-and-eggs	SNA		5																			x			x	
Lindera benzoin	Spicebush	S4	6	-3	x							x			x		x	x									
Liriodendron tulipifera	Tulip Tree	S4	8	3					planted																		
Lobelia siphilitica	Great Blue Lobelia	S5	6	-3	x			x				x		x		x	x										
Lolium arundinaceum	Tall Fescue	SNA		3	x		x	x																			
Lonicera dioica	Limber Honeysuckle	S5	5	3	x	x									x		x										
Lonicera tatarica	Tartarian Honeysuckle	SNA		3			x				x				x			x	x				x	x	x		x
Lotus corniculatus	Garden Bird's-foot Trefoil	SNA		3			x	x																			
Ludwigia palustris	Marsh Seedbox	S5	5	-5			x							x													
Luzula sp.	Woodrush																	x									

Lycopus americanus	American Water-horehound	S5	4	5	-			x					x	x							x						
Lycopus uniflorus	Northern Water-horehound	S5	5	5	-	x					x										x	x					
Lysimachia borealis	Northern Starflower	S5	6	0			x						x			x			x								
Lysimachia ciliata	Fringed Loosestrife	S5	4	3	-	x		x					x	x	x		x	x			x	x				x	
Lysimachia nummularia	Creeping Jennie	SNA		3	-									x	x												
Lysimachia thyrsiflora	Water Loosestrife	S5	7	5	-	x																					
Lythrum salicaria	Purple Loosestrife	SNA		5	-										x						x						
Maianthemum canadense	Wild Lily-of-the-valley	S5	5	3		x	x						x			x			x			x					
Maianthemum racemosum	Large False Solomon's Seal	S5	4	3			x												x				x				
Maianthemum stellatum	Star-flowered False Solomon's Seal	S5	6	0		x	x						x	x					x			x	x				
Malus coronaria	Sweet Crabapple	S4	5	5																			x				
Malus pumila	Common Apple	SNA		5			x			x	x					x			x	x			x	x		x	
Matteuccia struthiopteris	Ostrich Fern	S5	5	0			x														x						
Medicago lupulina	Black Medic	SNA		3		x																					
Medicago sativa	Alfalfa	SNA		5						x																	
Melilotus albus	White Sweet-clover	SNA		3					x	x												x			x		
Mentha canadensis	Canada Mint	S5	3	3	-			x					x	x	x												
Mitchella repens	Partridge-berry	S5	6	3			x						x			x			x								
Mitella diphylla	Two-leaved Mitrewort	S5	5	3									x						x								
Mitella nuda	Naked Mitrewort	S5	6	3	-								x		x												
Monarda fistulosa	Wild Bergamot	S5	6	3		x		x											x				x				
Morus alba	White Mulberry	SNA		0					x		x													x	x		
Muhlenbergia glomerata	Marsh Muhly	S5	7	5	-																x						

Muhlenbergia mexicana var. mexicana	Mexican Muhly	S5	1	-3				x																		
Mysotis sp.	Forget-me-not													x						x						
Nabalus albus	White Rattlesnakeroot	S5	6	3		x									x		x									
Nasturtium officinale	Watercress	SNA		-5									x	x						x						
Oenothera biennis	Common Evening Primrose	S5	0	3		x																x				x
Onoclea sensibilis	Sensitive Fern	S5	4	-3	x		x					x	x	x	x		x	x	x	x	x				x	
Osmunda regalis	Royal Fern	S5	7	-5	x											x										
Osmundastrum cinnamomeum	Cinnamon Fern	S5	7	-3	x							x			x		x			x						
Ostrya virginiana	Eastern Hop-hornbeam	S5	4	3		x																x				
Oxalis sp.	Wood-sorrel																	x								
Oxalis stricta	Upright Yellow Wood-sorrel	S5	0	3		x																				
Packera aurea	Golden Ragwort	S5	7	-3	x		x					x							x							
Parthenocissus quinquefolia	Virginia Creeper	S4?	6	3															x							
Parthenocissus vitacea	Thicket Creeper	S5	4	3	x	x			x				x	x	x	x	x	x		x	x	x	x			x
Penthorum sedoides	Ditch-stonecrop	S5	4	-5			x																			
Persicaria hydropiper	Marshpepper Smartweed	SNA		-5			x																			
Persicaria maculosa	Spotted Lady's-thumb	SNA		-3			x																			
Phalaris arundinacea	Reed Canary Grass	S5	0	-3	x	x		x	x				x	x	x					x	x		x		x	
Phleum pratense	Common Timothy	SNA		3			x		x														x			x
Phragmites australis ssp. australis	European Reed	SNA		-3		x		x		x					x						x					x
Physocarpus opulifolius	Eastern Ninebark	S5	5	-3		x						x	x	x	x	x				x	x					

Picea abies	Norway Spruce	SNA		5					planted															planted	
Picea glauca	White Spruce	S5	6	3					planted													planted			
Picea pungens	Blue Spruce	SNA		3					planted																
Pilea pumila	Dwarf Clearweed	S5	5	-3	x						x		x					x							
Pinus resinosa	Red Pine	S5	8	3					planted														planted		
Pinus strobus	Eastern White Pine	S5	4	3		x			planted	x	x		planted	x	x	x	x			x	planted				
Pinus sylvestris	Scots Pine	SNA		3		x			planted	planted														planted	
Plantago major	Common Plantain	SNA		3	x	x	x	x	x															x	x
Plantago rugelii	Rugel's Plantain	S5	1	0		x																			
Poa compressa	Canada Bluegrass	SNA		3																x					
Poa palustris	Fowl Bluegrass	S5	5	-3	x		x				x	x	x		x				x	x					
Poa pratensis	Kentucky Bluegrass	S5	0	3			x	x	x				x							x		x		x	x
Podophyllum peltatum	May-apple	S5	5	3		x												x	x		x				
Populus alba	White Poplar	SNA		5									planted												
Populus balsamifera	Balsam Poplar	S5	4	-3						x									x						
Populus deltoides	Eastern Cottonwood	S5	4	0	x		x		x	x			x							x		x			x
Populus grandidentata	Large-toothed Aspen	S5	5	5												x	x								
Populus tremuloides	Trembling Aspen	S5	2	0	x				x		x		x	x	x		x			x	x	x			x
Potentilla recta	Sulphur Cinquefoil	SNA		5			x																		x
Potentilla simplex	Old-field Cinquefoil	S5	3	3		x																			
Prunella vulgaris	Self-heal	S5	0	0	x		x			x	x														
Prunus serotina	Black Cherry	S5	3	3		x	x		x				x			x	x			x	x	x	x	x	x
Prunus virginiana	Choke Cherry	S5	2	3	x	x			x	x			x			x	x	x		x			x		
Pteridium aquilinum	Bracken Fern	S5	2	3					x							x									

Pycnanthemum virginianum	Virginia Mountain-mint	S4	6	-3								x		x												
Quercus alba	White Oak	S5	6	3		x									x				x			x		x		x
Quercus macrocarpa	Bur Oak	S5	5	3	x	x			x		x	x	x	x		x		x	x		x	x		x	x	
Quercus rubra	Northern Red Oak	S5	6	3		x			x		x							x				x				x
Ranunculus acris	Tall Buttercup	SNA		0											x											
Ranunculus caricetorum	Northern Swamp Buttercup	S5	5	-5								x				x	x				x			x		
Ranunculus recurvatus	Hooked Buttercup	S5	4	-3								x			x											
Rhamnus cathartica	Common Buckthorn	SNA		0	x	x			x		x		x		x			x	x			x	x	x	x	
Rhus aromatica	Fragrant Sumac	S4	8	5					planted																	
Rhus typhina	Staghorn Sumac	S5	1	3	x			x	x						x								x			
Ribes americanum	Wild Black Currant	S5	4	-3	x	x			x			x		x		x	x			x		x		x	x	
Ribes cynosbati	Prickly Gooseberry	S5	4	3		x							x								x					
Ribes hirtellum	Smooth Gooseberry	S5	6	-3										x												
Ribes triste	Swamp Red Currant	S5	6	-5								x		x		x	x									
Robinia pseudoacacia	Black Locust	SNA		3																		x		x		
Rosa multiflora	Multiflora Rose	SNA		3	x	x	x	x	x					x	x			x	x		x				x	
Rosa palustris	Swamp Rose	S5	7	-5								x								x						
Rubus sp.	Brambles										x				x											
Rubus allegheniensis	Allegheny Blackberry	S5	2	3		x												x		x						x
Rubus idaeus	Common Red Raspberry	S5	2	3		x		x	x														x			
Rubus occidentalis	Black Raspberry	S5	2	5	x	x									x	x			x		x		x	x		x
Rubus pubescens	Dewberry	S5	4	-3	x	x						x	x		x		x	x	x			x				
Rudbeckia hirta	Black-eyed Susan	S5	0	3		x	x		x																	
Rumex crispus	Curly Dock	SNA		0	x			x	x																x	x

Rumex obtusifolius	Bitter Dock	SNA		-3	x																						
Rumex verticillatus	Swamp Dock	S4	7	-5								x		x		x				x	x						
Sagittaria latifolia	Broad-leaved Arrowhead	S5	4	-5										x						x	x						
Salix amygdaloides	Peach-leaved Willow	S5	6	-3	x					x											x						
Salix bebbiana	Bebb's Willow	S5	4	-3	x		x							x		x				x	x						
Salix discolor	Pussy Willow	S5	3	-3	x		x			x		x		x						x	x						
Salix eriocephala	Heart-leaved Willow	S5	4	-3	x		x			x											x					x	
Salix euxina	Crack Willow	SNA		0	x	x				x				x						x	x						
Salix interior	Sandbar Willow	S5	1	-3						x											x						
Salix lucida	Shining Willow	S5	5	-3								x									x						
Salix nigra	Black Willow	S4	6	-5	x																x						
Salix petiolaris	Meadow Willow	S5	3	-3										x						x	x						
Salix serissima	Autumn Willow	S5	6	-5																x							
Sambucus canadensis	Common Elderberry	S5	5	-3	x							x				x					x						
Sambucus racemosa	Red Elderberry	S5	5	3		x																					
Sanguinaria canadensis	Bloodroot	S5	5	3		x																	x				
Saponaria officinalis	Bouncing-bet	SNA		3					x																		
Schoenoplectus tabernaemontani	Soft-stemmed Bulrush	S5	5	-5			x							x						x	x					x	
Scirpus atrovirens	Dark-green Bulrush	S5	3	-5	x		x	x				x		x			x			x						x	
Scirpus cyperinus	Cottongrass Bulrush	S5	4	-5			x							x						x							

