

Final Terrestrial Ecosystems Existing Conditions and Impact Assessment Report

Highway 400 to Highway 404 Link (Bradford Bypass)

Ontario Ministry of Transportation

60636190

August 23, 2023

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Highway 400 to Highway 404 Link (Bradford Bypass)

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1. Overview of Undertaking

1.1 Project Overview

The Ontario Ministry of Transportation (the Ministry) has retained AECOM Canada Ltd. (AECOM) to undertake a Preliminary Design and project-specific assessment of environmental impacts for the proposed Highway 400 – Highway 404 Link (Bradford Bypass). The Bradford Bypass (the project) is being assessed in accordance with Ontario Regulation 697/21 (the Regulation).

The Bradford Bypass is part of Ontario's plan to expand highways and public transit across the Greater Golden Horseshoe to fight congestion, create jobs and prepare for the massive population growth expected in the next 30 years. Simcoe County's population is expected to increase to 416,000 by 2031, with the Regional Municipality of York growing to 1.79 million by 2041. The Bradford Bypass has been proposed as a response to this dramatic growth in population and travel demand in the area and the forecasted increase in congestion on key roadways linking Highway 400 to Highway 404.

The project is a new 16.3 kilometre (km) controlled access freeway. The proposed highway will extend from Highway 400 between 8th Line and 9th Line in Bradford West Gwillimbury, will cross a small portion of King Township, and will connect to Highway 404 between Queensville Sideroad and Holborn Road in East Gwillimbury. There are proposed full and partial interchanges, as well as grade separated crossings at intersecting municipal roads and watercourses, including the Holland River and Holland River East Branch. This project will also include the design integration for the replacement of the 9th Line structure on Highway 400, which will accommodate the proposed future ramps north of the Bradford Bypass corridor. The Ministry is considering an interim four-lane configuration and an ultimate eight-lane design for the Bradford Bypass. The interim condition will include two general purpose lanes in each direction and the ultimate condition will include four lanes in each direction (one high-occupancy vehicle lane and three general purpose travel lanes in each direction). The interim and ultimate designs are being reviewed as the project progresses. This Report and its findings are based on the project footprint identified within this Report. Should the footprint change or be modified in any way, a review of the changes shall be undertaken, and the report will be updated to reflect the changes, impacts, mitigation measures, and any commitments to future work.

The purpose of this Draft Terrestrial Ecosystems Existing Conditions and Impact Assessment Report (this Report) is to identify terrestrial existing conditions within the Study Area and to assess potential impacts of proposed works for the Updated Technically Preferred Route, in accordance with the *Environmental Reference for Highway Design* (ERHD; MTO, 2013). The aquatic existing conditions are documented in the *Draft Fish and Fish Habitat Existing Conditions and Impact Assessment Report* (AECOM, 2022).

1.2 Study Area

The Study Area limits are shown on **Figure 1-1** and **Figure 1-2** in **Appendix A**. The Study Area for this report included the proposed approximate 100 metre wide Bradford Bypass Right-of-Way (ROW) with an additional 120 m from the proposed ROW limits. A desktop analysis was completed for both the entire ROW and the additional 120 m Study Area. However, given the scale of the project, field investigations for the majority of the project were limited to the 100 m ROW with the exception of the Highway 400 and 9th Line Structural Replacement Study Area where field investigations were also conducted within the 120 m Study Area where Permission to Enter (PTE) was obtained.

1.3 Environmental Protection Requirements

Current legislations and policies relevant to terrestrial ecosystems within the Study Area are outlined in **Table 1-1** below.

Table 1-1: Relevant Legislation and Policies

Legislation	Governing Authority	Relevant Information
Endangered Species Act, 2007 (ESA)	Ontario Ministry of the Environment, Conservation and Parks (MECP)	<ul style="list-style-type: none"> • Under the Ontario ESA, species are listed as Extirpated, Endangered, Threatened and Special Concern (SC). • The ESA prohibits the killing, harming or harassment of Extirpated, Endangered or Threatened species and the damage or destruction of their habitat. • MECP may grant a permit, or other authorization, for activities that would otherwise not be allowable under the ESA. • For this Report, Extirpated, Endangered and Threatened Species are considered Species at Risk (SAR) and SC species are considered <i>Species of Conservation Concern (SOCC)</i>.
Species at Risk Act, 2002 (SARA)	Government of Canada	<ul style="list-style-type: none"> • SARA is federal legislation that monitors and protects SAR in Canada, provides recovery strategies for Extirpated, Endangered or Threatened species, and manages species of SC (Government of Canada, 2016). • Species listed as Extirpated, Endangered or Threatened under SARA are only protected on federal lands unless they are aquatic species or migratory birds listed on Schedule 1. The Governor and Council may issue an order for additional species listed as SAR under SARA to be protected on non-federal lands where critical habitat has been identified and other provincial or municipal legislation does not adequately protect the species. • For this Report, SOCC includes migratory birds listed as Extirpated Endangered or Threatened under Schedule 1 of the SARA.
Planning Act, 1990 and Provincial Policy Statement, 2020 (PPS)	Ontario Ministry of Municipal Affairs and Housing	<ul style="list-style-type: none"> • The PPS was issued under Section 3 of the Ontario <i>Planning Act, 1990</i>. • The PPS identifies seven types of natural heritage features to be protected: <ul style="list-style-type: none"> - Habitat of Endangered or Threatened species; - Significant wetlands; - Coastal wetlands; - Significant woodlands in Ecoregions 6E and 7E; - Significant valleylands in Ecoregions 6E and 7E; - Significant wildlife habitat (including habitat of SOCC); and - Significant Areas of Natural and Scientific Interest (ANSIs). • Policies in the PPS are used to guide decision making in the Class EA for Provincial Transportation Facilities process. Under the PPS, development and site alteration are prohibited in significant wetlands in Ecoregions 6E and 7E. Development and site alteration are also not permitted within the remaining natural heritage features or adjacent lands unless it can be shown that there will be no adverse impact. Of note, development does not include activities that create or maintain infrastructure, such as transit and transportation corridors, authorized under an environmental assessment process; therefore, transportation projects are permitted in natural heritage features and their adjacent lands provided that these

Legislation	Governing Authority	Relevant Information
<p>Migratory Birds Convention Act, 1994 (MBCA) Migratory Birds Regulation, 2022 (SOR/2022-105)</p>	<p>Environment and Climate Change Canada (ECCC)</p>	<p>are considered when planning for corridors or right-of-ways for significant transportation as per Section 1.6.8.6 of the PPS.</p> <ul style="list-style-type: none"> • Intended to protect migratory birds, their eggs and their nests. • Includes more than 700 species of birds. • Prohibits the possession, destruction and harm of migratory birds and/or their nests unless it is: <ul style="list-style-type: none"> - a nest shelter, eider duck shelter or duck box that does not contain a live bird or a viable egg; - a nest that was built by a species that is not listed in Schedule 1 of the Act if that nest does not contain a live bird or a viable egg; - a nest that was built by a species that is listed in Schedule 1 if the following conditions are met: <ul style="list-style-type: none"> ○ the person who damages, destroys, removes or disturbs that nest provided a written notice to the Minister a number of months beforehand that corresponds to the number of months set out in column 3 of the relevant Table to that Schedule for the species, and, ○ the nest has not been used by migratory birds since the notice was received by the Minister.
<p>Ontario Fish and Wildlife Conservation Act, 1997</p>	<p>Ontario Ministry of Natural Resources and Forestry (MNR)</p>	<ul style="list-style-type: none"> • Provides protection and regulation (e.g., ownership and possession, sale facilities, administrative, import/export, transportation, habitat) for wildlife in Ontario. • Includes protection for raptors and other bird species not protected under MBCA. Nests of these bird species can only be removed if a permit is obtained from MNR.
<p>Greenbelt Act, 2005 and the Greenbelt Plan, 2017</p>	<p>Ontario Ministry of Municipal Affairs and Housing (MMAH)</p>	<ul style="list-style-type: none"> • The Greenbelt Plan contains land use designations that are divided into Protected Countryside lands and Urban River Valley lands. • All infrastructure within Protected Countryside needs to meet one of the following two objectives: <ul style="list-style-type: none"> - Support agriculture, recreation and tourism, Towns/Villages and Hamlets, resource use or the rural economic activity that exists and is permitted within the Greenbelt; or - Serves the significant growth and economic development expected in southern Ontario beyond the Greenbelt by providing for the General Policies for the appropriate infrastructure connections among urban centres and between these centres and Ontario's borders. • All infrastructure within Urban River Valley, which is approved under the <i>Environmental Assessment Act</i>, or which receives a similar approval, is permitted provided it supports: <ul style="list-style-type: none"> - Needs of adjacent settlement areas; or - Serves the significant growth and economic development expected in southern Ontario and supports the goals and objectives of the Greenbelt Plan.

2. Methods

2.1 Background Information Review

A desktop background review was completed prior to field investigations as part of a separate Work Order (W.O.) which is documented in the Highway 400 – Highway 404 Link (Bradford Bypass W.O. #19-2001) – Terrestrial Ecosystems Existing Conditions Report (AECOM, 2020), under a separate cover. As part of the background review, the Ontario Ministry of Natural Resources and Forestry (MNR), the Ministry of Environment, Conservation and Parks (MECP), the Lake Simcoe Region Conservation Authority (LSRCA) and the Nottawasaga Valley Conservation Authority (NVCA) were consulted to acquire background natural heritage information. A copy of agency correspondence can be found in the aforementioned report. Results of the background review are provided in **Section 3**.

2.2 Field Investigations

Field investigations were completed in accordance with the ERHD (MTO, 2013) to supplement available background information as described in **Section 2.1**. The following sections provide the methods of the field investigations completed in Spring/Summer of 2020, 2021 and 2022 in order to update the existing terrestrial ecosystems within the Study Area.

Direct and indirect (e.g., animal tracks) incidental wildlife observations were recorded during all field investigations. Furthermore, Species at Risk (SAR) or their habitat and Significant Wildlife Habitat (SWH) features were searched for and recorded during all field investigations. Targeted surveys for SAR will be undertaken in the Detail Design phase of the project. Field investigations were completed on the dates outlined in **Table 2-1**.

Table 2-1: Field Investigation Dates

Survey	Year	Dates
Ecological Land Classification and Botanical Inventory Surveys	2020	August 24, 26, 31, September 1, and October 21, 22, 29
	2021	August 19, 23, and September 7
	2022	May 5 and 6, August 30
Amphibian Night Call Surveys	2021	Round 1 – April 10, 29 Round 2 – May 19, 26 Round 3 - June 23, 24
Breeding Birds Surveys	2021	Round 1 - June 7, 9, 10, Round 2 – June 23, 28, 29

2.2.1 Ecological Land Classification

Vegetation communities within the Study Area were delineated and classified in accordance with the Ecological Land Classification (ELC) system for southern Ontario (Lee et al., 1998). This protocol uses a series of six nested levels (Site Region, System, Community Class, Community Series, Ecosite and Vegetation Type) to describe the ecological form and function of a vegetation community in a spatial context, from largest to smallest scale.

In advance of field investigations, vegetation communities were delineated based on the interpretation of aerial photographs (i.e., visually assessing contrast and colour changes, canopy density, etc.) and existing data. Field investigations were then completed within each delineated vegetation community, where access was permitted, to classify to the most detailed/lowest level possible (i.e., Vegetation Type or Ecosite) based on plant and substrate compositions. If an area was identified within the Study Area during the field investigations that was not previously delineated but represented a significant area of variation (i.e., at least 0.5 hectare in size), a new community was delineated and classified in the field. Vascular plant species lists were compiled for each vegetation community within the proposed MTO ROW where access was permitted. Where access was not permitted, all species visible from the ROW/edge of the community were recorded.

ELC surveys and vascular plant inventories were conducted on the dates outlined in **Table 2-1**.

2.2.2 Amphibian Night Call Surveys

Before amphibian night call surveys, candidate significant breeding habitat was identified through both interpretation of aerial imagery and the SWH assessments conducted during ELC surveys. Survey station locations were selected based on the presence of potential habitat for breeding amphibians, as confirmed through daytime site visits conducted on the dates outlined in **Table 2-1**. A total of 12 survey stations were established, and their locations are mapped on **Figure 2-1** to **Figure 2-7** in **Appendix A**.

Amphibian night call surveys followed the protocol as outlined under the Marsh Monitoring Program (MMP; BSC, 2009). Surveys were completed on three separate occasions (at least 15 days apart) as outlined in **Table 2-1**. The sequence of the surveys was based on a combination of seasonal timing and appropriate weather conditions. Site visits coincided with a minimum nighttime air temperature of 5°C for the first survey, 10°C for the second survey, and 17°C for the third survey. Surveys were conducted in the evening when there was little wind (Beaufort scale of 3 or less).

At each station, the observer stopped and listened for a minimum of three minutes. The calling frogs were identified by species, and the intensity of the calling activity was recorded using the MMP call abundance codes. The frequency categories of calls are described as follows:

Code 1: individual calls do not overlap and calling individuals can be discretely counted.

Code 2: calls of individuals sometimes overlap, but numbers of individuals can still be estimated.

Code 3: overlap among calls seems continuous (full chorus), and a count estimate is impossible.

The background noise intensity at each monitoring station was also recorded to further characterize sampling conditions on-site and assess habitat quality.

2.2.3 Breeding Birds

Due to Ontario's size and habitat diversity, various bird monitoring protocols are used in the province to target a variety of species in different habitats. For this project, breeding bird surveys were completed following the Ontario Breeding Bird Atlas (OBBA) *Guide for Participants* (2001) and *Forest Monitoring Protocol* (Environmental Canada – Canadian Wildlife Service [EC-CWS, 2009]). These surveys were used to determine habitat utilization by birds and the presence of bird SAR and Species of Conservation Concern (SOCC) within the Study Area.

A total of 20 breeding bird survey stations, each separated by an approximate distance of 250 metres, were established within the Study Area as shown on **Figure 2-1** to **Figure 2-7** in **Appendix A**. In accordance with the protocol, each station was surveyed twice at least ten days apart between May 24th and July 10th. Breeding bird surveys were completed on the dates outlined in **Table 2-1**.

Surveys consisted of 10-minute point counts, which involved recording species, breeding evidence and observations within or beyond a 100 metres radius of the observer. Birds flying over during point counts were recorded as flyovers. Breeding bird surveys were conducted in the morning (i.e., between dawn and five hours after dawn) and during weather conducive to identifying breeding birds (e.g., wind speed of three or less on the Beaufort scale, clear sunny days), whenever possible.

3. Results

The following sections document the existing terrestrial conditions within the Study Area as determined by the desktop review and field investigations as outlined in **Section 2**.

3.1 Designated Natural Areas

Natural features and areas identified for protection in the Provincial Policy Statement (PPS) and other legislation (e.g., *Greenbelt Act, 2005*) are collectively referred to as 'designated natural areas'. These include, but are not limited to, Areas of Natural and Scientific Interest (ANSIs), significant wetlands, Environmentally Significant/Sensitive Area, etc. These may be identified by the planning authority (e.g., province, municipality, conservation authority).

3.1.1 Background Data

A summary of designated natural areas identified within the Study Area through the background review are provided in **Table 3-1** below. Designated natural areas within and in the vicinity of the Study Area are illustrated on **Figures 1-1 to 1-2** in **Appendix A**.

Table 3-1: Designated Natural Areas within the Study Area

Area Type	Designated Natural Areas	Location Within Study Area
Environmentally Significant/Sensitive Areas	Holland Marsh Environmentally Significant Area (LSRCA)	Encompasses sections of wooded areas and agricultural land between Young Street and 2 nd Concession Road.
Wetlands	Holland Marsh (BW5) Provincially Significant Wetland (PSW)	Located along the western bank of the Holland River
	Holland Marsh Wetland Complex PSW	Located along the Holland River and Holland River East Branch.
	Maskinonge River Wetland Complex PSW	Located west of Highway 404. The PSW is mapped along the banks of the Maskinonge River.
	Unevaluated Wetlands	Nineteen unevaluated wetlands are present within the Study Area between Highway 400 and Highway 404 including three large (>5ha) unevaluated wetlands present between the Holland River and Holland River East Branch.
Policy Areas	Deer Wintering Areas (MNRF)	Stratum 2 Deer Wintering Areas are present within large portions of the wooded areas present between the Holland River and Holland River East Branch and along the east bank of the Holland River East Branch. Another Stratum 2 Deer Wintering Area is present in the wooded area between 2 nd Concession Road and Leslie Street.

Area Type	Designated Natural Areas	Location Within Study Area
	Greenbelt Plan - Protected Countryside	Includes the majority of land between the Holland River to Highway 404 with the exception of some agricultural fields located east and west of 2 nd Concession Road and Leslie Street.
	LSRCA Natural Heritage System (2018) - Core Features ¹	Natural Heritage System Core and associated 30 m buffer encompass all forested natural areas in the Study Area. Farmland present between the Holland River and Holland River East Branch, portions of farmland found west of 2 nd Concession Road and land east of Highway 404 adjacent to the Maskinonge River have been classified as Targeted Areas for Natural Heritage System Enhancement.
	York Region Official Plan (2019) – Regional Greenlands System ¹	Regional Greenlands System present between the Holland River and Holland River East Branch extending east of Yonge Street. Included in wooded area between 2 nd Concession Road and along the Maskinonge River.
	County of Simcoe Official Plan (2016) – Greenlands ¹	Wooded and wetland areas between Highway 400 and the Holland River
	Town of East Gwillimbury Official Plan – Natural Heritage System - Core Areas and Supporting Areas ¹	Wooded and natural areas present between Bathurst Street and Highway 404.
	Town of Bradford West Gwillimbury Official Plan – Natural Areas ¹	The Holland River and wetland areas associated with the Holland Marsh Complex PSW and Holland Marsh (BW5) PSW.
	Township of King Official Plan – Natural Heritage System ¹	Natural areas present between the Holland River and Bathurst Street.

¹ These designated natural areas are not included on **Figure 1.1** and **Figure 1.2** as they largely overlap each other and other designated natural features. Natural Heritage System mapping can be found in the respective municipalities Official Plan Schedules.

3.2 Vegetation Communities and Plants

In Ontario, vegetation communities are delineated according to the ELC system (Lee et al., 1998), described in **Section 2.2.1**. The ELC system provides methods for identifying and mapping vegetation communities in a way that can be used for land use planning.

3.2.1 Background Data

A detailed background review was completed prior to field investigations, and the results of the background review are documented under a separate cover in the *Highway 400 – Highway 404 Link (Bradford Bypass W.O. #19-2001 – Terrestrial Ecosystems Existing Conditions Report* (AECOM, 2020). Through the background review, vegetation

communities within the Study Area were identified and delineated using a combination of the vegetation community boundaries provided in the *Environmental Assessment Report One – Stage Submission: Highway 400 – Highway 404 Extension Link (Bradford Bypass) W.P. 377-90-00* (McCormick Rankin Corporation, 1997), hereafter referred to as the 2002 Approved EA, and updated aerial photo interpretation. Boundaries were further refined using both the existing York Region ELC mapping and current PSW mapping. In some locations, vegetation communities were identified to the Ecosite level using the information available in the 2002 Approved EA report and the York Region ELC mapping.

A review of the 2002 Approved EA identified two species that were observed in fen communities present along the Holland River that were considered regionally rare for central region according to the *Distribution and Status of the Vascular Plants of Central Region* (Riley, 1989). These species included Sartwell's sedge (*Carex sartwellii*) and downy willow-herb (*Epilobium strictum*). Another seven species observed are considered locally rare according to the *Vascular Plants of Lake Simcoe Watershed* (MNR, 2015a). These species included glaucous-leaved bog rosemary (*Andromeda polifolia* var. *latifolia*), marsh bellflower (*Campanula aparinoides*), hoary willow (*Salix candida*), rush aster (*Symphotrichum boreale*), Buxbaum's sedge (*Carex buxbaumii*), bog birch (*Betula pumila*) and marsh muhly (*Muhlenbergia glomerata*). Another locally-rare species, daisy-leaved moonwort (*Botrychium matricariifolium*), was observed in the deciduous swamp found directly east of the Holland River East Branch. SAR and SOCC plant records in the vicinity of the Study Area identified through the background information review are further discussed in **Section 3.4** and **Section 3.5**, respectively.

3.2.2 Field Investigations

Agricultural lands largely represent the Study Area with some industrial, and commercial properties also present. Natural areas are generally limited to remnant woodlands and wetlands persisting in an otherwise agriculturally dominated landscape, with some larger naturalized areas intersecting the Study Area at the Holland River and Holland River East Branch and associated wetlands, including the Holland Marsh (BW5) PSW and Holland Marsh Wetland Complex PSW.

Field investigations completed in support of the Preliminary Design confirmed that vegetation communities within the Study Area include deciduous, coniferous, and mixed forests (FOD, FOC & FOM), plantations (CUP), cultural woodlands, thickets and meadows (CUW, CUT, CUM), wetlands and open water communities (MAM, MAS, SAF and OAO) as well as coniferous and deciduous swamps (SWC and SWD) and swamp thickets (SWT). A total of 153 polygons represented by 53 different community types were examined as part of the field investigations. One rare vegetation community (Dry – Fresh Hickory Deciduous Forest [FOD2-3], S3S4) was identified within the Study Area, west of County Road 4 outside of the proposed ROW. No other rare vegetation communities were identified within the Study Area during field investigations.

Comments received from the MNR on June 17, 2022 indicated that the treed swamps and contiguous adjacent upland forest in between the branches of the Holland River likely meet the criteria outlined in the MNR *Technical Definitions and Criteria for Key Natural Heritage Features in the Natural Heritage System of the Protected Countryside Area* (2005) to be considered Significant Woodland. Following the guidelines for Significant Woodlands it is likely that the majority of forest, woodland and swamp communities intersected by the proposed ROW meet one of the criteria for Significant Woodland based on area requirements and/or these communities being considered candidate habitat for SAR (**Section 3.4**).

Additionally, field investigations noted areas where wetland vegetation communities associated with the Holland River and Holland River East Branch extended beyond the existing PSW boundaries of the Holland Marsh (BW5) PSW and the Holland Marsh Wetland Complex PSW. This includes the wetland communities present between the Holland River and Artesian Industrial Parkway and communities between the Holland River East Branch and Bathurst Street.

Vegetation communities present along existing roadways within the MTO ROW, which have resulted from or have been maintained by anthropogenic disturbances (i.e., seed mixes and plantings as part of restoration activities and/or continued maintenance or mowing), were largely delineated and classified as Mineral Cultural Meadows (CUM1) or Dry-Moist Old Field Cultural Meadow (CUM1-1) communities.

The locations of ELC communities are displayed on **Figure 2-1** to **Figure 2-7** in **Appendix A** and a complete description of each vegetation community and its associated dominant plant species are provided in **Appendix B**.

Two plant SAR were recorded within the Study Area; butternut (*Juglans cinerea*) and black ash (*Fraxinus nigra*). Both species are listed as Endangered under the ESA. **Table 3-2** provides details of the butternut and black ash found during field investigations. Black ash individuals and their habitat are afforded protection under the *Endangered Species Act* (ESA); however, the protection of the species has been temporarily suspended for two years until 2024 to allow the MECP to determine the best way to protect and recover black ash in the province of Ontario. During this time, activities that impact black ash and its habitat may proceed without authorization under the ESA.

Table 3-2: Records of Butternut and Black Ash within Study Area

ELC Community	Details
Butternut	
FOD2-3 Dry – Fresh Hickory Deciduous Forest	Three butternut trees were found in this community. The community is located in a naturalized area approximately 750 m west of crossing of Yonge Street.
CUP3-2 White Pine Coniferous Plantation	Thirteen butternut trees were found in this community. The community is located in a naturalized area approximately 640 m west of crossing of Yonge Street.
CUT1 Mineral Cultural Thicket Ecosite	Sixteen butternut trees were found in this community. The community is located in a naturalized area approximately 450 m west of crossing of Yonge Street.
CUT1-4 Mineral Gray Dogwood Cultural Thicket	One butternut tree was found in this community. The community is located in the middle of an agricultural field approximately 750 m west of Yonge Street.
CUW1 Mineral Cultural Woodland Ecosite	Eight butternut trees were found in this community. The community is located adjacent to the Highway 404 southbound lanes.
Black Ash	
FOM7 Fresh – Moist Lowland Deciduous Forest Ecosite	Located within the forested areas adjacent to the Holland River, southwest of the Bathurst Street and Hochreiter Road Intersection.
SWT3-1 Alder Organic thicket Swamp	Located within the forested areas adjacent to the Holland River, north of River Drive.
SWD3-1 Red Maple Mineral Deciduous Swamp	Located within the forested areas adjacent to the Holland River, north of the Yonge Street and Morgans Road intersection.
FOD4/SWD3-3 Dry – Fresh Deciduous Forest Ecosite/ Swamp Maple Mineral Deciduous Swamp Complex	Located within the forested areas adjacent to the Holland River, north of the Yonge Street and Morgans Road intersection.
FOD7	Located within the forested areas east of Yonge Street.

ELC Community	Details
Fresh - Moist Lowland Deciduous Forest	

No SOCC plants were observed within the Study Area. A complete list of vascular plant species observed within each vegetation community is provided in **Appendix C**. A total of 327 plant species were recorded; of which 241 (74%) were native and 86 (26%) were non-native. SAR and SOCC plants identified through the field investigations are further discussed in **Section 3.4** and **Section 3.5**.

A total of 19 species considered to be locally rare in the Lake Simcoe Watershed (MNRF, 2015a) were recorded, these include: American hazelnut (*Corylus americana*), one-sided wintergreen (*Orthilia secunda*), brome-like sedge (*Carex bromoides*), American witch-hazel (*Hamamelis virginiana*), Virginia false dragonhead (*Physostegia virginiana*), round-leaved pyrola (*Pyrola americana*), black walnut (*Juglans nigra*), bristly black currant (*Ribes lacustre*), large yellow lady's-slipper (*Cypripedium parviflorum* var. *pubescens*), butternut, eastern ninebark (*Physocarpus opulifolius*), meadow horsetail (*Equisetum pratense*), purple-stemmed angelica (*Angelica atropurpurea*), red pine (*Pinus resinosa*), spreading goldenrod (*Solidago patula*), stout woodreed (*Cinna arundinacea*), swamp fly-honeysuckle (*Lonicera oblongifolia*), white heath aster (*Symphotrichum ericoides*) and white oak (*Quercus alba*).

Noxious plant species, as defined by O.Reg. 248/14 of Ontario's *Weed Control Act* (2014), observed within the proposed ROW included bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), coltsfoot (*Tussilago farfara*), common buckthorn (*Rhamnus cathartica*), brown knapweed (*Centaurea jacea*), poison-ivy (*Toxicodendron radicans*), common ragweed (*Ambrosia artemisiifolia*), field sow-thistle (*Sonchus arvensis*), smooth bedstraw (*Galium mollugo*) and wild parsnip (*Pastinaca sativa*).

Of these species, wild parsnip and poison-ivy are considered a concern to public health and safety due to the oils or chemical compounds present in each species which are known to cause allergic reactions or severe dermatitis. In addition, phragmites (*Phragmites australis* ssp. *australis*), an invasive species regulated under the *Invasive Species Act* (2015) was observed in various wetlands and roadside ditches throughout the Study Area.

3.3 Wildlife

Wildlife surveys were completed to develop an understanding of species composition, abundance and habitat use of wildlife within the Study Area.

3.3.1 Background Data

A detailed background review was completed prior to field investigations and the results of the background review are documented under a separate cover in the *Highway 400 – Highway 404 Link (Bradford Bypass W.O. #19-2001 – Terrestrial Ecosystems Existing Conditions Report* (AECOM, 2020). Breeding bird surveys completed as part of the 2002 Approved EA report identified two species considered provincially and nationally vulnerable at the time of the 2002 Approved EA: Louisiana Waterthrush (*Parkesia motacilla*) and Red-Shouldered Hawk (*Buteo lineatus*), were observed during field investigations. Since the 2002 Approved EA report, the federal and provincial statuses of Louisiana Waterthrush and Red-Shouldered Hawk have been reassessed. The Louisiana Waterthrush was designated as Threatened both federally and provincially in 2015 and 2016, respectively (Committee on the Status of Species at Risk in Ontario [COSSARO], 2016). The Red-Shouldered Hawk was determined to no longer be at risk federally or provincially in 2006 (Committee on the Status of Endangered Wildlife in Canada [COSEWIC], 2006). The updated background information review (AECOM, 2020) identified records of 139 bird species potentially present within the Study Area, which included one species that is listed as Endangered, six that are

listed as Threatened and eight that are listed as SC under the *ESA*. These species are further discussed in **Section 3.4.2** and **Section 3.5.2**.

Herpetofauna surveys completed as part of the 2002 Approved EA report identified the presence of seven amphibian species and three reptiles. Of these, two SOCC were identified, which included: Snapping Turtle (*Chelydra serpentina*) and Western Chorus Frog (*Pseudacris triseriata*). The updated background information review (AECOM, 2020) identified records for 23 reptile and amphibian species. Of these, one is listed as Endangered; one is listed as Threatened and another three species are considered SOCC. SAR and SOCC records in the vicinity of the Study Area identified through the field investigations are further discussed in **Section 3.4** and **Section 3.5**, respectively.

A total of 18 incidental mammal observations were recorded as part of the 2002 Approved EA. Of these, one unconfirmed bat species, which was noted to likely be Little Brown Myotis (*Myotis lucifugus*), was observed during field investigations. This presumed species is now listed as Endangered under the *ESA*. The updated background information review (AECOM, 2020) identified records for 48 mammal species with potential to be present within the project Study Area. Most of these species are common, tolerant to disturbance and have secure populations in Ontario except four species listed as Endangered and protected under the *ESA*; these SAR, Little Brown Myotis (*Myotis lucifugus*), Eastern Small-footed Myotis (*Myotis leibii*), Northern Myotis (*Myotis septentrionalis*) and Tri-colored Bat (*Perimyotis subflavus*), are discussed further in **Section 3.4**.

The updated background information review also identified records of 33 butterfly species; all of these species are common and have secure populations in Ontario with the exception of Monarch (*Danaus plexippus*), which is listed as SC under the *ESA* and is therefore treated as SOCC. SOCC is further discussed in **Section 3.5.2**.

3.3.2 Field Investigations

3.3.2.1 Amphibian Night Call Surveys

Potential amphibian breeding habitat locations present in the Study Area were identified based on aerial photo interpretation and SWH assessment. A total of 12 locations were confirmed to be potentially suitable as they contained either permanent or seasonal standing water. Therefore, amphibian night call surveys were performed at 12 monitoring stations. The results of these surveys are summarized in **Table 5** and locations of each station are shown on **Figure 2-1** to **Figure 2-7** in **Appendix A**.

Amphibians were recorded calling at the majority of the stations during at least one round of surveys. AMP-11 and AMP-12 were the only stations where staff did not observe frogs calling. The first two rounds of surveys at AMP-12 could not be completed due to accessibility limitations. Although, no frogs were heard at AMP-12 during the third round of surveys, a conservative approach that assumes amphibian breeding habitat has been adopted.

A total of six amphibian species were heard calling during night call surveys. Species recorded included the following: American Toad (*Anaxyrus americanus*), Gray Treefrog (*Hyla versicolor*), Green Frog (*Lithobates clamitans*), Spring Peeper (*Pseudacris crucifer*), Northern Leopard Frog (*Lithobates pipiens*) and Wood Frog (*Lithobates sylvaticus*). Two stations, AMP-01 and AMP-02, met the criteria of Amphibian Breeding Habitat (Wetlands) SWH as defined in the *Significant Wildlife Habitat Criteria Schedule for Ecoregion 6E* (MNRF, 2015b). Amphibian Breeding Habitat SWH is further discussed in **Section 3.5.2**.

Table 3-3: Summary of Amphibian Survey Conditions and Results

Monitoring Round and Station ID	Date	Time	Beaufort Wind Scale	Cloud Cover (%)	Background Noise	Air Temperature (°C)	Precipitation	Results
AMP-1.1	04/10/2021	22:27 – 22:30	1	100	2-3	18	none	▪ Choruses of American toad and spring peeper, two wood frogs also heard calling.
AMP-1.2	05/19/2021	23:35 – 23:38	1	50	2	18	none	▪ Two spring peepers heard calling. One spring peeper and one American toad heard calling outside the Terrestrial Ecosystems Study Area.
AMP-1.3	06/24/2021	21:50 – 21:53	1	95	4	24	none	▪ Two gray treefrogs heard calling.
AMP-2.1	04/10/2021	20:35 – 20:38	1	100	1	18	none	▪ Choruses of American toad and spring peeper heard calling.
AMP-2.2	05/19/2021	21:25 – 21:28	1	80	1	22	none	▪ Two spring peepers heard calling.
AMP-2.3	06/24/2021	21:32 – 21:35	1	95	0-1	24	none	▪ No frogs heard calling.
AMP-3.1	04/10/2021	20:27 – 20:31	1	100	2-3	18	none	▪ Chorus of spring peeper heard calling
AMP-3.2	05/19/2021	21:25 – 21:28	1	80	1	22	none	▪ One gray treefrog and a chorus of spring peeper heard calling.
AMP-3.3	06/24/2021	21:21 – 21:24	1	95	0	24	none	▪ One gray treefrog heard calling.
AMP-4.1	04/10/2021	21:12 – 21:15	1	100	1	18	none	▪ One spring peeper and three northern leopard frogs heard calling.
AMP-4.2	05/19/2021	22:16 – 22:19	0-1	60	2	19	none	▪ No frogs heard calling within the Terrestrial Ecosystems Study Area. One American toad and one gray treefrog were heard outside of the Terrestrial Ecosystems Study Area
AMP-4.3	06/24/2021	22:13 – 20:16	0-1	95	1	23	none	▪ No frogs heard calling.
AMP-5.1	04/10/2021	22:27 – 22:30	1	100	2-3	18	none	▪ A chorus of spring peeper, one northern leopard frog and one American toad head calling.
AMP-5.2	05/19/2021	22:16 – 22:19	0-1	60	2	19	none	▪ No frogs heard calling within the Terrestrial Ecosystems Study Area. It was noted that green frogs, spring peepers and American toads were calling away from the station south of the road in a shallow marsh.
AMP-5.3	06/24/2021	22:07 – 20:10	0-1	95	1	23	none	▪ No frogs heard calling. It was noted that green frogs were seen on the trail.
AMP-6.1	04/10/2021	21:46 – 21:49	0	100	1	18	none	▪ One spring peeper, one northern leopard frog and two wood frogs heard calling
AMP-6.2	05/19/2021	22:44 – 22:47	0-1	60	2	19	none	▪ No frogs heard calling within the Terrestrial Ecosystems Study Area. A chorus of gray treefrogs and one green frog were heard outside of the Terrestrial Ecosystems Study Area.
AMP-6.3	06/23/2021	22:44 – 22:47	1	5	0-1	17	none	▪ No frogs heard calling.
AMP-7.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	▪ Station was inaccessible due to health and safety reasons.
AMP-7.2	05/26/2021	21:15 – 21:18	2-3	10	0	15	none	▪ Two gray treefrogs were heard calling.
AMP-7.3	06/23/2021	22:20 – 22:23	2	5	1	18	none	▪ One green frog and one gray treefrog heard calling.
AMP-8.1	04/29/2021	20:30 – 20:33	0	100	0	8	none	▪ Chorus of spring peeper heard calling.
AMP-8.2	05/26/2021	22:24 – 22:27	2-3	10	0	14	none	▪ No frogs heard calling.
AMP-8.3	06/23/2021	21:15 – 21:18	2	5	0	18	none	▪ No frogs heard calling.
AMP-9.1	04/10/2021	22:00 – 22:05	0	100	1	18	none	▪ Chorus of American toad, one wood frog. As well a chorus of spring peeper was heard calling outside of the Terrestrial Ecosystems Study Area.
AMP-9.2	05/19/2021	23:06 – 23:09	0-1	50	2	18	none	▪ One spring peeper heard calling. A chorus of American toads and one spring peeper recorded calling outside of Terrestrial Ecosystems Study Area.
AMP-9.3	06/23/2021	21:38 – 21:41	2	5	0	18	none	▪ No frogs heard calling.
AMP-10.1	04/29/2021	21:50 – 21:53	0	100	0	8	drizzle	▪ No frogs heard calling within 100 m. American toad and spring peeper were heard outside of the Terrestrial Ecosystems Study Area.
AMP-10.2	05/26/2021	23:44 – 23:47	3	10-20	0	12	none	▪ One green frog heard calling.

Monitoring Round and Station ID	Date	Time	Beaufort Wind Scale	Cloud Cover (%)	Background Noise	Air Temperature (°C)	Precipitation	Results
AMP-10.3	06/23/2021	23:05 – 23:08	2	5	1	18	none	▪ No frogs heard calling within the Terrestrial Ecosystems Study Area. One green frog heard outside of the Terrestrial Ecosystems Study Area.
AMP-11.1	04/29/2021	21:19 – 21:22	0	100	1	9	drizzle	▪ No frogs heard calling.
AMP-11.2	05/26/2021	00:10 – 00:13	3	10-20	2	11	none	▪ No frogs heard calling.
AMP-11.3	06/23/2021	23:28 – 23:31	2	5	2	18	none	▪ No frogs heard calling.
AMP-12.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	▪ Permission to Enter not granted
AMP-12.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	▪ Permission to Enter not granted
AMP-12.3	06/23/2021	23:36 – 23:39	2	5	2-3	18	none	▪ No frogs heard calling.

Notes: Background noise is indicated using the following background noise codes reproduced from the Marsh Monitoring Program Participants Handbook (BSC, 2008):

- 0 – No appreciable effect (e.g., owl calling)
- 1 – Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
- 2 – Moderately affecting sampling (e.g., distant traffic, 2 to 5 cars passing)
- 3 – Seriously affecting sampling (e.g., continuous traffic nearby, 6 to 10 cars passing)
- 4 – Profoundly affecting samplings (e.g., continuous traffic passing, construction noise)

3.3.2.2 Breeding Birds

Breeding bird surveys were conducted in various habitats representative of the Study Area, including forest, woodland, thicket, meadow and marsh vegetation communities. Survey conditions are outlined in **Table 3-4** below.

Table 3-4: Breeding Bird Survey Conditions

Round	Point Count Station ID	Date	Start Time/ End Time	Temperature (Low-High; °C)	Wind (Min-Max; Beaufort Scale)	Cloud Cover (Min-Max; %)	Precipitation
1	BBS-01, 04 to 09	June 7, 2021	5:46 to 9:25	23-25	0-1	15-100	None
	BBS-10 to 17	June 9, 2021	6:16 to 9:55	20	0	50	None
	BBS-02,03,18 to 20	June 10, 2021	6:13 to 9:51	18	0-1	0	None
2	BBS-01 to 07	June 23, 2021	6:08 to 9:12	8-14	1	0-15	None
	BBS-08 to 16	June 28, 2021	5:58 to 9:58	23-25	0-2	10-45	None
	BBS-17 to 20	June 29, 2021	6:22 to 7:54	22-24	0-1	50-100	None

A total of 63 species were observed over two rounds of point count surveys. Of these, breeding evidence was confirmed for the following species:

- Black-capped Chickadee (*Poecile atricapillus*)
- Eastern Meadowlark (*Sturnella magna*)
- Mallard (*Anas platyrhynchos*); and
- Yellow Warbler (*Dendroica petechia*).

Black-capped Chickadee, Eastern Meadowlark, Mallard and Yellow Warbler are species that are protected under the MBCA. Eastern Meadowlark (BBS-01), Black-capped Chickadee (BBS-06) and Yellow Warbler (BBS-09) were observed during surveys. Recently fledged mallards were observed at breeding bird station BBS-15.

The following SAR and/or SOCC were observed during breeding bird surveys:

- Barn Swallow (*Hirundo rustica*)
- Bobolink (*Dolichonyx oryzivorus*)
- Eastern Meadowlark
- Eastern Wood-pewee (*Contopus virens*); and
- Wood Thrush (*Hylocichla mustelina*).

These species are discussed in further detail in **Section 3.4.2** and **Section 3.5.2**. The complete results of the breeding bird surveys are listed in **Appendix D** with point count locations shown in **Appendix A, Figure 2-1** and **Figure 2-7**.

3.3.2.3 Incidental Wildlife Observations

During field investigations, any evidence (e.g., observation, scat, tracks, calls, etc.) of wildlife and their associated habitat and habitat usages were documented. Incidental wildlife observations made during field investigations are listed in **Table 3-5**. A total of five mammals, 21 Birds, five insects, two amphibians and two reptiles were observed. Of these, two SOCC were recorded. The remaining species are designated as Secure or Apparently Secure in Ontario. AECOM Ecologists observed midland painted turtles (*Chrysemys picta marginata*) within the Holland River East Branch. While Midland Painted Turtles are not considered SAR or SOCC in Ontario, this species is designated as SC federally by SARA. While Midland Painted Turtles do not receive habitat protection, individuals are protected under the *Fish and Wildlife Conservation Act* (FWCA).

Table 3-5: Incidental Wildlife Observations

Taxon	Common Name	Scientific Name	S-Rank ¹	ESA Status ²
Amphibians	Northern Leopard Frog	<i>Lithobates pipiens</i>	S5	NAR
	Green Frog	<i>Lithobates clamitans</i>	S5	No Status
Birds	American Crow	<i>Corvus brachyrhynchos</i>	S5	No Status
	American Robin	<i>Turdus migratorius</i>	S5	No Status
	American Goldfinch	<i>Spinus tristis</i>	S5	No Status
	Belted Kingfisher	<i>Megaceryle alcyon</i>	S5B, S4N	No Status
	Black-capped Chickadee	<i>Poecile atricapillus</i>	S5	No Status
	Blue Jay	<i>Cyanocitta cristata</i>	S5	No Status
	Canada Goose	<i>Branta canadensis</i>	S5	No Status
	Cedar Waxwing	<i>Bombycilla cedrorum</i>	S5	No Status
	Double-crested Cormorant	<i>Phalacrocorax auritus</i>	S5B, S4N	NAR
	Downy Woodpecker	<i>Dryobates pubescens</i>	S5	No Status
	Eastern Wood-pewee	<i>Contopus virens</i>	S4B	SC
	Mallard	<i>Anas platyrhynchos</i>	S5	No Status
	Osprey	<i>Pandion haliaetus</i>	S5B	No Status
	Pileated Woodpecker	<i>Dryocopus pileatus</i>	S5	No Status
	Red-eyed Vireo	<i>Vireo olivaceus</i>	S5B	No Status
	Savannah Sparrow	<i>Passerculus sandwichensis</i>	S5B, S3N	No Status
	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	S5	No Status
	Ring-billed Gull	<i>Larus delawarensis</i>	S5	No Status
	Wild Turkey	<i>Meleagris gallopavo</i>	S5	No Status
	Turkey Vulture	<i>Cathartes aura</i>	S5	No Status
White-breasted Nuthatch	<i>Sitta carolinensis</i>	S5	No Status	
Insects	Cabbage White	<i>Pieris rapae</i>	SNA	No Status
	Common Eastern Bumble Bee	<i>Bombus impatiens</i>	S5	No Status
	Monarch	<i>Danaus plexippus</i>	S2N, S4B	No Status
	Praying Mantis	<i>Mantis religiosa</i>	SNA	No Status
	European Honey Bee	<i>Apis mellifera</i>	SNA	No Status
Mammals	Beaver	<i>Castor canadensis</i>	S5	No Status
	Coyote	<i>Canis latrans</i>	S5	No Status
	Eastern Cottontail	<i>Sylvilagus floridanus</i>	S5	No Status

Taxon	Common Name	Scientific Name	S-Rank ¹	ESA Status ²
	Red Squirrel	<i>Tamiasciurus hudsonicus</i>	S5	No Status
	White-tailed Deer	<i>Odocoileus virginianus</i>	S5	No Status
Reptiles	Eastern Gartersnake	<i>Thamnophis sirtalis sirtalis</i>	S5	No Status
	Midland Painted Turtle	<i>Chrysemys picta marginata</i>	S4	No Status

¹S2 – Imperilled, S3 – Vulnerable, S4 – Apparently Secure, S5 – Secure, S#B/S#N – Breeding/Non-breeding

²SC – Special Concern, THR – Threatened, END – Endangered, NAR – Not at Risk

3.4 Species at Risk

For the purpose of this Report, SAR are defined as species that are listed as Threatened, Endangered or Extirpated, provincially. These species, as well as their habitat, are afforded protection under the ESA. Species listed as Special Concern (SC) under the *ESA* are considered SOCC and are addressed through the SWH screening exercise (**Section 3.5.2**). Refer to **Appendix A, Figure 3-1 to Figure 3-7** for mapped potential SAR habitat.

3.4.1 Background Review

The 2002 Approved EA defined SAR as those species identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Vulnerable, Threatened or Endangered. At the time of the report, no species listed by COSEWIC were observed within the Recommended Plan. The current *ESA* was enacted in 2007. This legislation provides individual and habitat protection to those species designated as either Endangered or Threatened on the Species at Risk in Ontario (SARO) List. Currently in Ontario there are over 200 SAR.

The updated background review documented in the *Highway 400 – Highway 404 Link (Bradford Bypass W.O. #19-2001 – Terrestrial Ecosystems Existing Conditions Report* (AECOM, 2020) identified the potential for 16 SAR within the Study Area. It is noted that two additional species potentially occurring within the Study Area were recently reassessed by COSSARO since the background review was completed. Black ash and Red-headed Woodpecker (*Melanerpes erythrocephalus*) were reassessed as Endangered in Ontario (previously considered not at risk). Additionally, Barn Swallow was reassessed as SC in Ontario (previously considered Threatened). The new designations for black ash and Red-headed Woodpecker were amended in O. Reg. 230/08 under the *ESA* on January 26, 2022 and Barn Swallow on January 26, 2023. As Barn Swallow was down listed to SC it is now considered a SOCC and is further addressed in **Section 3.5**. Additionally, since the updated background review was completed, Ontario Reptile and Amphibian Atlas (ORAA) records were refined by Ontario Nature and background records of Jefferson/Blue-spotted Salamander hybrid (*Ambystoma jeffersonianum /laterale hybrid*) were removed in the vicinity of the Study Area through a manual vetting process. As such, a total of 17 SAR were identified to potentially occur within the Study Area. Of these SAR records, eight are species listed as Endangered and nine are species listed as Threatened. These SAR are listed in **Table 3-6** below.

Table 3-6: Species at Risk Records for the Vicinity of the Study Area

Taxa	Common Name	Scientific Name	S-Rank ¹	ESA Status ²	SARA Status ²	Source of Record ³	Date of Most Recent Observation ⁴
Bird	Bank Swallow	<i>Riparia riparia</i>	S4B	THR	THR	MECP, NHIC, OBBA	2013

Taxa	Common Name	Scientific Name	S-Rank ¹	ESA Status ²	SARA Status ²	Source of Record ³	Date of Most Recent Observation ⁴
	Bobolink	<i>Dolichonyx oryzivorus</i>	S4B	THR	THR	MECP, NHIC, OBBA	2002
	Chimney Swift	<i>Chaetura pelagica</i>	S4B,S4N	THR	THR	OBBA	2001-2005
	Eastern Meadowlark	<i>Sturnella Magna</i>	S4B	THR	THR	MECP, NHIC, OBBA	2001
	Eastern Whip-poor-will	<i>Anrostomus vociferus</i>	S4B	THR	THR	OBBA	2001-2005
	Henslow's Sparrow	<i>Ammodramus henslowii</i>	SHB	END	END	MECP	N/A
	Least Bittern	<i>Ixobrychus exilis</i>	S4B	THR	THR	MECP, NHIC	1997
	Louisiana Waterthrush	<i>Parkesia motacilla</i>	S3B	THR	THR	EA	1995
	Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	S4B	END	THR	MECP	N/A
Mammal	Eastern Small-footed Myotis	<i>Myotis leibii</i>	S2S3	END	No Status	BCI	N/A
	Little Brown Myotis	<i>Myotis lucifugus</i>	S4	END	END	MECP, BCI	N/A
	Northern Myotis	<i>Myotis septentrionalis</i>	S3	END	END	MECP, BCI	N/A
	Tri-colored Bat	<i>Perimyotis subflavus</i>	S3	END	END	MECP, BCI	N/A
Plant	Black ash	<i>Fraxinus nigra</i>	S3	END	THR	MECP	N/A
	Butternut	<i>Juglans cinerea</i>	S2?	END	END	MEPC, EA, NHIC	1997
Reptile	Blanding's Turtle	<i>Emydoidea blandingii</i>	S3	THR	THR	ORAA	2017

¹S2 – Imperilled, S3 – Vulnerable, S4 – Apparently Secure, SH – Historic, S#B/S#N – Breeding/Non-breeding

²THR – Threatened, END – Endangered, ESA – *Endangered Species Act* (2007), SARA – *Species at Risk Act* (2002)

³OBBA – Ontario Breeding Bird Atlas, NHIC – Natural Heritage Information Center, MECP – Ministry of Environment Conservation and Parks, EA – 2002 Approved EA, BCI – Bat Conservation International, ORAA – Ontario Reptile Amphibian Atlas

⁴Date represents most recent observation date prior to the completion of the BBP field investigations.

3.4.2 SAR Habitat Assessment

SAR records were compiled through a review of background data and evidence of these species, or their habitats were searched for during the field investigations. A habitat assessment was completed for each of the 17 SAR to determine if there is potential for that SAR to occur within the Study Area. This assessment was based on the characterization of vegetation communities using aerial photograph interpretation and further refined following field investigations. **Appendix E** provides this habitat assessment for each 17 SAR, including their habitat preferences and evaluation of potential occurrence in the Study Area, based on the results of the 2020-2022 field investigations. The potential for the species to occur was determined through a probability of occurrence whereby the following rankings were applied:

- **Low Probability:** No suitable habitat present within the Study Area and/or species not identified during targeted surveys and/or no recent occurrence record identified through background review;
- **Medium Probability:** Suitable habitat present within the Study Area. Although species were not observed during the 2020-2022 field investigations, targeted surveys will be undertaken in Detail Design, and there are recent occurrence records within or in the vicinity of the Study Area identified through background review; and,
- **High Probability:** Species and suitable habitat observed within the Study Area during the 2020-2022 field investigations.

Species listed as SC provincially are not afforded protection under the *ESA* but have been included in the SAR screening to avoid future implications should the status of these species change under the *ESA*. Furthermore, habitats of SOCC, including SC species' habitats, are considered SWH under the PPS and associated *Natural Heritage Reference Manual (NHRM)* (MNR, 2010; refer to **Section 3.5**). For this reason, consideration was given to identifying SC species in addition to Threatened and Endangered species.

Through this assessment, 12 SAR (Threatened or Endangered) were determined to have high or medium potential to occur in the Study Area based on candidate habitat presence within the Study Area.

As described in **Section 3.2** and **Section 3.3**, five SAR were recorded during field investigations conducted from 2020 to 2022. SAR observed within the Study Area included Bobolink, black ash, butternut and Eastern Meadowlark. Habitat was confirmed within the proposed ROW for black ash, butternut, Bobolink and Eastern Meadowlark. A table summarizing these species and the locations of their respective potential habitats is provided in **Table 3-7** below. Confirmed and candidate SAR habitat is mapped on **Figure 3-1** to **Figure 3-7** in **Appendix A**. Mapped candidate habitat represents where a SAR is most likely to occur within the Study Area based on habitat requirements and survey results and does not necessarily represent habitat mapping standards outlined in various SAR General Habitat Descriptions provided by the MECP. SAR habitat mapping will need to be refined during Detail Design based upon the completion of targeted SAR surveys.

Table 3-7: Species at Risk Identified with High or Medium Potential to Occur within the Study Area

Taxa	Common Name	Scientific Name	ESA Status ¹	SARA Status ¹	Probability of Occurrence	Confirmed or Candidate Habitat
Bird	Bobolink	<i>Dolichonyx oryzivorus</i>	THR	THR	High	Confirmed Both Bobolink and Eastern Meadowlark require large areas of grassland habitat to carry out their life process and are often found nesting in agricultural settings such as pastures and hayfields (McCracken et al., 2013). Bobolink was observed incidentally within a fallow field located directly east of 2 nd Concession Road during the first round of the 2021 breeding bird surveys. The field was noted to be mowed during the second round of surveys, with bobolink no longer present. All agricultural fields present within the Study Area may provide future opportunities for nesting depending on the crop selection in a given year (i.e. lightly grazed pastures, young hayfields or alfalfa fields).

Taxa	Common Name	Scientific Name	ESA Status ¹	SARA Status ¹	Probability of Occurrence	Confirmed or Candidate Habitat
	Chimney Swift	<i>Chaetura pelagica</i>	THR	THR	Medium	Candidate Chimney Swift is a species that prefers to nest and roost in vertical cavities and has become adapt to using humanmade structures such as chimneys for these activities (COSSARO, 2020). Buildings with potentially suitable chimneys for nesting and roosting may be present within the Study Area. Foraging habitats in the form of cultural meadows, marshes and open or shallow water are also present within the Study Area.
	Eastern Meadowlark	<i>Sturnella magna</i>	THR	THR	High	Confirmed Both Bobolink and Eastern Meadowlark require large areas of grassland habitat to carry out their life process and are often found nesting in agricultural settings such as pastures and hayfields (McCracken et al., 2013). Confirmed breeding habitat was identified during field investigations within the cultural meadow adjacent to Highway 400 and 9 th during the 2021 breeding bird surveys. In 2020, seven Eastern Meadowlark were observed incidentally in the same cultural meadow community where Bobolink was observed in 2021, directly east of 2 nd Concession Road. However, Eastern Meadowlark was not observed in the area during the 2021 breeding bird surveys. All agricultural fields present within the Study Area may provide future opportunities for nesting depending on the crop selection in a given year (i.e. lightly grazed pastures, young hayfields or alfalfa fields).
	Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	S4B	THR	Medium	Candidate The Eastern Whip-poor-will nests on the ground in areas with a mix of open and forested areas, including mature deciduous, coniferous and mixed forest communities (MECP, 2019a). Candidate habitat within the Study Area was noted in the cultural thicket, plantation, woodland and meadow communities east of County Road 4, in the coniferous forest community (FOC4) located between 2 nd Concession Road and Leslie Street, the cultural woodland community west of Yonge Street and in the cultural woodland community adjacent to Highway 404. Targeted crepuscular bird surveys will be completed during Detail Design.

Taxa	Common Name	Scientific Name	ESA Status ¹	SARA Status ¹	Probability of Occurrence	Confirmed or Candidate Habitat
	Least Bittern	<i>Ixobrychus exilis</i>	THR	THR	Medium	Candidate In Ontario the Least Bittern prefers large cattail marshes with open pools and channels for hunting (MECP, 2016). Suitable vegetation communities for Least Bittern were observed along the banks of the Holland River where large continuous areas of cattail marsh communities were present. Targeted surveys (i.e., call playback surveys) required to confirm species presence/absence will be completed during Detail Design.
Mammals	Little Brown Myotis	<i>Myotis lucifugus</i>	END	END	Medium	Candidate Roosts and maternity colonies of Little Brown Myotis may occur in manmade structures (attics, abandoned buildings, barns), rock crevices, behind loose or flaking bark, or within tree cavities (Humphrey and Fotherby, 2019). Forested communities within proximity of suitable roosting habitat are present in the Study Area. Little Brown Myotis forages over water, rivers, and open areas within forests (e.g., gaps, edges; COSEWIC, 2013). Targeted surveys for SAR bats (i.e., acoustic monitoring) will be completed during Detail Design.
	Eastern Small-footed Myotis	<i>Myotis leibii</i>	END	-	Medium	Candidate Eastern Small-footed myotis roosts in a variety of habitats, including under rocks and bridges and in rock outcrops, caves, mines, and hollow trees. (Humphrey, 2017). This species hibernates in caves and abandoned mines, preferring colder, drier sites and showing strong hibernation site fidelity. Deciduous forest and buildings within the Study Area provide potentially suitable habitat for this species. Targeted surveys for SAR bats (i.e., acoustic monitoring) will be completed during Detail Design.
	Northern Long-eared Myotis	<i>Myotis septentrionalis</i>	END	END	Medium	Candidate This species is associated with forest habitats, roosting under loose bark or in tree cavities (Humphrey and Fotherby, 2019). Deciduous forests within the Study Area provide potentially suitable habitat for this species. Targeted surveys for SAR bats (i.e., acoustic monitoring) will be completed during Detail Design.
	Tri-colored Bat	<i>Perimyotis subflavus</i>	END	END	Medium	Candidate This species lives in forested habitats, forming day roosts and maternity colonies in older forest within foliage or in high tree cavities, occasionally also in barns or other man-made structures (Humphrey and Fotherby, 2019). Forested communities with suitable roosting habitat were present. Targeted surveys for SAR

Taxa	Common Name	Scientific Name	ESA Status ¹	SARA Status ¹	Probability of Occurrence	Confirmed or Candidate Habitat
						bats (i.e., acoustic monitoring) will be completed during Detail Design.
Plant	Black Ash	<i>Fraxinus nigra</i>	END	THR	High	Confirmed Black ash grows in open, moist to wet communities such as swamps, bogs, and riparian areas. The species is considered widespread throughout Ontario but is under threat due to the spread of Emerald Ash Borer, an invasive pest species that targets ash species (COSEWIC, 2018). Black Ash was observed in the Study Area during field investigations. The location of Black Ash observations is provided in Table 4 . Any moist forest, wooded swamp or swamp thicket community where Black Ash has not already been observed should be considered candidate habitat for Black Ash.
	Butternut	<i>Juglans cinerea</i>	END	END	High	Confirmed Butternut trees were observed in the Study Area during field investigations. Location and number of butternuts observed are provided in Table 4 . Butternut trees usually grow alone or in small groups in deciduous forests. It prefers moist, well-drained soil and is often found along streams but is also found on well-drained gravel sites and rarely on dry rocky soil (Poisson and Ursic, 2013). Any cultural thicket, cultural woodland or forest community where Butternut trees have not already been observed should be considered candidate habitat.
Reptile	Blanding's Turtle	<i>Emydoidea blandingii</i>	THR	THR	Medium	Candidate Blanding's Turtles live in shallow water, usually in large wetlands and shallow lakes with lots of aquatic plants. It is not unusual though, to find them hundreds of metres from the nearest water body, especially while they are searching for a mate or travelling to a nesting site (MECP, 2019b). Wetland communities that provide suitable habitat for Blanding's Turtle were observed along the Holland River and Holland River East Branch. Targeted surveys for Blanding's Turtle will be completed during Detail Design. Candidate habitat mapped on Figure 3-1 to Figure 3-7 represent candidate aquatic habitat only.

¹THR – Threatened, END – Endangered, ESA – Endangered Species Act (2007), SARA – Species at Risk Act (2002)

3.5 Significant Wildlife Habitat

The *Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E* (MNRF, 2015b) outline recommended criteria, based on science and expert knowledge, for identifying SWH within Ecoregion 6E, which encompasses the Study Area. The schedules include a description of the wildlife habitat, indicator wildlife species, and criteria used for determining significance.

SWH is divided into four broad categories, which are described as:

- Seasonal Concentration Areas
- Rare Vegetation Communities or Specialized Habitats for Wildlife
- Habitats of SOCC; and
- Animal Movement Corridors.

According to the NHRM (MNRF, 2010), which was developed to provide technical guidance for implementing the natural heritage policies of the PPS, SWH includes the habitat of SOCC, which consists of the following:

- Species with Provincial S-rank assigned by the NHIC as S1 (critically imperilled), S2 (imperilled) or S3 (vulnerable)
- Species listed as SC under the *ESA*; and
- Species identified as nationally Endangered or Threatened by COSEWIC, that are not protected under the *ESA*.

3.5.1 Background Data

Based on a review of the background information sources listed in **Section 2.1**, the presence of Deer Wintering Areas and Habitat for SC and Rare Wildlife Species were identified in the vicinity of the Study Area (**Figure 1-1** and **Figure 1-2** in **Appendix A**). Deer Wintering Areas (Stratum 2) were largely congruent with the Holland Marsh Wetland Complex PSW and Holland Marsh (BW5) PSW and overlapped the Study Area in multiple locations both east and west of the Holland River (refer to **Figure 1-1** and **Figure 1-2**). There were also records of 18 SOCC in the vicinity of the Study Area. SOCC records included ten bird, one amphibian, two reptile, one insect, and three plant species. Of the 18 SOCC, 14 are considered SC under the *ESA*. These SOCC are listed in **Table 3-8** below.

A habitat screening for SOCC was completed separately following the same methods as the SAR habitat screening described in **Section 3.4**. The results of the SWH and SOCC screening is summarized in **Section 3.5.2** below.

Table 3-8: SOCC Records within the Vicinity of the Study Area

Taxa	Common Name	Scientific Name	S-Rank ¹	ESA Status ²	COSEWIC Status ²	SARA Status ²	Source of Record ³	Date of Most Recent Observation ⁴
Bird	Bald Eagle	<i>Haliaeetus leucocephalus</i>	S4	SC	NAR	No Status	MECP	N/A
	Barn Swallow	<i>Hirundo rustica</i>	S4B	SC	THR	THR	MECP, NHIC, OBBA	2013
	Black Tern	<i>Chlidonias niger</i>	S3B,S4M	SC	NAR	No Status	NHIC, OBBA	2001-2005
	Canada Warbler	<i>Cardellina canadensis</i>	S5B	SC	SC	THR	EA, OBBA	2001-2005
	Common Nighthawk	<i>Chordeiles minor</i>	S4B	SC	SC	THR	EA, OBBA	2001-2005
	Eastern Wood-pewee	<i>Contopus virens</i>	S4B	SC	SC	SC	EA, OBBA	2001-2005
	Golden-Winged Warbler	<i>Vermivora chrysoptera</i>	S3B	SC	THR	THR	EA, OBBA	2001-2005
	Grasshopper Sparrow	<i>Ammodramus savannarum</i>	S4B	SC	SC	No Status	OBBA	2001-2005

Taxa	Common Name	Scientific Name	S-Rank ¹	ESA Status ²	COSEWIC Status ²	SARA Status ²	Source of Record ³	Date of Most Recent Observation ⁴
	Peregrine Falcon	<i>Falco peregrinus</i>	S4	SC	NAR	No Status	MECP	N/A
	Wood Thrush	<i>Hylocichla mustelina</i>	S4B	SC	THR	THR	EA, NHIC, OBBA	2001-2005
	Yellow Rail	<i>Coturnicops noveboracensis</i>	S3B	SC	SC	SC	NHIC	1985
Amphibian	Western Chorus Frog (Great Lakes/St. Lawrence – Canadian Shield population)	<i>Pseudacris maculata</i>	S4	NAR	THR	THR	ORAA	2017
Reptiles	Northern Map Turtle	<i>Graptemys geographica</i>	S3	SC	SC	SC	ORAA	1993
	Snapping Turtle	<i>Chelydra serpentina</i>	S4	SC	SC	SC	ORAA	2019
Insect	Monarch	<i>Danaus plexippus</i>	S2N, S4B	SC	END	SC	OBA	2018
Plants	Early-branching panicgrass	<i>Dichanthelium praecocius</i>	S3	No Status	No Status	No Status	NHIC	1977
	Houghton's flatsedge	<i>Cyperus houghtonii</i>	S3	No Status	No Status	No Status	NHIC	1976
	Bristly buttercup	<i>Ranunculus hispidus</i>	S3	No Status	No Status	No Status	EA	1995

¹S2 – Imperilled, S3 – Vulnerable, S4 – Apparently Secure, S#B/S#N – Breeding/Non-breeding

²SC – Special Concern, THR – Threatened, END – Endangered, NAR – Not at Risk, ESA – Endangered Species Act (2007), SARA – Species at Risk Act (2002), COSEWIC – The Committee on the Status of Endangered Wildlife in Canada

³OBBA – Ontario Breeding Bird Atlas, NHIC – Natural Heritage Information Center, MECP – Ministry of Environment Conservation and Parks, EA – 2002 Approved EA, ORAA – Ontario Reptile Amphibian Atlas, OBA – Ontario Butterfly Atlas

⁴Date represents most recent observation date prior to the completion of the BBP field investigations.

3.5.2 Significant Wildlife Habitat Assessment

Candidate SWH for SC and Rare Wildlife Species was identified based on SOCC with records in the vicinity of the Study Area. For this reason, a habitat assessment was completed for SOCC to determine if suitable habitat is present within the Study Area based on vegetation communities observed during field investigations and included in **Appendix E**. The potential for the species to occur was determined through a probability of occurrence whereby the following rankings were applied:

- **Low Probability:** No suitable habitat present within the Study Area or a recent occurrence record identified through background review;
- **Medium Probability:** Potentially suitable habitat present within the Study Area. Although species were not observed during field investigations, there are recent occurrence records in the vicinity of the Study Area identified through background review; and
- **High Probability:** Species observed during field investigations or there are recent occurrence records in the Study Area identified through background review.

The species included in **Table 3-9** were noted to potentially occur in the Study Area based on suitable habitat and recent occurrence records. A total of three SOCC were recorded in the Study Area during field investigations. Barn Swallows were observed foraging within the Study Area during breeding bird surveys; however, breeding evidence was not recorded. While candidate habitat for Barn Swallow is present within the Study Area limits, no nests were identified in/on any of the examined structures. Eastern Wood-pewee was recorded during breeding bird surveys and incidentally in several of the deciduous, coniferous and mixed forests and swamps intersected by the proposed ROW. Eastern Wood-pewee was recorded at ten breeding bird stations, including BBS-02, 03, 04, 06, 11, 12, 13, 15, 16 and 18. Wood thrush was also recorded in the eastern half of the Study Area at stations BBS-16 and 18. Monarch (*Danaus plexippus*) was observed incidentally within the Study Area, and confirmed habitat (i.e., communities with sufficient milkweed populations) was observed along sections of the Highway 400 and Highway 404 ROWs and within the Reed-canary Grass Mineral Meadow Marsh (MAM2-2) community west of Leslie Street. The remaining SOCC from **Table 3-8** are considered to have a low probability of occurrence due to a lack of potential habitat documented during field investigations. No other SOCC or suitable habitat were observed during field investigations; however, this cannot be considered conclusive evidence of species absence as targeted surveys were not performed beyond a plant inventory, community classification and breeding bird surveys.

Table 3-9: Species of Conservation Concern Identified with Medium or High Potential to Occur within the Study Area

Taxa	Common Name	Scientific Name	S-Rank ¹	ESA Status ²	Probability of Occurrence	Confirmed During Field Investigations
Amphibian	Western Chorus Frog (Great Lakes/St. Lawrence – Canadian Shield population)	<i>Pseudacris maculata</i>	S4	No Status	Medium	No
Birds	Barn Swallow	<i>Hirundo rustica</i>	S4B	SC	High	Yes (Species was observed but habitat was not confirmed)
	Common Nighthawk	<i>Chordeiles minor</i>	S4B	SC	Medium	No
	Eastern Wood-pewee	<i>Contopus virens</i>	S4B	SC	High	Yes
	Wood Thrush	<i>Hylocichla mustelina</i>	S4B	SC	High	Yes
Insects	Monarch	<i>Danaus plexippus</i>	S2N, S4B	SC	High	Yes
Reptile	Northern Map Turtle	<i>Graptemys geographica</i>	S3	SC	Medium	No
	Snapping Turtle	<i>Chelydra serpentina</i>	S4	SC	Medium	No

¹S2 – Imperilled, S3 – Vulnerable, S4 – Apparently, S#B/S#N – Breeding/Non-breeding

²SC – Special Concern, ESA – Endangered Species Act (2007)

The preliminary SWH screening exercise identified several preliminary SWH types within the Study Area. Field investigations, including ELC, botanical inventories, and breeding bird surveys further refined this total to nine candidate SWH and six confirmed SWH (including confirmed habitat for SOCC described above); these are mapped in **Appendix A, Figure 4a-1 to 4a-7** and **Figure 4b-1 to 4b-7** and outlined below. Full results of the SWH screening are provided in **Appendix F**. The habitat assessment for SOCC is provided in **Appendix E**.

Seasonal Concentration Areas

Candidate

- **Waterfowl Stopover and Staging Areas (Terrestrial)** - Agricultural fields within the Study Area were noted to possibly experience suitable amounts of spring melt and/or flooding and were considered significant stopover and staging areas for waterfowl.
- **Waterfowl Stopover and Staging Areas (Aquatic)** – Large shallow marsh (MAS) and swamp thicket (SWT) communities noted to be present along the banks of the Holland River and Holland River East Branch presented suitable characteristics for use by local and migrant waterfowl populations during the spring or fall migration.
- **Raptor Wintering Area** – Candidate Raptor Wintering Habitat was identified in the naturalized area located directly west of County Road 4. The candidate habitat was noted to be greater than 20 ha in size and provided a combination of deciduous forest, mixed forest, woodland, thicket and meadow vegetation communities.
- **Bat Maternity Colonies** – bat species may use deciduous forest (FOD), mixed forest (FOM) deciduous swamp (SWD) and mixed swamp (SWM) communities, which provide potentially suitable habitat for maternity roosting, where tree cavities or loose bark are present. Forested areas within the Study Area presented suitable characteristics for use by bats, but this has not been confirmed through acoustic monitoring.
- **Turtle Wintering Areas** – Suitable habitat for overwintering turtles was observed within the wetland communities present along both the Holland River and Holland River East Branch.
- **Reptile Hibernaculum** – Candidate reptile hibernaculum sites were observed within the Dry - Fresh Sugar Maple Deciduous Forest (FOD5-1) community east of Side Road 10, the Mineral Cultural Woodland (CUW1) community west of County Road 4 and the Mineral Cultural Thicket (CUT1) community east of Artesian Industrial Parkway.

Confirmed

- **Deer Yarding and Deer Winter Congregation Areas** – The management and mapping of Deer Yarding and Winter Congregation areas are the responsibility of the MNR. Based on MNR mapping, the proposed ROW intersects three Stratum 2 Deer Wintering Areas. Stratum 2 habitats are considered winter staging areas. These areas are typically located in close proximity to core wintering areas (Stratum 1 habitat) and provide high quality foraging habitat (agricultural and forested areas) for deer prior to their entrance into core wintering areas (MNR, 2014). The first wintering area is associated with the large, wooded area between the Holland River and Holland River East Branch and extends north and south of the Study Area. The second wintering area is present along the eastern bank of the Holland River East Branch and extends north of the Study Area, into the adjacent golf course. In both cases, the proposed ROW intersects either the northern or southern extent of the polygon. The third wintering area includes the forested communities identified between 2nd Concession Road and Leslie Street.

Rare Vegetation Communities

Confirmed

- **Other Rare Vegetation Communities** – A Dry - Fresh Hickory Deciduous Forest (FOD2-3) (S3S4) was confirmed within the Study Area, west of County Road 4. This community is located outside of the proposed ROW.

Specialized Habitats for Wildlife

Candidate

- Woodland Raptor Nesting Habitat – Several forest and swamp communities located in the vicinity of the Holland River and the Holland River East Branch were noted to be part of a more extensive, contiguous forest system that meets the size criteria to be considered candidate habitat.
- Turtle Nesting Areas – Suitable conditions for turtle nesting were observed in the CUM1-1 community located west of the Holland River East Branch.

Confirmed

- Amphibian Breeding Habitat (Wetlands) - The required number of indicator species were recorded calling with a Call Code Level of 3 at both amphibian call stations AMP-01 and AMP-02. A chorus of American Toads and Spring Peepers were recorded at AMP-01 on April 10, 2021 and a chorus of Wood Frogs and Spring Peepers were recorded at AMP-02 during the same evening. Both the Willow Mineral Deciduous Thicket Swamp (SWT2-2) and Birch - Conifer Mineral Mixed Swamp Type (SWM3-1) communities associated with AMP-01 and the Gray Dogwood Mineral Deciduous Thicket Swamp (SWT2-9) community associated with AMP-02 are considered confirmed Amphibian Breeding Habitat. Additionally, the Open Aquatic (OAO) community associated with AMP-12 is also conservatively being considered confirmed Amphibian Breeding Habitat, as first and second round surveys could not be completed at the station due to access restrictions.
- Seeps and Springs – Seepage areas were observed in the Alder Organic Thicket Swamp (SWT3-1) community west of the Holland River East Branch.

Habitat for Species of Conservation Concern Considered SWH

Candidate

- Marsh Breeding Bird Habitat – Large shallow marsh (MAS) and swamp thicket (SWT) communities present along the banks of the Holland River and Holland River East Branch presented suitable characteristics for use by local and migrant waterfowl populations during the spring or fall migration. Green Heron (BBS-15) and Marsh Wren (BBS-10) were both observed during breeding bird surveys. However, confirmed nesting was not observed for either species.

Confirmed

- Terrestrial Crayfish chimneys were observed in the SWT2-9 community west of County Road 4. Candidate habitat for terrestrial crayfish was observed within the wetland communities adjacent to the Holland River and Holland River East Branch.
- Habitat for SC and Rare Wildlife Species – SOCC with confirmed habitat are discussed above, a full screening for SOCC is provided in **Appendix E**.

Animal Movement Corridors

Animal movement corridors under *Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E* (MNR, 2015b) are identified as Amphibian Movement Corridors, and Deer Movement Corridors. Animal movement corridors may be present where Amphibian Breeding Habitat (Wetlands) and Deer Wintering Habitat occurs. Both Amphibian Breeding Habitat (Wetlands) and Deer Wintering Habitat were identified as SWH during the background review and field investigations. However, no SWH animal movement corridors were identified in the Study Area based on the criteria described in *Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E* (MNR, 2015b).

While confirmed Deer Wintering Areas are in close proximity to both banks of the Holland River East Branch this section of river is unlikely to provide conditions suitable to be considered SWH. This is largely based upon the residential and commercial developments present both north and south of the alignment. Additionally, the alignment intersects the northern extent of the Wintering Area to the west and the southern extent of the Wintering Area to the

east of the river with little habitat present directly north or south of the respective areas in which deer would be traveling to or from particularly for seasonal movement. The proposed ROW intersects the center portion of the third Deer Wintering Area present in the Study Area with no suitable movement corridor habitat present adjacent to the feature in the Study Area.

Areas of confirmed Amphibian Breeding Habitat (Wetland) in the Study Area are directly adjacent to upland communities with no connecting corridor present (lack of water).

4. Determination of Significance

Significant features and species identified within the Study Area and included in **Section 3** of the report are summarized in the sections below.

4.1 Designated Natural Areas

- The Study Area contains several natural areas, predominately in the vicinity of the Holland River, most of which are designated as either PSWs, unevaluated wetlands, ESAs, Significant Woodlands and/or identified by the Greenbelt Plan and/or Official Plans (**Figure 1-1** and **Figure 1-2** in **Appendix A**).
- The location of designated natural areas and where they cross the area of proposed works are illustrated in **Figures 1-1 to 1-2** in **Appendix A**.

4.2 Vegetation Communities and Plants

- One rare vegetation community (FOD2-3, S3S4) was identified within the Study Area, west of County Road 4 outside of the proposed ROW. All other vegetation communities identified within the Study Area are common throughout Ecoregion 6E, and none are considered significant.
- Both butternut and black ash were identified in several communities throughout the Study Area. Both plant species are considered Endangered under the *ESA*.
- A total of 19 locally rare plant species in the Lake Simcoe Watershed were identified in several communities throughout the Study Area.
- Noxious plant species observed within the proposed ROW included bull thistle, Canada thistle, coltsfoot, common buckthorn, brown knapweed, poison-ivy, common ragweed, field sow-thistle, smooth bedstraw and wild parsnip. Of these species, wild parsnip and poison-ivy are considered a concern to public health and safety due to the oils or chemical compounds present in each species which are known to cause allergic reactions or severe dermatitis. In addition, phragmites, an invasive species regulated under the *Invasive Species Act* (2015) was observed in various wetlands and roadside ditches throughout the Study Area. Plant communities are illustrated in **Figures 2-1 to 2-7** in **Appendix A**, and a complete list of vascular plants recorded through field investigations are included in **Appendix C**.

4.3 Wildlife

- Amphibian surveys confirmed the presence of American Toad, Grey Treefrog, Green Frog, Spring Peeper, Northern Leopard Frog and Wood Frog.
- A total of 63 bird species were identified during breeding bird surveys and/or incidentally during field investigations.
- The following Habitats of SOCC SWH types were either confirmed to be present within the Study Area or considered candidate. Candidate communities could not be confirmed despite the presence of suitable habitat, as targeted confirmatory surveys were not completed
 - Western Chorus Frog (Great Lakes/St. Lawrence – Canadian Shield population) - Candidate
 - Barn Swallow – Candidate
 - Eastern Wood-pewee – Confirmed
 - Monarch – Confirmed
 - Wood Thrush – Confirmed
 - Common Nighthawk (*Chordeiles minor*) – Candidate
 - Northern Map Turtle (*Graptemys geographica*) – Candidate
 - Snapping Turtle – Candidate

- Confirmed SWH included Deer Yarding and Winter Congregation Areas (Stratum 2), Amphibian Breeding Habitat (Wetlands), Seeps and Springs, Terrestrial Crayfish, Other Rare Vegetation Communities and habitat for Rare Wildlife Species (Eastern Wood-pewee, Monarch and Wood Thrush). Candidate SWH types that could be present within the Study Area but could not be confirmed in the absence of targeted surveys include:
 - Waterfowl Stopover and Staging Areas (Terrestrial)
 - Waterfowl Stopover and Staging Areas (Aquatic)
 - Raptor Wintering Area
 - Bat Maternity Colonies
 - Turtle Wintering Areas
 - Reptile Hibernaculum
 - Woodland Raptor Nesting Habitat
 - Turtle Nesting Areas; and
 - Marsh Breeding Bird Habitat.

4.4 Species at Risk

- The following SAR were observed within the Study Area: black ash, Bobolink, butternut and Eastern Meadowlark.
- Confirmed breeding habitat for Eastern Meadowlark was identified during field investigations in the cultural meadow east of Highway 400, south of 9th line.
- Bobolink individuals were observed within the Study Area, east of 2nd Concession Road, in 2021 and Eastern Meadowlark were observed in the same community incidentally during field investigations in 2020. No nests were found and the habitat where the species was observed was found to be mowed during additional field investigations in 2021. Agricultural fields present within the Study Area may provide future opportunities for nesting for both species depending on the crops planted in a given year.
- Both butternut and black ash were identified in several communities throughout the Study Area. Both plant species are considered Endangered under the ESA.
- The presence/absence of the following species could not be confirmed as targeted surveys were not performed; however, suitable habitat was identified within the Study Area: Chimney Swift, Eastern Whip-poor-will, Least Bittern, Eastern Small-footed myotis, Little Brown Myotis, Northern Myotis, Tri-colored Bat and Blanding's Turtle. Targeted surveys will be undertaken in Detail Design.