Scirpus microcarpus	Red-tinged Bulrush	S5	4	-5										x												
Scirpus pendulus	Rufous Bulrush	S5	3	-5			x																			
Scrophularia marilandica	Carpenter's Square Figwort	S4	7	3																		x			x	
Scutellaria galericulata	Hooded Skullcap	S5	6	-5										x												
Scutellaria lateriflora	Mad Dog Skullcap	S5	5	-5									x							x						
Securigera varia	Common Crown-vetch	SNA		5																				x		
Setaria sp.	Foxtail	SNA			x			x																		
Setaria faberi	Giant Foxtail	SNA		3																			x			
Silene vulgaris	Bladder Campion	SNA		5					x																	
Sisyrinchium montanum var. montanum	Strict Blue-eyed-grass	S5	4	0				x																		
Smilax herbacea	Herbaceous Carrionflower	S4?	5	0	x																					
Solanum carolinense	Carolina Horse-nettle	SNA		3																						x
Solanum dulcamara	Bittersweet Nightshade	SNA		0	x									x	x	x	x			x	x				x	
Solidago altissima	Tall Goldenrod	S5	1	3	x	x	x	x	x	x				x	x	x		x	x		x	x	x		x	x
Solidago caesia	Blue-stemmed Goldenrod	S5	5	3														x								
Solidago canadensis	Canada Goldenrod	S5	1	3			x	x	x	x					x						x	x				
Solidago flexicaulis	Zigzag Goldenrod	S5	6	3																		x				
Solidago gigantea	Giant Goldenrod	S5	4	-3	x		x							x		x				x	x				x	
Solidago nemoralis	Gray-stemmed Goldenrod	S5	2	5					x																	
Solidago patula	Round-leaved Goldenrod	S4	8	-5	x							x		x		x	x			x	x					
Solidago rugosa	Rough-stemmed Goldenrod	S5	4	0	x		x							x	x		x		x	x	x					
Sonchus arvensis	Field Sow-thistle	SNA		3	x		x	x	x					x											x	x
Sparganium eurycarpum	Broad-fruited Burreed	S5	3	-5										x			x			x						
Spiraea alba	White Meadowsweet	S5	3	-3	x									x							x					

Stellaria longifolia	Long-leaved Starwort	S5	2	-3								x		x												
Stuckenia pectinata	Sago Pondweed	S5	4	-5																					x	
Symphyotrichum ericoides	White Heath Aster	S5	4	3				x	x																	x
Symphyotrichum lanceolatum	Panicled Aster	S5	3	-3			x		x				x	x						x	x				x	
Symphyotrichum lanceolatum ssp. lanceolatum	Panicled Aster	S5	3	-3	x																x					x
Symphyotrichum lateriflorum	Calico Aster	S5	3	0	x	x	x					x	x	x	x		x	x	x	x	x	x		x		
Symphyotrichum novae-angliae	New England Aster	S5	2	-3					x													x	x		x	x
Symphyotrichum pilosum	White Heath Aster	S5		3																						x
Symphyotrichum puniceum	Swamp Aster	S5	6	-5	x		x					x	x	x	x	x	x		x	x	x					
Symphyotrichum urophyllum	Arrow-leaved Aster	S4	6	5			x															x				
Symplocarpus foetidus	Skunk Cabbage	S5	7	-5	x		x					x		x	x	x	x		x	x	x					
Taraxacum officinale	Common Dandelion	SNA		3				x															x		x	
Thalictrum pubescens	Tall Meadow-rue	S5	5	-3								x	x	x	x	x	x							x	x	
Thalictrum dioicum	Early Meadow-rue	S5	6	3														x								
Thelypteris noveboracensis	New York Fern	S4S5	7	0	x																					
Thelypteris palustris	Marsh Fern	S5	5	-3	x		x					x		x		x	x			x	x					
Thuja occidentalis	Eastern White Cedar	S5	4	-3	x	x	x		planted		planted	x				x	x						x			
Tiarella cordifolia	Heart-leaved Foam-flower	S5	6	3	x	x						x			x		x	x			x					
Tilia americana	American Basswood	S5	4	3							x	x			x		x					x		x	x	x
Toxicodendron radicans	Poison Ivy	S5	2	0									x	x	x			x	x			x				
Toxicodendron radicans var. rydbergii	Western Poison Ivy	S5	2	0	x	x			x			x														

Toxicodendron vernix	Poison Sumac	S4	8	-5								x		x						x						
Trifolium hybridum	Alsike Clover	SNA		3			x	x	x														x			
Trillium grandiflorum	White Trillium	S5	5	3		x																				
Triosteum aurantiacum	Orange-fruited Horse-gentian	S4S5	7	5														x								
Tussilago farfara	Colt's-foot	SNA		3	x		x						x													
Typha sp.	Cattail						x					x				x										
Typha angustifolia	Narrow-leaved Cattail	SNA		-5										x						x						
Typha latifolia	Broad-leaved Cattail	S5	1	-5	x									x							x					
Ulmus americana	American Elm	S5	3	-3	x	x						x	x	x			x	x		x	x			x		x
Urtica dioica	Stinging Nettle	S5	2	0	x				x												x					
Vaccinium corymbosum	Highbush Blueberry	S4	8	-3								x			x		x									
Verbascum thapsus	Common Mullein	SNA		5				x														x	x			x
Verbena hastata	Blue Vervain	S5	4	-3			x																		x	
Verbena urticifolia	White Vervain	S5	4	0			x	x													x					
Veronica officinalis	Common Speedwell	SNA		5		x									x											
Viburnum acerifolium	Maple-leaved Viburnum	S5	6	5		x																				
Viburnum lentago	Nannyberry	S5	4	0	x				x			x					x				x	x				
Viburnum opulus	Cranberry Viburnum	S5	5	-3					x																	x
Viburnum opulus ssp. trilobum	Highbush Cranberry	S5	5	-3	x	x						x			x						x					
Viburnum rafinesquianum	Downy Arrowwood	S5	7	5														x						x		
Vicia cracca	Tufted Vetch	SNA		5					x																	x
Viola sp.	Violet						x														x					
Viola blanda	Sweet White Violet	S5	6	-3								x														
Viola cucullata	Marsh Blue Violet	S5	5	-5								x	x	x												

Viola labradorica	Labrador Violet	S5	3	0		x																					
Viola sororia	Woolly Blue Violet	S5	4	0	x													x						x			
Vitis riparia	Riverbank Grape	S5	0	0	x				x	x								x			x	x	x	x		x
Zanthoxylum americanum	Common Prickly-ash	S5	3	3																		x		x	x	
					138	105	93	36	88	19	21	105	43	107	77	58	69	74	31	72	96	76	47	38	57	51

2.2 FAUNAL SCREENING

Faunal Observations from the Dorchester Study Area, 2019

James Holdsworth / Consulting Biologist

Field Review / Chronology of Field Investigations / Fauna
May 10 – reconnaissance, early season breeding bird surveys, faunal surveys

May 14 – 1st MMP Survey

May 22 – Bobolink / Eastern Meadowlark survey 1, early breeding bird surveys, faunal surveys

May 31 - Bobolink / Eastern Meadowlark survey 2, early breeding bird surveys, incidental fauna

June 9 – Bobolink / Eastern Meadowlark survey 3, early breeding bird surveys, incidental fauna, 2nd MMP survey (pm)

July 4 - breeding bird confirmation surveys, SAR specific surveys and incidental fauna

Site Visit Weather Conditions

Visit Date	Visit Time	Temp. Range [C]	Cloud Cover [%]	Wind Speed [Beaufort scale]
May 10	10.30 – 2.30 pm	12 - 14	100 - 90	B3 – B2
May 14	7.00 – 9.30 pm	14 - 12	10 - 5	B2 – B1
May 22	5.50 – 7.40 am	7 - 10	100	B2
May 31	5.45 – 11 am	8 - 22	0 - 20	B1 – B2
June 9	5.45 – 12 pm	12 - 23	20 - 50	B2
June 9	9.15 – 11 pm	20 - 19	100	B2
July 4	8.00 – 11.30 am	20 - 28	25 - 5	B2

Species Lists for the Dorchester Site

Birds - Methodology
Breeding bird surveys were undertaken on 5 separate dates by a breeding bird expert under appropriate weather conditions. They are partitioned into 3 Wildlife Survey Quadrants, based on broad habitat characteristics and continuity.

These areas were thoroughly covered by walking random transects and recording presence, abundance and level of breeding evidence (using *Ontario Breeding Bird Atlas* [OBBA] protocols).

OBBA Breeding Evidence Codes

POSSIBLE
H-species observed in breeding season in suitable nesting habitat
S-singing male present or breeding calls heard in breeding season in suitable habitat

PROBABLE
P-pair observed in their breeding season in suitable habitat
T-permanent territory presumed through registration of territorial song or presence of adult bird in breeding habitat on at least 2 days, one week or more apart at the same place.
D-courtship or display between a male and female, or two males including courtship feeding and copulation.
V-visiting probable nest site.
A-agitated behavior or anxiety calls of adults
B-brood patch on adult female or cloacal protuberance on adult male
N-nest building or excavation of nest hole

CONFIRMED

DD-distraction display or injury feigning
NU-used nest or eggshell found [occupied/laid during atlas period]
FY-recently fledged young or downy young.
AE-adults leaving or entering nest site in circumstances indicating occupied nest
FS-adult carrying faecal sac
CF-adult carrying food for young
NE-nest containing eggs
NY-nest with young seen or heard

In the species columns, each species is assigned a breeding level, based on the highest level of breeding evidence observed, by quadrant. A species observed, showing no breeding evidence or where no suitable habitat is present, is marked 'X'.

The number recorded represents the highest one-day total for that species.

The table also lists the COSSARO [provincial] and COSEWIC [national] rank [if any], as well as the Natural Heritage Information Centre [NHIC, MNR] S rank. COSSARO is the Committee on the Status of Species at Risk in Ontario [MNR] and COSEWIC is the Committee on the Status of Endangered Wildlife in Canada.