5. Impact Assessment

The proposed work for the project is described in **Section 1.1**. For the purposes of the Preliminary Design and the terrestrial ecosystems impact assessment, it is assumed that the project will impact all natural features delineated within the proposed ROW limits. It is likely that in the Detail Design phase of the project, impacts will be refined to a specific construction footprint and further reduced through avoidance and mitigation measures. The potential impacts associated with the project include:

- Loss or degradation of vegetation cover, wildlife habitat, SWH and SAR habitat
- Disturbance to wildlife, including SAR and SOCC through noise or possible mortality; and
- Possible injury and mortality of wildlife, including SOCC and SAR, during construction.

A general discussion of the potential impacts and the mitigation measures recommended to avoid or minimize these potential impacts is provided in the following sections.

5.1 Assessment of Potential Impacts

The construction disturbance area (CDA), which encompasses the outermost limit of the proposed Bradford Bypass ROW, represents the anticipated wildlife disturbance and habitat removal areas. Potential effects on vegetation communities, wildlife and wildlife habitat, including SWH, and SAR and their habitats as a result of vegetation removal and other construction activities, were analyzed based on Preliminary Design and are discussed in the following sections. For Preliminary Design purposes, all areas within the proposed ROW have been assumed to be impacted by the proposed works in order to accommodate any future updates to the design in the Detail Design phase of the project. Project refinements during the Detail Design stage are likely to reduce the amount of habitat and vegetation community removal. The following discussion and assessment of potential impacts is primarily focused on the construction phase wherein most of the project-related impacts may occur if proper mitigation measures -were not implemented.

5.1.1 Designated Natural Area, Vegetation Communities and Plants

The area of vegetation communities affected by vegetation clearing is summarized in **Table 5-1** below. A total of 147 ha of identified vegetation have the potential to be impacted by the proposed works. However, it is not anticipated that all 147 ha will be impacted. As mentioned in Section 5.1, project refinements during Detail Design, in addition to implementation of proper mitigation measures, are anticipated to reduce the amount of habitat and vegetation removal.

Table 5-1. Summary of Vegetation Community Impacts

ELC Community	ELC Vegetation Code	Total Area (Ha) in Study Area	Total Impacted Area (Ha)
Cultural Meadow (CUM)	CUM1 – Mineral Cultural Meadow Ecosite	3.04	0
	CUM1-1 - Dry – Fresh Old Field Cultural Meadow	104.91	64.16
CUM Subtotal		107.96	64.16
Cultural Plantation (CUP)	CUP3 - Coniferous Plantation	0.89	0
	CUP3-1 - Red Pine Coniferous Plantation	1.22	0.94
	CUP3-2 - White Pine Coniferous Plantation	1.78	0.05
	CUP3-3 - Scotch Pine Coniferous Plantation	0.40	0.40

ELC Community	ELC Vegetation Code	Total Area (Ha) in Study Area	Total Impacted Area (Ha)
	CUP3-9	0.90	0
CUP Subtotal		5.19	1.39
Cultural Thicket (CUT)	CUT1 - Mineral Cultural Thicket	9.66	7.46
	CUT1-4 - Grey Dogwood Cultural Thicket	2.08	0.75
	CUT1-5 - Raspberry Cultural Thicket	5.08	0.82
CUT Subtotal		16.81	9.03
Cultural Woodland (CUW)	CUW1 - Mineral Cultural Woodland	14.91	6.57
Coniferous Forest (FOC)	FOC	1.47	0
	FOC4 - Fresh - Moist White Cedar Coniferous Forest Ecosite	4.80	2.01
	FOC4-1 - Fresh - Moist White Cedar Coniferous Forest	0.48	0.13
FOC Subtotal		6.75	2.14
Deciduous Forest (FOD)	FOD – Deciduous Forest	6.05	0.55
	FOD2-3 - Dry - Fresh Hickory Deciduous Forest	0.41	0
	FOD4 - Dry – Fresh Upland Deciduous Forest Ecosite	16.47	5.61
	FOD5-1 - Dry - Fresh Sugar Maple Deciduous Forest	7.03	2.34
	FOD5-2 - Dry - Fresh Sugar Maple - Beech Deciduous Forest	3.98	1.32
	FOD5-6 - Dry - Fresh Sugar Maple - Basswood Deciduous Forest	3.09	1.95
	FOD6-5 - Fresh - Moist Sugar Maple Deciduous Forest	3.33	0.51
	FOD7 - Fresh - Moist Lowland Deciduous Forest	17.28	4.59
	FOD7-1 - Fresh - Moist White Elm Lowland Deciduous Forest	1.15	0.99
	FOD7-2 - Fresh - Moist Ash Lowland Deciduous Forest	2.15	0.71
	FOD7-3 - Fresh - Moist Willow Lowland Deciduous Forest	2.88	2.52
	FOD8-1 - Fresh - Moist Poplar Deciduous Forest	3.34	1.31
	FOD Subtotal		67.15
Mixed Forest (FOM)	FOM – Mixed Forest	0.49	0
	FOM5-2 - Dry - Fresh Poplar Mixed Forest	0.56	0
	FOM6-1 - Fresh - Moist Sugar Maple - Hemlock Mixed Forest	1.25	0.03
	FOM7 - Fresh - Moist White Cedar - Hardwood Mixed Forest	10.79	3.27
	FOM7-2 - Fresh - Moist White Cedar - Hardwood Mixed Forest	5.64	1.78

ELC Community	ELC Vegetation Code	Total Area (Ha) in Study Area	Total Impacted Area (Ha)
	FOM8-1 - Fresh - Moist Poplar Mixed Forest	0.06	0
FOM Subtotal		18.78	5.08
Meadow Marsh (MAM)	MAM – Meadow Marsh	4.45	0.07
	MAM2 - Mineral Meadow Marsh Ecosite	0.88	0.24
	MAM2-2 - Reed-canary Grass Mineral Meadow Marsh	5.09	1.09
MAM Subtotal		10.42	1.40
Shallow Marsh (MAS)	MAS2-1 - Cattail Mineral Shallow Marsh	11.82	4.85
	MAS3-1 - Cattail Organic Shallow Marsh	0.19	0
MAS Subtotal		12.02	4.85
Open Aquatic (OAO)	OAO - Open Aquatic	12.82	4.26
Floating Aquatic (SAF)	SAF1-3 - Duckweed Floating-leaved Shallow Aquatic	0.15	0
Deciduous Swamp (SWD)	SWD – Deciduous Swamp	3.21	0
	SWD2-2 - Green Ash Mineral Deciduous Swamp	39.30	17.24
	SWD3-1 - Maple Mineral Deciduous Swamp Ecosite	0.99	0.57
	SWD3-2 - Silver Maple Mineral Deciduous Swamp	1.94	1.71
	SWD3-3 - Swamp Maple Mineral Deciduous Swamp	0.93	0.58
	SWD4 - Mineral Deciduous Swamp Ecosite	0.39	0
	SWD4-3 - White Birch – Poplar Mineral Deciduous Swamp	1.03	0.52
	SWD6-3 - Swamp Maple Organic Deciduous Swamp	0.38	0
SWD Subtotal		48.18	20.62
Mixed Swamp (SWM)	SWM – Mixed Swamp	0.22	0
	SWM3-1 - Birch - Conifer Mineral Mixed Swamp	1.79	0.70
SWM Subtotal		2.01	0.70
Swamp Thicket (SWT)	SWT – Swamp Thicket	1.23	0
	SWT2-2 - Willow Mineral Deciduous Thicket Swamp	0.82	0.80
	SWT2-9 - Gray Dogwood Mineral Deciduous Thicket Swamp	0.42	0
	SWT3-1 - Organic Thicket Swamp Ecosite	6.47	3.33
SWT Subtotal		8.94	4.12
Grand Total		332.08	146.72

The potential impacts to vegetation communities are described as follows:

Loss of and/or damage to vegetation, ELC communities and designated natural areas:

Vegetation removal required to support the proposed works will be limited to the extent of the proposed ROW. A total of 37 vegetation community types and 94 individual vegetation communities have the potential to be impacted by the proposed works, including a mixture of forest, wetland, and meadow habitats. The sizes in

hectares (ha) of the affected vegetation communities are provided in **Table 5-1**. Of the 147 ha of total potential impacts to vegetation communities, cultural communities (cultural meadow, plantation, thicket and woodland communities) account for 55% of the total area, forested communities account for 20% of the total area, marsh communities account for 4% of the total area, aquatic communities account for 3% of the total area and swamp communities account for 17% of the total area.

Loss of and/or damage to designated natural areas: A total of 4.79 ha (0.4%) of the Provincially Significant Holland Marsh (BW5) Wetland (1261.67 ha), 7.94 ha (0.4%) of the Holland Marsh Wetland Complex PSW (1986.90 ha), 0.86 ha (0.2%) of the Maskinonge River Wetland Complex PSW (398.77 ha) and 23.41 ha of unevaluated wetlands are anticipated to be impacted by the proposed work. The CDA also overlaps with the Greenbelt Plan (128.04 ha) and 12.19 ha of the LSRCA's Holland Marsh Environmentally Significant Area. ANSIs are not anticipated to be impacted by the proposed works.

- According to the PPS and the Greenbelt Plan, while “*development*” is not permitted in PSWs, the definition of “*development*” does not pertain to the creation or maintenance of infrastructure such as transit and transportation corridors and facilities authorized under an EA process. Section 1.6.8.6. of the PPS, states that consideration shall be given to significant resources (e.g., PSWs) when planning for corridors and ROWs of significant transportation. Mitigation measures provided in **Section 5.2** provide mitigation measures in consideration of minimizing effects on PSWs.
- For the purposes of this Report, all vegetation communities located within the proposed ROW are assumed to be impacted by the proposed works, however, PSW communities, as identified in the 2002 Approved EA, are anticipated to be spanned by the proposed highway as a result of commitments made in the 2002 Approved EA. As such, refinements to the design and limits of work in the Detail Design phase of the project may reduce the extent of impacts to the PSWs intersected by the Bradford Bypass. Spanning of wetland communities may lead to indirect impacts including changes to species assemblage within communities that the highway crosses due to the potential shading effect of the proposed structure.

Adjacent ELC communities and designated natural areas may also be inadvertently damaged or indirectly affected, as described below, if not appropriately mitigated:

■ **Indirect Loss and/or Damage to Vegetation Communities:**

Incidental intrusion into the adjacent vegetation communities surrounding the ROW may occur.

■ **Fill and sediment transport from disturbed areas to undisturbed areas:**

During grubbing or grading of the site, fill and sediment runoff from the active construction area may enter adjacent, undisturbed vegetation communities and adjacent watercourses, if not appropriately controlled.

■ **Soil or water contamination (including groundwater):**

Oil, gasoline, grease and other materials from construction equipment, materials, storage and handling may enter vegetation communities and adjacent watercourses, if not appropriately managed.

■ **Introduction or spread of invasive species:**

A total of 85 of the 327 plants (26%) recorded within the Study Area during field investigations are non-native including some highly invasive species such as phragmites, garlic mustard (*Alliaria petiolata*) and common buckthorn. These species can outcompete and displace native species, forming monocultural stands that impact the form and function of the community. Vegetation clearing, grubbing, grading, and movement of construction equipment may perpetuate invasive species in new areas and advance the spread of the species in already established areas if control measures are not implemented.

The potential effects on vegetation, ELC communities and designated natural areas described above are not anticipated to be significant provided that mitigation measures described in **Section 5.2** are implemented.

5.1.2 Wildlife and Wildlife Habitat

Vegetation communities provide a variety of habitats for various wildlife, including SOCC and/or birds protected under the *MBCA*. SOCC and their habitats potentially affected by proposed works include Western Chorus Frog (Great Lakes/St. Lawrence – Canadian Shield population), Barn Swallow, Common Nighthawk, Eastern Wood-pewee, Wood Thrush, Monarch, Northern Map Turtle (*Graptemys geographica*), Snapping Turtle and Western Chorus Frog (*Great Lakes/ St. Lawrence - Canadian Shield population*). Furthermore, migratory birds may use humanmade structures, isolated trees and shrubs, and suitable ground cover for nesting. The potential impacts on wildlife and wildlife habitats as a result of the proposed works are described as follows:

- **Disturbance or displacement of migratory birds and destruction of their nests:**

Of the 63 species of birds observed within the Study Area, 28 species were recorded displaying probable or confirmed breeding activity during breeding bird surveys or incidentally. Vegetation removal has the potential to disturb or displace nesting birds, including SOCC and/or species protected under the *MBCA* and destroy their active nests where there are trees or shrubs or where suitable ground cover occurs if activities are conducted during the overall bird nesting period of April 1 to August 31.

Additionally, nests of species listed under Schedule 1 of the *MBCA* may be present within the proposed limits of work and could require removal. Bird species list under Schedule 1 are known to re-use nests annually and as such, their nests are provided additional protections under the *MBCA*. Two species listed under Schedule 1, Green Heron and Pileated Woodpecker, were observed within the Study Area along with suitable nesting habitat. Authorization under the *MBCA* may be required if removal of nests of Schedule 1 species cannot be avoided through Detail Design.

- **Loss of and/or damage to wildlife habitat:**

Vegetation removal may result in the direct or indirect loss of wildlife habitat, including confirmed and candidate SWH such as habitat for SOCC (Western Chorus Frog, Common Nighthawk, Eastern Wood-pewee, Wood Thrush, Monarch, Northern Map Turtle and Snapping Turtle), Terrestrial Crayfish, bat maternity colonies, deer yarding and winter congregation areas, raptor wintering areas, reptile hibernaculum, seeps and springs, turtle wintering areas, waterfowl stopover and staging areas and woodland raptor nesting habitat, Turtle Nesting Areas, Marsh Breeding Bird Habitat and Amphibian Breeding Habitat (Wetlands). As the Bradford Bypass is a new highway intersecting some previously undeveloped lands, most impacts will be permanent. For the purpose of the Preliminary Design, 147 ha of wildlife habitat is anticipated to be damaged or removed. Effects to vegetation communities situated within the proposed ROW but outside of the permanent footprint of the highway infrastructure will either be avoided or temporarily disturbed until vegetation is re-established or rehabilitated following the completion of construction activities.

- **Disturbance to wildlife from lighting, noise and vibration:**

Although wildlife within the majority of the Study Area is likely already adapted to existing anthropogenic sources of lighting and noise (i.e., homesteads, farms and adjacent roads), they may be temporarily disturbed or displaced by increased lighting and noise emissions from construction activities and future use of the proposed infrastructure. Wildlife within the larger tracts of natural habitat associated with the Holland River and Holland River East Branch may not be as adapted and tolerant to the same existing anthropogenic noise sources other wildlife are exposed to in sections of the Study Area that are more fragmented and under anthropogenic influences. As such, the additional light and noise generated by

construction activities and vehicular traffic in these areas may cause the permanent displacement of some species to locations outside the limits of the Study Area.

- **Incidental wildlife injury or mortality from construction activities:** There are several SWHs and other wildlife habitats present within the Study Area. Wildlife may enter the construction work area and become susceptible to accidental injury or mortality associated with construction machinery and equipment if not mitigated.
- **Wildlife mortality through vehicle collisions:**
A review of LIO (MNR, 2019) identified Deer Wintering Areas (Stratum 2) between the Holland River and Holland River East Branch, between the Holland River East Branch and Yonge Street and between 2nd Concession Road and Leslie Street within the Project Limits and Study Area as mapped on **Figure 1-1 to Figure 1-2 and Figure 4b-1 to Figure 4b-7 in Appendix A**. Approximately 44.34 ha of the Deer Wintering Area (Stratum 2) is anticipated to be impacted by the proposed works. Vegetation removal and the construction of a new highway within the Deer Wintering Area (Stratum 2) may lead to increased wildlife vehicle collisions (WVC) in the immediate area due to increased exposure to humanmade infrastructure.

Adverse impacts to wildlife and wildlife habitat can be minimized provided avoidance and mitigation measures as described in **Section 5.2** are implemented.

5.1.3 Species at Risk

Several SAR may be negatively affected by the removal/disturbance of vegetation communities within the proposed ROW and by sources of disturbance during construction and operations. Potential impacts to SAR and their habitats include:

- **Disturbance or displacement of Chimney Swift and destruction of their nests:** Although no Chimney Swift nests were identified within buildings likely affected by construction activities, there is potential for them to occur within the Study Area as targeted surveys were not completed at this stage and will be undertaken in Detail Design. Removal of buildings within the Study Area may therefore result in the disturbance or displacement of chimney swift and destruction of their nests if conducted during the bird nesting period of April 1 to August 31. If confirmed habitat is identified in the Study Area and impacts to Chimney Swift habitat cannot be avoided, authorization under the ESA may be required.
 - Mitigation measures to limit or avoid impacts to Chimney Swift and their habitat are presented in Section 5.2.
- **Removal of candidate bat SAR habitat and possible disturbance, mortality or injury:** The CDA overlaps approximately 58.91 ha of suitable maternity roosting habitat, represented by forest communities, cultural woodlands, and swamps. These communities are often associated with larger, contiguous wooded communities located inside and beyond the limits of the Study Area (i.e., candidate bat habitat in the vicinity of the Holland River and Holland River East Branch). As such, the removal of a portion of vegetation within the forested and woodland communities is not anticipated to prevent the continued use of the remaining treed habitat as roosting habitat by bat SAR. However; bat SAR may be inadvertently killed or injured due to the removal of or accidental damage to suitable maternity roost trees if vegetation clearing occurs during the bat roosting season between April 1 and September 30. Authorization under the *ESA* may be required if the presence of bat SAR is confirmed during Detail Design phase and impacts cannot be avoided.

- Mitigation measures to limit or avoid impacts to bat Species at Risk and their habitat are presented in **Section 5.2**.

- **Removal of candidate Eastern Whip-poor-will habitat and possible disturbance, mortality or injury:** The CDA overlaps approximately 20.96 ha of candidate habitat for Eastern Whip-poor-will. As discussed in **Table 3-8**, candidate nesting habitat for Eastern Whip-poor-will was identified in the deciduous forest, cultural woodland, cultural thicket and cultural meadow communities west of County Road 4 (**Figure 3-3**), in the cultural woodland community west of Yonge Street (**Figure 3-5**) and in the coniferous forest east of 2nd Concession Road (**Figure 3-6**). If vegetation removal occurs between April 1 and August 31, nesting Eastern Whip-poor-will, their nests and young may be incidentally killed or harmed by vegetation clearing activities. If impacts on Eastern Whip-poor-will habitat cannot be avoided, consultation with MECP and/ or authorization under the ESA will be required.
 - Mitigation measures to limit or avoid impacts to Eastern Whip-poor-will and their habitat are presented in **Section 5.2**.

- **Removal of confirmed grassland bird SAR habitat and possible disturbance, mortality or injury:** Both Bobolink and Eastern Meadowlark require large areas of grassland habitat to carry out their life process and are often found nesting in agricultural settings such as pastures and hayfields (McCracken et al., 2013). As such, the presence of candidate habitat for Bobolink and Eastern Meadowlark largely depends on the type of crop (i.e. wheat) planted within the agricultural fields that intersect the Study Area. Currently, the CDA overlaps approximately 8.05 ha of confirmed Bobolink and Eastern Meadowlark Habitat as shown on **Figure 3-1** to **Figure 3-7**. Most of the confirmed habitat present within the Study Area is located directly east of Highway 400 in the cultural meadow community south of 9th Line. The majority of the cultural meadow community is located within the proposed ROW and is expected to be temporarily and permanently impacted to accommodate the construction of the new highway. The majority of the confirmed habitat east of 2nd Concession Road is located outside of the proposed ROW, with only a small portion of the overall habitat expected to be impacted by the proposed works. However, as noted in **Table 3-7**, the field was mowed at some point between the first and second round of breeding bird surveys and was no longer providing suitable nesting habitat. Bobolink and Eastern Meadowlarks are ground nesters and build their nests on soil that is concealed by dense vegetation. If vegetation removal occurs between April 1 and August 31, nesting Bobolink and Eastern Meadowlark, their nests and young may be incidentally killed or harmed by vegetation clearing activities. If impacts to Bobolink and Eastern Meadowlark habitat cannot be avoided, consultation with MECP, and/ or authorization under the *ESA* will be required.
 - Mitigation measures to limit or avoid impacts to grassland bird Species at Risk and their habitat are presented in **Section 5.2**.

- **Possible injury or mortality of Black Ash:** Black ash typically prefers wet environments such as swamps but can also persist in moist upland communities (COSEWIC, 2018). In the Study Area, black ash was identified in swamp and forested communities present within the Holland River floodplain. As a targeted surveys for black ash were not completed as part of Preliminary Design, any moist forest, swamp or swamp thicket community where black ash was not observed was flagged as candidate habitat. Black ash individuals and their habitat will eventually be afforded protection under the *ESA*, however, the protection of the species has been temporarily suspended until January, 2024 to allow the MECP to determine a strategy to protect and recover black ash in the province of Ontario. During this time, activities that impact black ash and its habitat may proceed without authorization under the *ESA*. A detailed plant inventory of the CDA during Detail Design is recommended to identify the total number of black ash within the proposed ROW. Authorization under the *ESA* may be required if removal of black ash cannot be avoided through Detail Design.

- Mitigation measures to limit or avoid impacts to Black Ash and their habitat are presented in **Section 5.2**.
- **Possible injury or mortality of Butternut:** A total of 32 butternut trees were observed in the forest and thicket communities west of County Road 4 (**Figure 3-3**) and another eight butternut were observed in the southeastern limits of the Study Area (**Figure 3-7**) where the proposed highway is planned to connect to Highway 404's south bound lanes. A detailed plant inventory of the CDA during Detail Design phase is recommended to identify the total number of butternuts within the proposed ROW. Any ground disturbance work (e.g., grading, excavation) within 25 m of a butternut or removal of butternuts will require a butternut health assessment to be completed by a qualified Butternut Health Assessor and an authorization under the *ESA* for the harm or removal of any identified butternuts may be required.
 - Mitigation measures to limit or avoid impacts to Butternut and their habitat are presented in **Section 5.2**.
- **Removal of candidate Blanding's Turtle and Least Bittern habitat and possible disturbance, injury or mortality:** Candidate Blanding's Turtle and Least Bittern habitat is associated with the Holland River and Holland River East Branch open water and wetland communities present within the Study Area. While areas of candidate Blanding's Turtle and Least Bittern habitat will be spanned to accommodate the 2002 Approved EA commitments and floodplain design requirements, impacts to candidate habitat for both species is anticipated as a result of construction activities and the permanent shading that will be created by the proposed structure. Approximately 9.65 ha of candidate Blanding's Turtle habitat and 2.81 ha of Least Bittern habitat is anticipated to be impacted by the proposed works.
 - Blanding's Turtle may be incidentally injured or killed while moving in between habitats if these species enter the construction work area. Stockpiled substrates in the construction work area may attract nesting turtles between late May to early July. Targeted surveys will be required during the Detail Design phase to assess potential need for authorization under the *ESA* for both species.
 - Mitigation measures to limit or avoid impacts to Blanding's Turtle and Least Bittern and their habitat are presented in **Section 5.2**.

Additional targeted species surveys will be undertaken during Detail Design as these species may find new habitats from year to year. Recommendations for additional targeted surveys are provided in **Section 6**. The removal of SAR habitat can be minimized, and possible injury or mortality of SAR can be avoided provided that mitigation measures as outlined in **Section 5.2** are implemented.

5.2 Mitigation Measures

Proposed mitigation and avoidance measure for the potential impacts on specific terrestrial features as identified in the previous section are described below.

- To assist in mitigating potential impacts, the following MTO *Provisions* should be utilized at a minimum:
 - Ontario Provincial Standard Specification (OPSS)-201: Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders
 - Vegetation removal, grading and soil compaction should be kept to a minimum. Further analysis of the required limits of work should be completed during the Detail Design phase to assess if impacts to certain vegetation communities located within the proposed ROW can be avoided.

- OPSS-801: Construction Specification for the Protection of Trees
 - All planned vegetation removals are anticipated to occur within the proposed MTO ROW. However, should anything change, and removals be required outside of MTO ROW, a tree inventory, an arborist report and a Tree Protection Plan may be required to obtain permits to injure or remove trees beyond the MTO ROW in accordance with applicable municipal by-laws.
- OPSS-803: Construction Specification for Vegetative Cover
 - To the extent feasible, affected areas shall be re-seeded and re-vegetated and restored to pre-disturbance conditions, using native species appropriate for the community type disturbed.
 - Seeded mixes that include common milkweed and native flowering plants should be used to rehabilitate or restore areas of herbaceous vegetation temporarily disturbed during proposed works.
- OPSS-180: General Specification for the Management of Excess Materials
 - Construction material should be stored within an authorized location and any soil stockpiles should only be located within a suitable sediment fenced and protected location.
 - If stockpiles of gravel and sandy substrates or the removal of these substrates in the vicinity of turtle habitat are required during the active turtle season (April 1 to October 15), turtle exclusion fencing should be installed in accordance with the *Reptile and Amphibian Exclusion Fencing Best Management Practices* (MECP, 2020) around stockpiles or area of disturbance prior to April 1. Fencing should be installed immediately after stockpiles are created if after April 1.
- OPSS-182: General Specification for Environmental Protection for Construction in Waterbodies and on Waterbody Banks
- OPSS-804 and OPSS-805: Construction Specification for Temporary Erosion and Sediment Control Measures
 - Erosion and Sediment Control (ESC) measures should be installed in accordance with the project's associated ESC plan.
 - ESC measures should be installed along the construction footprint within 30 m of any PSW. In areas where the construction of the highway is expected to intersect a PSW, ESC measures should be installed along the limits of work.
- OPSS-517: Construction Specification for Dewatering
- Special Provision (SP) 199S56 Control of Emissions During Structural Work
- SP 100S14 Unexpected Species at Risk Occurrence
 - Should SAR be encountered within the work area, construction activities will cease and MTO and MECP will be contacted for next steps.
- Non-Standard Special Provision (NSSP) Invasive Species Prevention
- NSSP: Operational Constraint – Migratory Bird Protection:
 - Schedule vegetation removal to occur outside of the overall bird nesting period of April 1 to August 31 to avoid disturbance to breeding migratory birds including SAR and/or damage/destruction of their nests. If vegetation removal must occur within this time period, active nest searches must be conducted prior to vegetation removal by a qualified biologist within 'simple habitats' (e.g., manicured lawn) or if minor vegetation clearing is

required, to ensure that no active nests of breeding migratory birds or bird SAR are destroyed, in order to prevent contravention of the *MBCA* and/or the *ESA*.

- Structures likely to be affected by construction may provide suitable nesting habitat for *MBCA* protected birds (i.e. Barn Swallow or Cliff Swallow) in the future. As such, it is recommended that they be examined to confirm the presence or absence of migratory bird nests prior to the commencement of construction activities. If birds are observed nesting in, under or on the structure prior to or during rehabilitation or replacement, a qualified biologist should be consulted to determine the appropriate steps taken to reduce impacts to wildlife and avoid a potential contravention of the *MBCA*. Such measures may include the installation of bird exclusion netting.
- To address potential wildlife vehicle collisions within the Study Area, the following mitigation measures are recommended:
- **Wildlife Exclusion Fencing** – Permanent Wildlife Exclusion Fencing should be considered to be erected along the entire limits of the Bradford Bypass ROW where there is opportunity for herpetofauna or mammals to enter the ROW. Additionally, jump-outs are recommended at approximately 1.4 km intervals to ensure that wildlife trapped within the ROW are able to exit (MTO, 2015). Wildlife are likely to experience fence-end effects at the limits of the Study Area, wherein wildlife attempting to cross the ROW will walk along the fence and cross where the fence ends. This may result in an increase in wildlife crossing at the limits of the Study Area. To mitigate end-effects, it is recommended that fence ends angle away from the ROW for a distance up to 100 m (MTO, 2015).
 - **Ecopassages** – Maintaining habitat connectivity across the landscape is important for preserving local wildlife and may reduce potential wildlife-vehicle collisions. While most of the proposed ROW is situated within areas of active agriculture or commercial land use, a portion of the ROW intersects forested and wetland habitats, specifically in the vicinity of the Holland River. In order to account for watercourse crossing, potential flooding scenarios, and the commitment made in the 2002 Approved EA to span existing PSWs, a significant portion of the highway in the vicinity of the Holland River and Holland River East Branch will be spanned. The extensive floodplain in the area will mean that the structure's abutments will extend beyond the river and the wetlands, providing ample wildlife crossing opportunities for both large and small wildlife to access the natural features present both north and south of the proposed ROW. Additionally, it is recommended that culverts be designed to provide openness ratios that would allow for the passage of small mammal and/or herpetofauna where possible. An openness ratio of 0.4 would permit usage by medium-sized mammals, while the minimum openness ratio to be considered should be 0.25, which would permit usage by reptiles such as turtles (Credit Valley Conservation [CVC], 2017). Although not observed during Preliminary Design surveys due to the absence of targeted surveys, where larger mammal movement in the proposed ROW (i.e., white-tailed deer) is observed, wildlife passage should be considered. Additional winter tracking surveys during Detail Design phase may be necessary to determine the need of additional wildlife crossing locations within the proposed ROW for larger mammals. A potential location where a larger passage could be considered is where the proposed highway intersects the Deer Wintering Area between 2nd Concession Road and Leslie Street. An openness of ratio of 0.6 or greater should be considered for ungulates (CVC, 2017). Other ecopassage characteristics to consider during Detail Design phase include the following:
 - Around the culvert structure, avoid the use of rip-rap or sharp rock protection and ensure areas on both sides of the watercourse provide substrate materials conducive to animal movement, where possible,
 - If rip-rap must be used, fill the interstitial space with small materials which would provide appropriate footing for wildlife,
 - Include natural substrates within the structure,

- Provide suitable cover elements adjacent to the structure (e.g., retained or planted vegetation) that can facilitate wildlife use of the structures (i.e., cover/shelter on route to structure) while not blocking the structure entrance,
 - Wherever possible, ensure that entrance and exits to the structures are reasonably level (e.g., no major grade changes) to provide an unimpeded view through the structure and habitat beyond,
 - Ensure that the elevation and slope of the structure does not result in flooding,
 - Remove or reduce potential predator perches (i.e., ledges) to the extent possible,
 - Avoid artificial light sources near the entrances/exit of the wildlife passage,
 - Any landscaping and erosion control materials required shall not include materials known to accidentally entrap snakes or fish; and
 - Restore adjacent vegetation areas disturbed for construction access using native species.
- The Detail Design phase of the project should determine areas that can be restored based upon the final highway design. Where possible, edge management plantings shall be considered along newly exposed forest edges. Plantings should consist of native tree and shrub species, similar to the native species already present in the area. Should regionally rare plant species be identified for removal, mitigation measures specific to regionally rare plant species will be considered. Additionally, sections of the Holland River Marsh PSW that will be spanned by the project and have been temporarily disturbed due to construction activities should be restored back to wetland habitat where possible in order to retain the function of the wetland. Planted species should consist of native species that are present within the adjacent wetland vegetation communities to ensure the composition of adjacent communities is retained. When deciding which species should be included in restoration plans, the Detail Design phase of the project should account for the shading effect the new structure will have on the restored habitat. Species planted directly underneath the new structures should include species that prefer or tolerate shaded environments. Plantings should be limited to low-growing species to allow the most amount of light to reach underneath the structure given the east-west orientation of the highway. Shade tolerant species observed in the Holland River Marsh PSW that could be considered include spotted jewelweed (*Impatiens capensis*), sensitive fern (*Onoclea sensibilis*), ostrich fern (*Matteuccia struthiopteris*), marsh marigold (*Caltha palustris*), American black currant (*Ribes americanum*), fringed loosestrife (*Lysimachia ciliata*) and fowl mannagrass (*Glyceria striata*). Where wetland habitat cannot be restored or is permanently impacted by the proposed highway the MTO should consider wetland compensation efforts including enhancement to the adjacent wetland communities or creation of new wetland habitat to maintain wetland function throughout the Study Area.
- Watercourse banks disturbed by any activity associated with the project should be immediately stabilized to prevent erosion and/or sedimentation, and re-vegetated with native species suitable for the site.
- Avoid work within areas of candidate turtle overwintering habitat identified on **Figure 4a-1 to 4a-7** during the turtle overwintering period (October 31 to April 1), whenever possible.
- Avoid removal of Monarch habitat (areas of milkweed), whenever possible. Where milkweed must be removed, milkweed should be seeded within rehabilitated / landscaped areas of the Bradford Bypass ROW.
- If work is required within the candidate reptile hibernacula habitat (i.e., rockpiles) identified on **Figure 4a-1 to 4a-7** work should be completed outside of the reptile overwintering period (October 31 to April 1), whenever possible.
- Avoid driving within construction zones in proximity to amphibian breeding habitat (**Figure 4b-1 to 4b-7**) at night between April 1 and June 30, and any rainy nights from spring to early autumn, whenever possible.

- For areas adjacent to natural heritage features (i.e., woodlands and wetlands) conduct construction activities during daylight hours for increased visibility (i.e., avoid wildlife strikes) and to avoid light pollution effects during the night, whenever possible.
- The final highway design should take into consideration potential light impacts on wildlife species and their habitats (i.e. bats, amphibian, amphibian breeding habitats etc.). Mitigation measures to be considered included the following:
 - Limit the number of lights immediately adjacent to woodlands to the extent possible.
 - If feasible, turn off lighting or reduce the number of active lights immediately adjacent to woodlands during sensitive timing windows (i.e., April 1 – September 30).
 - Avoid the use of high-pressure sodium and LED lights immediately adjacent to woodlands as these types of lighting have been noted to negatively affect bat activity (Row et al. al., 2015 & ILP, 2018).
- Wherever possible, avoid changes to hydrology in areas of candidate (**Figure 4a-1 to 4a-7**) and confirmed (**Figure 4b-1 to 4b-7**) terrestrial crayfish habitat.
- If during construction any wildlife are observed within the Limits of Work:
 - Under no circumstances will any wildlife be knowingly harmed, harassed or otherwise disturbed. If an animal is encountered, it will be permitted to move away on its own.
 - If wildlife is observed within the work area, a qualified biologist or environmental monitor will determine if there is a concern about the significance of the species observed.
 - If the species is identified as SAR, do not handle the individual unless it is in immediate danger. A qualified Biologist shall contact the Contracting Authority and MECP immediately. In accordance with the ESA, no Threatened or Endangered species can be handled or relocated without the proper approvals/ permitting and authorization from MNRF.
 - If the species is not identified as SAR, direct the species away from the construction zone into the nearest natural area (i.e., woodland, wetland, etc.); if unsure of where to move the species, a Qualified Biologist shall be contacted for guidance.
 - For SOCC (e.g., a snapping turtle) or other non-SAR wildlife, it may appropriate to request that a Qualified Biologist of environmental move the species for the safety of both the onsite personnel and the species.
- Should an injured or orphaned animal be encountered, a Qualified Biologist will transport the animal to a wildlife rehabilitation centre that is considered to be an approved Wildlife Custodian by the MNRF or a member of the College of Veterinarians of Ontario.
 - Any injured wildlife will be immediately transported to a suitable wildlife rehabilitation centre.
 - Any amphibians or reptiles unearthed during their hibernation will also be immediately transported to a suitable wildlife rehabilitation centre.
- All vegetation removal within suitable maternity roost habitat for bat SAR shall occur outside of the bat roosting season between April 1 and September 30 and can only proceed upon confirmation from MECP and/ or authorization under the *ESA*.
- During the bat roosting season between April 1 and September 30, any construction activities within 30 m of suitable maternity roost habitat will be restricted to daylight hours when possible, to minimize duration of disturbance.

- Avoid or minimize vegetation removal within areas of confirmed Bobolink and Eastern Meadowlark Habitat (**Figure 3-1 to Figure 3-7**). If impacts to Bobolink and Eastern Meadowlark habitat cannot be avoided, consultation with MECP and/ or authorization under the *ESA* will be required.
- The need for additional plans (i.e., wildlife management, wildlife monitoring, ecological restoration, environmental management, Invasive Species management, Ministry Salt Management Plan) to support the proposed works should be determined during Detail Design.

Additional mitigation specific to SAR will be confirmed through MECP consultation, and permitting processes as outlined in Section 6.

5.3 Net Effects

Effects are expected to be minimized through the implementation of avoidance and mitigation measures identified in **Section 5.2**. Vegetation removal or disturbance will be limited to areas within the proposed MTO ROW and in some areas will be temporary in nature. Given the utilization of agricultural land and the large contiguous natural features present adjacent to and intersected by the proposed ROW, the overall functionality of the adjacent tracts of habitat for wildlife including SAR and SOCC is not expected to be adversely impaired or eliminated. Disturbance or possible mortality of wildlife including SAR and SOCC will be minimized by restricting nighttime work, installing wildlife exclusion fencing, and scheduling vegetation clearing outside the bird nesting and bat roosting seasons. The mitigation measures prescribed in **Section 5.2** are intended to minimize or avoid effects to SAR; however, authorization under the *ESA* is likely required as works are set to occur in and adjacent to general habitat protections for SAR. **Section 6** provides a summary of additional field investigations likely required to confirm habitats and assess effects as part of the Detail Design phase and permitting requirements. The table also outlines anticipated permits and approvals likely required prior to the onset of construction activities.

6. Anticipated Permits and Approvals and Next Steps

Table 6-1 below summarizes anticipated permits and approvals and additional surveys that may be required during the Detail Design phase of this project.

Table 6-1: Summary of Anticipated Permits and Approvals

Legislation	Governing Authority	Anticipated Permits and Approvals	Additional Studies to be Completed during Detail Design
Species at Risk Act, 2002 (SARA)	Government of Canada	<ul style="list-style-type: none"> Not anticipated as the mitigation measures provided to protect MBCA-protected birds are sufficient to avoid harm/mortality and destruction of residences (nests) of MBCA-protected SAR bird species. 	<ul style="list-style-type: none"> None.
Migratory Birds Convention Act, 1994 (MBCA)	Environment and Climate Change Canada (ECCC)	<ul style="list-style-type: none"> Permitting under the MBCA will be required if a nest of a bird listed under Schedule 1 of the act is identified within the proposed project footprint. 	<ul style="list-style-type: none"> Both Green Heron and Pileated Woodpecker, birds listed under Schedule 1 of the MBCA, were identified within the project Study Area during field investigations. Targeted sweeps/ surveys for nests and suitable nesting sites will be required during Detailed Design and/or prior to vegetation removal to determine potential permitting requirements.
Endangered Species Act, 2007 (ESA)	Ontario Ministry of the Environment, Conservation and Parks (MECP)	<ul style="list-style-type: none"> Consultation with MECP and/ or authorization under the ESA will be required if Chimney Swifts are found to be nesting in any affected structures. 	<ul style="list-style-type: none"> Searches for MBCA-protected bird or SAR bird nests in suitable structures (i.e. buildings) prior to construction.
		<ul style="list-style-type: none"> Consultation with MECP and/ or Authorization under the ESA will be required for Least Bittern if confirmed using the candidate habitat present in the Holland River Marsh PSW and impacts to suitable habitat within 500 m of breeding activity cannot be avoided (MECP, 2016). 	<ul style="list-style-type: none"> Targeted marsh breeding bird call back surveys following approved MECP protocols shall be undertaken in areas where impacts are proposed in candidate habitat identified on Figure 3-1 to Figure 3-7. Should Least Bittern be confirmed, habitat should be mapped in accordance with the Recovery Strategy for the Least Bittern (MECP, 2016).
		<ul style="list-style-type: none"> Consultation with MECP and/ or authorization under the ESA will be required for bat SAR if confirmed using treed habitats and impacts to habitats or SAR individuals cannot be avoided. 	<ul style="list-style-type: none"> Species-specific surveys following the MECP's <i>Species at Risk Bats Survey Note (2022a)</i> and <i>Maternity Roost Surveys (Forest and Woodlands) (2022b)</i> shall be undertaken in areas where tree removal is proposed in suitable bat SAR habitat (Figure 3-1 to Figure 3-7).
		<ul style="list-style-type: none"> Consultation with MECP and/ or Authorization under the ESA for Bobolink and Eastern Meadowlark will 	<ul style="list-style-type: none"> Due to the number of agricultural fields intersected by the proposed ROW, targeted SAR surveys to determine the presence/

Legislation	Governing Authority	Anticipated Permits and Approvals	Additional Studies to be Completed during Detail Design
		<p>be required if impacts to confirmed habitats or SAR individuals cannot be avoided.</p> <ul style="list-style-type: none"> • Consultation with MECP and/or authorization under the ESA will be required for Eastern Whip-poor-will if confirmed using the candidate habitat identified on Figure 3-1 to 3-7 and impacts to protected habitat outlined in the species General Habitat Description (MECP, 2013a) or SAR individuals cannot be avoided. • Consultation with MECP and/or authorization under the ESA may be required if ground disturbance occurs within 25 m or removal of pure or archivable butternuts is required. • Authorization requirements for black ash under the ESA are currently unknown and will be dependent on how the MECP chooses to protect the species once the temporary suspension of statutory protections has ended in January 2024. • Consultation with MECP and/ or authorization under the ESA will be required for Blanding’s Turtle if confirmed using the candidate habitat identified on Figure 3-1 to 3-7 and impacts to protected habitat outlined in the species General Habitat Description (MECP, 2013b) or SAR individuals cannot be avoided. 	<p>absence of grassland SAR bird habitat (Bobolink and Eastern Meadowlark) shall be completed during Detail Design. Consultation with MECP and/or authorization under the ESA will be required for Bobolink or Eastern Meadowlark if confirmed using the candidate habitats and impacts to protected habitat outlined in the species General Habitat Description (MECP, 2021a & 2021b) or SAR individuals cannot be avoided.</p> <ul style="list-style-type: none"> • Crepuscular bird surveys following approved MECP protocols shall be undertaken in areas where impacts are proposed in candidate habitat identified on Figure 3-1 to 3-7. Should Eastern Whip-poor-will be confirmed habitat should be mapped in accordance to the General Habitat Description (MECP, 2013a) • Detailed plant inventory within the CDA will be required to confirm no additional butternuts or other SAR plants are affected by the proposed works. • A Butternut Health Assessment may be required if works are located within 25 m of a pure butternut. • Detailed plant inventory within the CDA may be required to confirm the number of black ash that will be impacted by the proposed works. • Turtle overwintering and nesting surveys following approved MECP protocols shall be undertaken in areas where impacts are proposed in candidate habitat identified on Figure 3-1 to 3-7. If Blanding’s Turtle habitat use is confirmed the habitat should be mapped in accordance with the General Habitat Description (MECP, 2013b).
<p>Planning Act, 1990 and Provincial Policy Statement, 2020 (PPS)</p>	<p>Ontario Ministry of Municipal Affairs and Housing</p>	<ul style="list-style-type: none"> • There are no permits to be obtained under the PPS, and development of infrastructure such as transportation corridors and facilities are allowed in and adjacent to natural heritage feature (e.g., PSWs) provided that consideration is given to these natural heritage features. 	<ul style="list-style-type: none"> • Wetland boundary delineation where encroachment into wetlands is anticipated is recommended. • Wetland compensation should be considered to offset potential impacts to the wetlands.
<p>Greenbelt Act, 2005 and the Greenbelt Plan, 2017</p>	<p>Ontario Ministry of Municipal Affairs and</p>	<ul style="list-style-type: none"> • There are no permits to be obtained under the <i>Greenbelt Act</i>, and development of infrastructure such as transportation corridors 	<ul style="list-style-type: none"> • None

Legislation	Governing Authority	Anticipated Permits and Approvals	Additional Studies to be Completed during Detail Design
	Housing (MMAH)	and facilities are permitted in and adjacent to natural heritage feature (e.g., PSWs).	
N/A	N/A	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Winter tracking surveys to determine deer/large mammal movement within the proposed ROW is recommended during the Detail Design phase of the project.
Municipal Tree Protection and Forest Conservation Bylaws	County of Simcoe, York Region, Township of King	<ul style="list-style-type: none"> Tree removals completed outside of the proposed ROW (i.e. areas of Temporary Limited Interest) may be subjected to applicable municipal tree protection or forest conservation by-laws and permitting process depending on the nature of the proposed disturbance. 	<ul style="list-style-type: none"> Where tree removals are required to accommodate the proposed design outside of MTO owned lands (i.e. areas of Temporary Limited Interest) a tree inventory should be completed in Detail Design by a certified arborist to determine the number and species of trees that will be removed. The inventory will inform potential restoration works and/or potential permitting requirements under applicable municipal bylaws.

7. Limitation of the Report

The observations and results obtained during the terrestrial investigations are representative of the conditions encountered during or prior to the field investigations completed in 2020, 2021 and 2022 only. Many of the species surveyed are migratory and may occur within the Study Area during some years and not others. Habitat (vegetation communities, SWH, SAR habitat, etc.) also change over time and may become more or less suitable for SAR or other wildlife. In addition, changes to legislation may result in new or altered protections for certain species, habitats or designated natural areas. The mitigation measures and recommendation in this report are based on current legislation at the time the report was prepared. It is possible that these legislative changes will result in some recommendations no longer being applicable or new mitigation measures being required to comply with future legislative requirements. AECOM has used its best professional judgment to interpret the survey results and provide accurate conclusions.

8. Summary and Recommendations

The following is a summary of this Report's findings and recommendations for the Detail Design phase of the Bradford Bypass:

- Noxious plant species, as defined by O.Reg. 248/14 of Ontario's *Weed Control Act* (2014), observed within the proposed ROW included bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), coltsfoot (*Tussilago farfara*), common buckthorn (*Rhamnus cathartica*), brown knapweed (*Centaurea jacea*), poison-ivy (*Toxicodendron radicans*), common ragweed (*Ambrosia artemisiifolia*), field sow-thistle (*Sonchus arvensis*), smooth bedstraw (*Galium mollugo*) and wild parsnip (*Pastinaca sativa*). Of these species, wild parsnip and poison-ivy are considered a concern to public health and safety due to the oils or chemical compounds present in each species which are known to cause allergic reactions or severe dermatitis. In addition, phragmites (*Phragmites australis* ssp. *australis*), an invasive species regulated under the *Invasive Species Act* (2015) was observed in various wetlands and roadside ditches throughout the Study Area.
- Vegetation, structures and buildings provide suitable nesting habitat for species protected under the MBCA and SAR (i.e., Chimney Swift). Structures or buildings where work is proposed (i.e., 9th Line) should be checked for the presence of migratory bird or chimney swift (buildings with suitable chimneys) nests prior to construction and any required vegetation removal should occur outside of the overall bird nesting period (April 1 to August 31).
- Confirmed SWH included Deer Yarding and Winter Congregation Areas (Stratum 2), Terrestrial Crayfish, Amphibian Breeding Habitat (Wetlands), Seeps and Springs, Other Rare Vegetation Communities and habitat for Rare Wildlife Species (eastern wood-pewee, monarch and wood thrush). Several other candidate SWH types could be present within the Study Area but could not be confirmed as targeted surveys were not conducted.
- The following SAR were observed within the Study Area: Bobolink, Eastern Meadowlark, black ash and butternut. Potential habitat loss is anticipated for bat SAR, black ash, Blanding's Turtle, Bobolink, butternut, Chimney Swift, Eastern Meadowlark, Eastern Whip-poor-will and Least Bittern.
- A total of 147 ha of vegetation communities identified within the Study Area are anticipated to be removed for the proposed works. The vegetation removal required for the proposed works will be within the existing and proposed MTO ROWs.
- A total of 4.79 ha (0.4%) of the Provincially Significant Holland Marsh (BW5) Wetland (1261.67 ha), 7.94 ha (0.4%) of the Holland Marsh Wetland Complex PSW (1986.90 ha), 0.86 ha (0.2%) of the Maskinonge River Wetland Complex PSW (398.77 ha) and 23.41 ha of unevaluated wetlands are anticipated to be impacted by the proposed work. The CDA also overlaps with the Greenbelt Plan (128.04 ha) and 12.19 ha of the LSRCA's Holland Marsh Environmentally Significant Area. The proposed ROW also overlaps policy areas associated with the *Greenbelt Act* (Protected Countryside) and various Official Plan and the LSRCA Natural Heritage Systems. Development of transportation infrastructure is permitted in natural heritage features in accordance with the PPS and *Greenbelt Act*.
- With the proper implementation of mitigation measures identified in **Section 5.2**, adverse impacts to terrestrial ecosystems within the Study Areas should be temporary in nature, aside from the permanent vegetation loss that may be required to accommodate the proposed highway and its associated infrastructure requirements.
- Consultation with MECP as well as targeted surveys will be required at the Detail Design phase to address the potential for Blanding's turtle, Eastern Whip-poor-will, Chimney Swift, Least Bittern, bat SAR and addition grassland SAR bird habitat within the CDA as well as to confirm the number of Butternut and Black Ash that are situated within the refined limits of works.

9. Summary of Environmental Commitments

9.1 2002 Approved Environmental Assessment Commitments

The 2002 Approved Environmental Assessment identified a number of proposed mitigation and commitments to future work for the project. **Table 9-1** below identifies the terrestrial ecosystem commitments carried forward through to Preliminary Design and describes any applicable changes to the 2002 Approved Environmental Assessment commitment. Commitments identified in the 2002 Approved Environmental Assessment are to be carried forward to Detail Design phase unless otherwise stated in **Table 14** below.

Table 9-1: 2002 EA Commitments

Factor/ Criterion	Issue	Concerned Group/ Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Report)	Proposed Mitigation/ Commitments to Future Work (as taken from 2002 Approved Environmental Report)	Changes to Mitigation/ Protection/ Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
<ul style="list-style-type: none"> ■ General Commitment 	<ul style="list-style-type: none"> ■ High priority given to environmental work as design proceeds 	<ul style="list-style-type: none"> ■ N/A 	<ul style="list-style-type: none"> ■ Minimal long term environmental impact of the Link through design and mitigation. 	<ul style="list-style-type: none"> ■ At the outset of the design phase, the proponent will meet with Ministry of Natural Resources and Forestry, Lake Simcoe Region Conservation Authority, and Fisheries and Oceans Canada staff to discuss concerns, review and update their work plan to current standards, policies, regulations, and approval requirements, and obtain any new information which may be applicable to the design phase. ■ This will include an assessment of the federal Canadian Environmental Assessment Act requirements and any additional work necessary to finalize and implement the design for the undertaking. ■ Prior to implementation, the proponent will identify design and construction details for the undertaking. This will include identification of the schedule, the construction activities, the impact of the activities upon adjacent lands or watercourses, and the mitigation that will be employed to minimize the impacts. ■ The details of the construction activities will include the location of storage areas, equipment maintenance areas, dewatering areas, and access requirements. ■ Appropriate mitigation will be developed by the proponent during the design phase and will be reviewed with Ministry of Natural Resources and Forestry, Lake Simcoe Region Conservation Authority, and the federal agencies to address their concerns and legislative requirements prior to implementation. The following sections identify specific commitments to provide appropriate mitigation for the impacts resulting from the undertaking. Appropriate refers to mitigation that is both practical and reasonable given the site conditions and the degree of impact. Appropriate also recognizes and accepts that the mitigation for one factor may result in additional impacts to another factor. For example, the installation of fencing below grade to discourage wildlife movement will cause some disturbance to vegetation. 	<ul style="list-style-type: none"> ■ No 	<ul style="list-style-type: none"> ■ In 2019, the Ministry advanced preparatory work to update the environmental conditions, which included initial consultation through information requests and reviews of current legislation. Consultation with agencies, including, but not limited to, the Ministry of Natural Resources and Forestry, Lake Simcoe Region Conservation Authority, and Fisheries and Oceans Canada has occurred through Preliminary Design and is ongoing throughout the study. ■ The Impact Assessment Agency of Canada reviewed the project in 2021 and the federal Minister of the Environment and Climate Change determined that the project does not warrant designation under the Impact Assessment Act. ■ The Ministry is undertaking the following project-specific assessment of environmental impact studies: Agricultural Impact Assessment; Air Quality Impact Assessment; Archaeological Assessment; Cultural Heritage Assessment; Drainage and Hydrology; Erosion and Sediment Control Risk Assessment; Fish and Fish Habitat Impact Assessment; Fluvial Geomorphology; Groundwater Impact Assessment; Land Use and Property Impact Assessment; Noise and Vibration Impact Assessment; Snowdrift Assessment; Terrestrial Ecosystems Existing Impact Assessment (including an assessment of vegetation and vegetation communities, wildlife and wildlife habitat, species at risk and designated natural areas); screening of human health; and development of a Preliminary Landscape

Factor/ Criterion	Issue	Concerned Group/ Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Report)	Proposed Mitigation/ Commitments to Future Work (as taken from 2002 Approved Environmental Report)	Changes to Mitigation/ Protection/ Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
						Composition Plan and Waste and Excess Materials Management Plan ■ Completion of the Environmental Conditions Report and Environmental Impact Assessment Report under the Regulation to document the study and integrated consideration of environmental impacts, mitigation and commitments to future work for the project.
■ Vegetation	■ Removal and/or disturbance of vegetation and flora, along with fragmentation of large woodland blocks	■ Ministry of Transportation, Ministry of Natural Resources and Forestry, interest groups, general public	■ Where possible, larger blocks of vegetation were avoided. However, 22.1 hectares of higher quality woodlands will be removed. The total area of the Holland Marsh Endangered Species Act affected by the proposed facility is 17.2 hectares. The impact will not affect the status of the Endangered Species Act. The Recommended Plan was routed, where possible, to areas of existing openings, areas of previous disturbance, or along the edge of vegetative blocks.	■ Where appropriate: ■ edge management plans for areas of new disturbance to protect remaining trees and re-establish edge ■ salvage of existing native vegetation, seed, and topsoil for re-establishment in identified areas of significant disturbance ■ relocate rare, threatened or endangered plant species ■ minimize disturbance to remaining vegetation by felling trees into the working easement, and leaving stumps and roots for soil stabilization and natural regeneration, and restricting access with fencing to working areas ■ maximize forest regeneration opportunities on lands which are surplus to transportation needs as mitigation for fragmentation of significant vegetation and to provide linkage to alternate habitat ■ vegetation removal and protection of residual vegetation should be completed in accordance with Ontario Provincial Standard Specifications.	■ No	■ The Ministry will assess potential impacts to vegetation, wildlife habitat and sensitive natural areas to propose appropriate mitigation measures to avoid, minimize and mitigate potential impacts to natural areas along the Updated Technically Preferred Route. ■ Environmental management plans such as an Edge Management Plan shall be prepared, which may be a standalone plan, or incorporated into other plans such as clearing and grubbing plans, access management plans, or another specific plan. ■ Proposed mitigation measures outlined for vegetation shall be carried forward to Detail Design.
■ Wetlands	■ Crossing of the Holland Marsh Wetland Complex	■ Ministry of Transportation, Ministry of Natural Resources and Forestry, Lake Simcoe Region Conservation Authority, Ministry of the Environment, Conservation and Parks, interest groups, general public	■ 9.5 hectares of Provincially Significant Wetlands will be crossed by the right-of-way; the remaining 8.9 hectares are composed of marsh and swamp community types. The above figures refer to the total land area taken by the 100 metres right-of-way to be designated for the route, however, the direct physical impacts will be significantly less and will be limited to the construction of widely separated bridge piers.	■ Maintaining of the volume and pattern of water flow through the wetland (both surface water and groundwater) and the post-construction restoration of areas affected by construction related activities will be a focal point of the migration efforts. ■ Commitments include, where appropriate: ■ develop restoration plans for areas of wetland temporarily disturbed by construction ■ installation of equalizer culverts to preserve dynamics of wetland hydrology by maintaining sheet flow through the wetland and facilitating	■ No	■ Through the project-specific assessment of environmental impacts, the Ministry will complete a Terrestrial Ecosystem Impact Assessment, drainage and hydrology study, stormwater management plan, hydrogeology study, and develop a preliminary landscape design plan. ■ Proposed mitigation measures outlined for wetlands shall be carried forward to Detail Design. ■ The proposed design will consider potential impacts to wetlands, wildlife

Factor/ Criterion	Issue	Concerned Group/ Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Report)	Proposed Mitigation/ Commitments to Future Work (as taken from 2002 Approved Environmental Report)	Changes to Mitigation/ Protection/ Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
			<ul style="list-style-type: none"> Fens are the most sensitive land use types along the route, being dependent on the shallow lateral movement of groundwater. Only a small area of degraded fen is potentially affected. 	<ul style="list-style-type: none"> wildlife crossing for small mammals and amphibians delineation of areas to be protected with sediment fences to prevent intrusion during construction timing constraints that restrict construction activities immediately adjacent to or within wetlands to respect the intent of the federal Migratory Bird Regulations (1994) and the Ontario Game and Fish Act (1980) salvage of wetland plant material to be used for re-establishment in identified areas of significant disturbance minimization of dewatering within wetlands and irrigation to maximize survival in disturbed areas that will be re-established retention of lands which are surplus to transportation needs for the purpose of mitigation by allowing reversion to wetland. The Ministry has committed to construct the facility as an elevated pier structure through the Provincially Significant Wetlands. Emphasis will be placed on minimizing backwater effects and maintaining groundwater flows and patterns, thereby minimizing longer term effects on the fen wetland type. Monitoring of all activities in the wetland along with ongoing site review efforts with the responsible agencies will be key elements of the design and construction process. Where feasible, wetland substrates will be salvaged for use in stormwater management facilities (e.g., substrate and seed bank for wetland creation in SWM ponds). Where other wetlands are encountered, similar mitigative measures will be employed. Efforts will be made to ensure, by way of the road design, that surface water drainage and shallow groundwater patterns are not subjected to major alterations. 		<ul style="list-style-type: none"> habitat, wildlife (including wildlife passage), erosion and sediment control measures, access management for spatial and temporal constraints, landscape and ecological restoration and legislative requirements. The Bradford Bypass will be elevated on structures through this section. Through the study consultation with the Ministry of Natural Resources and Forestry and Ministry of Environment, Conservation and Parks for wetlands, wildlife, sensitive natural areas and protection of sensitive species will be carried out. Consultation with Lake Simcoe Region Conservation Authority and Nottawasaga Valley Conservation Authority is ongoing, to consider watershed specific environmental constraints and restoration recommendations.
<ul style="list-style-type: none"> Wildlife 	<ul style="list-style-type: none"> Minimize wildlife habitat disturbance, minimize fragmentation of large habitat blocks and maintenance of wildlife corridors 	<ul style="list-style-type: none"> Ministry of Transportation, Ministry of Natural Resources and Forestry, interest groups, general public 	<ul style="list-style-type: none"> The proposed 400-404 Link has the potential to remove 23.7 hectares of significant wildlife habitat, potentially affect two Provincially and Nationally "vulnerable" species (Louisiana Waterthrush and Red-shouldered 	<ul style="list-style-type: none"> By using available openings skirting the large woodland blocks in the Holland River floodplain and using disturbed edge location, habitat fragmentation in that area is minimized. 	<ul style="list-style-type: none"> No 	<ul style="list-style-type: none"> Bridge designs for the crossings of the Holland River and Holland River East Branch have considered environmental constraints including, but not limited to, terrestrial ecosystem, including sensitive

Factor/ Criterion	Issue	Concerned Group/ Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Report)	Proposed Mitigation/ Commitments to Future Work (as taken from 2002 Approved Environmental Report)	Changes to Mitigation/ Protection/ Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
			Hawk) currently nesting in proximity to the recommended plan, and potentially interrupt wildlife movement along some stream corridors and woodlots, particularly in the area between Highway 400 and Simcoe County Road 4 (Highway 11).	<ul style="list-style-type: none"> ■ The proposed long-span bridge across the Holland River branches will retain wildlife movement opportunities along the riverbanks. ■ The drainage plan will minimize the ponding of salt-laden runoff and decrease impacts on sensitive aquatic habitat for breeding amphibians and other species. To minimize road kills, measures will include a wide, grassed, open, median, fencing of the right-of-way, provision of good visibility for drivers, and the consideration of cautionary wildlife crossing signage. ■ Commitments include, where appropriate: ■ Design bridges and culverts that accommodate terrestrial passage for small mammals at identified locations within specified wildlife corridors; ■ Restrict clearing of trees immediately adjacent to or within significant breeding areas to non-critical periods; and ■ Monitor wildlife movement patterns and potential of conflict. 		species and wetlands, fish and fish habitat, archaeological resources, floodplain modelling, and stormwater management. <ul style="list-style-type: none"> ■ Design of structures will take into account passage for both small and large mammals where feasible.
<ul style="list-style-type: none"> ■ Greenways and Open Space Linkages 	<ul style="list-style-type: none"> ■ Minimize the disruption to existing greenways/natural corridors 	<ul style="list-style-type: none"> ■ Ministry of Transportation, Ministry of Natural Resources and Forestry, York Region, general public 	<ul style="list-style-type: none"> ■ The Link is an east-west route traversing a landscape in which the main natural features are on a north-south axis particularly in the centre of the study area, namely, the two branches of the Holland River and the associated wetlands and upland forest ■ Where possible, the Link alignment skirts the edges of contiguous forest blocks or follows existing gaps in the forest. Between the CN rail line and Yonge Street, an area that is predominantly naturally vegetated, the route will be on a pier structure for more than one quarter of its length, thereby providing opportunities to maintain the natural corridor function. Similarly, where the Link crosses both branches of the Holland River and its associated wetlands it will be on a pier structure. 	<ul style="list-style-type: none"> ■ Mitigative efforts will be focused on the restoration of natural vegetation disturbed by construction-related activities, thereby ensuring the continuity of the natural vegetation within the central portion of the study area. 	<ul style="list-style-type: none"> ■ No 	<ul style="list-style-type: none"> ■ The Preliminary Landscape Conceptual Design Plan and future landscape and ecological restoration will consider recommendations, mitigation measures and commitments identified through the project-specific assessment of environmental impacts (ecological, social and cultural), environmental legislative requirements, and aesthetics. Recommendations have been made to retain and restore natural vegetation where feasible and provide enhanced wildlife connectivity where possible through wildlife passages (culverts and bridges).

9.2 Preliminary Design Commitments

Impacts to the terrestrial environment and proposed mitigation measures, monitoring activities and commitments identified during this terrestrial ecosystems assessment are summarized in **Table 9-2** below.

Table 9-2: Summary of Proposed Mitigation Measures, Monitoring Activities and Commitments

ID	Issues/ Concerns/ Potential Effects	Concerned Agencies	ID	Mitigation/ Protection/ Monitoring
Terrestrial Ecosystems				
TERR-1.00	General impacts	MNR, LSRCA, MECP	TERR-1.01	■ The need for additional plans (i.e., wildlife management, wildlife monitoring, ecological restoration, environmental management, Invasive Species management, Ministry Salt Management Plan) to support the proposed works should be determined and prepared during Detail Design.
TERR-2.00	Temporary loss of natural vegetation	MNR, LSRCA, MECP	TERR-2.01	■ Vegetation removal, grading and soil compaction should be kept to a minimum. Further analysis of the required limits of work should be completed during the Detail Design phase to assess if impacts to certain vegetation communities located within the proposed ROW can be avoided.
			TERR-2.02	■ OPSS -201: Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders
			TERR-2.03	■ OPSS-801: Construction Specification for the Protection of Trees
			TERR-2.04	■ Where tree removals are required to accommodate the proposed design outside of MTO owned lands (i.e. areas of Temporary Limited Interest) a tree inventory should be completed in Detail Design by a certified arborist to determine the number and species of trees to be removed. The inventory will inform potential restoration works and/or potential permitting requirements under applicable municipal bylaws.
			TERR-2.05	■ OPSS.MUNI 804: Construction Specification for Seed and Cover
			TERR-2.06	■ A Landscaping and Ecological Restoration Plan shall be prepared and include invasive species management, as outlined in LAND-1.01 and LAND-1.02.
			TERR-2.07	■ To the extent feasible, affected areas shall be re-seeded and re-vegetated and restored to pre-disturbance conditions, using native species appropriate for the community type disturbed.
			TERR-2.08	■ Plantings should consist of native tree and shrub species, similar to the native species already present in the area.
			TERR-2.09	■ Wetland boundary delineation where encroachment into wetlands is anticipated.
			TERR-2.10	■ Sections of the Holland River Marsh PSW that will be spanned by the project and have been temporarily disturbed due to construction activities should be restored back to wetland habitat where possible in order to retain the function of the wetland. Planted species should consist of native species that are present within the adjacent wetland vegetation communities to ensure the composition of adjacent communities is retained.
			TERR-2.11	■ Species planted directly underneath the new structures that span the Holland River Marsh PSW should include species that prefer or tolerate shaded environments. Plantings should be limited to low-growing species to allow the most amount of light to reach underneath the structure given the east-west orientation of the highway.
			TERR-2.12	■ Seeded mixes that include common milkweed and native flowering plants should be used to rehabilitate or restore areas of herbaceous vegetation temporarily disturbed during proposed works.
			TERR-2.13	■ A detailed plant inventory will be completed during future phases of work for the project. Should regionally rare species be identified within the final limits of work, mitigation measures specific to regionally rare species can be considered.
TERR-3.00	Permanent loss of natural vegetation	MNR, LSRCA, MECP	TERR- 3.01	■ Vegetation removal, grading and soil compaction should be kept to a minimum. Further analysis of the required limits of work should be completed during the Detail Design phase to assess if impacts to certain vegetation communities located within the proposed ROW can be avoided.
			TERR- 3.02	■ OPSS-803: Construction Specification for Vegetative Cover
			TERR- 3.03	■ OPSS -201: Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders
			TERR- 3.04	■ OPSS-801: Construction Specification for the Protection of Trees
			TERR- 3.05	■ Where tree removals are required to accommodate the proposed design outside of MTO owned lands (i.e. areas of Temporary Limited Interest) a tree inventory should be completed in Detail Design by a certified arborist to determine the number and species of trees to be removed. The inventory will inform potential restoration works and/or potential permitting requirements under applicable municipal bylaws.
			TERR- 3.06	■ OPSS.MUNI 804: Construction Specification for Seed and Cover
			TERR- 3.07	■ Wetland boundary delineation where encroachment into wetlands is anticipated.
			TERR- 3.08	■ Where wetland habitat cannot be restored or is permanently impacted by the proposed highway the MTO should consider wetland compensation efforts including enhancement to the adjacent wetland communities or creation of new wetland habitat to maintain wetland function throughout the Study Area.
			TERR- 3.09	■ A detailed plant inventory will be completed during future phases of work for the project. Should regionally rare species be identified within the final limits of work, mitigation measures specific to regionally rare species can be considered.
TERR-4.00	Potential for construction fill and sediment runoff to enter	MNR, LSRCA, MECP	TERR- 4.01	■ OPSS-804: Construction Specification for Temporary Erosion Control
			TERR- 4.02	■ SSP-805: Construction Specification for Temporary Sediment Control
			TERR- 4.03	■ Erosion and Sediment Control measures should be installed along the construction footprint within 30 m of any PSW. In areas where the construction of the highway is expected to intersect a PSW, sediment fencing should be installed along the limits of work. Erosion and Sediment Control (ESC) measures should be installed in accordance with the project's associated ESC plan.

ID	Issues/ Concerns/ Potential Effects	Concerned Agencies	ID	Mitigation/ Protection/ Monitoring
	vegetation communities		TERR- 4.04	■ OPSS.MUNI 804: Construction Specification for Seed and Cover
			TERR- 4.05	■ OPSS-180: General Specification for the Management of Excess Materials
			TERR- 4.06	■ Construction material should be stored within an authorized location and any soil stockpiles should only be located within a suitable sediment fenced and protected location.
			TERR- 4.07	■ If stockpiles of gravel and sandy substrates or the removal of these substrates in the vicinity of turtle habitat are required during the active turtle season (April 1 to October 15), turtle exclusion fencing should be installed in accordance with the Reptile and Amphibian Exclusion Fencing Best Management Practices (MECP, 2020) around stockpiles or area of disturbance prior to April 1. Fencing should be installed immediately after stockpiles are created if after April 1.
			TERR- 4.08	■ OPSS-182: General Specification for Environmental Protection for Construction in Waterbodies and on Waterbody Banks.
			TERR- 4.09	■ Watercourse banks disturbed by any activity associated with the project should be immediately stabilized to prevent erosion and/or sedimentation, through re-vegetation with native species suitable for the site.
			TERR- 4.10	■ OPSS -201: Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders.
TERR- 5.00	Potential for oil, gasoline, grease, emissions and other materials from construction equipment, material storage and handling to enter adjacent vegetation communities	MNR, LSRCA, MECP	TERR- 5.01	■ A Spills Management Plan should be prepared and shall include materials, instructions, education and emergency numbers. The plan shall be kept onsite at all times, communicated to work crews and be properly implemented in the event of accidental spills (OC – Spill Prevention and Response Contingency Plan as per OPSS 182).
			TERR- 5.02	■ Environmental Incident Management Under Legislation Protecting the Environment and Natural Resources in accordance with OPSS 100.
			TERR- 5.03	■ Special Provision (SP) 199S56 Control of Emissions During Structural Work.
TERR- 6.00	Potential impacts to wetland hydrology	MNR, LSRCA, MECP	TERR-6.01	■ OPSS-517: Construction Specification for Dewatering.
TERR- 7.00	Potential impacts to species at risk and their habitat	MNR, LSRCA, MECP	TERR- 7.01	■ Consultation with MECP and/or authorization under the ESA will be required if Chimney Swift are found to be nesting within any affected buildings.
			TERR- 7.02	■ Targeted marsh breeding bird call back surveys following approved MECP protocols shall be undertaken in areas where impacts are proposed in candidate habitat for Least Bittern. Should Least Bittern be confirmed habitat should be mapped in accordance with the Recovery Strategy for the Least Bittern (MECP, 2016). Consultation with MECP and/or authorization under the ESA will be required for Least Bittern if confirmed using the candidate habitat present in the Holland River Marsh PSW and impacts to suitable habitat within 500 m of breeding activity cannot be avoided (MECP, 2016).
			TERR- 7.03	■ Species-specific surveys following the MECP's Species at Risk Bats Survey Note (2022a) and Maternity Roost Surveys (Forest and Woodlands) (2022b) shall be undertaken in areas where tree removal is proposed in suitable bat SAR habitat. Consultation with MECP and/or authorization under the ESA will be required for bat SAR if confirmed using treed habitats and impacts to habitats or SAR individuals cannot be avoided.
			TERR- 7.04	■ Targeted SAR surveys to determine the presence/ absence of grassland SAR bird habitat (Bobolink and Eastern Meadowlark) shall be completed during Detail Design. Consultation with MECP and/or authorization under the ESA will be required for Bobolink or Eastern Meadowlark if confirmed using the candidate habitats and impacts to protected habitat outlined in the species General Habitat Description (MECP, 2021a & 2021b) or SAR individuals cannot be avoided.
			TERR- 7.05	■ Crepuscular bird surveys following approved MECP protocols shall be undertaken in areas where impacts are proposed in candidate habitat identified. Should Eastern Whip-poor-will be confirmed habitat should be mapped in accordance to the General Habitat Description (MECP, 2013a). Consultation with MECP and/or authorization under the ESA will be required for Eastern Whip-poor-will if confirmed using the candidate habitats and impacts to protected habitat outlined in the species General Habitat Description (MECP, 2013a) or SAR individuals cannot be avoided.
			TERR- 7.06	■ A detailed plant inventory within the CDA is required to confirm no additional butternuts or other SAR plants are affected by the proposed works. A Butternut Health Assessment may be required if works are located within 25 m of a pure butternut. Consultation with MECP and/or authorization under the ESA may be required if ground disturbance occurs within 25 or removal of pure or archivable butternuts is required.
			TERR- 7.07	■ A detailed plant inventory within the CDA may be required to confirm the number of black ash that will be impacted by the proposed works. Authorization requirements for black ash under the ESA are currently unknown and will be dependent on how the MECP chooses to protect the species once the temporary suspension of statutory protections has ended in January 2024.

ID	Issues/ Concerns/ Potential Effects	Concerned Agencies	ID	Mitigation/ Protection/ Monitoring
			TERR- 7.08	■ Turtle overwintering and nesting surveys following approved MECP protocols shall be undertaken in areas where impacts are proposed in candidate habitat identified. If Blanding's Turtle habitat use is confirmed the habitat should be mapped in accordance with the General Habitat Description (MECP, 2013b). Consultation with MECP and/or authorization under the ESA may be required for Blanding's Turtle if confirmed using the candidate habitat identified and impacts to protected habitat outlined in the species General Habitat Description (MECP, 2013b) or SAR individuals cannot be avoided.
TERR- 8.00	Potential impacts to migratory birds and their habitat	MNRF, LSRCA, MECP, ECCC	TERR- 8.01	■ Schedule vegetation removal to occur outside of the overall bird nesting period of April 1st to August 31st to avoid disturbance to breeding migratory birds including SAR and/or damage/destruction of their nest.
			TERR- 8.02	■ Non-Standard Special Provision Operational Constraints (Environmental) - Migratory Bird Protection.
			TERR- 8.03	■ If vegetation removal must occur within this time period, active nest searches must be conducted prior to vegetation removal by a qualified biologist within 'simple habitats' (e.g., mown vegetation) or if minor vegetation clearing is required, to ensure that no active nests of breeding migratory birds or bird SAR are destroyed, in order to prevent contravention of the MBCA and/or the ESA.
			TERR- 8.04	■ Permitting under the MBCA will be required if a nest of a bird listed under Schedule 1 of the act is identified within the proposed project footprint. Both Green Heron and Pileated Woodpecker, birds listed under Schedule 1 of the MBCA, were identified within the project Study Area during field investigations. Targeted sweeps/surveys for nests and suitable nesting sites are required during Detail Design and/or prior to vegetation removal to determine potential permitting requirements. Authorization under the MBCA may be required if removal of nests of Schedule 1 species cannot be avoided through Detail Design.
			TERR- 8.05	■ It is recommended that any structure expected to be impacted by the proposed works be examined to confirm the presence or absence of migratory or SAR bird nests the year prior to construction.
			TERR- 8.06	■ If birds are observed nesting in, under or on a structure or building prior to or during rehabilitation or replacement, a qualified biologist should be consulted to determine the appropriate steps taken to reduce impacts to wildlife and avoid a potential contravention of the MBCA and/or the ESA.
TERR- 9.00	Removal of potential monarch habitat	MNRF, LSRCA,	TERR- 9.01	■ Limiting vegetation removal to outside of the monarch nesting period will help to protect monarch while they are present as eggs or larvae on milkweed plants (May 25th to August 15th).
			TERR- 9.02	■ Inclusion of milkweed in the species mix for the revegetation of temporary disturbed areas.
TERR- 10.00	Potential impacts to bats and bat habitat	MNRF, LSRCA, MECP	TERR- 10.01	■ Should impacts to woodlands be confirmed through Detail Design, MECP should be consulted to determine permitting requirements. At a minimum conduct any tree removals outside of the bat roosting season (April 1st to September 30th), following MECP consultation.
			TERR- 10.02	■ During the bat roosting season between April 1 and September 30, any construction activities within 30 m of suitable maternity roost habitat should be restricted to daylight hours when possible, to minimize duration of disturbance.
TERR- 11.00	Potential impacts to turtle overwintering habitat	MNRF, LSRCA, MECP	TERR- 11.01	■ Avoid work within areas of candidate turtle overwintering habitat during the turtle overwintering period (October 31 to April 1), whenever possible.
TERR- 12.00	Potential impacts to reptile hibernacula	MNRF, LSRCA,	TERR- 12.01	■ If work is required within candidate reptile hibernacula habitat (i.e., rockpiles) work should be completed outside the reptile overwintering period (October 31 to April 1), whenever possible.
TERR- 13.00	Potential impacts to terrestrial crayfish habitat	MNRF, LSRCA	TERR- 13.01	■ Wherever possible, avoid changes to hydrology in areas of candidate and confirmed terrestrial crayfish habitat.
			TERR- 13.02	■ Additional surveys will be completed during future phases of the project and will include recording observations of terrestrial crayfish burrows/ chimneys. Should burrows/ chimneys be identified, mitigation measures specific to terrestrial crayfish will be considered.
TERR- 14.00	Potential sightings of Species at Risk during construction	MNRF, LSRCA, MECP	TERR- 14.01	■ SP 100S14 Unexpected Species at Risk Occurrence.
			TERR- 14.02	■ Should additional SAR be encountered within the work area, construction activities will cease, and the contracting authority and MECP will be contacted for next steps.
			TERR- 14.03	■ All SAR observations should be reported to the contracting authority and MECP.
TERR- 15.00	Potential to find wildlife		TERR- 15.01	■ If wildlife is found within the work area, the wildlife should be permitted to vacate the area.
			TERR- 15.02	■ If wildlife is observed within the work area, a qualified biologist or environmental monitor will determine if there is a concern about the significance of the species observed.