For the purpose of wildlife surveys, the study area is composed of 3 habitat quadrants, defined below –

Q1. South cropfield, north hayfield, edges and hedgerows (includes south-east dug pond, AC1)

Q2. South-west and west woodland (includes west dug pond, AC5)

Q3. North wetland / woodland

Bird Species

SPECIES	Q1	Q2	Q3	Breeding Level	COSSARO/ COSEWIC	Comment
Great Blue Heron	1			H		
Green Heron		1		H		
Canada Goose	6			H		
Mallard	8			FY		
Wood Duck		2		P		
Hooded Merganser		2		H		
Wild Turkey	4	2	6	H/T/FY		
Turkey Vulture	6			H		Flying over
Bald Eagle	1			**X**	**SC/ -**	**See SAR discussion**
Osprey		1		X		Flying over
Cooper's Hawk	1		2	H/A		
Red-tailed Hawk	2			P		
Killdeer	2			A		
Spotted Sandpiper	2			A		
Ring-billed Gull	3			X		
Rock Pigeon	8			X		
Mourning Dove	4	2		H/H		
Yellow-billed Cuckoo		1		S		
Great Horned Owl			1	FY		
Ruby-throated Hummingbird		1		H		
Belted Kingfisher		1		T		
Downy Woodpecker		1	3	H/FY		
Hairy Woodpecker			1	H		

Red-bellied Woodpecker		1	1	T/T		
Yellow-bellied Sapsucker			1	H		
Northern Flicker	1	3	1	H/T/H		
Pileated Woodpecker			1	H		
Eastern Kingbird	4			A		
Eastern Wood Pewee	1	2	3	T/T/T	**SC/SC**	**See SAR discussion**
Eastern Phoebe		1		T		
Willow Flycatcher			1	S		
Alder Flycatcher			1	S		
SPECIES	**Q1**	**Q2**	**Q3**	**Breeding Level**	**COSSARO/ COSEWIC**	**Comment**
Least Flycatcher		1		S		
Great Crested Flycatcher		1	2	T/T		
Red-eyed Vireo		3	5	T/A		
Warbling Vireo	1	1		T/T		
Blue Jay	2	2	4	H/H/A		
American Crow	4	3	4	T/T/FY		
Horned Lark	4			N		Nest in cornfield
Purple Martin	2			H		
Cliff Swallow	2			X		
Barn Swallow	13			X	**THR/THR**	**See SAR discussion**
Tree Swallow	4			AE		
Bank Swallow	6			X	**THR/THR**	**Over site**
Northern Rough-winged Swallow	2			X		
Black-capped Chickadee	2	6	4	H/FY/FY		
White-breasted Nuthatch		1	1	H/T		
Red-breasted Nuthatch			1	H		
House Wren	1	1	3	S/S/T		
Winter Wren		1		T		
Carolina Wren		1		T		
Brown Creeper			1	H		
Eastern Bluebird	2			AE		
American Robin	4	6	6	FY/FY/FY		
Wood Thrush		1		S	**SC/THR**	**See SAR discussion**
Gray Catbird	2	3	3	S/A/A		
Brown Thrasher	1			S		
European Starling	20	6	11	FY/FY/FY		
Cedar Waxwing		3	4	H/H		
Yellow Warbler	1	2	3	S/T/A		
Pine Warbler		1	2	T/T		
Black and White Warbler			1	S		
Blue-winged Warbler	1			S		
Northern Waterthrush		1		S		
American Redstart		1		S		
Common Yellowthroat		2	2	A/A		
Eastern Towhee		1		S		
Chipping Sparrow	1		2	T/T		
Field Sparrow	4			CF		
Savannah Sparrow	16			FY		Large numbers in hayfield
Vesper Sparrow	2			T		
Song Sparrow	5	3	8	FY/CF/FY		
Swamp Sparrow		1	3	T/S		
Northern Cardinal	2	3	5	T/A/FY		
Rose-breasted Grosbeak	2	5	2	S/FY/FY		

Indigo Bunting	2		2	S/T		
Bobolink	6			D	**THR/THR**	See SAR discussion
Red-winged Blackbird	10	6	12	FY/A/FY		
Common Grackle	20	11	13	FY/FY/FY		
SPECIES	**Q1**	**Q2**	**Q3**	**Breeding Level**	**COSSARO/ COSEWIC**	**Comment**
Brown-headed Cowbird	4	3	3	T/FY/FY		
Baltimore Oriole	2	2	5	S/T/FY		
Orchard Oriole			1	S		
American Goldfinch	2	2	2	P/H/P		
House Finch	4			T		
House Sparrow	4			T		

Species of Conservation Concern

Species status [for all fauna] was evaluated using the following sources:

- The COSEWIC list for national status designations (current list at time of report preparation);
- The Species At Risk Act for federally listed species (current at time of report preparation);
- The COSSARO list for provincial status designations (current list at time of report preparation);
- The NHIC / Biodiversity Explorer website for provincial rarity ranks (i.e. S-Ranks);

Of the 85 summer resident bird species [80 with some breeding evidence], the following species of conservation concern [e.g. species that are "designated" by COSEWIC and/or listed under the Species at Risk Act [SARA]; species "designated" by COSSARO, including Endangered and Threatened species listed and regulated under Ontario's ESA; and provincially rare species [NHIC S-rank of S1 to S3] were observed during field surveys

- 5 species are listed **Species at Risk (SAR) in Canada** (by COSEWIC):
  - Barn Swallow – *Threatened*
  - Bank Swallow – *Threatened*
  - Eastern Wood Pewee – *Special Concern*
  - Wood Thrush - *Threatened*
  - Bobolink – *Threatened*

- 6 species are listed **Species at Risk (SAR) in Ontario** (by COSSARO):
  - Bald Eagle – *Special Concern*
  - Barn Swallow – *Threatened*
  - Bank Swallow – *Threatened*
  - Eastern Wood Pewee – *Special Concern*
  - Wood Thrush – *Special Concern*
  - Bobolink – *Threatened*

SAR Bird Discussion

Bald Eagle – A single adult Bald Eagle was observed flying over the site. The site does not have suitable wetlands to provide foraging habitat for this species – much more likely to be using the Dorchester Mill Pond or the adjacent Thames River. The mature woodlands on-site may support nesting but extensive field surveys did not detect occupied nesting trees.

Barn Swallow – A maximum of 13 birds, including fledged young, were observed aerial foraging over the crop and hayfields (Q1). The study area does not possess the suitable anthropogenic or natural habitat suitable for nesting for this species.

Bank Swallow – 6 Bank Swallow were observed aerial foraging over the open / agricultural areas of the site. The study site does not possess suitable breeding habitat for this species, in the form of steep sand or earth banks, the open and agricultural areas of Q1 could be considered important aerial foraging habitat.

Eastern Wood Pewee – A total of 6 singing males were recorded within the study site. A single bird was found in the small copse of woods (Q1) surrounded by hayfield and cropland. 2 males were found in the southwest and west woodlands (Q2) and three males were found in the north woodland / wetland (Q3). Rather than GPS locate all of the these records, it is accurate to say that all of Q2 and Q3 is suitable habitat for this species and, based on the known occurrences thus far, this species could be found at almost any location within these quadrants in the future.

The occurrence of the male in the copse in Q1 would be considered an anomaly, as the habitat is very small, isolated and likely only used as a satellite territory and not a primary nesting area.

Wood Thrush – A single singing male was located at in the Southwest woodlot (493789 / 4758311). Habitat here is suitable and this record is considered to be a likely breeding resident

EAWP UTM's as follows
1. 494440 / 4758182
2. 494183 / 4758443
3. 493761 / 4758310
4. 493693 / 4758664
5. 493830 / 4758858
6. 494152 / 4758808

Potential SAR Bird Species Based on Suitability of Habitat

Red-headed Woodpecker [SC/END] – Suitable habitat is present throughout most of the study area. Although not detected during the course of field surveys, this species could occur as a breeding resident at any time.

Canada Warbler [SC/THR] – Suitable habitat is present for this species in Q3, where bog-like conditions are present in the form of wet mixed woods with a Tamarack component. The author has found this species in similar habitat in adjacent Oxford County and it is possible for this species to occur as a breeder at some point in the future.

Eastern Meadowlark and Bobolink Surveys
Bobolink and Eastern Meadowlark point count surveys were carried out in suitable habitat within the subject property in accordance with the MNRF Bobolink survey methodology under the Endangered Species Act, 2007 (MNRF, 2011, 2015). These surveys were conducted on three separate dates (May 22, May 31 and June 9 2019), for a total of approximately 7 person hours.

The surveys were conducted under suitable weather conditions (i.e. no precipitation, good visibility, low wind) by walking linear and edge transects across suitable habitat with two point count stations. Surveys were conducted between dawn and 9 am. Point count type and methods were 10 minutes in duration, to adhere to MNRF survey protocols.

See site mapping for PC location and transect lines and PC datasheets can be provided upon request

Results

A maximum of 6 individual Bobolink were observed during the course of field surveys. This consisted of 4 males and 2 females. Although no overt nesting indications were observed – no carrying food or fledglings etc. - the behaviour observed is indicative of nesting birds and it is presumed that (at least) two pairs of Bobolink were nesting in the study area.

In terms of site usage, refer to the PC datasheets for mapped movements and approximate positions from the point count locations. Observations indicated that almost the entire north hay / alfalfa field was utilized in some capacity by the Bobolink present – either as singing posts, display habitat or potential nesting habitat. Only the north-west corner of the study area, that area surrounded by woodland (see mapping), was shunned by the Bobolink present.

Conclusion regarding the site is as follows – a minimum of 2 pairs of Bobolink are territorial on-site, both pairs are presumed to be breeding on-site and almost the entirety of the hay / alfalfa field is considered critical breeding and foraging habitat for this species. Site and location fidelity was illustrated through the point count surveys and it is concluded that the study site is a permanent breeding location.

Compensation habitat for most of the area of suitable habitat [as negotiated] is suggested and should be anticipated.

No observations of Eastern Meadowlark were obtained and the species is considered not present, although habitat (primarily in the area of hay / alfalfa) is suitable and this species could occur as a breeder at some point in the future.

Preferred breeding habitat for Bobolink consists of hayfields, pastures, and meadows which are dominated by a mixture of grasses and broad-leaved forbs (e.g., red clover, dandelion, timothy). It also occurs in wet prairie, graminoid peatlands, abandoned fields, no-till cropland, small-grain fields, and reed beds. It does not *typically* occupy agricultural fields of row crops such as corn, soybean, and wheat. However, during extensive surveys in south-western Ontario (Essex, Chatham Kent, Oxford, Peel, and York counties) this observer has found "widespread use of wheat fields for nesting Bobolink, especially where alternate [higher quality] habitat does not exist. Use of wheat fields in areas where higher quality habitat is present [pasture and hayfields] is most often predicated by wheat field size as compared to those areas of more suitable habitat. It is speculated that these large wheat fields provide more interior habitat - farther from woodland edges - and provide nesting habitat less prone to predation.'' (Holdsworth pers. obs).

Bobolink density is significantly higher in areas with relatively low amounts of total vegetative cover, low alfalfa cover, and low total legume cover but with high litter cover and high grass-to-legume ratios (e.g.hayfields ≥ 8 yr old). Nest tends to be sited in wet habitats, transitional between drier soils and areas providing poor drainage. Nest is always on ground, often at base of large forbs such as meadow rue, golden alexander, clover, etc. Bobolink avoids nesting in habitats dominated by overly dense shrubs and overly deep litter layer (>2cm). Bobolink density and likelihood of occurrence increase as a function of distance from forest edges (Martin et al., 1995; COSEWIC 2010).

Mammals – Methodology

Mammals were surveyed as part of 'general' wildlife surveys. These surveys involved general coverage recording all species observations and sign (e.g. tracks / trails, scat, burrows, dens, browse, vocalizations).

Mammals

SPECIES	Q1	Q2	Q3	COSSARO/ COSEWIC	Comments
Raccoon	2	1	1		
White-tailed Deer	2	2	5		
Coyote	2				
Red Fox	1				
Muskrat	1				
Gray Squirrel	4	4	2		
Red Squirrel			2		
Eastern Chipmunk	1		2		
Striped Skunk	1				
Eastern Cottontail	2	1			
Meadow Vole	1				
Woodchuck	1				

Reptiles, Amphibians - Methodology

Searches for herptiles were conducted throughout the study site, primarily as incidental observations. All observations below are those made outside of the MMP survey protocol. For MMP results, see that section below.

Herptiles

SPECIES	Q1	Q2	Q3	COSSARO / COSEWIC	Comments
Common Snapping Turtle	1			SC/SC	
Midland Painted Turtle	**9**			**SC/SC**	
Eastern Gartersnake	1				
American Toad					See MMP survey results
Green Frog					See MMP survey results
Northern Leopard Frog		1	2		
Spring Peeper					See MMP survey results
Gray Tree Frog			1		

Survey Methodology of Amphibian Calling Surveys

Amphibian calling activity was assessed using the Marsh Monitoring Program (MMP) amphibian calling survey protocol (Bird Studies Canada 2003). Surveys were conducted by qualified experienced staff under appropriate conditions (i.e. dusk/evening survey with suitable air temperatures and wind strength). Following guidelines of the MMP, night time air temperatures were greater than 10°C for the 1st survey, and 17°C for the second survey. Each calling station was surveyed for 3 minutes between one half hour after sunset and midnight.

Using the MMP, amphibian calling activity was rated using three levels: Level 1 (individual calls can be counted with no overlap), Level 2 (some calls can be counted or estimated, some overlap) or Level 3 (calls continuous and overlapping, individuals not distinguishable).

Based on air photo interpretation and field reconnaissance, 8 locations were selected as potential calling stations.

Due to the late start for authorization to begin fieldwork (May 10), only two calling amphibian surveys were completed at these 8 stations - May 14 and June 9. It was conceded that (due to the start date of May 10) that early calling species like Wood Frog were likely missed and therefore considered likely to be present (suitable breeding habitat for that species is present within the study area) based on MMP surveys.

MMP Calling Station GPS Locations

AC1 - 494563 / 4758256
AC2 – 493784 / 4758313
AC3 – 493668 / 4758341
AC4 – 493534 / 4758283
AC5 – 493836 / 4758486
AC6 – 493946 / 4758826
AC7 – 494175 / 4758890
AC8 – 494069 / 4759104

Table of Results / Amphibian Calling Surveys

SPECIES	AC1	AC2	AC3	AC4	AC5	AC6	AC7	AC8

	Pond				Pond			
American Toad	-/3	-/-	-/-	-/-	-/3	-/-	-/-	-/-
Chorus Frog	-/-	1/-	-/-	-/-	-/-	-/-	-/-	-/-
Green Frog	-/3	-/-	-/-	-/-	-/3	-/1	-/-	-/3
Gray Treefrog	-/-	-/-	-/-	-/-	-/-	-/-	-/1	-/-
Northern Leopard Frog	-/-	-/-	-/-	-/-	-/-	-/-	-/1	-/-
Spring Peeper	3/-	3/1	-/-	-/1	2/-	3/3	2/-	1/-
Species Richness	3	2	0	1	3	2	3	2

Interpretation of Results / MMP Calling Surveys

AC1 – a dug pond, this station recorded full chorus of Spring Peeper during the 1st visit and a full chorus of both American Toad and Green Frog on the 2nd visit. Excellent amphibian breeding habitat.

AC2 – a small woodland pond, recorded full chorus of Spring Peeper and a single Chorus Frog on the 1st visit. A single Spring Peeper called during visit 2. Excellent amphibian breeding habitat.

AC3 – wet area that dried through the period, no calling detected and no viable breeding habitat concluded.

AC4 – small wetland west of Harris Road, a single Spring Peeper called during the 2nd visit. Marginal amphibian breeding habitat.

AC5 – a dug pond, this station recorded level 2 numbers of Spring Peeper during the 1st visit and a full chorus of both American Toad and Green Frog on the 2nd visit. Excellent amphibian breeding habitat.

AC6 – woodland pond, recorded full chorus of Spring Peeper during the 1st and 2nd visit and a single Green Frog on the 2nd visit. Excellent amphibian breeding habitat.

AC7 - woodland pond, recorded level 2 of Spring Peeper during the 1st and 2nd visit and a single Gray Tree Frog and Leopard Frog on the 2nd visit. Excellent amphibian breeding habitat.

AC8 – woodland pond, recorded level 1 Spring Peeper on visit 1 and full chorus of Green Frog on visit 2. Excellent amphibian breeding habitat.

Conclusion

Due to both species diversity and numbers of breeding / calling amphibians recorded, the study site would likely qualify for Significant Wildlife Habitat under both Woodland and Wetland Amphibian Breeding Habitat guidelines, under the SWH schedules. An interpretation of the estimated numbers, as recorded by calling level and not to numerical value, would need to occur to reconcile the criteria required for SWH inclusion.

Also, due to the late start and truncated MMP survey regimen, it is likely that both numbers and species diversity would be greater with an early season MMP round.

Species of Conservation Concern

Two herpetofaunal species of conservation concern were observed within the study area during field investigations - Common Snapping Turtle and Midland Painted Turtle

- **Common Snapping Turtle** is designated "Special Concern" both federally (COSEWIC) and provincially (MNR/COSSARO) with an S-rank of S3.

- **Midland Painted Turtle** is designated "Special Concern" provincially (MNRF/COSSARO)

One adult Common Snapping Turtle was recorded in Q1, within the dug pond designated as AC1.

9 adult or near adult Midland Painted Turtle were recorded in Q1, within the dug pond designated as AC1. This pond has suitable habitat for overwintering for both turtle species, as it has sufficient depth and a soft, muck bottom. Also, although soft soils for nesting are not present immediately adjacent, the nearby (est. 20m) cornfield has loose, sandy soil, very suitable for nesting for both species.

AC5 (also a dug pond), considered part of Q2, also has suitable habitat for both species, although neither were observed but may occur at some point in the future.

Lepidoptera and Odonata – Methodology

Lepidoptera (butterflies and skippers) and Odonata field surveys were completed on all field visits.

Butterflies

SPECIES	Q1	Q2	Q3	COSSARO/ COSEWIC/ S rank	Comments
Cabbage White	15	3			
Clouded Sulphur	45				
Azure sp.	1				
Crescent sp.	5	3			
Common Buckeye	1				
Eastern Comma		1			
American Lady	1				
Red Admiral	15	5	2		
Mourning Cloak			1		
Question Mark		1			
Red-spotted Purple		2			
Monarch	**2**			**SC/END**	**See SAR discussion**
Baltimore		10			Colony in moist meadow at south edge of Q2
Black Swallowtail	2				
Eastern Tiger Swallowtail		1			

Northern Pearly-eye	1	4	2		
Appalachian Brown		1			
Little Wood Satyr	2	4	4		
Common Wood Nymph	3	2			
Common Ringlet	15	2			
Juvenal's Duskywing	2				
Silver-spotted Skipper		1			
Hobomok Skipper		2	3		
European Skipper	11	2			

Odonata

SPECIES	Q1	Q2	Q3	COSSARO/ COSEWIC/ S rank	Comments
Common Green Darner	5	2	2		
Swamp Darner		**1**		**NHIC S2/S3**	
Lilypad Clubtail	**1**			**NHIC S3**	**photo**
Common Baskettail	15	8	8		
Black Saddlebags	2				
Dot-tailed Whiteface	6	11			
Blue Dasher	2				
Eastern Pondhawk		3			
Widow Skimmer	2				
Twelve-spotted Skimmer	3	1			
Common Whitetail	10	6	2		
Meadowhawk Sp.	1	1			
Ebony Jewelwing		2	13		
Slender Spreadwing	6				
Familiar Bluet	30	15			
Eastern Forktail	10	6	2		
Fragile Forktail	1				

Species of Conservation Concern

One Lepidoptera / Odonata species considered species of concern was observed during field surveys

- One species is designated as a **Species at Risk (SAR) in Canada** (by COSEWIC):
  - Monarch – *Endangered*
- One species is designated as a **Species at Risk (SAR) in Ontario** (by COSSARO):
  - Monarch – *Special Concern*

2 Monarch Butterfly were observed in Q1. The study site does possess life-cycle habitat for this species, as the host plant [Milkweed] is present, mostly along field and forest edges.

Two NHIC rare species were observed during field surveys

- **Swamp Darner** [S2/S3] – a fairly common cedar swamp, wet woodland species in south-western Ontario, and expected throughout the wetlands and woodlands in small numbers.

- **Lilypad Clubtail** [S3] – this species requires wetland habitat with lilypads, lacking in the study area. This record is considered to refer to an individual

dispersing from a suitable breeding area, in this case presumed to be the Dorchester Mill Pond.

Cited Literature / References

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Parker, Holdsworth and Skevington, 2010, Checklist to the Butterflies of Oxford County

Holdsworth and Skevington, 2010, Checklist to the Odonata of Oxford County

Holdsworth, 1980 – 2018, Personal notes and records, breeding birds of Oxford County [partial in lit.]

Parker and Bucknell, Summary Records of the Birds of Oxford County, Woodstock Field Naturalists [notes]

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Ontario Ministry of Natural Resources. MNR website. Species at Risk in Ontario (SARO) List. Ontario Ministry of Natural Resources.

Ontario Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section. Science Development and Transfer Branch, Southcentral Sciences Section.

Ontario Ministry of Natural Resources. 2009a. *Draft* Significant Wildlife Habitat Ecoregion Criteria Schedules. Addendum to Significant Wildlife Habitat Technical Guide.

2.3 2022 Additional Surveys

2022 Early Spring Amphibian Calling Survey, Christie Drive, Dorchester

On April 14th, 2022 Vroom & Associates conducted the early spring amphibian calling survey to build upon and complement the 2019 data. In 2019, due to the late retainment of ourselves on this survey could not be completed.