ID	Issues/ Concerns/ Potential Effects	Concerned Agencies	ID	Mitigation/ Protection/ Monitoring
	within the work area during construction	MNRF, LSRCA, MECP	TERR- 15.03	■ If the species is identified as SAR, do not handle the individual unless it is in immediate danger. A Qualified Biologist shall contact the Contracting Authority and MECP immediately. In accordance with the ESA, no Threatened or Endangered species can be handled or relocated without the proper approvals/ permitting and authorization from MNRF.
			TERR- 15.04	■ If the species is not identified as SAR, direct the species away from the construction zone into the nearest natural area (i.e., woodland, wetland, etc.); if unsure of where to move the species, a Qualified Biologist shall be contacted for guidance.
			TERR- 15.05	■ For SOCC (e.g., a snapping turtle) or other non-SAR wildlife, it may appropriate to request that a qualified biologist move the species for the safety of both the onsite personnel and the species.
			TERR- 15.06	■ Avoid driving within construction zones in proximity to amphibian breeding habitat at night between April 1 and June 30, and any rainy nights from spring to early autumn, whenever possible.
			TERR- 15.07	■ Should an injured or orphaned animal be encountered, a Qualified Biologist will transport the animal to a wildlife rehabilitation centre that is considered to be an approved Wildlife Custodian by the MNRF or a member of the College of Veterinarians. Any amphibians or reptiles unearthed during their hibernation will also be immediately transported to a suitable wildlife rehabilitation centre.
TERR- 16.00	Potential for wildlife vehicle collisions within during operation	MNRF, LSRCA, MECP	TERR- 16.01	■ Permanent Wildlife Exclusion Fencing should be considered to be erected along the entire limits of the Bradford Bypass ROW where there is opportunity for herpetofauna or mammals to enter the ROW.
			TERR- 16.02	■ Jump-outs are recommended at approximately 1.4 km intervals to ensure that wildlife trapped within the ROW are able to exit.
			TERR- 16.03	■ It is recommended that fence ends angle away from the ROW for a distance up to 100 m.
			TERR- 16.04	■ It is recommended that culverts be designed to provide openness ratios that would allow for the passage of small mammal and/ or herpetofauna where possible. An openness ratio of 0.4 would permit usage by medium-sized mammals, while the minimum openness ratio to be considered should be 0.25, which would permit usage by reptiles.
			TERR- 16.05	■ A larger wildlife passage with an openness ratio of 0.6 or greater should be considered where the proposed ROW intersects the Deer Wintering Area situated between 2nd Concession Road and Leslie Street.
			TERR- 16.06	■ Implement the commitment made in the 2002 Approved EA to span existing PSWs associated with the Holland River and Holland River East Branch. Spanning of the wetland units will provide ample wildlife crossing opportunities for both large and small wildlife to access the natural features present both north and south of the proposed ROW.
			TERR- 16.07	■ Winter tracking surveys to determine deer/large mammal movement within the proposed ROW is recommended during the Detail Design phase of the project.
			TERR- 16.08	■ Around culvert structures, avoid the use of rip-rap or sharp rock protection and ensure areas on both sides of the watercourse provide substrate materials conducive to animal movement, where possible.
			TERR- 16.09	■ If rip-rap must be used, fill the interstitial space with small materials which would provide appropriate footing for wildlife.
			TERR- 16.10	■ Include natural substrates within culverts structures.
			TERR- 16.11	■ Provide suitable cover elements adjacent to structures (e.g., retained or planted vegetation) that can facilitate wildlife use of the structures (i.e., cover/shelter on route to structure) while not blocking the structure entrance.
			TERR- 16.12	■ Wherever possible, ensure that entrance and exits to the structures are reasonably level (e.g., no major grade changes) to provide an unimpeded view through the structure and habitat beyond.
			TERR- 16.13	■ Ensure that the elevation and slope of the structure does not result in flooding.
			TERR- 16.14	■ Remove or reduce potential predator perches (i.e., ledges) to the extent possible.
			TERR- 16.15	■ Avoid artificial light sources near the entrances/exit of the wildlife passage.
			TERR- 16.16	■ Any landscaping and erosion control materials required shall not include materials known to accidentally entrap snakes or fish.
			TERR- 16.17	Restore adjacent vegetation areas disturbed for construction access using native species.
TERR- 17.00	Potential Impact of lighting on natural areas and wildlife	MNRF, LSRCA, MECP	TERR- 17.01	■ Limit the number of lights immediately adjacent to woodlands to the extent possible.
			TERR- 17.02	■ If feasible, turn off lighting or reduce the number of active lights immediately adjacent to woodlands during sensitive timing windows (i.e., April 1 – September 30).
			TERR- 17.03	■ Avoid the use of high-pressure sodium and LED lights immediately adjacent to woodlands.

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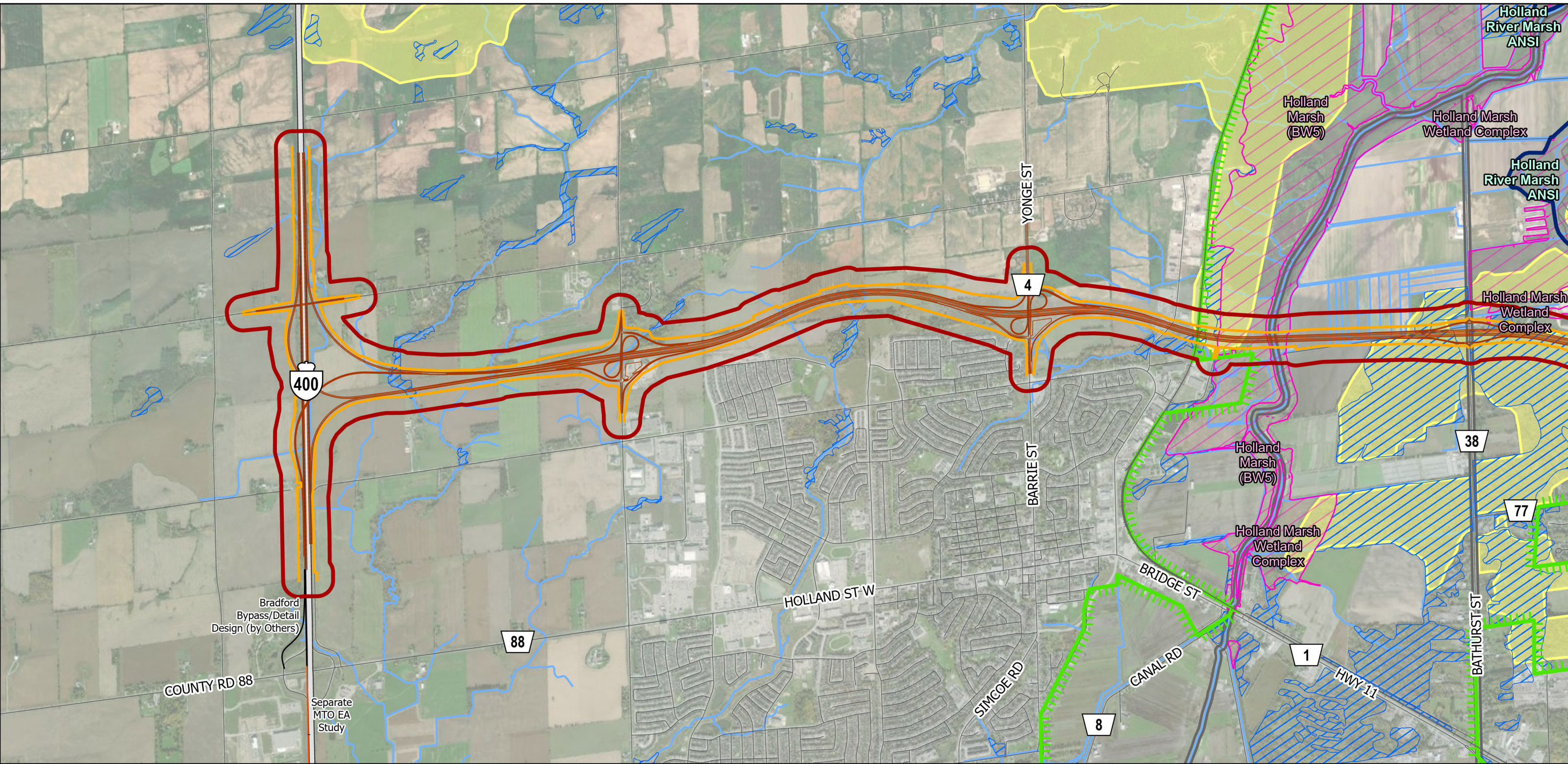
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Appendix A

Figures



LEGEND

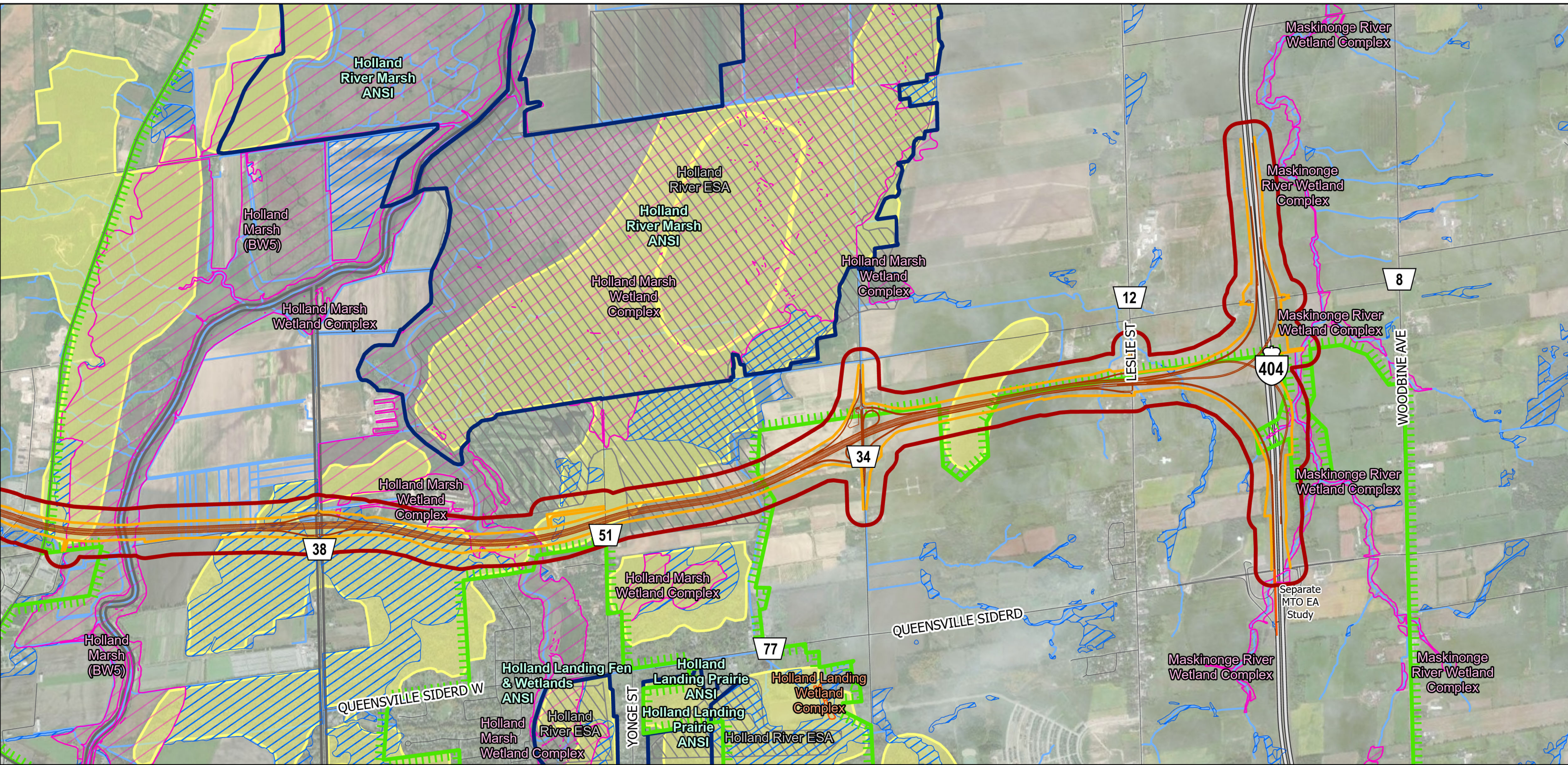
Bradford Bypass - MTO Right-Of-Way	Preliminary Design Terrestrial Study Area	Environmentally Significant Area
Bradford Bypass Preliminary Design	Municipality	Deer Wintering Areas - Stratum 2
Bradford Bypass/Detail Design (by Others)	Watercourse	Significant Wetlands (LIO)
Separate MTO EA Study	Provincial Highway	Evaluated – Provincially Significant
	Other Road	Not evaluated per OWES
	Railway	

0 200 400 800 1,200 1,600 2,000
 Meters

**Highway 400 to Highway 404 Link
(Bradford Bypass)**

Designated Natural Areas	Figure 1-1
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:28,000	

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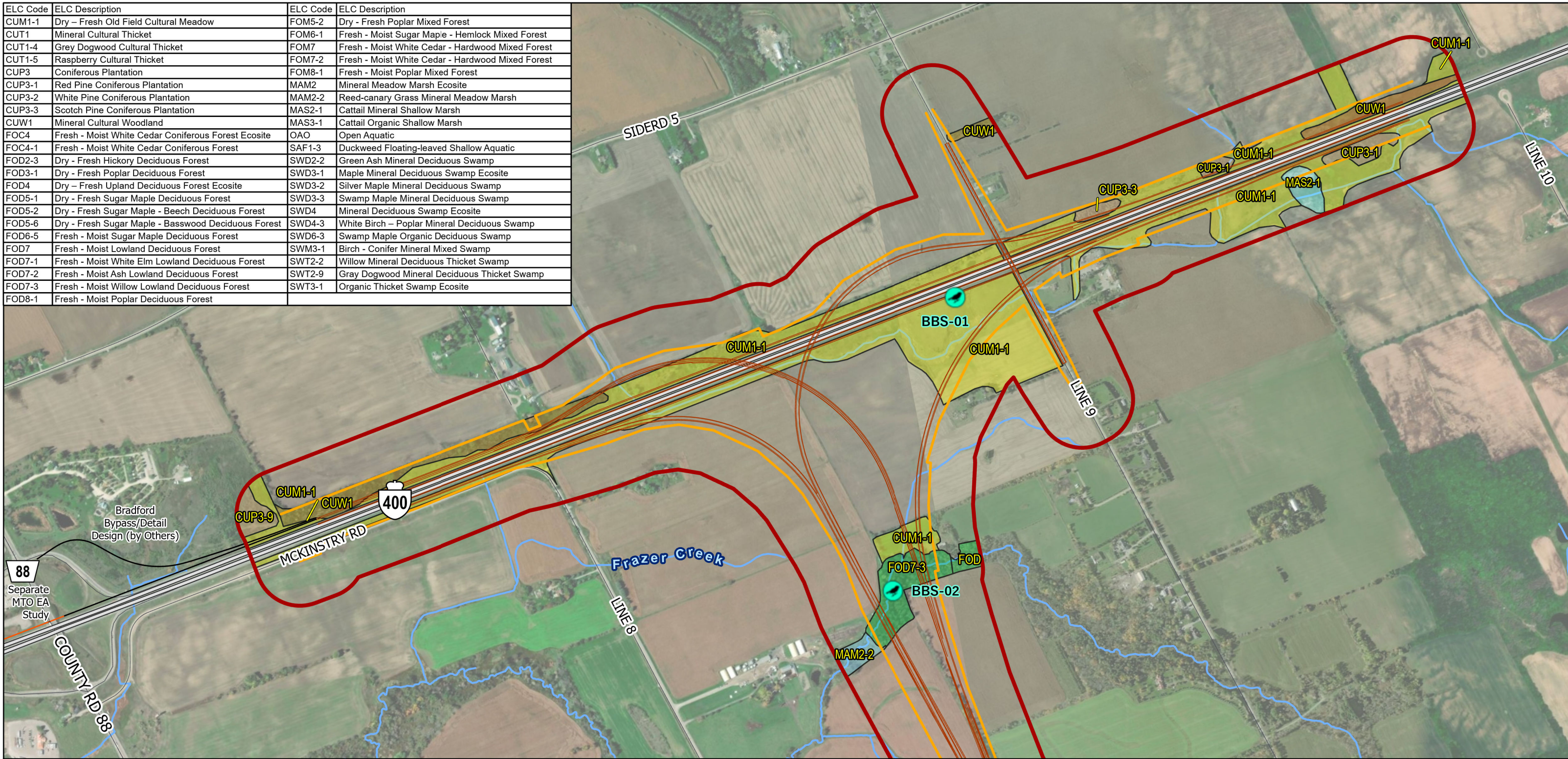
LEGEND

Bradford Bypass - MTO	Watercourse	Significant Wetlands (LIO)
Right-Of-Way	Provincial Highway	
Bradford Bypass	Other Road	
Preliminary Design	Railway	
Separate MTO EA Study	Environmentally Significant Area	Evaluated – Provincially Significant
Preliminary Design	Deer Wintering Areas - Stratum 2	Evaluated – Regionally Significant
Terrestrial Study Area		Not evaluated per OWES
Municipality		

Highway 400 to Highway 404 Link (Bradford Bypass)

Designated Natural Areas	Figure 1-2
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:28,000	
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ELC Code	ELC Description	ELC Code	ELC Description
CUM1-1	Dry - Fresh Old Field Cultural Meadow	FOM5-2	Dry - Fresh Poplar Mixed Forest
CUT1	Mineral Cultural Thicket	FOM6-1	Fresh - Moist Sugar Maple - Hemlock Mixed Forest
CUT1-4	Grey Dogwood Cultural Thicket	FOM7	Fresh - Moist White Cedar - Hardwood Mixed Forest
CUT1-5	Raspberry Cultural Thicket	FOM7-2	Fresh - Moist White Cedar - Hardwood Mixed Forest
CUP3	Coniferous Plantation	FOM8-1	Fresh - Moist Poplar Mixed Forest
CUP3-1	Red Pine Coniferous Plantation	MAM2	Mineral Meadow Marsh Ecosite
CUP3-2	White Pine Coniferous Plantation	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
CUP3-3	Scotch Pine Coniferous Plantation	MAS2-1	Cattail Mineral Shallow Marsh
CUW1	Mineral Cultural Woodland	MAS3-1	Cattail Organic Shallow Marsh
FOC4	Fresh - Moist White Cedar Coniferous Forest Ecosite	OAO	Open Aquatic
FOC4-1	Fresh - Moist White Cedar Coniferous Forest	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
FOD2-3	Dry - Fresh Hickory Deciduous Forest	SWD2-2	Green Ash Mineral Deciduous Swamp
FOD3-1	Dry - Fresh Poplar Deciduous Forest	SWD3-1	Maple Mineral Deciduous Swamp Ecosite
FOD4	Dry - Fresh Upland Deciduous Forest Ecosite	SWD3-2	Silver Maple Mineral Deciduous Swamp
FOD5-1	Dry - Fresh Sugar Maple Deciduous Forest	SWD3-3	Swamp Maple Mineral Deciduous Swamp
FOD5-2	Dry - Fresh Sugar Maple - Beech Deciduous Forest	SWD4	Mineral Deciduous Swamp Ecosite
FOD5-6	Dry - Fresh Sugar Maple - Basswood Deciduous Forest	SWD4-3	White Birch - Poplar Mineral Deciduous Swamp
FOD6-5	Fresh - Moist Sugar Maple Deciduous Forest	SWD6-3	Swamp Maple Organic Deciduous Swamp
FOD7	Fresh - Moist Lowland Deciduous Forest	SWM3-1	Birch - Conifer Mineral Mixed Swamp
FOD7-1	Fresh - Moist White Elm Lowland Deciduous Forest	SWT2-2	Willow Mineral Deciduous Thicket Swamp
FOD7-2	Fresh - Moist Ash Lowland Deciduous Forest	SWT2-9	Gray Dogwood Mineral Deciduous Thicket Swamp
FOD7-3	Fresh - Moist Willow Lowland Deciduous Forest	SWT3-1	Organic Thicket Swamp Ecosite
FOD8-1	Fresh - Moist Poplar Deciduous Forest		



LEGEND

- Municipality
- Watercourse
- Provincial Highway
- Other Road
- Breeding Bird Surveys
- Preliminary Design
- Terrestrial Study Area
- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass
- Preliminary Design
- Bradford Bypass/Detail Design (by Others)
- Separate MTO EA Study

Ecological Land Classifications

- CUM
- CUP
- CUS
- CUW
- FOD
- MAM
- MAS

Scale: 0 50 100 200 300 400 Meters

Highway 400 to Highway 404 Link (Bradford Bypass)

Ecological Land Classification and Survey Locations

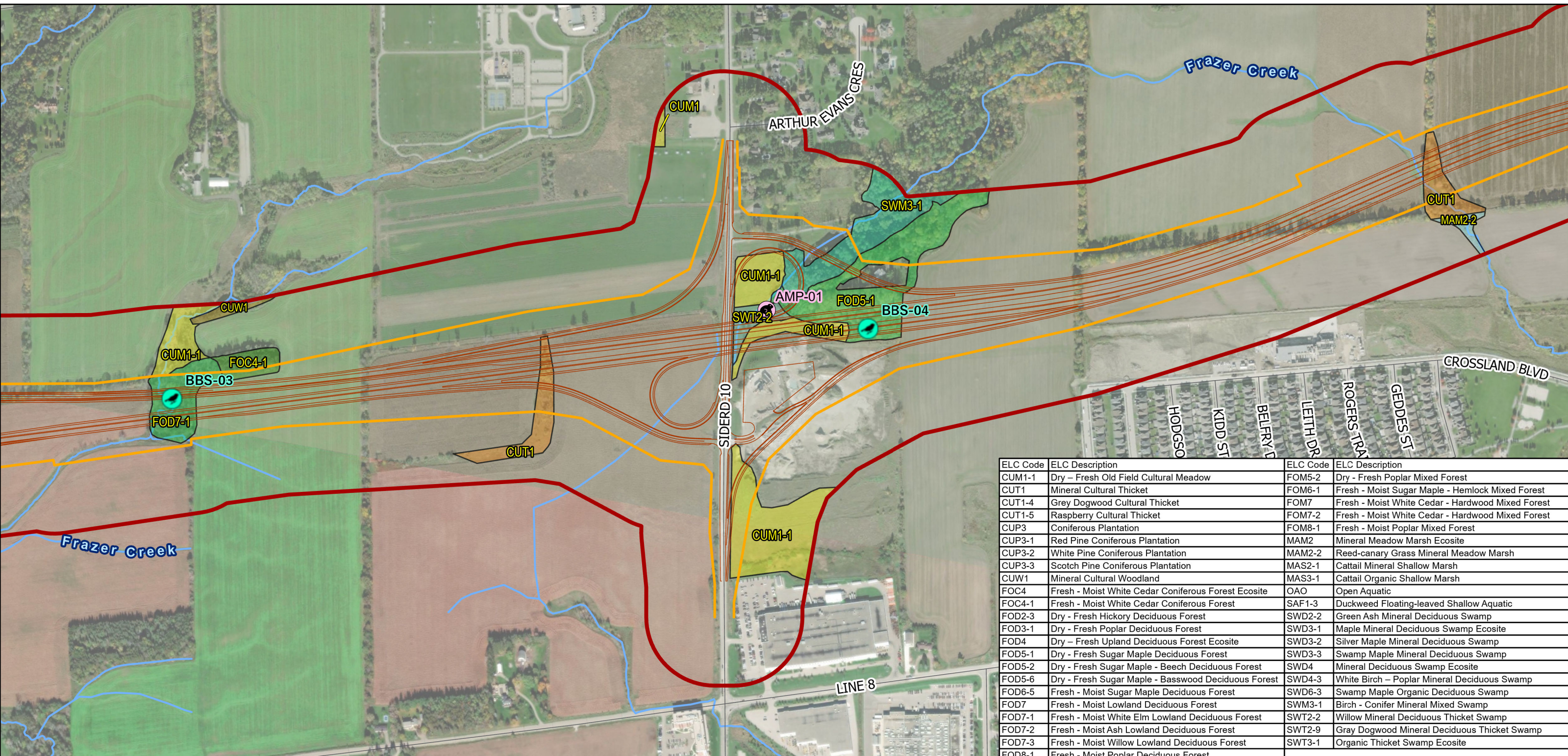
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Datum: NAD 1983 UTM Zone 17N
Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury.
Scale: 1:10,000

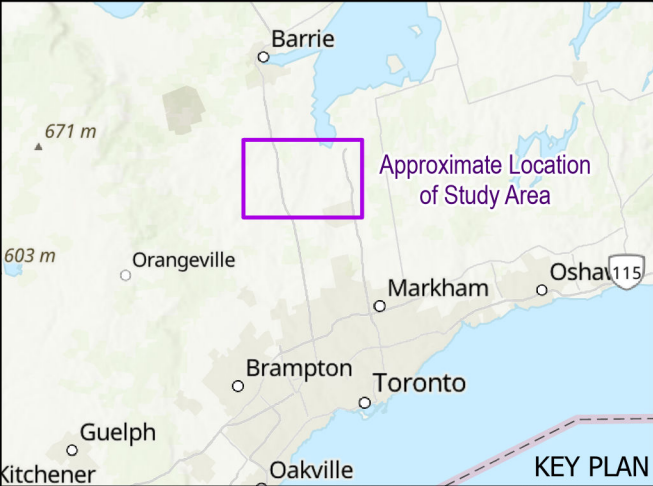
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CUM1-1	Dry - Fresh Old Field Cultural Meadow	FOM5-2	Dry - Fresh Poplar Mixed Forest
CUT1	Mineral Cultural Thicket	FOM6-1	Fresh - Moist Sugar Maple - Hemlock Mixed Forest
CUT1-4	Grey Dogwood Cultural Thicket	FOM7	Fresh - Moist White Cedar - Hardwood Mixed Forest
CUT1-5	Raspberry Cultural Thicket	FOM7-2	Fresh - Moist White Cedar - Hardwood Mixed Forest
CUP3	Coniferous Plantation	FOM8-1	Fresh - Moist Poplar Mixed Forest
CUP3-1	Red Pine Coniferous Plantation	MAM2	Mineral Meadow Marsh Ecosite
CUP3-2	White Pine Coniferous Plantation	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
CUP3-3	Scotch Pine Coniferous Plantation	MAS2-1	Cattail Mineral Shallow Marsh
CUW1	Mineral Cultural Woodland	MAS3-1	Cattail Organic Shallow Marsh
FOC4	Fresh - Moist White Cedar Coniferous Forest Ecosite	OAO	Open Aquatic
FOC4-1	Fresh - Moist White Cedar Coniferous Forest	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
FOD2-3	Dry - Fresh Hickory Deciduous Forest	SWD2-2	Green Ash Mineral Deciduous Swamp
FOD3-1	Dry - Fresh Poplar Deciduous Forest	SWD3-1	Maple Mineral Deciduous Swamp Ecosite
FOD4	Dry - Fresh Upland Deciduous Forest Ecosite	SWD3-2	Silver Maple Mineral Deciduous Swamp
FOD5-1	Dry - Fresh Sugar Maple Deciduous Forest	SWD3-3	Swamp Maple Mineral Deciduous Swamp
FOD5-2	Dry - Fresh Sugar Maple - Beech Deciduous Forest	SWD4	Mineral Deciduous Swamp Ecosite
FOD5-6	Dry - Fresh Sugar Maple - Basswood Deciduous Forest	SWD4-3	White Birch - Poplar Mineral Deciduous Swamp
FOD6-5	Fresh - Moist Sugar Maple Deciduous Forest	SWD6-3	Swamp Maple Organic Deciduous Swamp
FOD7	Fresh - Moist Lowland Deciduous Forest	SWM3-1	Birch - Conifer Mineral Mixed Swamp
FOD7-1	Fresh - Moist White Elm Lowland Deciduous Forest	SWT2-2	Willow Mineral Deciduous Thicket Swamp
FOD7-2	Fresh - Moist Ash Lowland Deciduous Forest	SWT2-9	Gray Dogwood Mineral Deciduous Thicket Swamp
FOD7-3	Fresh - Moist Willow Lowland Deciduous Forest	SWT3-1	Organic Thicket Swamp Ecosite
FOD8-1	Fresh - Moist Poplar Deciduous Forest		



LEGEND

- Municipality
- Watercourse
- Other Road
- Breeding Bird Surveys
- Amphibian Call Surveys
- Preliminary Design
- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass
- Preliminary Design

Ecological Land Classifications

- CUM
- CUT
- CUW
- FOC
- FOD
- MAM
- SWM
- SWT

Scale: 0 50 100 200 300 Meters

Highway 400 to Highway 404 Link (Bradford Bypass)

Ecological Land Classification and Survey Locations

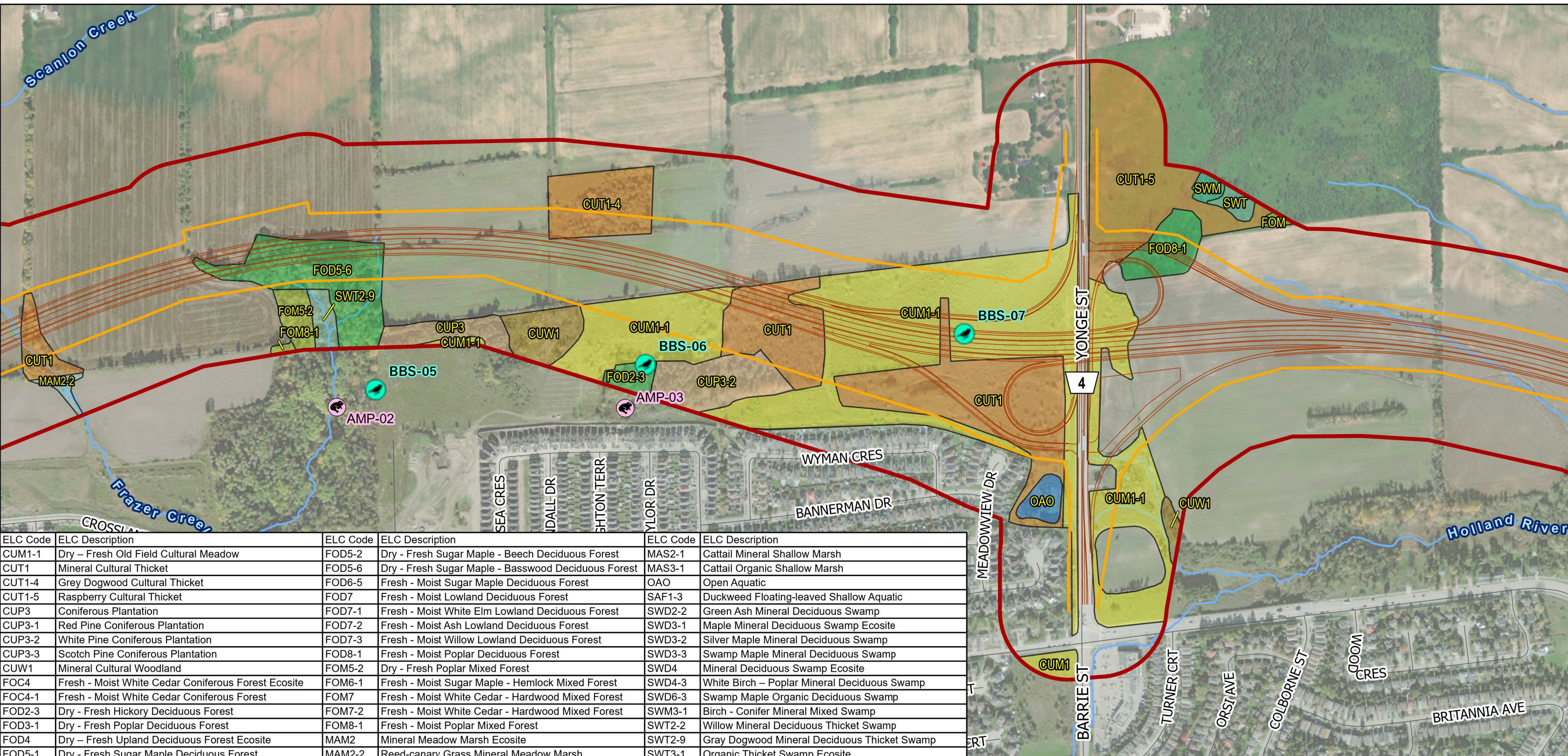
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Figure 2-2

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LEGEND

- Municipality
- Watercourse
- Other Road
- Breeding Bird Surveys
- Amphibian Call Surveys
- Preliminary Design
- Terrestrial Study Area
- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass
- Preliminary Design

Ecological Land Classifications

- CUM
- CUP
- CUT
- CUW
- FOD
- FOM
- MAM
- OAO
- SWM
- SWT

Highway 400 to Highway 404 Link (Bradford Bypass)

Ecological Land Classification and Survey Locations

Figure 2-3

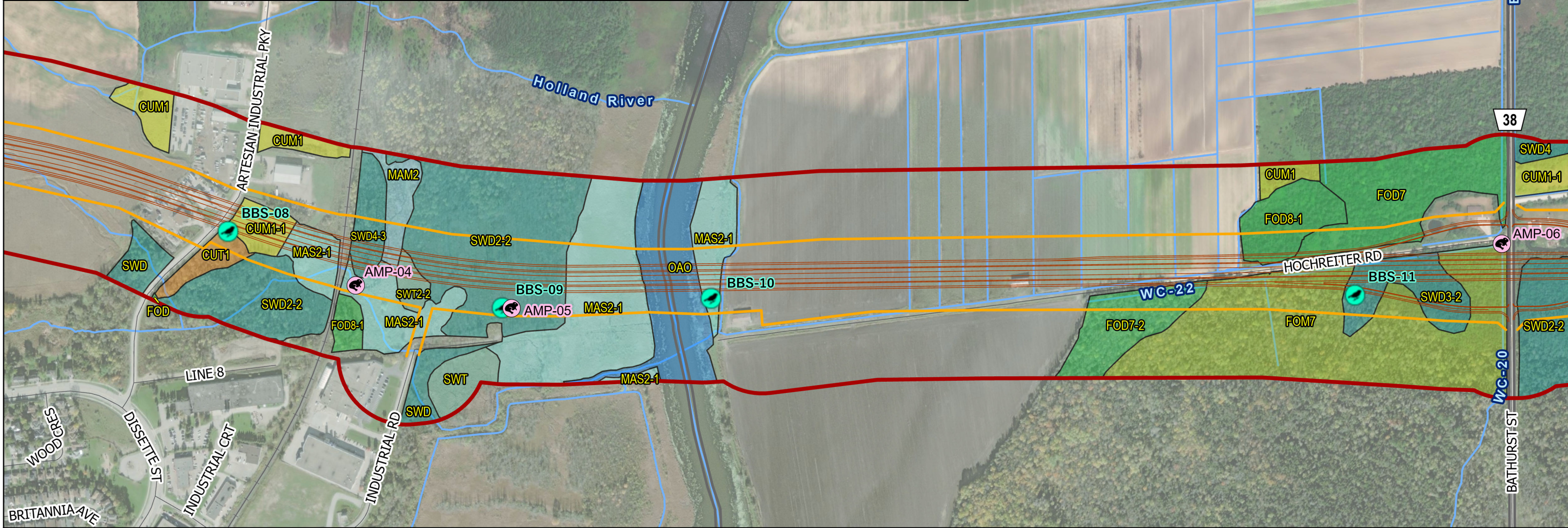
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ELC Code	ELC Description	ELC Code	ELC Description	ELC Code	ELC Description
CUM1-1	Dry - Fresh Old Field Cultural Meadow	FOD5-2	Dry - Fresh Sugar Maple - Beech Deciduous Forest	MAS2-1	Cattail Mineral Shallow Marsh
CUT1	Mineral Cultural Thicket	FOD5-6	Dry - Fresh Sugar Maple - Basswood Deciduous Forest	MAS3-1	Cattail Organic Shallow Marsh
CUT1-4	Grey Dogwood Cultural Thicket	FOD6-5	Fresh - Moist Sugar Maple Deciduous Forest	OAO	Open Aquatic
CUT1-5	Raspberry Cultural Thicket	FOD7	Fresh - Moist Lowland Deciduous Forest	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
CUP3	Coniferous Plantation	FOD7-1	Fresh - Moist White Elm Lowland Deciduous Forest	SWD2-2	Green Ash Mineral Deciduous Swamp
CUP3-1	Red Pine Coniferous Plantation	FOD7-2	Fresh - Moist Ash Lowland Deciduous Forest	SWD3-1	Maple Mineral Deciduous Swamp Ecosite
CUP3-2	White Pine Coniferous Plantation	FOD7-3	Fresh - Moist Willow Lowland Deciduous Forest	SWD3-2	Silver Maple Mineral Deciduous Swamp
CUP3-3	Scotch Pine Coniferous Plantation	FOD8-1	Fresh - Moist Poplar Deciduous Forest	SWD3-3	Swamp Maple Mineral Deciduous Swamp
CUW1	Mineral Cultural Woodland	FOM5-2	Dry - Fresh Poplar Mixed Forest	SWD4	Mineral Deciduous Swamp Ecosite
FOC4	Fresh - Moist White Cedar Coniferous Forest Ecosite	FOM6-1	Fresh - Moist Sugar Maple - Hemlock Mixed Forest	SWD4-3	White Birch - Poplar Mineral Deciduous Swamp
FOC4-1	Fresh - Moist White Cedar Coniferous Forest	FOM7	Fresh - Moist White Cedar - Hardwood Mixed Forest	SWD6-3	Swamp Maple Organic Deciduous Swamp
FOD2-3	Dry - Fresh Hickory Deciduous Forest	FOM7-2	Fresh - Moist White Cedar - Hardwood Mixed Forest	SWM3-1	Birch - Conifer Mineral Mixed Swamp
FOD3-1	Dry - Fresh Poplar Deciduous Forest	FOM8-1	Fresh - Moist Poplar Mixed Forest	SWT2-2	Willow Mineral Deciduous Thicket Swamp
FOD4	Dry - Fresh Upland Deciduous Forest Ecosite	MAM2	Mineral Meadow Marsh Ecosite	SWT2-9	Gray Dogwood Mineral Deciduous Thicket Swamp
FOD5-1	Dry - Fresh Sugar Maple Deciduous Forest	MAM2-2	Reed-canary Grass Mineral Meadow Marsh	SWT3-1	Organic Thicket Swamp Ecosite



LEGEND

- Municipality
- Watercourse
- Other Road
- Railway
- Breeding Bird Surveys
- Amphibian Call Surveys
- Preliminary Design
- Terrestrial Study Area
- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass
- Preliminary Design