2022 survey assessed amphibian calling activity using the Marsh Monitoring Program (MMP) amphibian calling survey protocol (Bird Studies Canada 2003). Surveys were conducted under appropriate conditions (i.e. dusk/evening survey with suitable air temperatures and wind strength). To ensure detection of all species present. Following guidelines of the MMP, night time air temperatures were greater than 5°C for the first survey. Each calling station was surveyed for 3 minutes between one half hour after sunset and midnight. Using the MMP, amphibian calling activity was rated using three levels: Level 1 (individual calls can be counted with no overlap), Level 2 (some calls can be counted or estimated, some overlap) or Level 3 (calls continuous and overlapping, individuals not distinguishable).

We selected 6/8 of the original calling stations in 2019 that were significant to the site and the most potential for breeding habitat was observed in 2019. In red is the 2019 Survey results.

SPECIES	AC1 SE Pond	AC2	AC3	AC5 West Pond	AC6	AC7
American Toad	-/-/3	-/-/-	-/-/-	-/-/3	-/-/-	-/-/-
Chorus Frog	1/-/-	2/1/-	-/-/-	-/-/-	2/-/-	1/-/-
Green Frog	-/-/3	-/-/-	-/-/-	-/-/3	-/-/1	-/-/-
Gray Treefrog	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/1
Northern Leopard Frog	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/1
Spring Peeper	3/3/-	3/3/1	-/-/-	-/2/-	3/3/3	3/2/-
Wood Frog	-/-/-	-/-/-	1/-/-	-/-/-	-/-/-	-/-/-
Species Richness	**2**	**2**	**1**	**0**	**2**	**2**

The Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (2015) defines significant amphibian breeding habitat (Woodland) where there is the presence of two of the following species with calling codes of 3; Gray Treefrog, Spring Peeper, Western Chorus Frog, or Wood Frog. Significant Amphibian Breeding habitat (Wetland) includes 2 of the following species with calling codes of 3; Gray Treefrog, Western Chorus Frog, Northern Leopard Frog, Pickerel Frog, Green Frog, Mink Frog, Bullfrog, or confirmed Bullfrog breeding.

The amphibian calling surveys determined confirmed there is no significant wildlife habitat for breeding amphibians. Although it is not considered Significant Habitat it is still considered excellent breeding habitat is the wet woods and southeast pond.

Turtle Basking Observations from the Harris Road and Christie Drive Ponds, Dorchester Study Area, 2022

Don Graham/ Consulting Biologist

Chronology of Field Investigations / Fauna

July 30 – reconnaissance, first turtle basking survey

August 8 – second turtle basking survey

Site Visit Weather Conditions

Visit Date	Visit Time	Temp. Range [C]	Cloud Cover [%]	Wind Speed [Beaufort scale]
July 30	7:47 – 9:30 Harris Road Pond 10:00 – 11:40 Christie Drive Pond	19 – 22	70 – 80	2 – 2
August 8	1:30 – 3:30 Harris Road Pond 11:20 – 1:20 Christie Drive Pond	24 – 25	80 – 80	2 - 2

Turtle Basking Survey- Methodology

Searches for turtles were conducted at each pond during suitable weather conditions during the summer period when turtles are active. Both ponds were examined from all sides by circumnavigating each pond, while visually searching for ponds from each site. Both ponds were searched twice on the dates listed above. The Harris Road Pond is located approximately 200 m east of Harris Road. The Christie Drive Pond is located approximately 250 m south of the Christie Drive – Wheeler Avenue intersection.

Turtle Basking Survey- Results

SPECIES	**Harris Road Pond**	**Christie Drive Pond**	**Comments**

Midland Painted Turtle	0 (July 30)	2 (July 30)	A Painted Turtle with a carapace of about 10 cm was seen basking on woody debris at the east end of the pond. A second similar sized Painted Turtle was seen swimming in the pond about 30 minutes after the first individual was seen. At this point, no turtle was basking on the woody debris. The second individual may or may not have been the individual seen basking earlier.
Midland Painted Turtle	0 (August 8)	1 (August 8)	A Painted Turtle was seen basking on a willow branch at the west end of the pond.

Turtle Basking Survey- Discussion

Midland Painted Turtle was seen at the Christie Drive Pond on both the July 30th and August 8th surveys. As explained in the Results table, one or two individuals may have been seen. Midland Painted Turtles are not designated as a Species at Risk by the Ontario government (Species at risk in Ontario | ontario.ca). The Midland Painted Turtle is designated as a Special Concern species by the federal government (Midland and Eastern Painted Turtle (Chrysemys picta marginata): COSEWIC assessment and status report 2018 - Canada.ca).

No turtles of any other species were seen during either the July 30th or August 8th surveys.

Good quality Midland Painted Turtle habitat are wetlands and waterbodies that have little or no current, are relatively shallow, have extensive floating vegetation, have abundant basking sites and a deep soft mud bottom (>100 cm depth) (COSEWIC, 2018).

Despite the sighting of a Midland Painted Turtle at the Christie Drive Pond, both ponds appeared to provide poor quality habitat for turtles. Both sites appear to be ponds dug below the water table to provide water for agriculture. Neither pond had abundant basking sites which are important for thermoregulation in turtles. Neither pond had extensive floating vegetation which is important for feeding within and for protection from predators. Given the relatively short period in which these ponds have existed, neither likely has a deep soft muddy bottom which provides superior overwintering sites relative to waterbodies without a muddy bottom.

Although these ponds are considered poor quality turtle habitat based on my observations and quality habitat characteristics provided in COSEWIC (2018), the species is known to occupy farm ponds (COSEWIC, 2018).

Cited Literature / References

COSEWIC. 2008. COSEWIC assessment and status report on the Snapping Turtle Chelydra serpentina in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp.
Government of Canada. 2022. Species at Risk Public Registry. Environment and Climate Change Canada.

COSEWIC. 2018. COSEWIC Assessment and Status Report on the Midland Painted Turtle (*Chrysemys picta marginata*) and the Eastern Painted Turtle (*Chrysemys picta picta*) in Canada 2018.

Ontario Ministry of Natural Resources. 2022. MNR website. Species at Risk in Ontario (SARO) List.
Ontario Ministry of Natural Resources.

Federal Government. 2022. Species at risk public registry. Species at risk public registry - Canada.ca

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Email: paigevroom@gmail.com

Paige Vroom
Senior Ecologist, B.Sc. M.Sc.

Professional History

Vroom + Associates Biologists and Natural Heritage Assessors
Senior Ecologist/Manager of Ecological Services/Principal
Simcoe, ON
2023 – present

Vroom + Leonard Landscape Architects and Natural Heritage Assessors,
Simcoe, ON
2019-2023

Subconsultant for Leonard + Associates in Landscape Architecture
Junior Ecologist
Simcoe, ON
2016-2019

Haldimand County Stewardship Program
Junior Biologist
2016-2018
Cayuga, ON

Education

Bachelor of Science, specializing in Marine and Freshwater Biology
University of Guelph
Guelph, ON
2014

Master of Science, specializing in Pathobiology
University of Guelph
Guelph, ON
2016

Training & Certifications

2023 Goldenrods & Asters Certification Course (EarthQuest)

2018 Bat Identification and Survey course (EarthQuest)

Paige Vroom is a Senior Ecologist with 8 years of consulting experience and expertise in terrestrial and wetland ecology. She has specialized in working for landowners and developers.

She conducts and manages a team of specialists conducting environmental impact studies, searching for species at risk, their habitat, and significant wildlife habitat, as well as assessing sensitive features including wetlands, watercourse, valleylands, and woodlands. Once site surveys are completed, she works to develop impact assessments, propose enhancement and restoration plans, identify opportunities and constraints, environmental monitoring and mitigation, applying the principles and concepts of Ecological Land Classification (ELC) and Ontario Wetland Evaluation System (OWES) to projects.

She has used environmental laws and policies as they pertain to Species at Risk (SAR), Significant Wildlife Habitat (SWH), Woodlands, Valleylands, Habitat for endangered or threatened species, recovery planning process for provincially and federally listed SAR. Her professional expertise is in terrestrial & wetland ecology, natural heritage assessments, Environmental Impact Studies (EIS), provincial and federal environmental laws & legislation, policies and regulations, and MNRF guidance documents.

Paige has helped clients understand specific natural heritage functions in the context of provincial and federal policies as they relate to development and construction proposals. She has helped facilitate regulatory approvals under the *Migratory Birds Convention Act, Fish and Wildlife Act, Conservation Authorities Act, Fisheries Act, Provincial Policy Statement,* provincial and federal *Species at Risk Act,* provincial and federal *Endangered Species Act,* and *Planning Act*. Paige's broad understanding of terrestrial, aquatic and wetland ecology has allowed her to effectively participate in multi-disciplinary projects as a Junior Arborist, Ecologist and Junior Botanist.

Experience

2025

- Scoped Envirmonmental Study – Sparta Line, Alymer ON
- Tree Assessment & Preservation Plan – Donegal Dr, City of Brantford

2024

- Scoped Environmental Impact Study – Hacienda Rd, Alymer
- Scoped Environmental Impact Study – Forestry Farm Rd, Norfolk County
- Scoped Environmental Impact Study - Charlotteville Rd 8, Norfolk County
- Scoped Environmental Impact Study – Plank Rd, Elgin County
- Tree Assessment & Preservation Plan – Victoria Woods, Oxford County
- MNRF Information Gathering Form, Avoidance Alternatives Form and Overall Benefit Permit Application – Union, Central Elgin
- Scoped Environmental Impact Study – Sandymount Subdivision, City of St

2018 Backpack Electrofishing Certification – Class 2

2017 WHMIS Certification Training

Thomas

- Stewardship Brochure and 6.84 Ha Planting Plan for habitat creation – Willow Run subdivision, Alymer
- DFO request for Review and on-site fish salvage during construction – Willow Run subdivision, Alymer

2023

- Tree Assessment & Preservation Plan – James St, City of London
- Scoped Environmental Impact Study – Willow Run, Alymer
- Scoped Environmental Impact Study – Sunset Dr, Central Elgin
- Tree Assessment & Preservation Plan – Walnut St, St Thomas
- Scoped Environmental Impact Study – Shedden, Southwold
- Scoped Environmental Impact Study - Rolph St, Port Ryerse Norfolk County
- Scoped Environmental Impact Study – Union Rd Subdivision, Central Elgin
- Scoped Environmental Impact Study – Dorchester Rd, Malahide
- Scoped Environmental Impact Study – Fingal Line, Southwold
- Scoped Environmental Impact Study – Charlotteville Rd 5, Norfolk County
- Tree Assessment & Protection Plan – Eagle Ridge Subdivision, City of St Thomas
- Scoped Environmental Impact Study – Nixion, Norfolk County
- Scoped Environmental Impact Study – Victoria Woods Subdivision, Oxford County
- MNRF Information Gathering Form – Victoria Woods Subdivision, Oxford County
- Scoped Environmental Impact Study – Prospect St, Norfolk County
- Scoped Environmental Impact Study – Hacienda Rd, Elgin County
- MNRF Information Gathering Form – Hacienda Rd, Elgin County
- Ontario Wetland Evaluation Collaboration – Jacklin Farms, Central Elgin

2022

- Scoped Environmental Impact Study - Jacklin Farms, Central Elgin
- Scoped Environmental Impact Study - Cultus Rd, Norfolk County
- Issues Scoping Report – Finney Rd - West Elgin
- Tree Assessment & Protection Plan - Finney Rd, West Elgin
- Letter of Opinion – Springfield Rd - Elgin County
- MNRF Information Gathering Form - Longwoods Rd, Chatham- Kent
- Scoped Environmental Impact Study - Longwoods Rd, Chatham-Kent
- Scoped Environmental Impact Study - Grand Bend Rd, North Middlesex
- Issues Scoping Report – Talbot Line, Central Elgin
- Issues Scoping Report – Light Line, Elgin County
- Issues Scoping Report – Canterbury Place Subdivision, Central Elgin
- Scoped Environmental Impact Study – Courtland, Norfolk County
- Scoped Environmental Impact Study – Culloden Line, Oxford County
- Scoped Environmental Impact Study – Mechanic St, Norfolk County
- Scoped Environmental Impact Study – North St Vienna, Elgin County
- Issues Scoping Report – Rogers Rd, Malahide
- Issues Scoping Report – Straffordville, Bayham, Central Elgin

2021

- Letter of Opinion – West Pearl St Apartments, City of St Thomas

- Tree Assessment & Protection Plan – South Edgeware, City of St Thomas
- Scoped Environmental Impact Study Addendum – Highbury Ave, City of St Thomas
- Scoped Environmental Impact Study – Iona Rd, Southwold
- Letter of Opinion – Red Pine Rd, Grand Bend
- Letter of Opinion – Sandalwood Crecent, Grand Bend
- Letter of Opinion – Thamesview Line, Dutton
- Issues Scoping Report – Beachville Rd, South-west Oxford
- Letter of Opinion – Ford Rd, Southwold
- Issues Scoping Report – Centennial Ave, Central Elgin
- Scoped Environmental Impact Study – Eagle Ridge Subdivision, City of St Thomas
- Scoped Environmental Impact Study – Talbot Line, Wallacetown, Central Elgin
- Scoped Environmental Impact Study – Muller Rd, Union, Central Elgin
- Scoped Environmental Impact Study Addendum – Orchard Park Meadows Subdivision, City of St Thomas
- Scoped Environmental Impact Study – Erie Blvd, Long Point, Norfolk County

2020

- Scoped Environmental Impact Study – North St, Tillsonburg, Oxford County
- Scoped Environmental Impact Study addendum – Lake Margret, City of St Thomas
- Species at Risk Screening Report – Elm Park Dr, Port Dover, Norfolk County
- Scoped Environmental Impact Study – Grigg Dr, Norfolk County
- Scoped Environmental Impact Study – Pressey Line Culvert Replacement, Malahide, Elgin County
- DFO Request for Review & fish salvage during construction – Pressey Line, Elgin County
- Targeted Badger Surveys – Van Norman Innovation Park, Tillsonburg, Oxford County
- DFO request for Review & Fish Salvage during construction – Thompson Line, Belomot
- Issues Scoping Report – Orchard Line Port Burwell, Bayham

2019

- Scoped Environmental Impact Study – Otter river Farms, Bayham
- Issues Scoping Report – Main St, Norwich
- Issues Scoping Report – Edwards St, Port Stanley, Central Elgin
- Letter of Opinion – Hwy 3 East, Haldimand County
- Issues Scoping Report – Edith Cavell, Port Stanley, Central Elgin
- Scoped Environmental Impact Study – Little Creek West, Port Stanley Central Elgin
- Scoped Environmental Impact Study – Concession 13, Norfolk County

2018

- DFO Request for Review – Mckillop, Wallacetown
- Scoped Environmental Impact Study – Water Tower Line, Bike Club, City of St Thomas

- Hazard Tree Assessment – Boler Mountain Tree Top Trekking, London
- Scoped Environmental Impact Study – Longwoods Rd, Chatham-Kent
- Scoped Environmental Impact Study – 45th Line, Woodstock, Oxford County
- Scoped Environmental Impact Study Addendum – Milmont Subdivision, Jarvis, Haldimand County
- Scoped Environmental Impact Study – County Rd 45, Norfolk County
- Scoped Environmental Impact Study – Gore Rd, Talbotville, Southwold

2017

- Scoped Environmental Impact Study – Prospect St, Port Dover, Norfolk County
- Scoped Environmental Impact Study – Rougham Rd, Strathroy-Caradoc
- Issues Summary Report – Princess Ave, City of St Thomas
- Scoped Environmental Impact Study – Queen St, Mount Brydges, Strathroy-Caradoc
- Scoped Environmental Impact Study – Radical Rd, Port Dover, Norfolk County
- Issues Summary Report – Major Line, City of St. Thomas

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Paul O'Hara is a field botanist, landscape designer and native plant gardening expert. Since 1991, Paul has worked in a wide variety of horticulture, botanical consulting, ecological restoration and native plant gardening capacities in both the private and public sectors. He is recognized for his work with Species At Risk and natural landscape design. Paul teaches courses, writes articles and speaks widely on plant identification, natural history and native plant gardening. Paul is the owner/operator of Blue Oak Native Landscapes and lives in Hamilton, Ontario.

EDUCATION

- Wilfrid Laurier University (Math/Music) 1991-1992.
- Environmental Engineering Technician Diploma, Sault College of Applied Arts and Technology, 1996
- Ecosystem Management Technician Diploma, Fleming College of Applied Arts and Technology, 1997

Continuing Education:

- NHIC Data Sensitivity Training
- Certified Seed Collector, Forest Gene Conservation Association
- Licenced Pesticide Applicator (Landscape and Forestry)
- Butternut Health Assessor #604
- numerous continuing education courses in ecology, horticulture, photography and landscape design at Mohawk CAAT, University of Guelph Arboretum, and Royal Botanical Gardens

CAREER EXPERIENCE

Owner/Operator (February 2004 - present)
Blue Oak Native Landscapes

- Design, landscape drawing, construction and maintenance of dozens of residential, institutional and corporate native plant gardens and naturalization projects in the Golden Horseshoe area (2004-present)
- Consulting Botanist for Long Point Region Conservation Authority; SAR surveying (2015-2019)
- Consulting Botanist for Leonard and Associates Landscape Architects (2015-2023)
- Consulting Botanist for City of Hamilton for Hoary Mountain Mint Restoration Work. (2014-2020)
- Consulting Botanist for BioLogic Environmental Consulting, London, ON. (2012-2014)
- Consulting Botanist for various botany and SAR projects with Dr. John Ambrose and Gerry Waldron: Wild Camassia (2001), Dwarf Hackberry (2003), Norfolk County Forests (2004), Bickford East Forest Complex (2005), Flowering Dogwood (2007), Cucumber Magnolia (2008), Pelee Island Bird Observatory (2009), Red Mulberry (2000, 2011), Blue Ash (2012).
- Lead consultant, designer and contractor for the 3.5 acre Vale Naturalization Project, Mississauga (2009-2022).
- Lead consultant for Mississaugas of the New Credit First Nation 'Life of the Grove' (2007-2009)
- Consulting Field Botanist for Conservation Halton Natural Areas Inventory (2004)
- Compiled and co-authored The Vascular Plants of Halton Region for Conservation Halton (2005)
- Many Species At Risk Stewardship Fund (SARSF) survey projects for the MNRF including Golden Horseshoe American Chestnut Study (2012-2014), Round-leaved Greenbrier (2017), White Wood Aster (2018-2022).

Landscape Coordinator (June 2001 - Feb. 2004)
Catholic Cemeteries of Hamilton

- Management of over 500 acres of natural and cultural landscapes on cemetery properties in Halton, Hamilton and Wellington Regions
- Large scale prairie and meadow creation projects
- Pond naturalization and planting
- Design/construction of native plant gardens at cemetery offices and monuments
- Construction and management of prairie seed nursery
- Tree planting, turf management, annuals and bulbs

Endangered Species Technician (Dec. 1999 - June 2001)
Royal Botanical Gardens

- Botanical surveying, research and technical report writing for rare and endangered species on RBG properties
- Seed collection, seed banking and propagation of SAR
- RBG Herbarium duties: collections management and database entry

Ecologist (1999 – 6 month contract)
Lower Thames Valley Conservation Authority

- Botanical and ecological surveying on Conservation Authority properties
- Prepared Managed Forest Plans for four properties under the Managed Forest Tax Incentive Program; all four plans were approved

Habitat Restoration Technician (1998 & 1999 field seasons)
Royal Botanical Gardens

- Wetland restoration planting and monitoring for Cootes Paradise Wetland Restoration Project
- Native wetland nursery duties: seed collection, propagation, plant care and maintenance
- Botanical surveying for SAR

AWARDS

- Conservation Achievement Award, Niagara Region Conservation Authority, 1999
- North American Native Plant Society Award 2006

PROFESSIONAL AFFILIATIONS

- Tallgrass Ontario Board Member (2004-2008)
- City of Burlington Naturalization Committee Member (2002-2005)
- Field Botanists of Ontario
- North American Native Plant Society
- Oakville Green Conservation Association
- Oakville Peace Centre

PUBLIC SPEAKING ENGAGEMENTS

- Carolinian Canada Conference
- Environment Hamilton
- Green Venture Hamilton
- Guelph Field Naturalists
- Habitat Haldimand
- Halton Eco-festival
- Halton Environment Network
- Oakville Horticultural Society
- Oakville Peace Centre
- Oakvillegreen Conservation Association
- Royal Botanical Gardens Green Gardening
- Royal Botanical Gardens Public Programs
- North American Native Plant Society
- Toronto Field Naturalists
- Seniors Canoe Club of Toronto
- Stoney Creek Garden Club
- Hamilton Garden Club
- Willow Beach Field Naturalists
- Tallgrass Ontario Conference and many more…

TEACHING EXPERIENCE

- Oakville Peace Centre Nature Walk Leader: guiding dozens of seasonal hikes at various natural areas in Halton and Hamilton Regions (1996 - 2004)
- Field Botanists of Ontario Trip Leader: Sixteen Mile Creek Oakville (2003), Bronte Creek Provincial Park (2004), Brantford Praries (2023).
- Royal Botanical Gardens Program Instructor: teaching bi-annual courses on tree identification and native plant gardening (1998-2013)

PUBLISHED ARTICLES

Tallgrass Ontario (The Bluestem Banner),
North American Native Plant Society (The Blazing Star)
Hamilton Naturalists' Club (The Wood Duck)
Field Botanists of Ontario newsletters
Ontario Archaeological Society (Arch Notes)

TECHNICAL REPORTS

O'Hara, P.G. 2015. Field Surveys for Species at Risk Plants and Provincially Rare Plants at Ringland, Deer Creek, Gibel and Landon Tracts. Unpublished report submitted to Long Point Region Conservation Authority. 50 pp.