Ecological Land Classifications

- CUM
- CUT
- FOD
- FOM
- MAM
- MAS
- OAO
- SWD
- SWT

**Highway 400 to Highway 404 Link
(Bradford Bypass)**

**Ecological Land Classification and
Survey Locations**

Figure 2-4

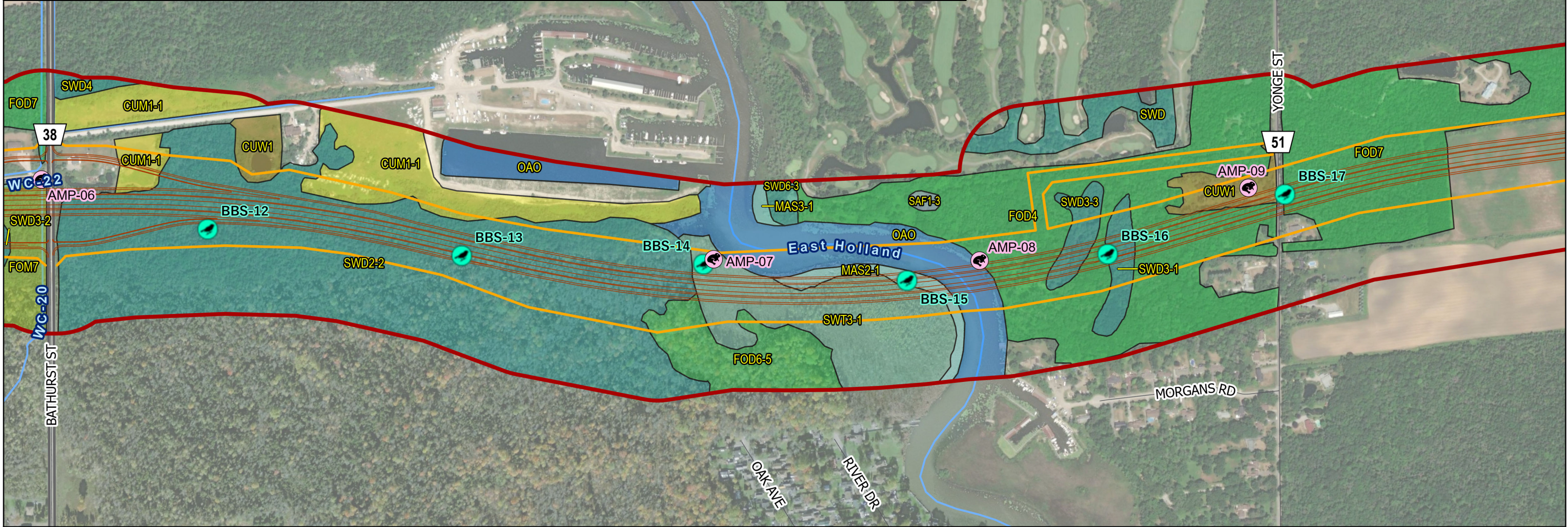
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CUT1	Mineral Cultural Thicket	FOD5-6	Dry - Fresh Sugar Maple - Basswood Deciduous Forest	MAS3-1	Cattail Organic Shallow Marsh
CUT1-4	Grey Dogwood Cultural Thicket	FOD6-5	Fresh - Moist Sugar Maple Deciduous Forest	OAO	Open Aquatic
CUT1-5	Raspberry Cultural Thicket	FOD7	Fresh - Moist Lowland Deciduous Forest	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
CUP3	Coniferous Plantation	FOD7-1	Fresh - Moist White Elm Lowland Deciduous Forest	SWD2-2	Green Ash Mineral Deciduous Swamp
CUP3-1	Red Pine Coniferous Plantation	FOD7-2	Fresh - Moist Ash Lowland Deciduous Forest	SWD3-1	Maple Mineral Deciduous Swamp Ecosite
CUP3-2	White Pine Coniferous Plantation	FOD7-3	Fresh - Moist Willow Lowland Deciduous Forest	SWD3-2	Silver Maple Mineral Deciduous Swamp
CUP3-3	Scotch Pine Coniferous Plantation	FOD8-1	Fresh - Moist Poplar Deciduous Forest	SWD3-3	Swamp Maple Mineral Deciduous Swamp
CUW1	Mineral Cultural Woodland	FOM5-2	Dry - Fresh Poplar Mixed Forest	SWD4	Mineral Deciduous Swamp Ecosite
FOC4	Fresh - Moist White Cedar Coniferous Forest Ecosite	FOM6-1	Fresh - Moist Sugar Maple - Hemlock Mixed Forest	SWD4-3	White Birch - Poplar Mineral Deciduous Swamp
FOC4-1	Fresh - Moist White Cedar Coniferous Forest	FOM7	Fresh - Moist White Cedar - Hardwood Mixed Forest	SWD6-3	Swamp Maple Organic Deciduous Swamp
FOD2-3	Dry - Fresh Hickory Deciduous Forest	FOM7-2	Fresh - Moist White Cedar - Hardwood Mixed Forest	SWM3-1	Birch - Conifer Mineral Mixed Swamp
FOD3-1	Dry - Fresh Poplar Deciduous Forest	FOM8-1	Fresh - Moist Poplar Mixed Forest	SWT2-2	Willow Mineral Deciduous Thicket Swamp
FOD4	Dry - Fresh Upland Deciduous Forest Ecosite	MAM2	Mineral Meadow Marsh Ecosite	SWT2-9	Gray Dogwood Mineral Deciduous Thicket Swamp
FOD5-1	Dry - Fresh Sugar Maple Deciduous Forest	MAM2-2	Reed-canary Grass Mineral Meadow Marsh	SWT3-1	Organic Thicket Swamp Ecosite



LEGEND

- Municipality
- Watercourse
- Other Road
- Breeding Bird Surveys
- Amphibian Call Surveys
- Preliminary Design
- Terrestrial Study Area
- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass
- Preliminary Design

Ecological Land Classifications

- CUM
- CUW
- FOD
- FOM
- MAS
- OAO
- SWD
- SWT
- SAF

0 50 100 200 300 Meters

Highway 400 to Highway 404 Link (Bradford Bypass)

Ecological Land Classification and Survey Locations

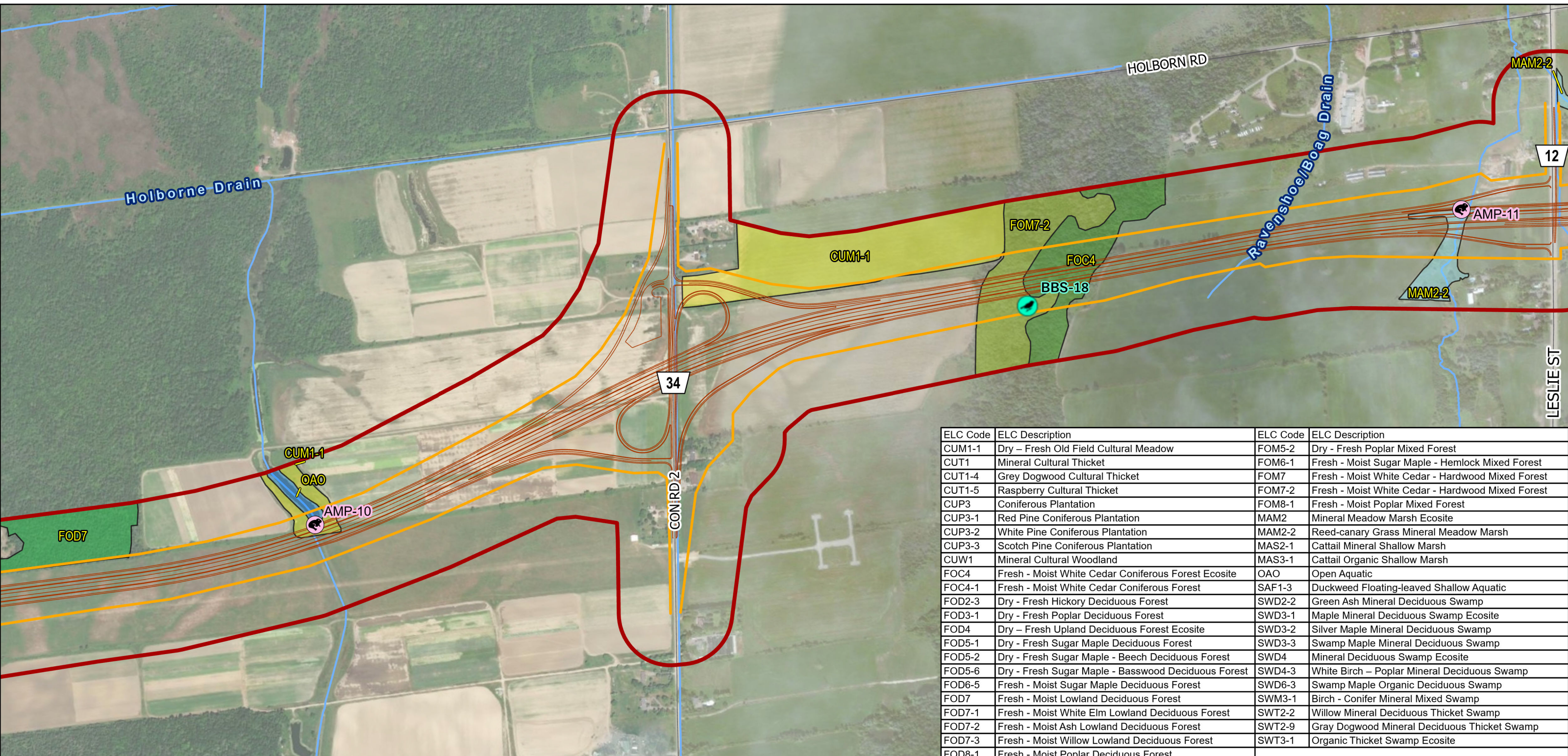
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Figure 2-5

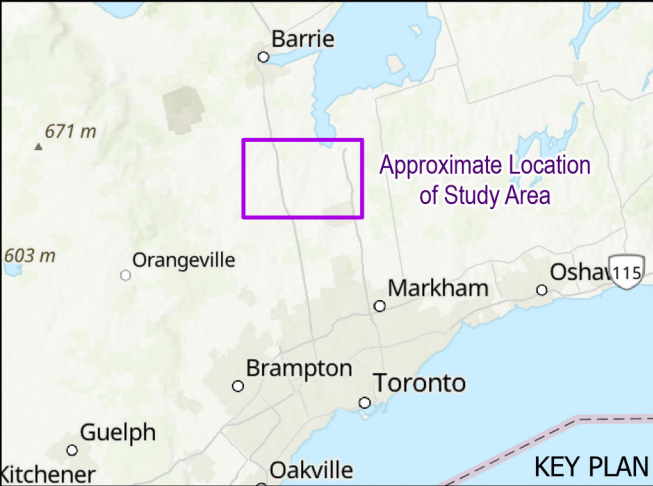
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CUT1-5	Raspberry Cultural Thicket	FOM7-2	Fresh - Moist White Cedar - Hardwood Mixed Forest
CUP3	Coniferous Plantation	FOM8-1	Fresh - Moist Poplar Mixed Forest
CUP3-1	Red Pine Coniferous Plantation	MAM2	Mineral Meadow Marsh Ecosite
CUP3-2	White Pine Coniferous Plantation	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
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FOD2-3	Dry - Fresh Hickory Deciduous Forest	SWD2-2	Green Ash Mineral Deciduous Swamp
FOD3-1	Dry - Fresh Poplar Deciduous Forest	SWD3-1	Maple Mineral Deciduous Swamp Ecosite
FOD4	Dry - Fresh Upland Deciduous Forest Ecosite	SWD3-2	Silver Maple Mineral Deciduous Swamp
FOD5-1	Dry - Fresh Sugar Maple Deciduous Forest	SWD3-3	Swamp Maple Mineral Deciduous Swamp
FOD5-2	Dry - Fresh Sugar Maple - Beech Deciduous Forest	SWD4	Mineral Deciduous Swamp Ecosite
FOD5-6	Dry - Fresh Sugar Maple - Basswood Deciduous Forest	SWD4-3	White Birch - Poplar Mineral Deciduous Swamp
FOD6-5	Fresh - Moist Sugar Maple Deciduous Forest	SWD6-3	Swamp Maple Organic Deciduous Swamp
FOD7	Fresh - Moist Lowland Deciduous Forest	SWM3-1	Birch - Conifer Mineral Mixed Swamp
FOD7-1	Fresh - Moist White Elm Lowland Deciduous Forest	SWT2-2	Willow Mineral Deciduous Thicket Swamp
FOD7-2	Fresh - Moist Ash Lowland Deciduous Forest	SWT2-9	Gray Dogwood Mineral Deciduous Thicket Swamp
FOD7-3	Fresh - Moist Willow Lowland Deciduous Forest	SWT3-1	Organic Thicket Swamp Ecosite
FOD8-1	Fresh - Moist Poplar Deciduous Forest		



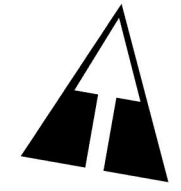
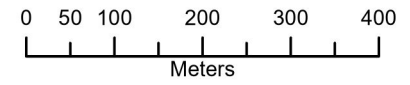
LEGEND

- Municipality
- Watercourse
- Other Road
- Breeding Bird Surveys
- Amphibian Call Surveys
- Preliminary Design
- Terrestrial Study Area

Bradford Bypass - MTO
 Right-Of-Way
 Bradford Bypass
 Preliminary Design

Ecological Land Classifications

- CUM
- FOC
- FOD
- FOM
- MAM
- OAO



**Highway 400 to Highway 404 Link
(Bradford Bypass)**

Ecological Land Classification and
Survey Locations

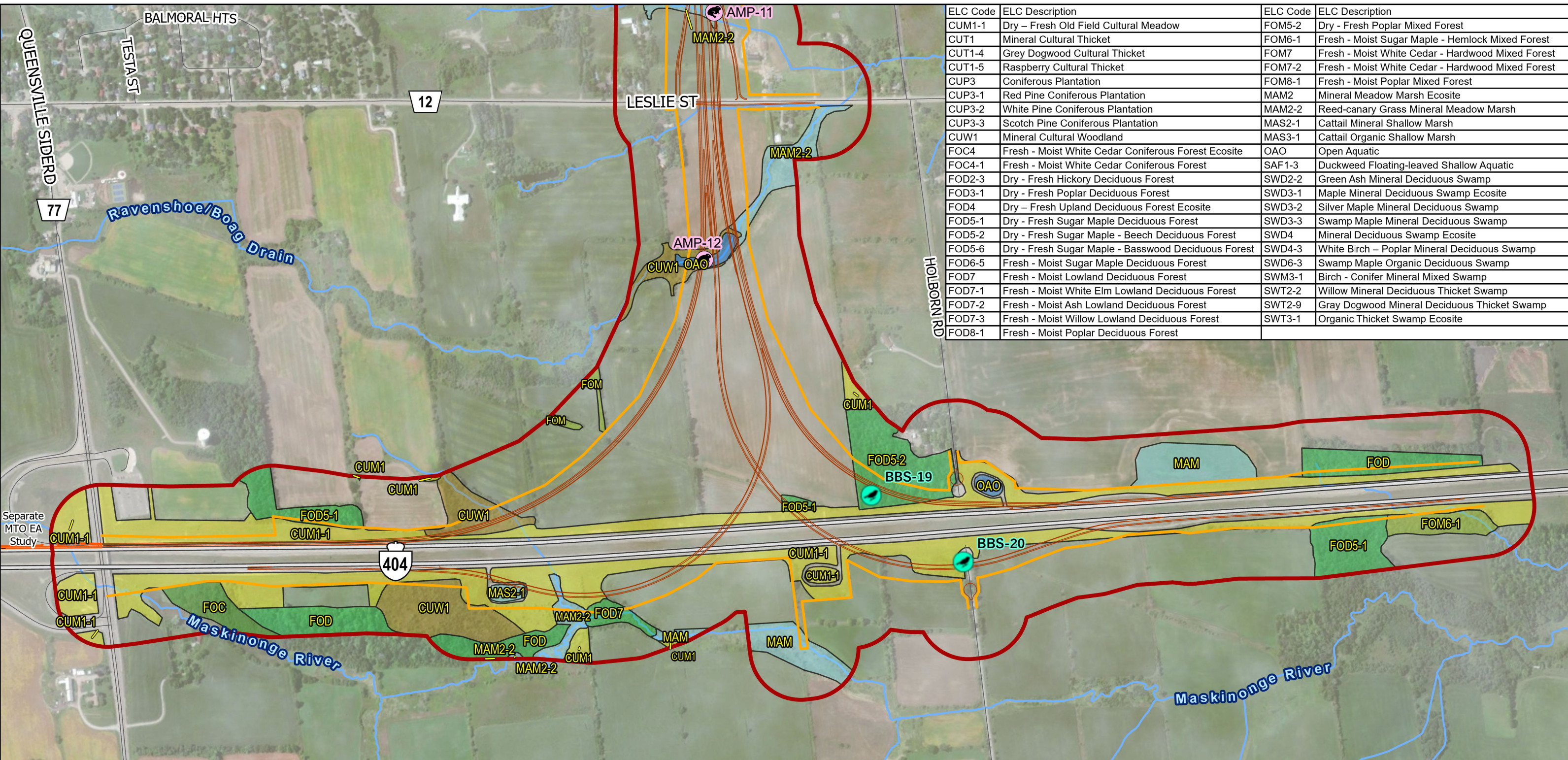
Datum: NAD 1983 UTM Zone 17N
 Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury.
 Scale: 1:8,590

Figure 2-6

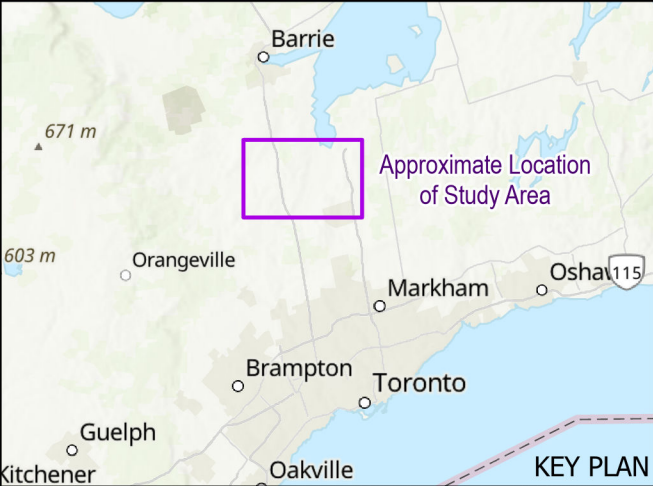
January 2023

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ELC Code	ELC Description	ELC Code	ELC Description
CUM1-1	Dry - Fresh Old Field Cultural Meadow	FOM5-2	Dry - Fresh Poplar Mixed Forest
CUT1	Mineral Cultural Thicket	FOM6-1	Fresh - Moist Sugar Maple - Hemlock Mixed Forest
CUT1-4	Grey Dogwood Cultural Thicket	FOM7	Fresh - Moist White Cedar - Hardwood Mixed Forest
CUT1-5	Raspberry Cultural Thicket	FOM7-2	Fresh - Moist White Cedar - Hardwood Mixed Forest
CUP3	Coniferous Plantation	FOM8-1	Fresh - Moist Poplar Mixed Forest
CUP3-1	Red Pine Coniferous Plantation	MAM2	Mineral Meadow Marsh Ecosite
CUP3-2	White Pine Coniferous Plantation	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
CUP3-3	Scotch Pine Coniferous Plantation	MAS2-1	Cattail Mineral Shallow Marsh
CUW1	Mineral Cultural Woodland	MAS3-1	Cattail Organic Shallow Marsh
FOC4	Fresh - Moist White Cedar Coniferous Forest Ecosite	OAO	Open Aquatic
FOC4-1	Fresh - Moist White Cedar Coniferous Forest	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
FOD2-3	Dry - Fresh Hickory Deciduous Forest	SWD2-2	Green Ash Mineral Deciduous Swamp
FOD3-1	Dry - Fresh Poplar Deciduous Forest	SWD3-1	Maple Mineral Deciduous Swamp Ecosite
FOD4	Dry - Fresh Upland Deciduous Forest Ecosite	SWD3-2	Silver Maple Mineral Deciduous Swamp
FOD5-1	Dry - Fresh Sugar Maple Deciduous Forest	SWD3-3	Swamp Maple Mineral Deciduous Swamp
FOD5-2	Dry - Fresh Sugar Maple - Beech Deciduous Forest	SWD4	Mineral Deciduous Swamp Ecosite
FOD5-6	Dry - Fresh Sugar Maple - Basswood Deciduous Forest	SWD4-3	White Birch - Poplar Mineral Deciduous Swamp
FOD6-5	Fresh - Moist Sugar Maple Deciduous Forest	SWD6-3	Swamp Maple Organic Deciduous Swamp
FOD7	Fresh - Moist Lowland Deciduous Forest	SWM3-1	Birch - Conifer Mineral Mixed Swamp
FOD7-1	Fresh - Moist White Elm Lowland Deciduous Forest	SWT2-2	Willow Mineral Deciduous Thicket Swamp
FOD7-2	Fresh - Moist Ash Lowland Deciduous Forest	SWT2-9	Gray Dogwood Mineral Deciduous Thicket Swamp
FOD7-3	Fresh - Moist Willow Lowland Deciduous Forest	SWT3-1	Organic Thicket Swamp Ecosite
FOD8-1	Fresh - Moist Poplar Deciduous Forest		



LEGEND

- Municipality
- Watercourse
- Provincial Highway
- Other Road
- Breeding Bird Surveys
- Amphibian Call Surveys
- Preliminary Design
- Terrestrial Study Area
- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass
- Preliminary Design
- Separate MTO EA Study

Ecological Land Classifications

- CUM
- CUW
- FOC
- FOD
- FOM
- MAM
- MAS
- OAO

Highway 400 to Highway 404 Link (Bradford Bypass)

Ecological Land Classification and Survey Locations

Datum: NAD 1983 UTM Zone 17N
 Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury.
 Scale: 1:8,800

Figure 2-7

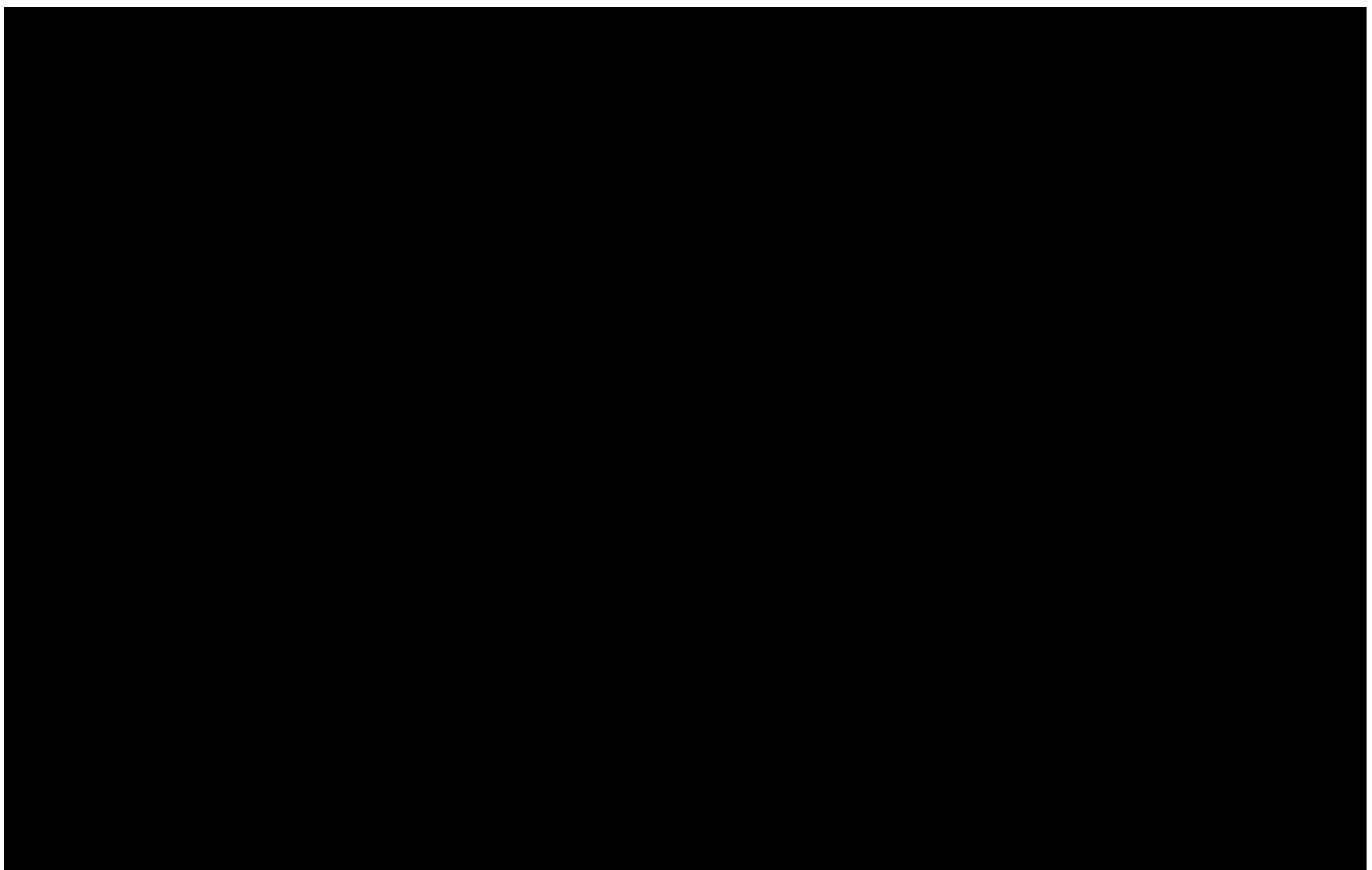
January 2023

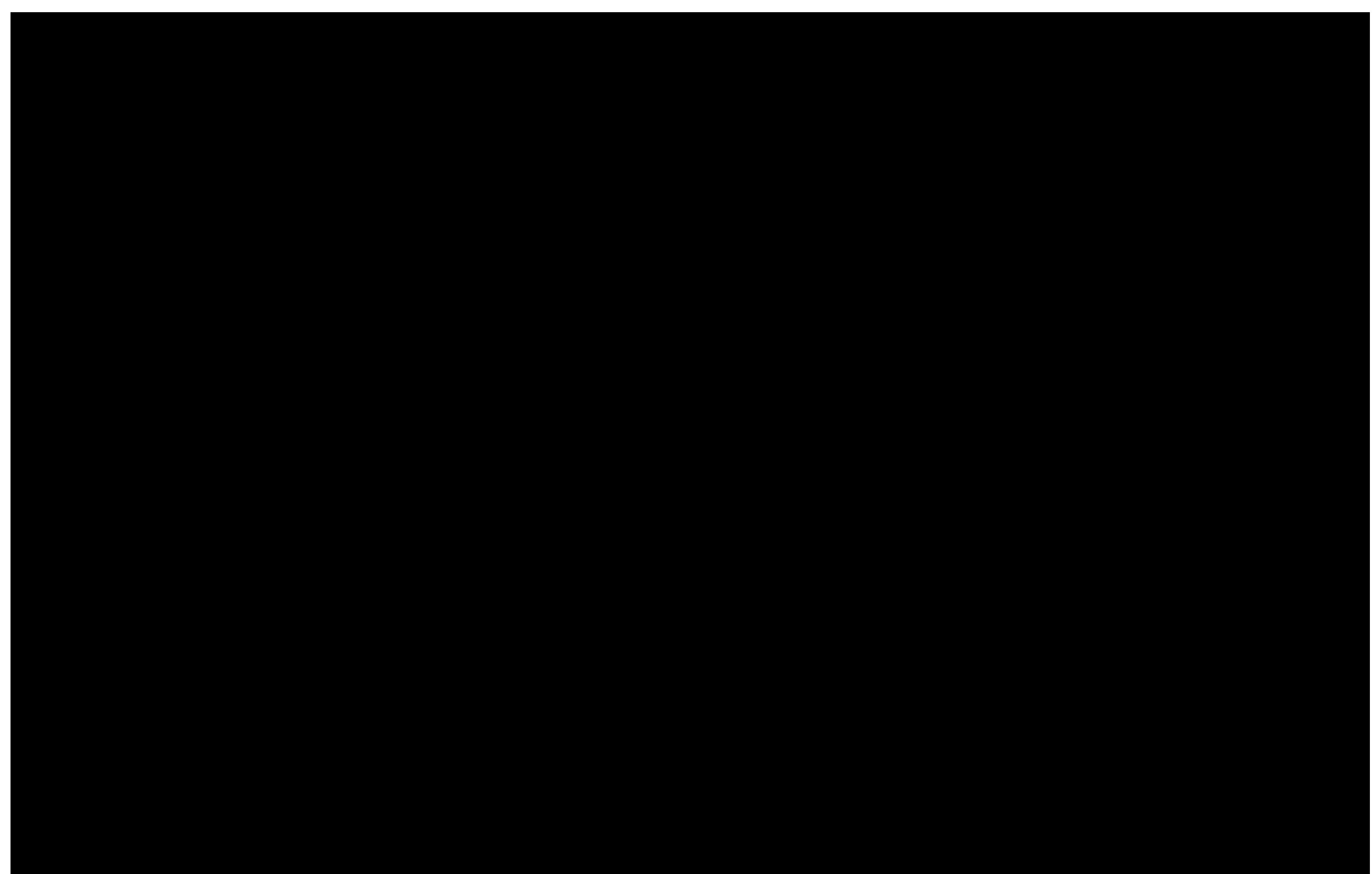
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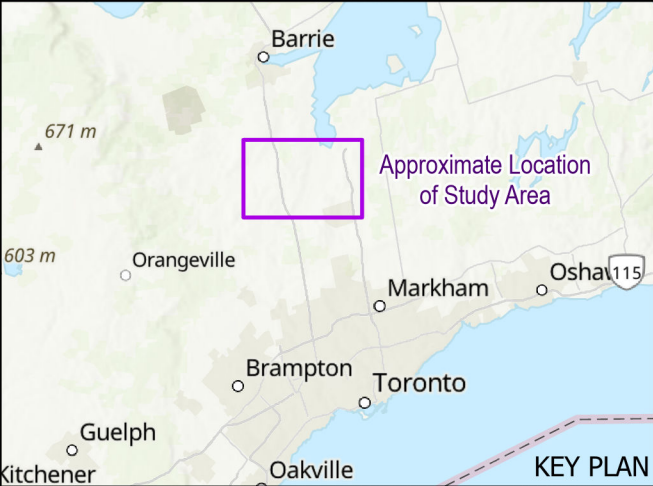
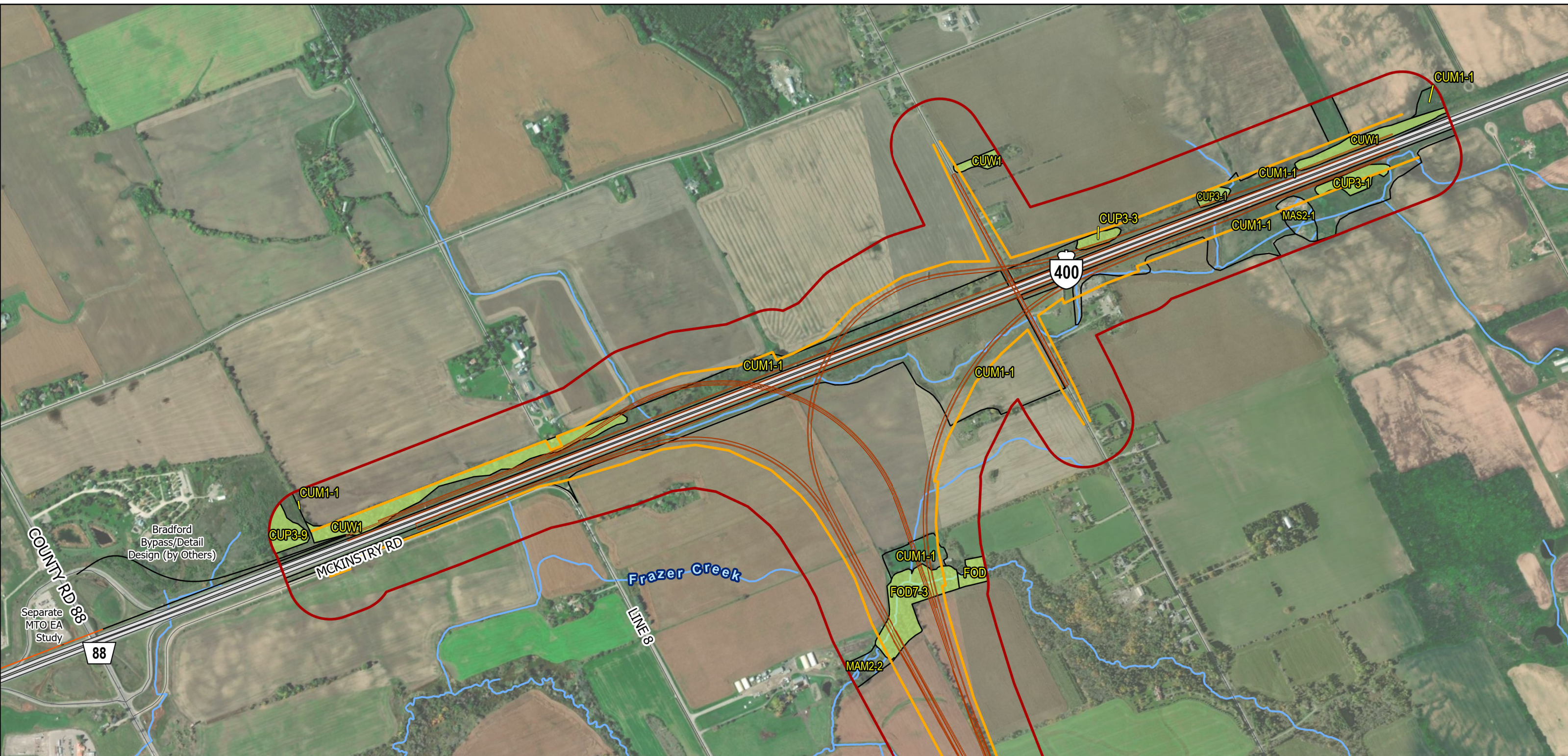










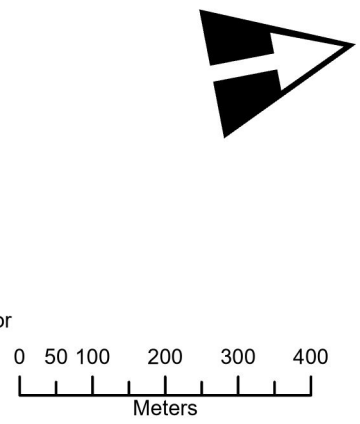


- LEGEND**
- Bradford Bypass - MTO Right-Of-Way
 - Bradford Bypass Preliminary Design
 - Bradford Bypass/Detail Design (by Others)
 - Separate MTO EA Study
 - Preliminary Design Terrestrial Study Area
 - Ecological Land Classification
 - Municipality
 - ~ Watercourse
 - Provincial Highway
 - Other Road

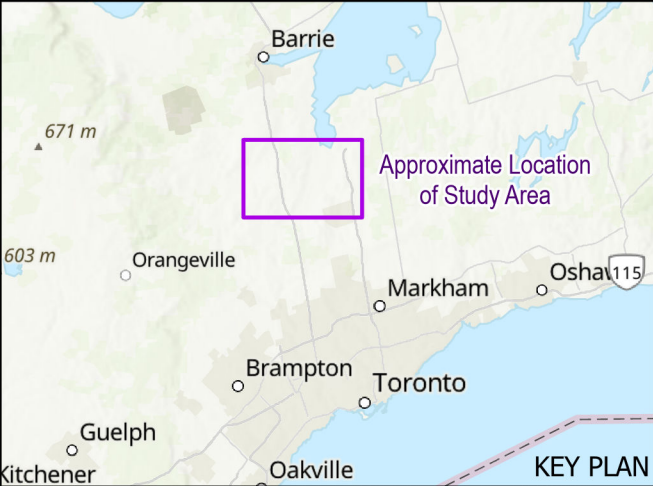
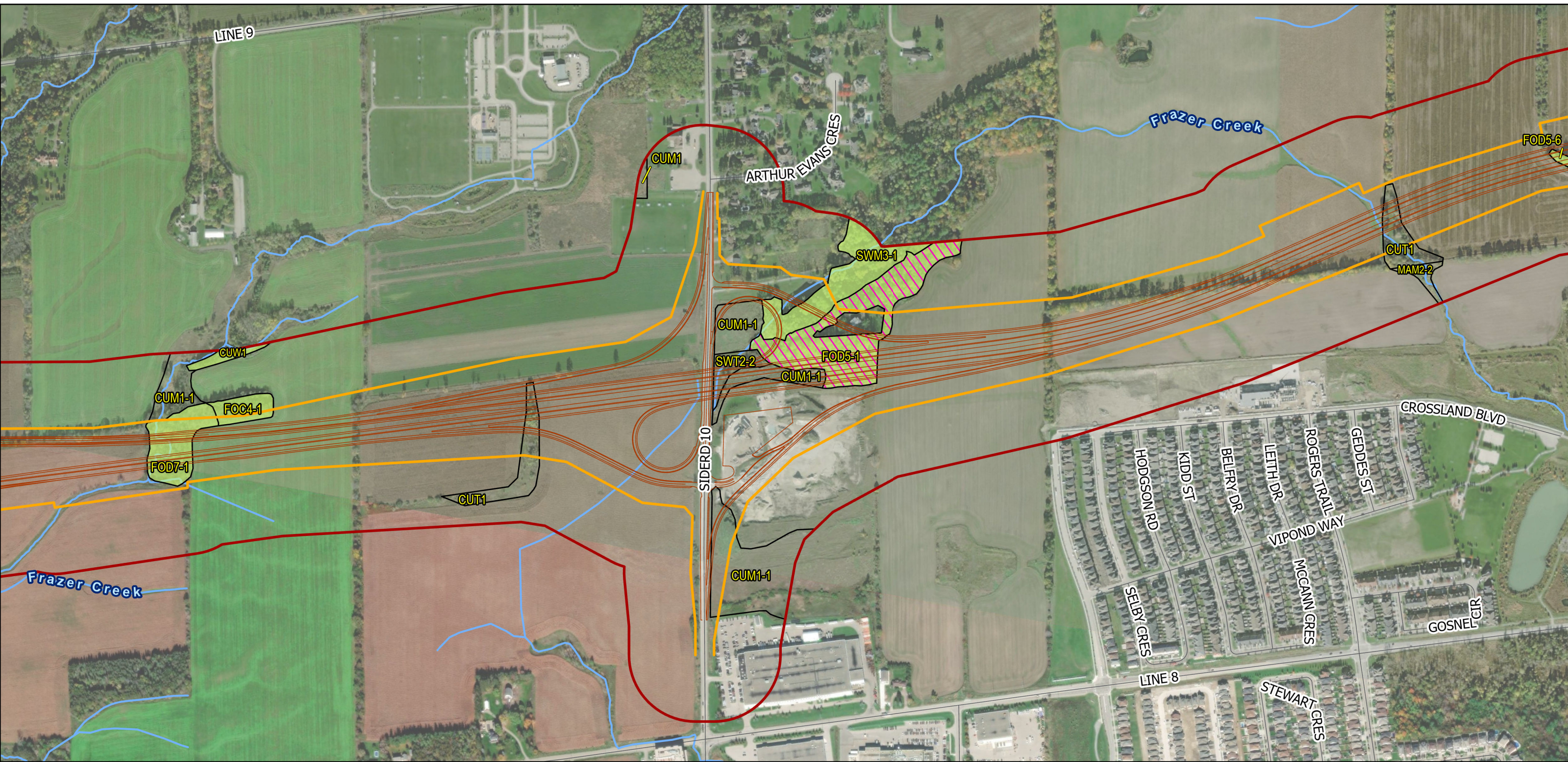
- CANDIDATE HABITAT**
- Terrestrial Crayfish Habitat
 - Bat Maternity Colonies

Note:

1. Agricultural fields within the Study Area are considered candidate Significant Wildlife Habitat for Waterfowl Stopover and Staging Areas (Terrestrial).
2. Wetland habitat targeted for amphibian call surveys presents candidate habitat for western chorus frog (Stations shown on **Figure 2-1 to Figure 2-7**)
3. Candidate Monarch habitat is present where Milkweed exists within the Study Area. Areas of confirmed Monarch habitat are displayed on **Figure 4b-1 to Figure 4b-7**.