O'Hara, P.G. 2014. 2012-2013 Golden Horseshoe American Chestnut (*Castanea dentata*) Survey. Unpublished report submitted to Ontario Ministry of Natural Resources, Guelph District Office. 17 pp.

Crins, W.J., W.D. McIllveen, A.G. Goodban, and P.G. O'Hara, 2006. The Vascular Plants of Halton Region. In J.K. Dwyer (Ed.) Halton Natural Areas Inventory, Conservation Halton. 69 pp.

O'Hara, P.G., 2004. Vegetation Observations for the Shell House Lands, Oakville, Ontario. Prepared for the Bronte Village Residents Association. 14 pp.

O'Hara, P.G., 2002. Vegetation Survey of the West Shoreline of Carroll's Bay, City of Hamilton. Prepared for the West Harbour Trails Steering Committee, City of Hamilton. 10 pp.

O'Hara, P.G., 2000. Preliminary Surveys and ELC Habitat Summaries for Red Mulberry (*Morus rubra* L.) in Dundas and Burlington, Ontario. Unpublished report submitted to Ontario Ministry of Natural Resources, Guelph District Office. Royal Botanical Gardens, Hamilton, ON. 25 pp.

O'Hara, P.G., 2000. Preliminary Surveys and Habitat Summaries for Bashful Bulrush (*Trichophorum planifolium* (Spreng.) Palla) at Cootes Paradise in Hamilton, Ontario. Unpublished report submitted to Ontario Ministry of Natural Resources, Guelph District Office. Royal Botanical Gardens, Hamilton, ON.

O'Hara, P.G., 2000. Preliminary Surveys and Habitat Summaries for Hoary Mountain Mint (*Pycnanthemum incanum* (L.) Michaux var. *incanum*) in Hamilton and Halton Regions. Unpublished report submitted to Ontario Ministry of Natural Resources, Guelph District Office. Royal Botanical Gardens, Hamilton, ON.

O'Hara, P.G., 1999. Managed Forest Plans (2000-2004) Walter Devereux, Rowsom, Two Creeks, and Ekfrid Conservation Areas. Lower Thames Valley Conservation Authority. 115 pp.

And many others...I have dozens of reports to list here but do not have the time to list them right now.

PUBLISHED BOOKS

A Trail Called Home: Tree Stories from the Golden Horsehsoe published by Dundurn Press, Toronto in 2019.

JAMES HOLDSWORTH

Wildlife Biologist

PROFESSIONAL EXPERIENCE

James Holdsworth has 40 years of field-based experience, with special emphasis on avian population dynamics in SW Ontario. Extensive knowledge of the natural areas of Eastern North America, with expert abilities in the identification and assessment of Species-at-risk, including birds, mammals, insects and herptiles.

SELECTED PROJECT EXPERIENCE

» GTA West Transportation Corridor, MMM, Toronto, ON, (2015): Species at Risk surveys and faunal inventories of natural areas within the expected footprint of the proposed GTA West transportation corridor. Primary goal was to document SAR in the study area, conduct faunal inventories and assess habitat and species occurrence / distribution to enable fine-tuning of preferred corridor alignment options.

» Trafalger Road North, MMM, Milton, ON, (2014): Species at Risk surveys and faunal inventories of ROW / edge habitat associated with Trafalger Road North, Milton. Included SAR occurrence probability, mitigation and anticipated constraint planning

» Ottawa O-Train Barrhaven and Airport Environs, MMM, Ottawa, ON, (2012 - 2014): Species at Risk surveys and faunal inventories of natural areas within the proposed rail corridors, including proposed Station and parking locations. Documented SAR in the study area, conduct faunal inventories and assess habitat and species occurrence / distribution to enable finetuning of preferred corridor alignment options.

» Glasbergen Hamilton Properties, Glasbergen, Hamilton, ON (2014): Species at Risk surveys and faunal inventories of 3 properties in the Hamilton area, including buffer / setback suggestions and rare species mitigation.

» Park 458 and Park 509, MMM, Mississauga, ON (2014): Species at Risk surveys and faunal inventories of 2 properties near Mississauga, Ontario. Sites were City of Mississauga properties that were proposed for parkland developments. Included site-by-site evaluations, with graded development potential as well as detailed SAR record mapping.

» Species at Risk surveys and faunal inventories of 13 bridge / culvert replacement / rehabilitation, MMM, Ottawa, ON (2013): Included design of preconstruction SAR survey methodology and mitigation requirements based on in-field observations and predictive assumptions.

» Wonderland Road South, MMM, London, ON (2013): Species at Risk surveys and faunal inventories of ROW / edge habitat. Included SAR occurrence probability, mitigation and anticipated constraint planning.

» Holcim Paris Pit, MMM, Paris, ON (2013): Species at Risk surveys and faunal inventories of a proposed Gravel Pitexpansion near Paris, Ontario. Included mitigation and anticipated effects as well as input into extraction plans and timetables.

» Walton Properties, MMM, Niagara Falls, ON (2013): Species at Risk surveys and faunal inventories of 22 properties near Niagara Falls, Ontario. Included site-by-site evaluations, with graded development potential as well as detailed SAR record mapping.

» Medway Creek, Dillon, London, ON (2013): Detailed faunal surveys of the Medway Creek corridor, within the City of London, with emphasis on Species at Risk and locally rare species. Extensive SAR habitat / location mapping.

» Veterans Memorial Parkway, MMM, London, ON (2012): Species at Risk surveys and faunal inventories of the Veterans Memorial Parkway re-alignment, London. Included mitigation and

selection of preferred alignment alternatives.

» Nyon Tank Farm, MMM, Niagara Region, ON (2012): Species at Risk surveys and faunal inventories of the Nyon Tank Farm site in the Niagara Region. Included mitigating for Species at Risk through liaison with MNR personnel. Extensive communication with MNR regarding implementation of the ESA in Ontario, including providing input and context to how the Act is applied and how the Act affects in-house projects.

» Sandwich South Secondary Plan and the Lauzon Parkway Extension , MMM, Windsor, ON (2011): Species at Risk surveys and faunal inventories of 42 wildlife units in and adjacent to the City of Windsor, as part of the Sandwich South Secondary Plan and the Lauzon Parkway Extension.

» Hwy 17 Arnprior, MMM, Arnprior, ON (2011): Species at Risk surveys and faunal inventories of a section of Hwy 17 near Arnprior, as part of a proposed road widening.

» Rama Quarry Expansion, Michalski Nielsen, (2010): Faunal inventory of a proposed quarry expansion near Rama Ontario, within an alvar environment. Surveys included searches for Loggerhead Shrike and other species at risk.

» Sydney Tar Ponds, Earth-tech, Sydney NS, (2008): Design and implementation of baseline bird study, lead writer of final report, Sydney Tar Ponds, Sydney, Nova Scotia: Responsibilities included all aspects of a baseline bird study of the Tar Ponds study area, with an assessment of habitat and faunal components, as well as remediation suggestions, as they would apply to a long-term rehabilitation of the site.

» Labroador Iron Mines site expansion, Earth-tech, Western Labrador (2008 – 2009): Design and implementation of baseline bird study, lead writer of final report, Western Labrador Iron Ore Mine: Responsibilities included all aspects of a baseline bird study of the subject area [remote western Labrador, mostly Taiga and sub-arctic tundra], assessment of habitats and faunal components, as well as identifying constraints and designing follow-up monitoring protocols.

» Avifauna / Fauna Inventory Specialist, Shell Refinery Project, Jaques Whitford, Lambton County, ON (2006 – 2008): Responsibilities included the faunal assessment of over 60 wildlife units, the evaluation and assessment of said units, developing setbacks, buffers and mitigation aspects, commenting on SAR species within the study area.

» Lead Faunal Inventory Specialist, 407 East Extension, MMM, Toronto, ON (2006 – 2008): Responsibilities included the faunal assessment of over 120 wildlife units, along the proposed 407 extension route; assessment and evaluation of proposed route, including mitigation aspects.

» Greensville Subwatershed Study, MMM, Greensville, (2006): Included a migrant and breeding bird study, as well as inventories of butterflies, dragonflies, mammals, reptiles and amphibians in the Alvar communities within the site. The study resulted in a comprehensive report on the Alvar fauna and regional significance of this area, from a development standpoint.

» Various Wind Turbine Projects, Dave Martin, 9 Ontario sites, (2006 – 2013): Systematic Raptor and migratory bird observations, for nine proposed Wind Turbine development sites (up to 100 turbines) in the Blenheim, Stony Point, Dover, Goshen, and Merlin area (Martin), Sept- 2006 through 2012: Responsibilities included all aspects of organizing and implementing a CWS vetted assessment program. Fieldwork consisted of roadside surveys for waterfowl and raptors, point counts of breeding birds, individual assessments of woodland blocks, fall raptor counts at fixed locations. Other aspects included public information open houses, providing opinion and feedback on setbacks, buffers; analyzing local and regional significance of fauna and habitat; providing opinion and feedback regarding patterns of movement observed and mitigation requirements.

» Lead Faunal Inventory Specialist, Toyota Woodstock, Earth-tech, Woodstock, ON (2005): Lead faunal inventory specialist on ancillary project (connecting spur rail line through Pittock Marsh (PSW) to the Toyota site).

» Community Beaches Migration Study, Dougan, Hamilton, ON (2005): Participated in the Community Beaches migration assessment for the City of Hamilton. This entailed alternate day migration observation at the Beaches site, recording numbers and behavior and participating in evaluating the site for potential significance.

» Consulting Breeding Bird Surveyor, Red Hill Expressway, Dougan, Hamilton, ON (2004): Working on the Red Hill Expressway project, City of Hamilton. Conducted daily breeding bird nest observations to allow construction crews to work within the MBCA framework.

» Lead Faunal Inventory Specialist, 404 North Extension, MMM, Newmarket, ON (2004):
Responsibilities included the faunal assessment of 13 wildlife units along the proposed 404 extension route; assessment and evaluation of proposed route, including mitigation aspects with emphasis on SAR.
Noteworthy Projects

» June-Sept, 1988 - Served as Field Researcher, under the direction of Mary Gartshore, studying Hooded Warblers in the Norfolk area: Duties included; Systematic observation of breeding pairs of Hooded Warbler's, recording behavior, movements, nesting success in a defined area. Also led an on-site banding operation that included colour banding of Hooded Warbler's, as well as banding resident and migrant woodland species.

» Also participated in the COSEWIC program, surveying habitats in the Norfolk area, recording avian diversity and providing data to establish important natural areas in Norfolk

» June 2001 - Active participant in the Ontario Breeding Birds Atlas, covering eight different squares in Oxford County. Over the past five years, Mr. Holdsworth has spent hundreds of hours in the field, surveying his sites and cataloguing the breeding species. Aspects of this fieldwork include point counts, colonial species documentation, rare species documentation, nest record

documentation, as well as meticulous data collection of the species recorded within the designated squares. He is also proficient with logging his data onto the OBBA website, as well as using the site for research and source material .Another aspect of the Atlas is contacting and cooperating with local landowners, building a working relationship that will enhance the program, and following up with Atlas results, as a way to keep the landowner interested and involved.

» June-2004 - Assisting Dave Martin with aspects of the Acadian Flycatcher Recovery Program. He was contracted to help the team re-find and examine six sites in Oxford County that have hosted Acadian Flycatchers in the past, with the intent to examine whether these sites are still viable.

PROFESSIONAL AFFILIATION

» Ontario Federation of Ornithologists

» American Birding Association

» Oxford County Faunal Records and Checklist Committee)

RECOGNITION

» Co-authored “Checklist of the Birds of Oxford County”, 2007

» Authored “Butterflies of Oxford County” and “Odonata of Oxford County”, unpublished reference checklists designed for planning agency usage.

» Served as Sub-regional Editor, Oxford County, for American Birds, Field Notes and North American Birds magazines, from 1988 to present.

» Participated in both Ontario Breeding Bird Atlas projects, providing survey data on the breeding birds of Oxford County.

» Led birding tours for the Woodstock Field Naturalists the Mcillraith Field Naturalist and the Ontario Federation of Ornithologists.

» Currently compiling and editing ''The Birds of Oxford County'', a definitive work on the history, abundance and diversity of the birds in the county of Oxford.

» Contributed articles to Ontario Birds, the journal of the Ontario Field Ornithologists

» Served as an Outdoor Education Leader at the Oxford Field Study Centre, during my time at Woodstock Collegiate Institute. The position entailed leading groups of grade school Students in environmentally oriented activities

Appendix 3 – 2024 BLACK ASH

	
Christie Drive ROW - Black Ash #1: 7.7 cm dbh	**Black Ash #2:** codominant stems 8.1 + 4.3 cm dbh
	
Black Ash #3: 2.5 cm dbh	Black Ash #4: 2.5 cm dbh

	
Black Ash #5: 3.5 cm dbh	Black Ash #6: Cluster of ≅20 saplings and seedlings < 2 cm dbh
	
Black Ash #7: 15 trees 3-5.7 cm dbh and numerous seedlings < 2 m height	Black Ash #8: 6.7 cm dbh

Black Ash #9: 2 trees on north side of trail. 8.8 cm and 4.3 cm dbh

Black Ash #10: 12.5 cm dbh, large canker on trunk. 7 undersized trees south of trail 3.2-7 cm dbh

Black Ash #11: 12.5 cm dbh, top down canopy decline

Black Ash #12: 9.2 cm dbh, top down canopy decline

	
Black Ash #13: 8.4 cm dbh, dying/dead, no canopy	**Black Ash #14**: 10 cm dbh, unhealthy and lacks canopy
	
Black Ash #15: 4 saplings < 3 cm dbh + seedlings	Black Ash #16: approx. 8 seedlings < 2 m height

	
Black Ash #17: 2 seedlings < 2 m height	North Tamarack Swamp - Black Ash #18: 5 seedlings < 2 m height and < 2 cm dbh
	
Black Ash #19: 6 cm dbh, unhealthy	Black Ash #20: 3 saplings < 3 cm dbh, 3 seedlings < 2 m height

Black Ash #21: 8.2 cm dbh

Black Ash #22: 8.4 cm dbh

Black Ash #23: 8.5 cm dbh

Black Ash #24: 8 cn dbh

Black Ash #25: 9.6 cm dbh

Black Ash #26: 9.4 cm dbh, top down canopy decline

Black Ash #27: 11.3 cm dbh, top down canopy decline

V R O O M + A S S O C I A T E S
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From: Paige Vroom and Dave Jolly Vroom + Associates

Date: 2025 11 07

SUBJECT: LETTER OF OPINION - ACORN VALLEY - SOUTHEAST SERVICING CONSTRUCTION

1. Overview

A new sanitary servicing pipe is proposed to cross the Rath-Harris Drain corridor within a SWT3 Mineral Thicket Swamp community. This memo outlines potential impacts, mitigation, and restoration measures to ensure that the function and integrity of the wetland and drain are maintained.

2. Existing Conditions

_The Rath-Harris Drain is a Municipal Drain that conveys surface flows from primarily agricultural land to the Mill Pond, characterized by seasonal flow and moderate channel stability.

_The corridor supports a Mineral Deciduous Thicket Swamp Ecosite (SWT2) dominated by shrub Willows (*Salix spp.)* and Dogwoods (*Cornus spp.)* with drifts of Reed Canary Grass (*Phalaris arundinacea*) and a diverse sedge-grass understory that is medium-high quality with low levels of invasives, and a medium coefficient of conservation.

_The community contains a number of Black Ash [Endnagered] 300+ meters upstream of this location. No identified Species at Risk or regulated SAR habitat were discovered in the area of the servicing corridor.

_As noted, invasive cover is currently low, with areas of Garlic Mustard, Tatarian Honeysuckle, Purple Loosestrife and Multiflora Rose.

3. Scope of Works

_Temporary clearing width: approximately 12 m to accommodate trench excavation, safety offsets, and equipment access.

_Pipe installation: by open-cut or trench excavation across the drain and wetland corridor.

_Duration: short-term disturbance (< 2 weeks).

_Area of impact: 100 x 12 meter path, 0.13 ha.

4. Potential Impacts

Category	Description
Vegetation removal	Temporary loss of vegetative cover within the 12 m corridor.
Soil compaction and rutting	Heavy equipment operation could compact saturated mineral soils, reducing hydrological infiltration and root aeration.
Hydrology alteration	Temporary dewatering or flow redirection may locally change soil saturation or channel stability.
Sedimentation and turbidity	Excavation could introduce fine sediments to the drain during construction.
Invasive species colonization	Exposed mineral soils may be susceptible to colonization by *Phragmites australis* ssp. *australis*, or *Lythrum salicaria*.
Wildlife disturbance	Temporary loss of cover for amphibians, mammals and wetland birds; low long-term significance.

5. Mitigation Measures

_Timing: Conduct clearing and excavation outside of the restricted activity timing windows during low-flow or frozen conditions where possible (November–March) to reduce rutting and sediment transport.

_Erosion & Sediment Control:

_Minimal footprint for in-water works in an efficient and timely manner. Install silt fencing or coir logs on both sides of the corridor and along the top of bank of the adjacent fields prior to excavation.

_Use trench plugs or straw wattles to prevent channelized flow along the trench.

_Equipment Access:

_Restrict machinery to a defined construction corridor

_Soil Management:

_Segregate and store topsoil/organic horizon separately; replace in original order during backfilling.

_Avoid soil mixing or contamination with granular fill.

_Invasive Species Prevention:

_Clean machinery before site entry at a location off site; ensure no residual mud or seedbanks.

_Use weed-free straw and soil amendments.
_Implement post-construction invasive species monitoring (1st, 3rd, and 5th growing seasons).

_Hydrology Protection:

_Maintain pre-existing surface grades; ensure backfilled trench matches natural microtopography.
_Install pipe at proper depth to avoid long-term impedance of shallow groundwater flow.
_If there is any de-watering the Ontario Water Resources Act (R.S.O. 1990) requires that a Permit to Take Water (PTTW) be obtained for water taking/movement in excess of 50,000 litres per day. The PTTW, which is issued by the MECP, would be required during some dewatering activities common on construction projects, where more than 50,000 L/day is being moved from a ground or surface water system, which may also include sediment control ponds (Erosion and Sediment Control Guidelines for Urban Construction TRCA 2019).

_Restoration & Revegetation:

_Immediately upon backfill, replant all bare soil areas with herbaceous native wetland species to avoid future woody-root interference with the pipe.
_Recommended seed mix (native, local genotype):

- *Joe Pye Weed*
- *Swamp Milkweed*
- *Carex lacustris, Carex stricta* (sedges)
- *Scirpus atrovirens* (Dark-green Bulrush)
- *Glyceria striata* (Fowl Manna Grass)

_Apply straw mulch or coir matting to stabilize soils until germination.
_Conduct follow-up planting if cover < 70 % by end of second growing season.

_Monitoring:

_Annual inspection for the first three years for vegetation cover, invasive presence, and erosion control measures plus integrity.
_Re-seeding or spot planting of native vegetation as required.

6. Residual Effects and Conclusion

With the implementation of the above measures, disturbance to the SWT2 community will be temporary and reversible. However, given the medium–high ecological quality of the corridor and the intact hydrological and vegetative structure, the width of vegetation clearing should be reduced to the smallest safe working width practicable.
The current 12 m clearing limit is considered excessive for a single sanitary servicing pipe. Industry practice for open-cut installations of this scale typically requires only 4 – 6 m, including excavation and equipment access. A narrower corridor will substantially reduce loss of shrub and sedge cover, limit compaction of mineral soils, and maintain micro-topography important for wetland hydrology.

Where feasible, directional drilling or auger boring should be evaluated as the preferred installation technique. Trenchless methods are recognized by MECP, Conservation Authorities,

and DFO Codes of Practice as the preferred avoidance measure for wetland and drain crossings because they:

_Avoid direct vegetation and root disturbance within the wetland;
_Preserve soil structure and anaerobic horizons critical to hydrologic function;
_Prevent sediment and turbidity release to the Rath-Harris Drain (a medium/good-quality watercourse);
_Minimize the potential for introduction of invasive species such as Phragmites australis; and
_Eliminate the need for long-term herbaceous restoration of a wide corridor.

If open-cut excavation is deemed technically necessary, the contractor should document the rationale and demonstrate why trenchless methods were not feasible. The corridor should then be restricted to a maximum 6 m width, with all spoil storage and equipment staging located outside the wetland boundary on timber mats or stabilized pads.

Following construction, the corridor will be revegetated with a native sedge–grass assemblage to restore cover and prevent woody-root conflict with the sanitary infrastructure. With these avoidance and minimization measures in place, the risk of long-term functional loss to the SWT2 wetland is low, and the natural heritage function of the Rath-Harris Drain corridor will be maintained.