Highway 400 to Highway 404 Link (Bradford Bypass)	
Significant Wildlife Habitat (SWH) Candidate	Figure 4a-1
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:10,400	
January 2023	
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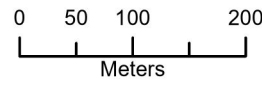
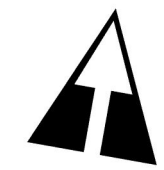


- LEGEND**
- Bradford Bypass - MTO Right-Of-Way
 - Bradford Bypass Preliminary Design
 - Preliminary Design Terrestrial Study Area
 - Ecological Land Classification
 - Municipality
 - ~ Watercourse
 - Other Road

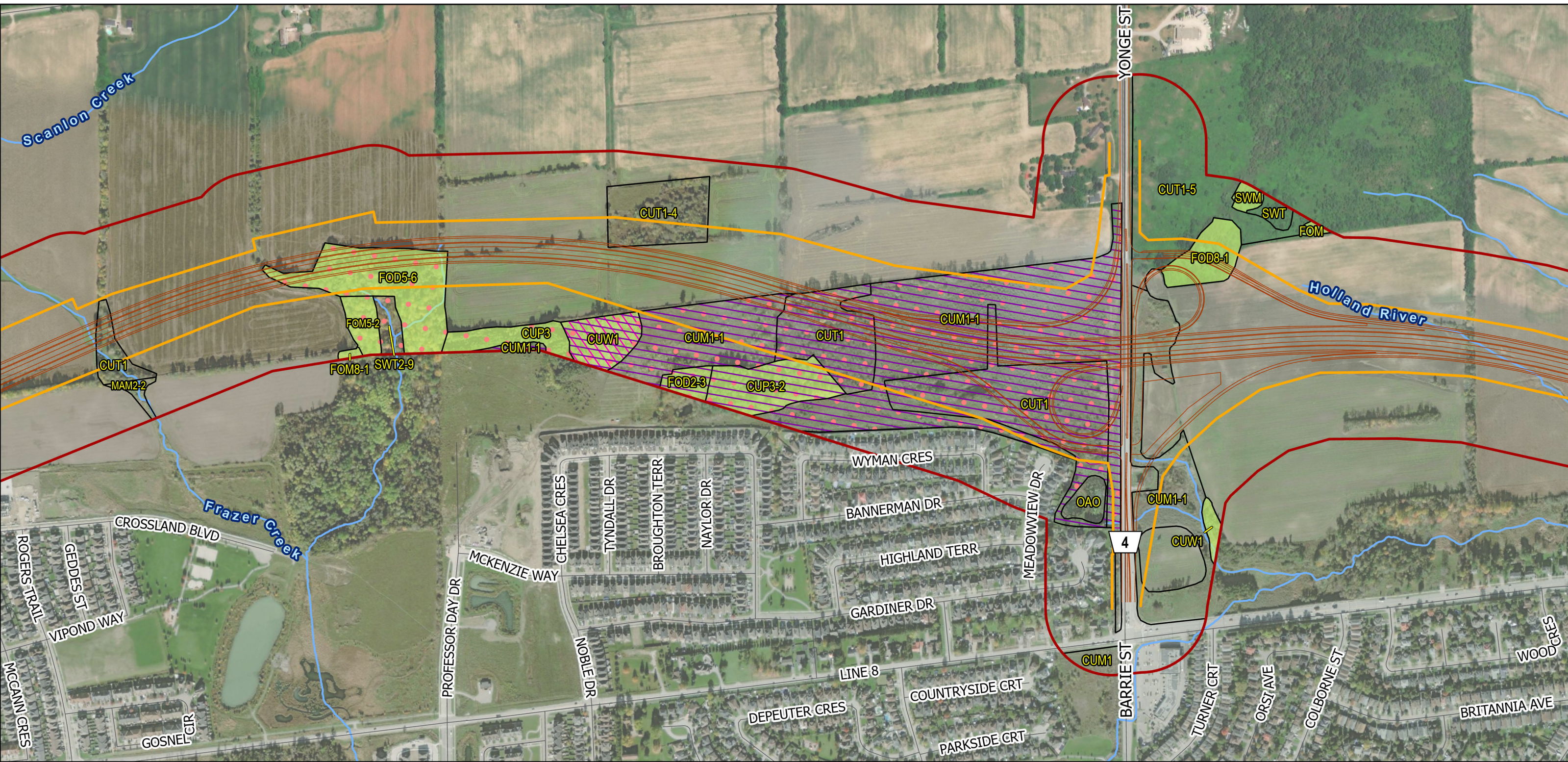
- CANDIDATE HABITAT**
- Raptor Wintering Area
 - Reptile Hibernaculum
 - Bat Maternity Colonies

Note:

1. Agricultural fields within the Study Area are considered candidate Significant Wildlife Habitat for Waterfowl Stopover and Staging Areas (Terrestrial).
2. Wetland habitat targeted for amphibian call surveys presents candidate habitat for western chorus frog (Stations shown on **Figure 2-1 to Figure 2-7**)
3. Candidate Monarch habitat is present where Milkweed exists within the Study Area. Areas of confirmed Monarch habitat are displayed on **Figure 4b-1 to Figure 4b-7**.



Highway 400 to Highway 404 Link (Bradford Bypass)	
Significant Wildlife Habitat (SWH) Candidate	Figure 4a-2
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:6,700	
January 2023	
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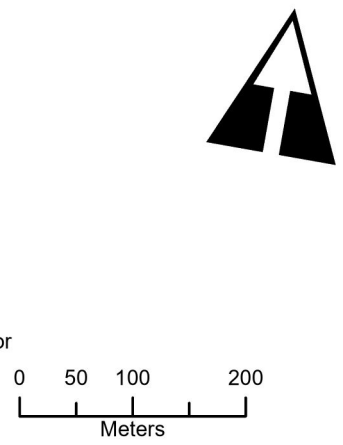


- LEGEND**
- Bradford Bypass - MTO Right-Of-Way
 - Bradford Bypass Preliminary Design
 - Preliminary Design Terrestrial Study Area
 - Ecological Land Classification
 - Municipality
 - ~ Watercourse
 - Other Road

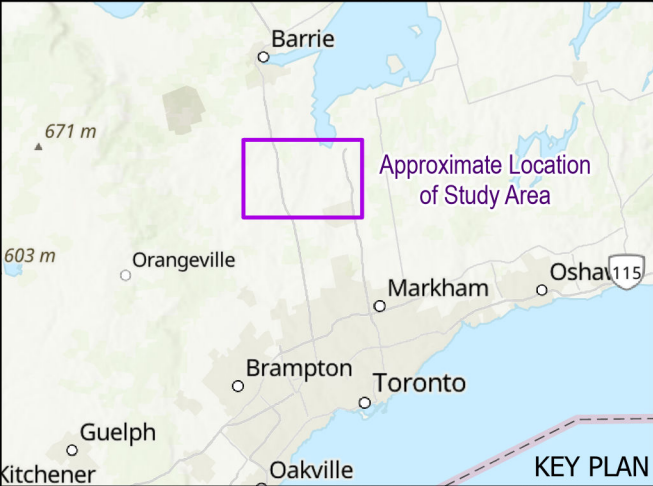
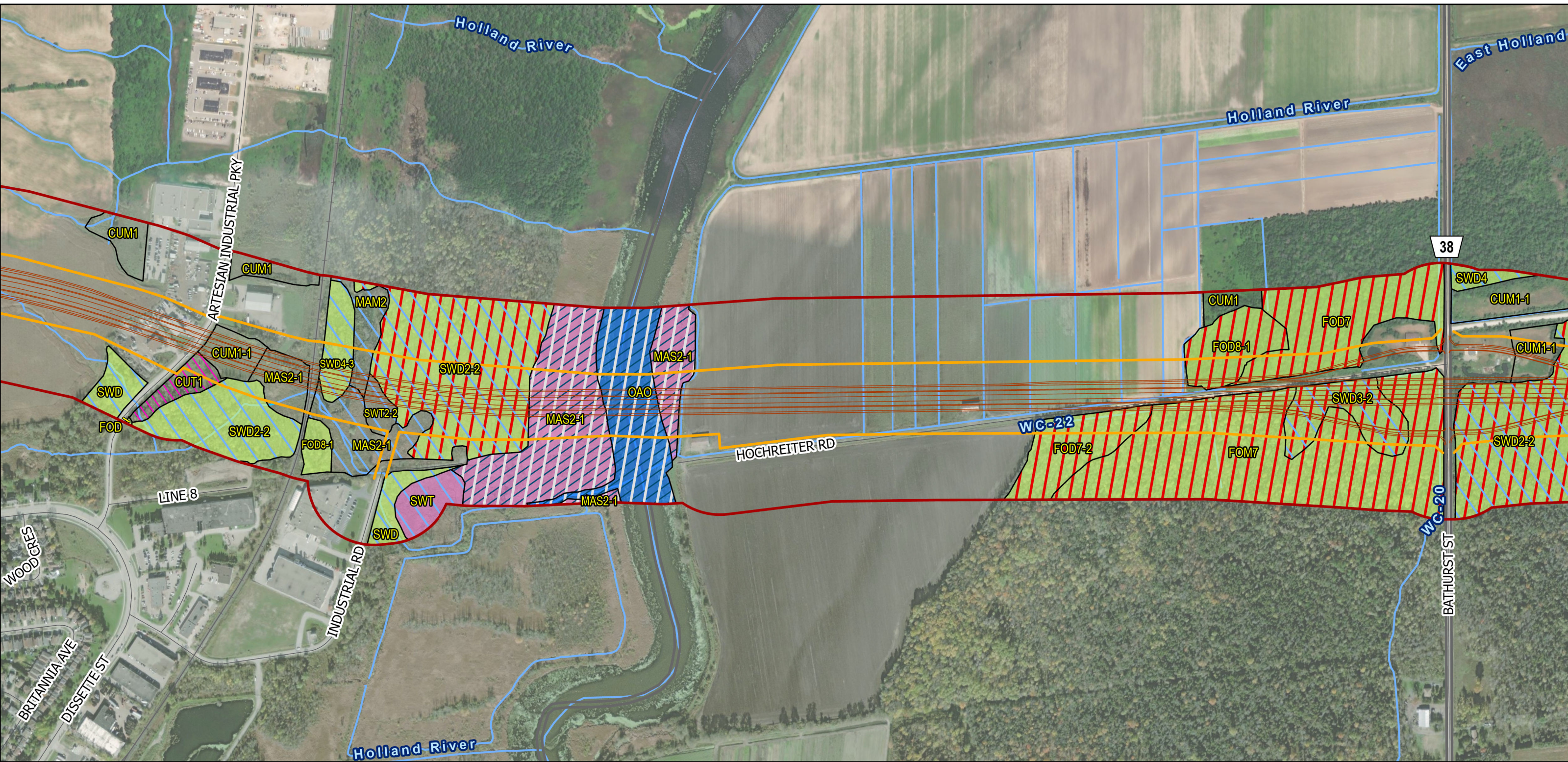
- CANDIDATE HABITAT**
- Common Nighthawk Habitat (SC)
 - Reptile Hibernaculum
 - Bat Maternity Colonies
 - Raptor Wintering Area

Note:

1. Agricultural fields within the Study Area are considered candidate Significant Wildlife Habitat for Waterfowl Stopover and Staging Areas (Terrestrial).
2. Wetland habitat targeted for amphibian call surveys presents candidate habitat for western chorus frog (Stations shown on **Figure 2-1 to Figure 2-7**)
3. Candidate Monarch habitat is present where Milkweed exists within the Study Area. Areas of confirmed Monarch habitat are displayed on **Figure 4b-1 to Figure 4b-7**.



Highway 400 to Highway 404 Link (Bradford Bypass)	
Significant Wildlife Habitat (SWH) Candidate	Figure 4a-3
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:6,700	
AECOM	
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LEGEND

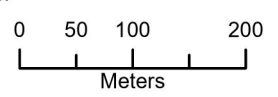
- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Preliminary Design Terrestrial Study Area
- Ecological Land Classification
- Municipality
- Watercourse
- Other Road
- Railway

CANDIDATE HABITAT

- Terrestrial Crayfish Habitat
- Woodland Raptor Nesting Habitat
- Turtle Wintering Area
- Snapping Turtle (SC)
- Reptile Hibernaculum
- Northern Map Turtle (SC)
- Waterfowl Stopover & Staging Areas (Aquatic)
- Bat Maternity Colonies

Note:

1. Agricultural fields within the Study Area are considered candidate Significant Wildlife Habitat for Waterfowl Stopover and Staging Areas (Terrestrial).
2. Wetland habitat targeted for amphibian call surveys presents candidate habitat for western chorus frog (Stations shown on **Figure 2-1 to Figure 2-7**)
3. Candidate Monarch habitat is present where Milkweed exists within the Study Area. Areas of confirmed Monarch habitat are displayed on **Figure 4b-1 to Figure 4b-7**.



**Highway 400 to Highway 404 Link
(Bradford Bypass)**

Significant Wildlife Habitat (SWH)
Candidate

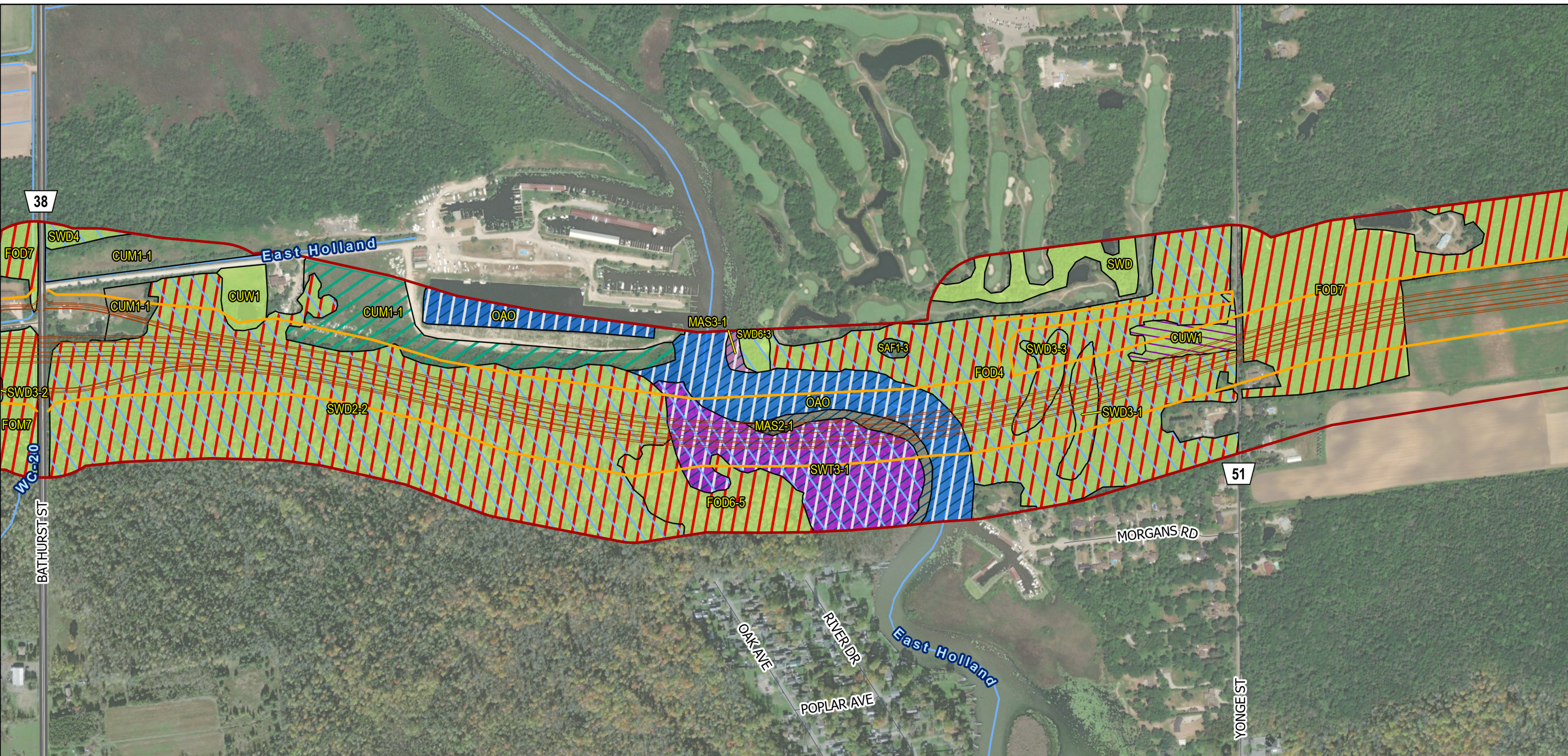
Figure 4a-4

Datum: NAD 1983 UTM Zone 17N
Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury.
Scale: 1:6,700

January 2023



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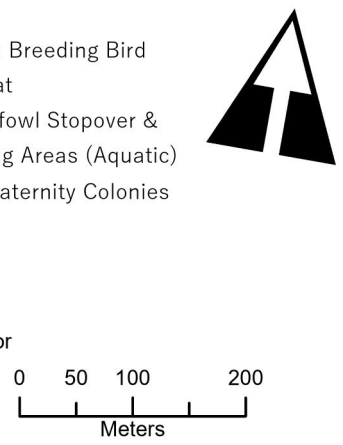


- LEGEND**
- Bradford Bypass - MTO Right-Of-Way
 - Bradford Bypass Preliminary Design
 - Preliminary Design Terrestrial Study Area
 - Ecological Land Classification
 - Municipality
 - Watercourse
 - Other Road

- CANDIDATE HABITAT**
- Common Nighthawk Habitat (SC)
 - Terrestrial Crayfish Habitat
 - Woodland Raptor Nesting Habitat
 - Turtle Nesting Area
 - Turtle Wintering Area
 - Snapping Turtle (SC)
 - Northern Map Turtle (SC)
 - Marsh Breeding Bird Habitat
 - Waterfowl Stopover & Staging Areas (Aquatic)
 - Bat Maternity Colonies

Note:

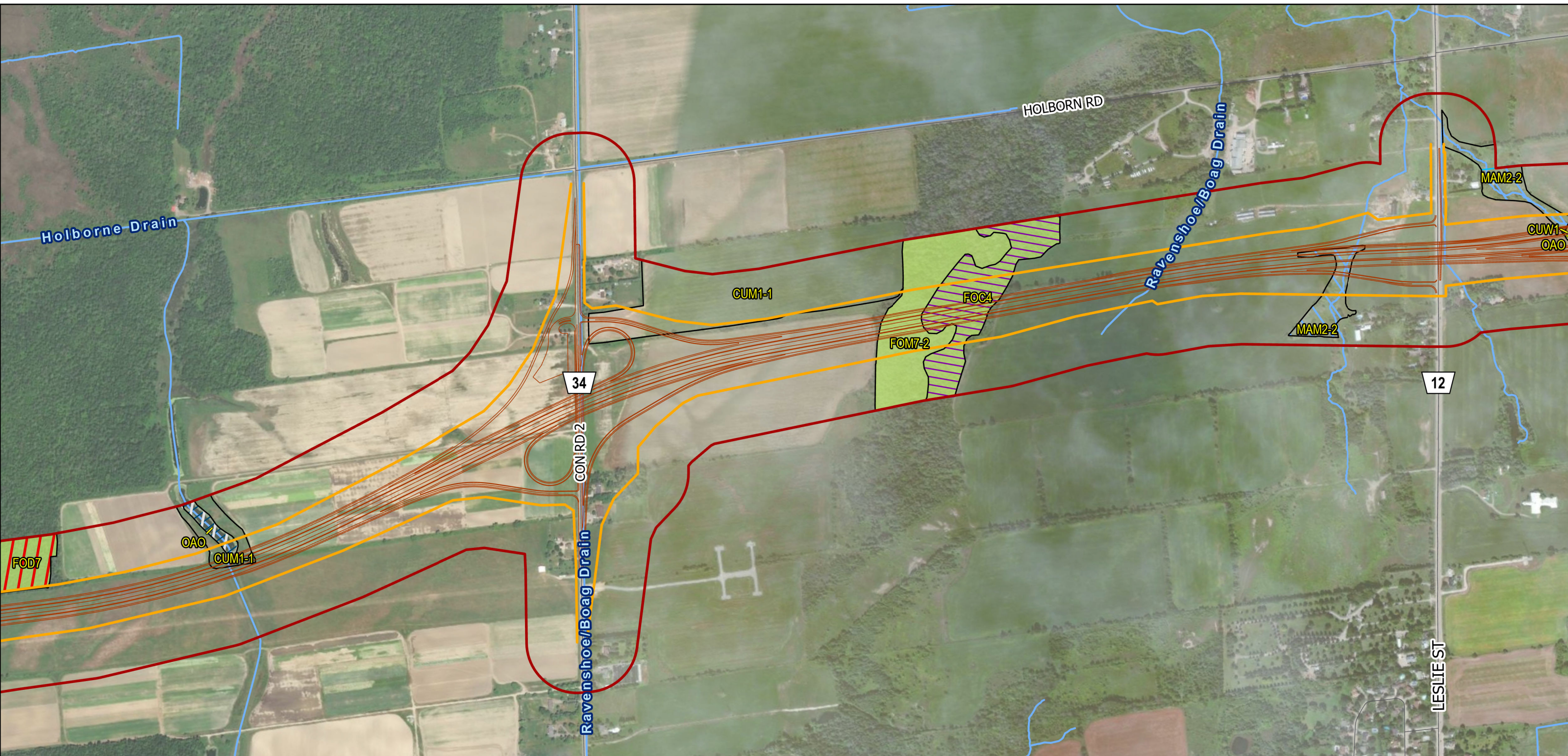
1. Agricultural fields within the Study Area are considered candidate Significant Wildlife Habitat for Waterfowl Stopover and Staging Areas (Terrestrial).
2. Wetland habitat targeted for amphibian call surveys presents candidate habitat for western chorus frog (Stations shown on **Figure 2-1 to Figure 2-7**)
3. Candidate Monarch habitat is present where Milkweed exists within the Study Area. Areas of confirmed Monarch habitat are displayed on **Figure 4b-1 to Figure 4b-7**.



**Highway 400 to Highway 404 Link
(Bradford Bypass)**

Significant Wildlife Habitat (SWH) Candidate	Figure 4a-5
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:6,700	
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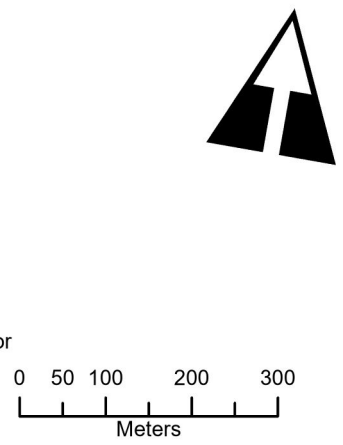


- LEGEND**
- Bradford Bypass - MTO Right-Of-Way
 - Bradford Bypass Preliminary Design
 - Preliminary Design Terrestrial Study Area
 - Ecological Land Classification
 - Municipality
 - ~ Watercourse
 - Other Road

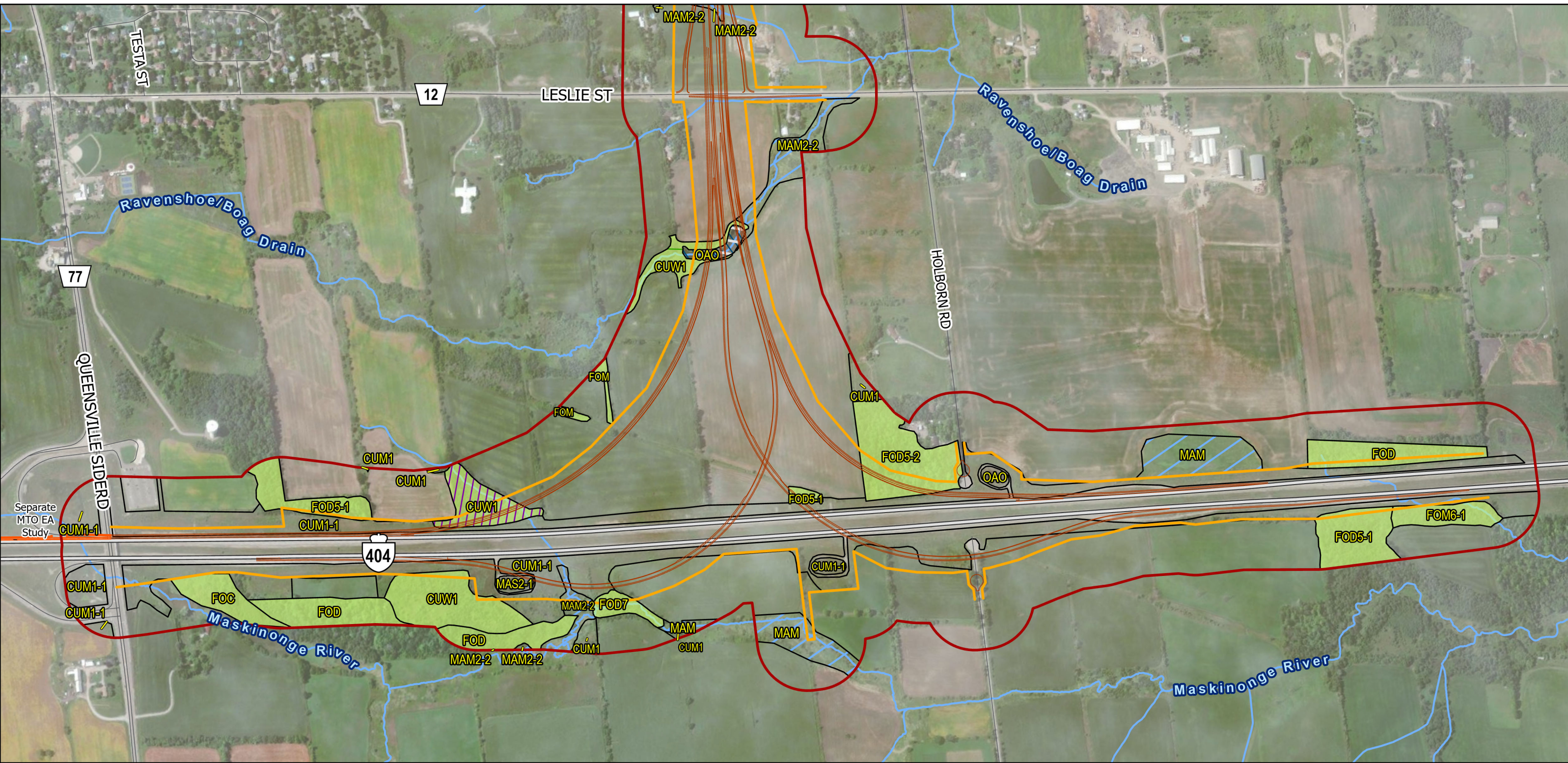
- CANDIDATE HABITAT**
- Common Nighthawk Habitat (SC)
 - Terrestrial Crayfish Habitat
 - Woodland Raptor Nesting Habitat
 - Turtle Wintering Area
 - Snapping Turtle (SC)
 - Bat Maternity Colonies

Note:

1. Agricultural fields within the Study Area are considered candidate Significant Wildlife Habitat for Waterfowl Stopover and Staging Areas (Terrestrial).
2. Wetland habitat targeted for amphibian call surveys presents candidate habitat for western chorus frog (Stations shown on **Figure 2-1 to Figure 2-7**)
3. Candidate Monarch habitat is present where Milkweed exists within the Study Area. Areas of confirmed Monarch habitat are displayed on **Figure 4b-1 to Figure 4b-7**.



Highway 400 to Highway 404 Link (Bradford Bypass)	
Significant Wildlife Habitat (SWH) Candidate	Figure 4a-6
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:8,800	
January 2023	
AECOM	
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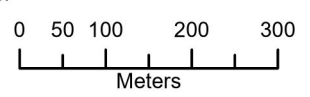
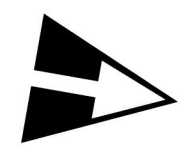


- LEGEND**
- Bradford Bypass - MTO Right-Of-Way
 - Bradford Bypass Preliminary Design
 - Separate MTO EA Study
 - Preliminary Design Terrestrial Study Area
 - Ecological Land Classification
 - Municipality
 - ~ Watercourse
 - Provincial Highway
 - Other Road

- CANDIDATE HABITAT**
- Common Nighthawk Habitat (SC)
 - Terrestrial Crayfish Habitat
 - Turtle Wintering Area
 - Snapping Turtle (SC)
 - Bat Maternity Colonies

Note:

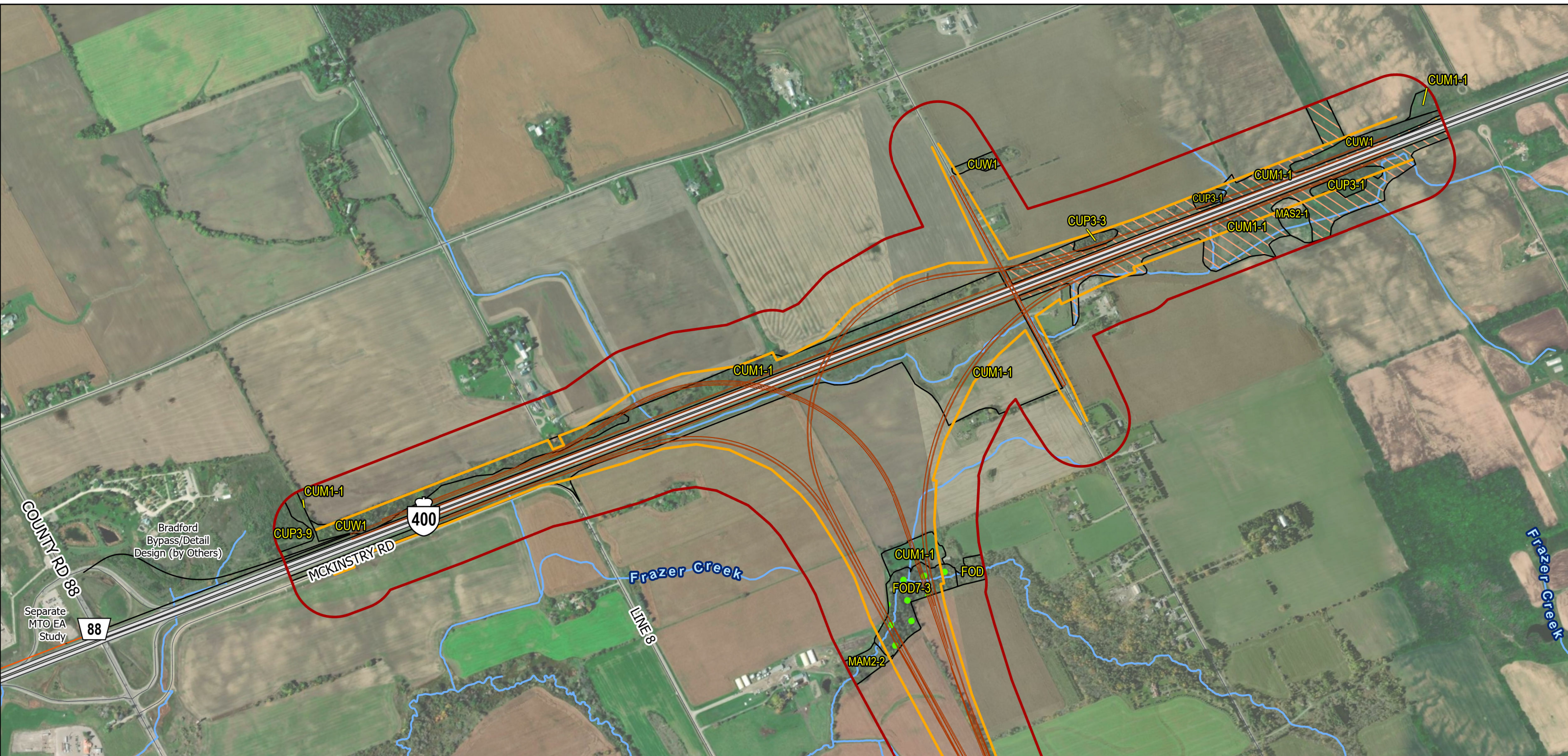
1. Agricultural fields within the Study Area are considered candidate Significant Wildlife Habitat for Waterfowl Stopover and Staging Areas (Terrestrial).
2. Wetland habitat targeted for amphibian call surveys presents candidate habitat for western chorus frog (Stations shown on **Figure 2-1 to Figure 2-7**)
3. Candidate Monarch habitat is present where Milkweed exists within the Study Area. Areas of confirmed Monarch habitat are displayed on **Figure 4b-1 to Figure 4b-7**.



**Highway 400 to Highway 404 Link
(Bradford Bypass)**

Significant Wildlife Habitat (SWH) Candidate	Figure 4a-7
Datum: NAD 1983 UTM Zone 17N	
Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury.	
Scale: 1:8,800	
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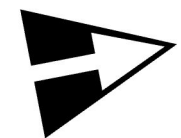


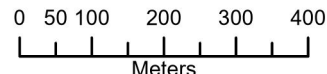
LEGEND

- Preliminary Design Terrestrial Study Area
- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Bradford Bypass/Detail Design (by Others)
- Separate MTO EA Study
- Ecological Land Classification
- Municipality
- ~ Watercourse
- Provincial Highway
- Other Road

CONFIRMED HABITAT

- Eastern Wood-pewee (SC)
- Monarch (SC)

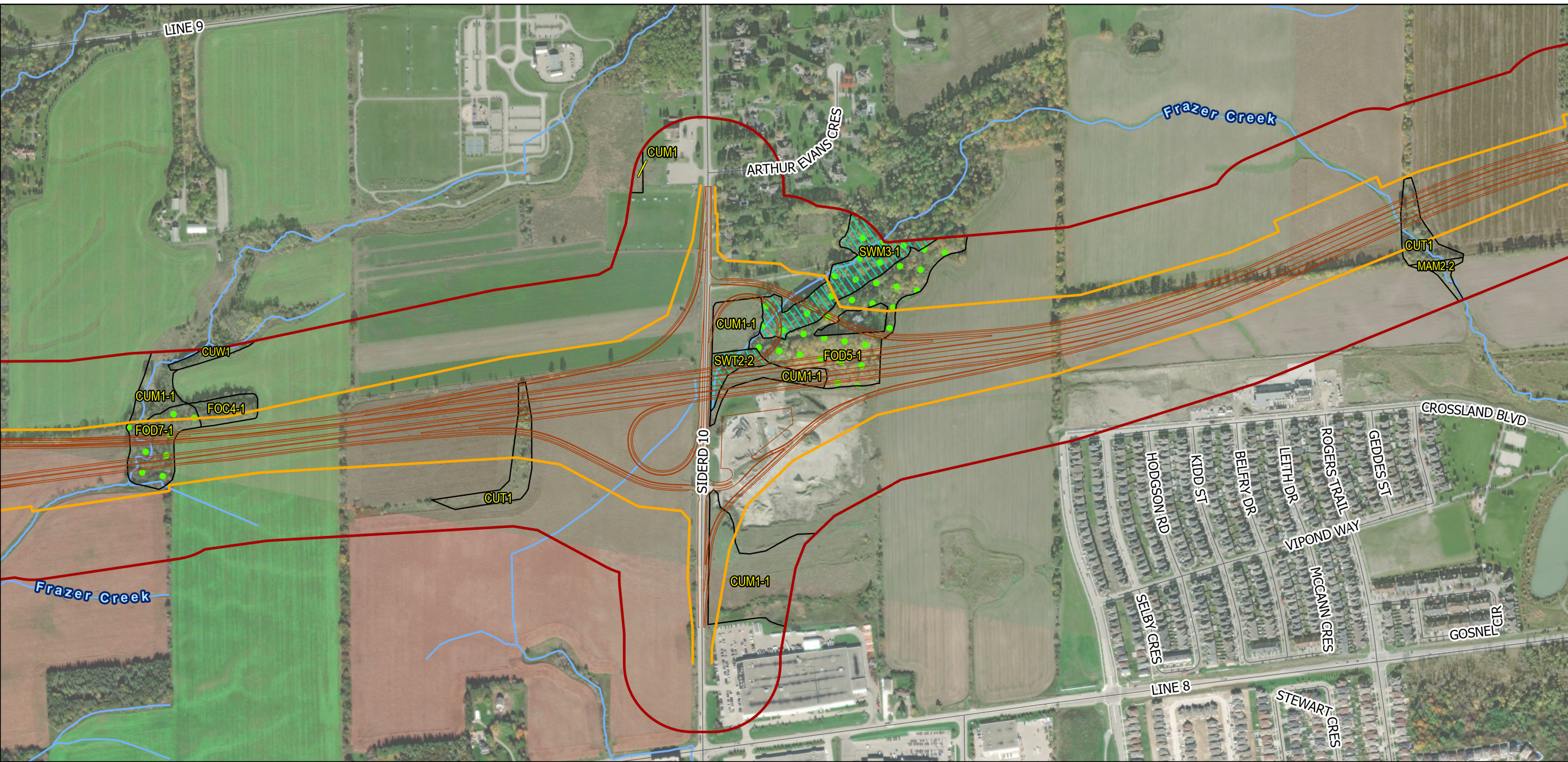




**Highway 400 to Highway 404 Link
(Bradford Bypass)**

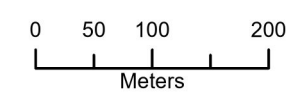
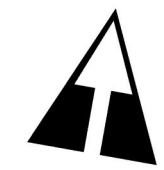
Significant Wildlife Habitat (SWH) Confirmed	Figure 4b-1
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:10,500	
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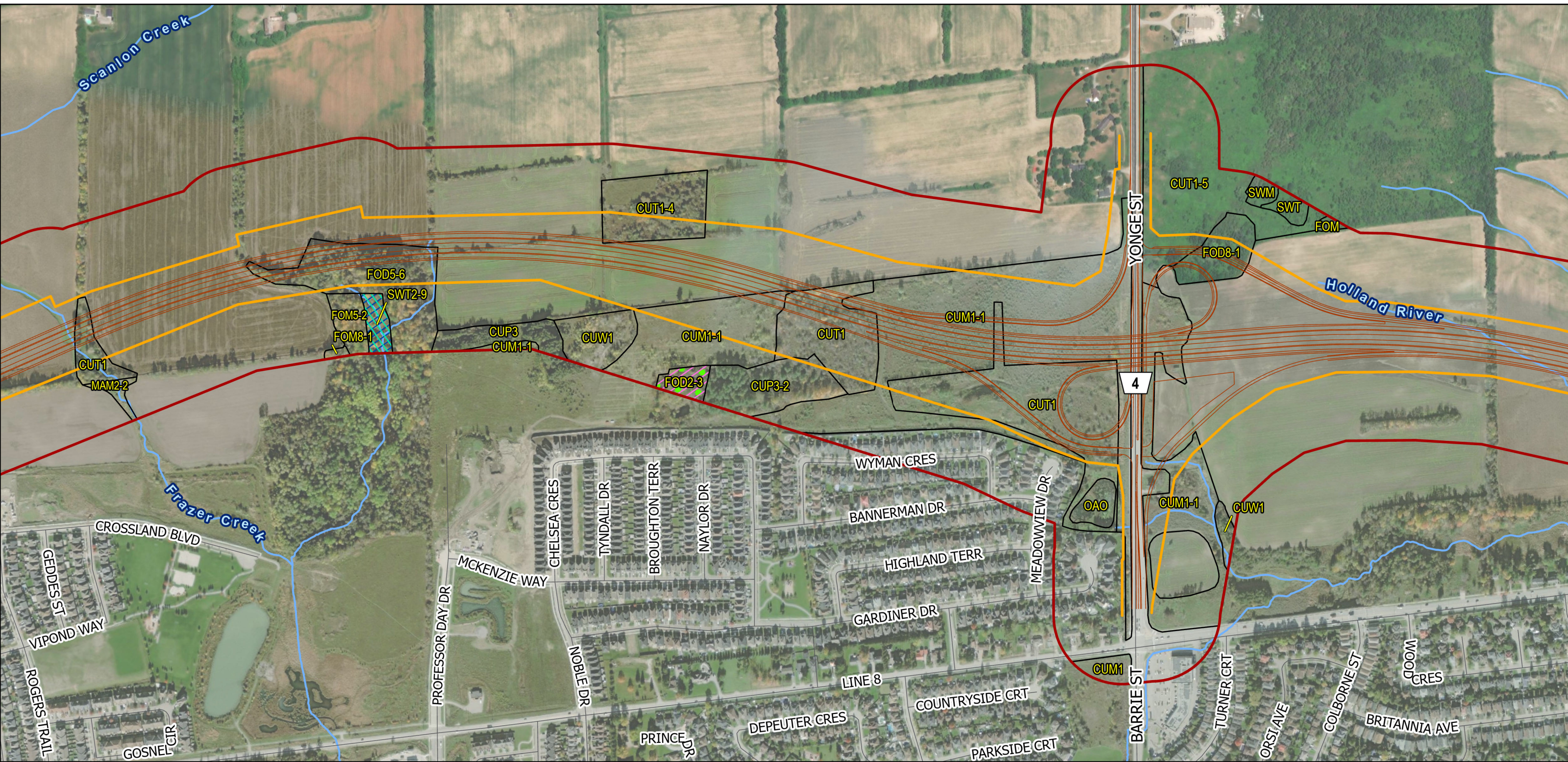


- LEGEND**
- Preliminary Design Terrestrial Study Area
 - Bradford Bypass - MTO Right-Of-Way
 - Bradford Bypass Preliminary Design
 - Ecological Land Classification
 - Municipality
 - ~ Watercourse
 - Other Road

- CONFIRMED HABITAT**
- Amphibian Breeding Habitat (Wetlands)
 - Eastern Wood-pewee (SC)

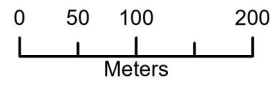


Highway 400 to Highway 404 Link (Bradford Bypass)	
Significant Wildlife Habitat (SWH) Confirmed	Figure 4b-2
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:6,500	
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- LEGEND**
- Preliminary Design Terrestrial Study Area
 - Bradford Bypass - MTO Right-Of-Way
 - Bradford Bypass Preliminary Design
 - Ecological Land Classification
 - Municipality
 - Watercourse
 - Other Road

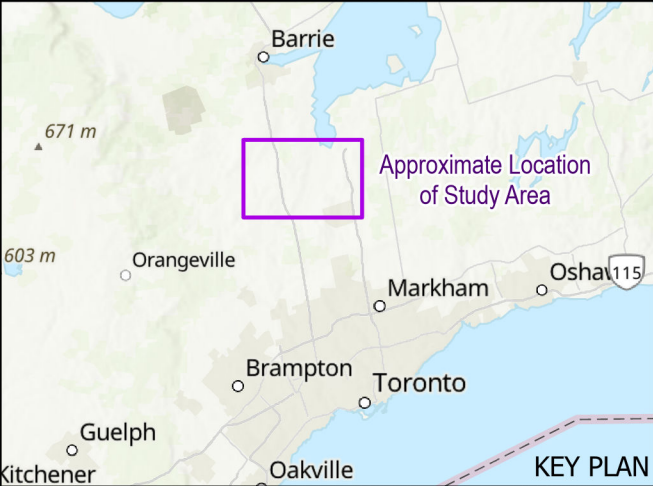
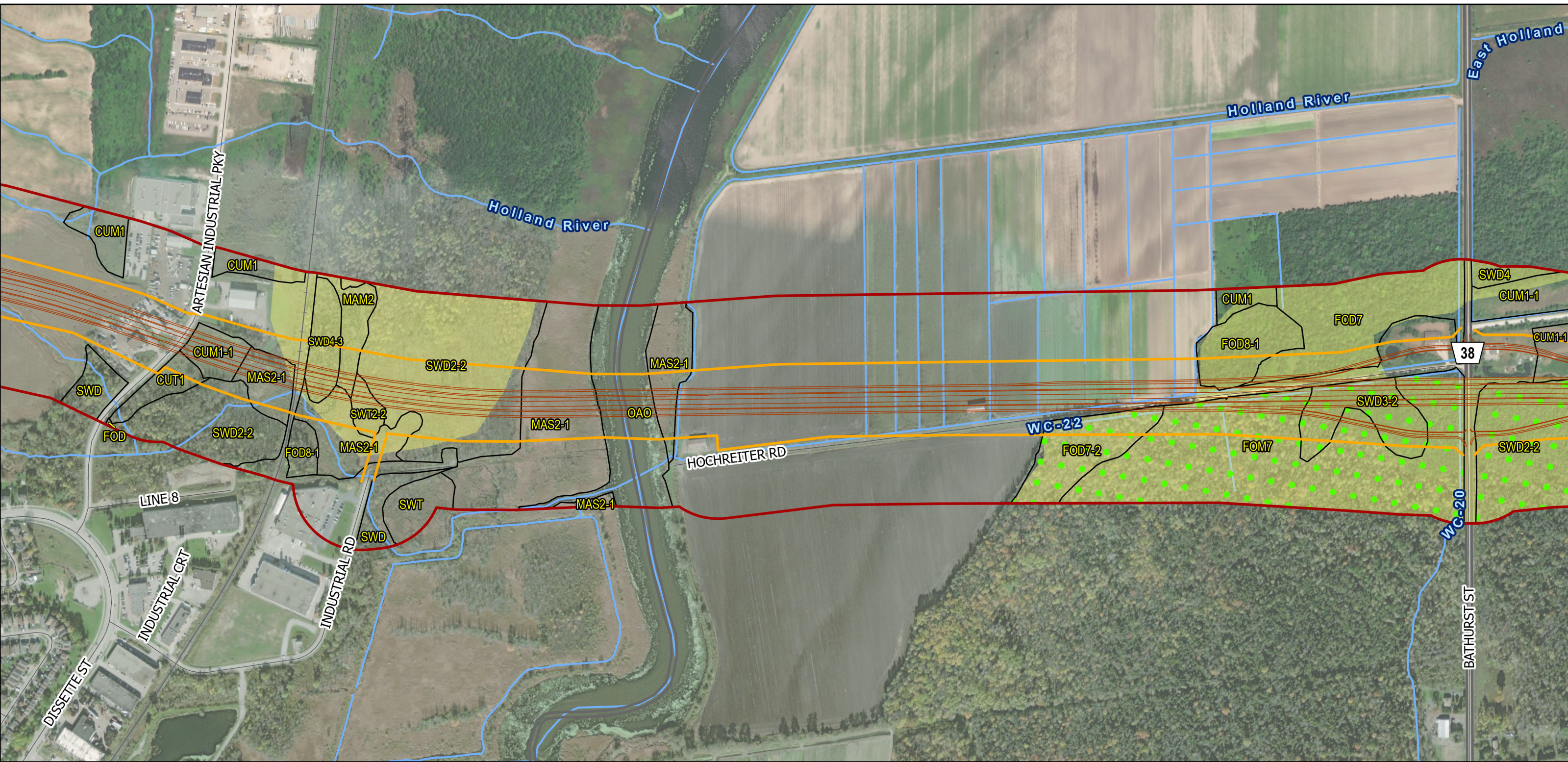
- CONFIRMED HABITAT**
- Other Rare Vegetation
 - Communities
 - Amphibian Breeding Habitat (Wetlands)
 - Confirmed Terrestrial Crayfish
 - Eastern Wood-pewee (SC)



**Highway 400 to Highway 404 Link
(Bradford Bypass)**

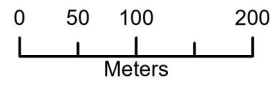
Significant Wildlife Habitat (SWH) Confirmed	Figure 4b-3
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:6,500	
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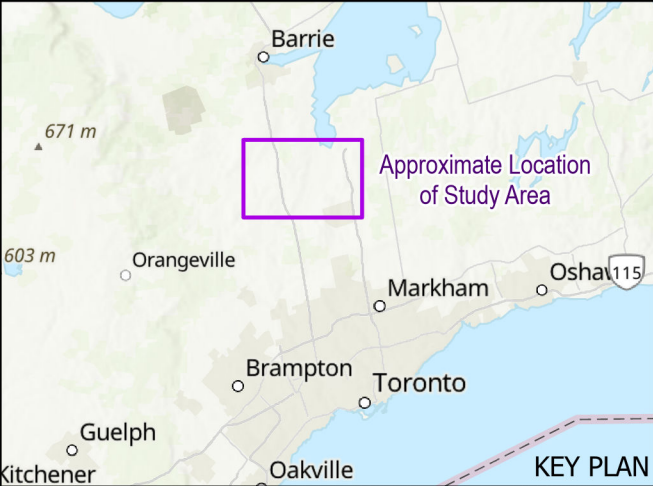
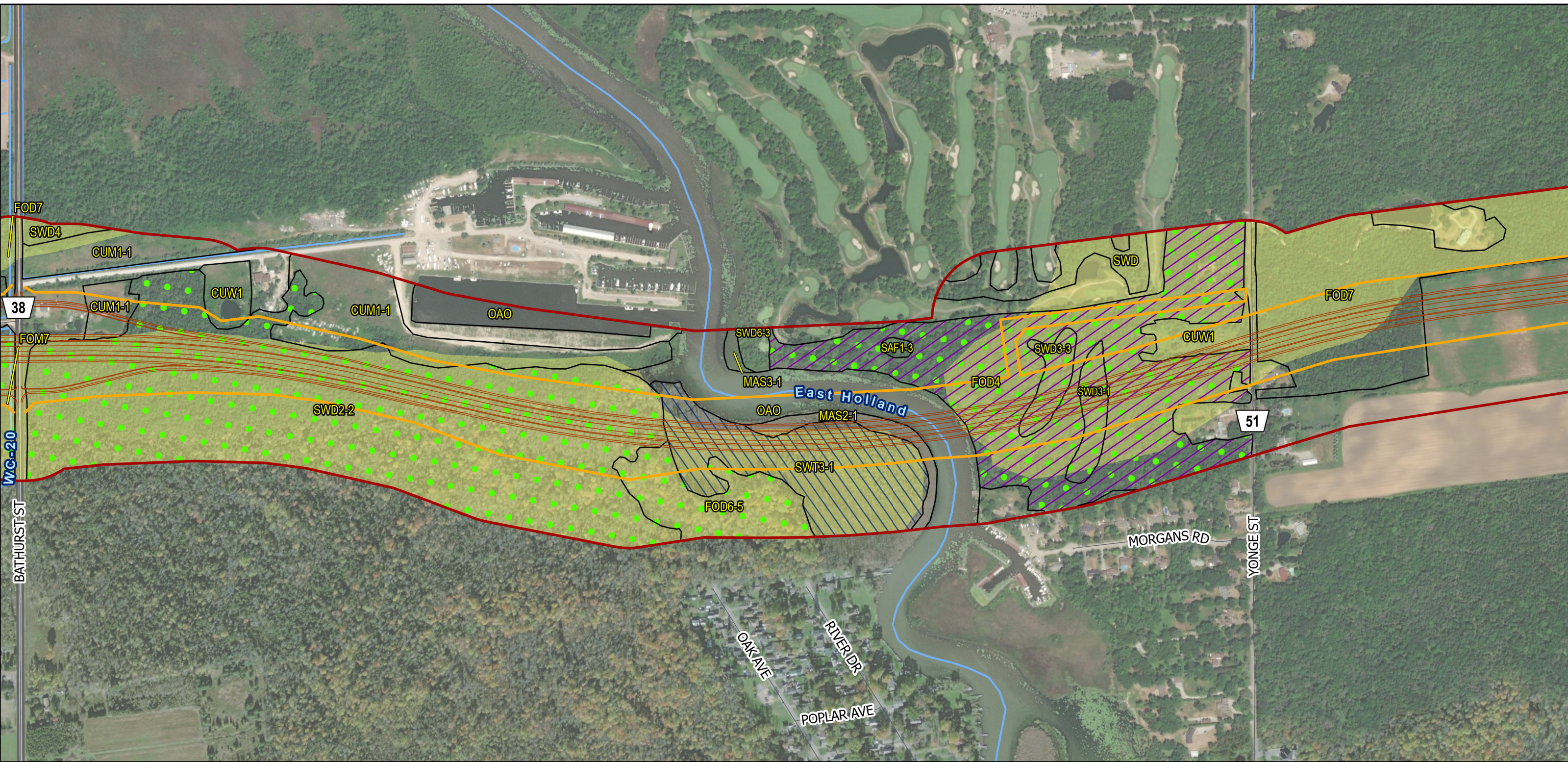


- LEGEND**
- Preliminary Design Terrestrial Study Area
 - Bradford Bypass - MTO Right-Of-Way
 - Bradford Bypass Preliminary Design
 - Ecological Land Classification
 - Municipality
 - ~ Watercourse
 - Other Road
 - Railway

- CONFIRMED HABITAT**
- Eastern Wood-pewee (SC)

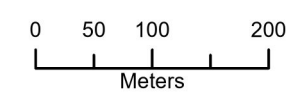
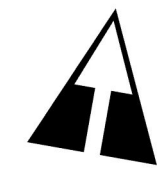


Highway 400 to Highway 404 Link (Bradford Bypass)	
Significant Wildlife Habitat (SWH) Confirmed	Figure 4b-4
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:6,500	
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- LEGEND**
- Preliminary Design Terrestrial Study Area
 - Bradford Bypass - MTO Right-Of-Way
 - Bradford Bypass Preliminary Design
 - Ecological Land Classification
 - Municipality
 - ~ Watercourse
 - Other Road

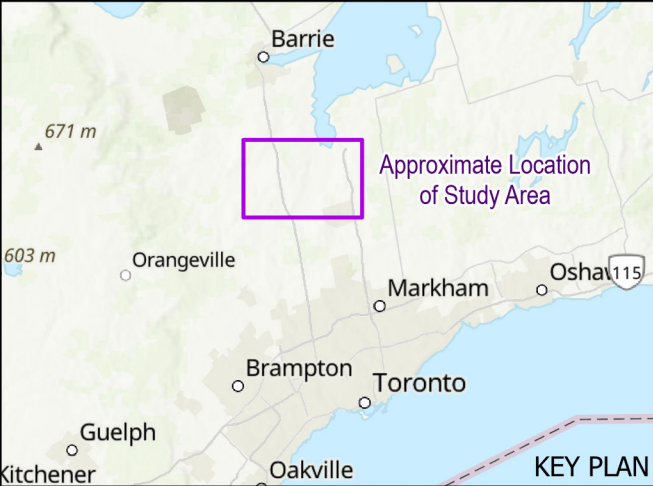
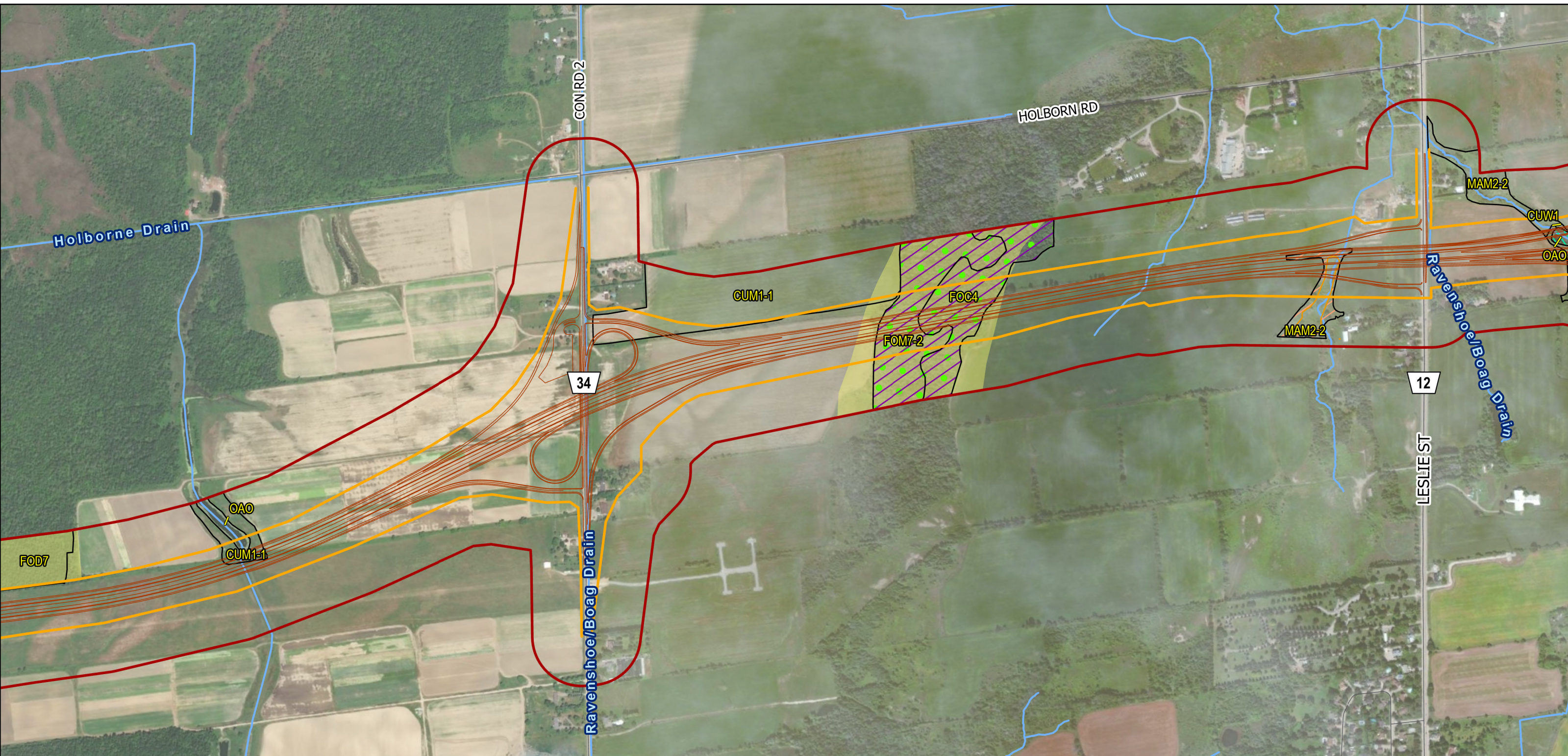
- CONFIRMED HABITAT**
- Wood Thrush (SC)
 - Eastern Wood-pewee (SC)
 - Seeps and Springs



**Highway 400 to Highway 404 Link
(Bradford Bypass)**

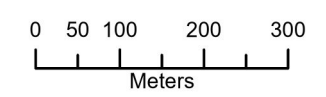
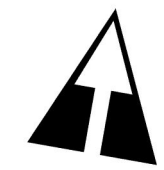
Significant Wildlife Habitat (SWH) Confirmed	Figure 4b-5
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:6,500	
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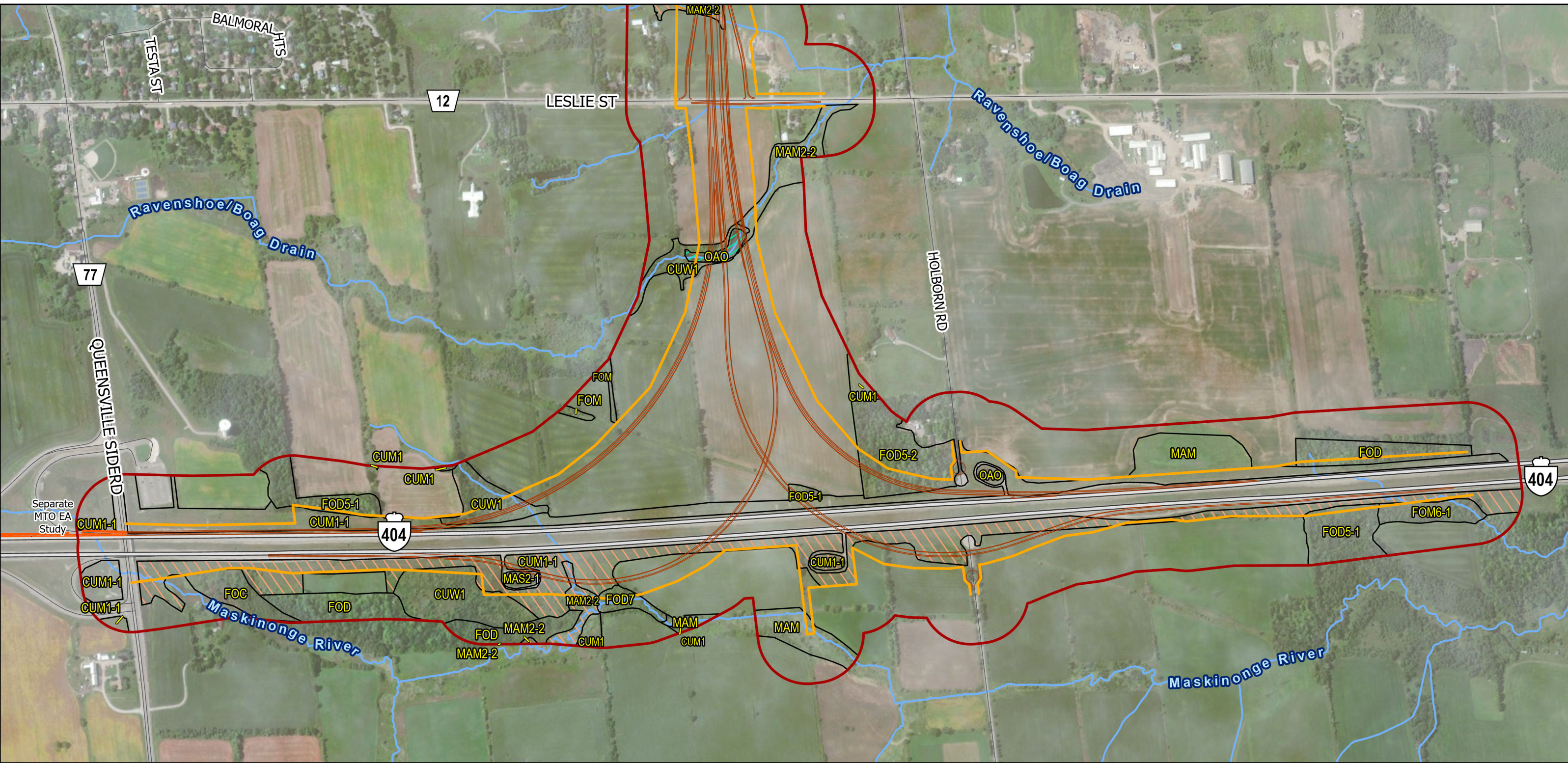


- LEGEND**
- Preliminary Design Terrestrial Study Area
 - Bradford Bypass - MTO Right-Of-Way
 - Bradford Bypass Preliminary Design
 - Ecological Land Classification
 - Municipality
 - Watercourse
 - Other Road

- CONFIRMED HABITAT**
- Amphibian Breeding Habitat (Wetlands)
 - Wood Thrush (SC)
 - Eastern Wood-pewee (SC)
 - Monarch (SC)

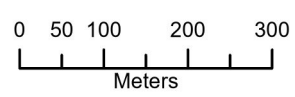
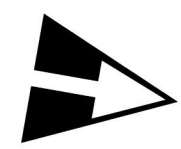


Highway 400 to Highway 404 Link (Bradford Bypass)	
Significant Wildlife Habitat (SWH) Confirmed	Figure 4b-6
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:9,000	
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- LEGEND**
- Preliminary Design Terrestrial Study Area
 - Bradford Bypass - MTO Right-Of-Way
 - Bradford Bypass Preliminary Design
 - Separate MTO EA Study
 - Ecological Land Classification
 - Municipality
 - ~ Watercourse
 - Provincial Highway
 - Other Road

- CONFIRMED HABITAT**
- Amphibian Breeding Habitat (Wetlands)
 - Monarch (SC)



Highway 400 to Highway 404 Link (Bradford Bypass)	
Significant Wildlife Habitat (SWH) Confirmed	Figure 4b-7
Datum: NAD 1983 UTM Zone 17N Source: MTO, GeoHub, Town of Bradford West Gwillimbury, Town of East Gwillimbury. Scale: 1:9,000	
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Appendix B

Ecological Land Classification Descriptions

Vegetation Community Code	Ecological Land Classification Code	S-Rank	Tree Canopy	Shrub Layer	Ground Layer	Location in Study Area	Comments
CUM1-1	Dry – Fresh Old Field Cultural Meadow	SNA	Typical species included green ash (<i>Fraxinus pennsylvanica</i>), white elm (<i>Ulmus americana</i>), trembling aspen (<i>Populus tremuloides</i>), Manitoba maple (<i>Acer negundo</i>), hybrid crack willow (<i>Salix x rubens</i>), large-tooth aspen (<i>Populus grandidentata</i>), white ash (<i>Fraxinus americana</i>), bitternut hickory (<i>Carya cordiformis</i>), balsam poplar (<i>Populus balsamifera</i>).	Typically dominated by Hawthorn species (<i>Crataegus sp.</i>), common apple (<i>Malus pumila</i>), trembling aspen, willow species (<i>Salix sp.</i>), choke cherry (<i>Prunus virginiana</i>), common lilac (<i>Syringa vulgaris</i>), green ash, common buckthorn (<i>Rhamnus cathartica</i>), gray dogwood (<i>Cornus racemosa</i>), staghorn sumac (<i>Rhus typhina</i>), Missouri river willow (<i>Salix eriocephala</i>) and Russian olive (<i>Elaeagnus angustifolia</i>).	Dominant species included smooth brome (<i>Bromus inermis</i>), reed canary grass (<i>Phalaris arundinacea</i>), white paniced aster (<i>Symphotrichum lanceolatum</i>), Canada goldenrod (<i>Solidago canadensis</i>), New England aster (<i>Symphotrichum novae-angliae</i>), heath aster (<i>Symphotrichum ercoides</i>), cow vetch (<i>Vicia cracca</i>), Canada thistle (<i>Cirsium arvense</i>), tall goldenrod (<i>Solidago altissima</i>), coltsfoot (<i>tussilago farfara</i>), field sow thistle (<i>Sonchus arvensis</i>), Kentucky bluegrass (<i>Poa pratensis</i>), common dandelion (<i>Taraxacum officinale</i>), flat-top goldenrod (<i>Euthamia graminifolia</i>), bird's-foot trefoil (<i>Lotus corniculatus</i>), red clover (<i>Trifolium pretense</i>), alfalfa (<i>Medicago savita</i>), and common plantain (<i>Plantago major</i>).	Cultural meadow communities are present throughout the Study Area.	<ul style="list-style-type: none"> - The community east of County Road 4 contained a MAS2 and MAS2-1 inclusion. - The community northeast of the intersection of Bathurst Street and the marina entrance was complexed with a CUW1 community. - The community within the western portion of the Highway 404 right-of-way (ROW) contained a MAS2-1 inclusion. - The community within the western portion of the Highway 404 right-of-way (ROW) contained a Sumac Cultural Thicket (CUT1-1) and MAS2 inclusion.
CUT1	Mineral Cultural Thicket	SNA	Typical species included white ash, Manitoba maple, butternut (<i>Juglans cinerea</i>) and green ash.	Dominated by Red-osier dogwood (<i>Cornus sericea</i>), Russian olive, nannyberry (<i>Viburnum lentago</i>), common buckthorn, red raspberry (<i>Rubus ideaus</i>), Missouri river willow, narrow-leaf willow (<i>Salix exigua</i>) and choke cherry.	Dominant species include Kentucky bluegrass, Canada blue-grass (<i>Poa compressa</i>), bird's-foot trefoil, red raspberry, Canada goldenrod, tall goldenrod, thicket creeper (<i>Parthenocissus vitacea</i>), field horsetail (<i>Equisetum arvense</i>), black medick (<i>Medicago lupulina</i>), white clover (<i>Melilotus alba</i>), red clover and common dandelion.	Cultural thicket communities are present throughout the Study Area.	<ul style="list-style-type: none"> - The community west of County Road 4, adjacent to the CUP3-2 community was complexed with a CUW1 community. - The community east of 2nd Concession Road was complexed with a CUM1 community.
CUT1-4	Gray Dogwood Cultural Thicket	SNA	Typical species included American elm, Manitoba maple, trembling aspen	Dominant species included red-osier dogwood, red raspberry, gray dogwood and nannyberry.	Dominant species included Canada goldenrod, tall goldenrod, flat-topped goldenrod and smooth brome.	This community is located west of County Road 4.	<ul style="list-style-type: none"> - This community was complexed with a CUM1-1 community.
CUT1-5	Raspberry Cultural Thicket	SNA	Species included Eastern cottonwood (<i>Populus deltoides</i>), Scots pine (<i>Picea sylvestris</i>), sugar maple (<i>Acer saccharum</i>) and black locust (<i>Robinia pseudo-acacia</i>).	Dominant species included red raspberry, staghorn sumac and riverbank grape (<i>Vitis riparia</i>).	Dominant species included Kentucky bluegrass, smooth brome, reed canary grass and thicket-creeper.	This community is located east of County Road 4.	<ul style="list-style-type: none"> - This community was complexed with a CUM1-1 and CUT1 community.
CUP3	Coniferous Plantation	SNA	Dominant species included white spruce (<i>Picea glauca</i>), balsam poplar, American elm and black cherry (<i>Prunus serotina</i>).	Typical species included Tatarian honeysuckle (<i>Lonicera tatarica</i>), common buckthorn, trembling aspen and balsam poplar.	Typical species included Canada goldenrod, thicket creeper, riverbank grape and hooked agrimony (<i>Agrimonia gryposepala</i>).	This community is located west of County Road 4, outside of the proposed ROW.	None
CUP3-1	Red Pine Coniferous Plantation	SNA	Dominant species included red pine, blue spruce (<i>Picea pungens</i>) and white ash.	Dominant species included choke cherry, Tatarian honeysuckle and riverbank grape.	Dominant species included smooth brome, Kentucky bluegrass, common dandelion and wild carrot (<i>Daucus carota</i>).	Two communities present within the Study Area located within the eastern and western portion of the Highway 400 ROW.	None
CUP3-2	White Pine Coniferous Plantation	SNA	Dominant species included White pine (<i>Pinus strobus</i>), green ash, pin cherry	Typical species included choke cherry, alternate-leaved dogwood	Typical species included herb-robert (<i>Geranium robertianum</i>), enchanter's	This community is located west of County Road 4.	None

Vegetation Community Code	Ecological Land Classification Code	S-Rank	Tree Canopy	Shrub Layer	Ground Layer	Location in Study Area	Comments
			(<i>Prunus pensylvanica</i>), black cherry and Norway spruce (<i>Picea abies</i>).	(<i>Cornus alternifolia</i>), red raspberry and pin cherry.	nightshade (<i>Circaea canadensis</i>), thicket-creeper and Canada goldenrod.		
CUP3-3	Scotch Pine Coniferous Plantation	SNA	Dominant species included Norway spruce and Scots pine and blue spruce.	Dominant species included choke cherry, Tatarian honeysuckle and Scots pine.	Typical species included smooth brome, Kentucky bluegrass, Canada goldenrod and New England aster.	This community is located west of Highway 400.	
CUW1	Mineral Cultural Woodland	SNA	Dominant species included trembling aspen, white ash, white elm, white birch (<i>Betula papyrifera</i>), white spruce, green ash, hybrid crack willow, American basswood (<i>Tilia americana</i>) and Manitoba maple.	Dominant species included Red-osier dogwood, autumn olive (<i>Elaeagnus umbellata</i>), common buckthorn, choke cherry, willow species, alternate-leaved dogwood, white ash and green ash.	Dominant species included Canada goldenrod, reed canary grass, Kentucky blue-grass, bird's-foot trefoil, smooth brome, tall goldenrod, New England aster, jewelweed (<i>Impatiens capensis</i>), riverbank grape (<i>Vitis riparia</i>) and Joe-pye-weed (<i>Eupatorium maculatum</i>).	Cultural woodland communities are present throughout the Study Area.	<ul style="list-style-type: none"> - The community east of Bathurst Street contained an OAO inclusion. - The community west of Yonge Street was complexed with a CUM1-1 community. - The community present within the western portion of the Highway 404 ROW was complexed with a CUM1-1 community and contained a Forb Mineral Meadow Marsh (MAM2-10) inclusion. - The community east of Leslie Street was complexed with a MAM2-2 community.
FOC4	Fresh - Moist White Cedar Coniferous Forest Ecosite	SNA	Dominant species included eastern white cedar (<i>Thuja occidentalis</i>), green ash, black cherry and bitternut hickory.	Typical species included common buckthorn and alternate-leaved dogwood.	Typical species included marginal wood fern (<i>Dryopteris marginalis</i>), ostrich fern (<i>Matteuccia struthiopteris</i>) and poison-ivy (<i>Toxicodendron radicans</i>).	This community is located east of 2 nd Concession Road.	None
FOC4-1	Fresh - Moist White Cedar Coniferous Forest Type	S5	Dominant species included eastern white cedar, sugar maple, white ash and American basswood.	Typical species included eastern white cedar, white ash and choke cherry.	Dominant species included red raspberry, enchanter's nightshade, jewelweed, garlic mustard (<i>Alliaria petiolata</i>) and wild mock cucumber (<i>Echinocystis lobata</i>).	This community is located west of Side Road 10.	None
FOD2-3	Dry - Fresh Hickory Deciduous Forest	S3S4	Dominant species included bitternut hickory, ironwood (<i>Ostrya virginiana</i>), white pine	Dominant species included alternative leaved dogwood, choke cherry, red-osier dogwood, black cherry and nannyberry.	Dominant species included enchanter's nightshade, dwarf raspberry (<i>Rubus pubescens</i>), thicket-creeper, and white avens (<i>Geum canadense</i>).	This community is located west of County Road 4, outside of the proposed ROW.	None
FOD4	Dry – Fresh Upland Deciduous Forest Ecosite	SNA	Dominant species included red maple, white ash, white birch, red oak and trembling aspen.	Dominant species included trembling aspen, white ash, red raspberry and choke cherry.	Dominant species included false Solomon's-seal (<i>Maianthemum racemosum</i>), enchanter's nightshade, dwarf raspberry and wild sarsaparilla (<i>Aralia nudicaulis</i>).	This community is located west of Yonge Street.	<ul style="list-style-type: none"> - This community was complexed with SWD3-3 community.
FOD5-1	Dry - Fresh Sugar Maple Deciduous Forest	S5	Dominant species included American basswood, sugar maple, white elm, and trembling aspen.	Dominant species included choke cherry, common buckthorn, alternate-leaved dogwood, thicket-creeper, sugar maple and green ash.	Dominant species included Pennsylvania sedge (<i>Carex pensylvanica</i>), enchanter's nightshade, Ivy hepatica (<i>Anemone acutiloba</i>) and young sugar maple.	One community is present east of Sideroad 10, one community is present within the eastern portion of the Highway 404 ROW and one community is present adjacent to the western portion of the Highway 404 ROW.	<ul style="list-style-type: none"> - This community contained a FOM5 inclusion.
FOD5-2	Dry - Fresh Sugar Maple - Beech Deciduous Forest	S5	Dominant species included sugar maple, American beech (<i>Fagus grandifolia</i>), white elm and green ash.	The shrub layer was abundant with green ash, alternate-leaved dogwood and choke cherry.	Dominant species included sugar maple, coltsfoot, early meadow-rue (<i>Thalictrum dioicum</i>) and enchanter's nightshade.	This community is located west of Highway 404.	<ul style="list-style-type: none"> - This community contained a FOD7-2 inclusion.

Vegetation Community Code	Ecological Land Classification Code	S-Rank	Tree Canopy	Shrub Layer	Ground Layer	Location in Study Area	Comments
FOD5-6	Dry - Fresh Sugar Maple - Basswood Deciduous Forest	S5	Dominant species included sugar maple, trembling aspen, American basswood, white ash, American beech and red oak.	Dominant species included alternate-leaved dogwood, choke cherry, white ash and riverbank grape.	Dominant species included alternate-leaved dogwood, white ash, enchanter's nightshade and Jack-in-the-pulpit (<i>Arisaema triphyllum</i>).	This community is located west of County Road 4.	None
FOD6-5	Fresh - Moist Sugar Maple Deciduous Forest	S5	The canopy was densely vegetated with sugar maple, red maple, Freeman's maple (<i>Acer x freemanii</i>), red oak, black cherry and white ash.	Dominant species included white ash, Allegheny blackberry (<i>Rubus allegheniensis</i>), round-leaved dogwood (<i>Cornus rugosa</i>) and wild sarsaparilla.	Typical species included thicket creeper, wild sarsaparilla, enchanter's nightshade and dwarf raspberry.	This community is located North of Oak Avenue.	None
FOD7	Fresh - Moist Lowland Deciduous Forest	SNA	Red maple, white ash, white birch, yellow birch (<i>Betula alleghaniensis</i>), Manitoba maple, green ash and riverbank grape were dominant. The sub canopy was dominated by red maple, green ash, white elm, chokecherry, riverbank grape and common buckthorn	Common buckthorn, red raspberry, thicket-creeper, tall goldenrod, Joe-pye-weed, Canada goldenrod, gray dogwood and alternate-leaved dogwood were dominant.	The ground layer was dominated by sensitive fern, dwarf raspberry, enchanter's nightshade and common buckthorn. Jewelweed and annual fleabane were also abundant.	One community located west of Bathurst Street, one community located east of Yonge Street and one community located east of Highway 404.	None
FOD7-1	Fresh - Moist White Elm Lowland Deciduous Forest	S4S5	American basswood, green ash and American beech were dominant. Green ash, white elm and ironwood comprised the sub canopy.	Alternate-leaved dogwood, choke cherry, green ash and American basswood comprised the shrub layer.	Enchanter's nightshade, jewelweed, zig-zag goldenrod (<i>Solidago flexicaulis</i>) and choke cherry was dominant.	One community is located west of Side Road 10.	None
FOD7-2	Fresh - Moist Ash Lowland Deciduous Forest	S4S5	Green ash, white elm, red maple and trembling aspen were dominant in the canopy. Green ash, common buckthorn, white elm, trembling aspen were dominant in the sub canopy.	The shrub layer was abundant with common buckthorn, green ash, choke cherry and Tartarian honeysuckle.	Dwarf raspberry, glaucous honeysuckle (<i>Lonicera dioica</i>), foamflower (<i>Tiarella cordifolia</i>) and Canada goldenrod were dominant.	One community is located west of Bathurst Street.	None
FOD7-3	Fresh - Moist Willow Lowland Deciduous Forest	S4S5	The canopy was composed mostly of hybrid crack willow. The sub canopy was densely vegetated with Manitoba Maple, trembling aspen, hybrid crack willow and white elm.	The shrub layer consisted of red raspberry, alternate-leaved dogwood and jewelweed.	Enchanter's nightshade, urban avens (<i>Geum urbanum</i>), choke cherry and herb-robert were dominant.	One community is located east of Highway 400.	None
FOD8-1	Fresh - Moist Poplar Deciduous Forest	S5	Trembling aspen was dominant in the canopy. Other species included green ash and white elm. Trembling aspen, green ash, white elm and Eastern cottonwood was dominant in the sub-canopy.	Trembling aspen, alternate-leaved dogwood and Tartarian honeysuckle was dominant.	The ground layer was vegetated with purple-stem aster (<i>Symphotrichum puniceus</i>), field horsetail, enchanter's nightshade, herb-robert and gray goldenrod (<i>Solidago nemoralis</i>).	One community is located east of County Road 4, one community located north of Industrial Road and one community located west of Bathurst Street.	None
FOM5-2	Dry - Fresh Poplar Mixed Forest	SNA	Trembling aspen was dominant in the canopy. American beech, white ash, white elm and white pine was dominant in the sub-canopy.	The shrub layer contained choke cherry, alternate-leaved dogwood, white ash and eastern cottonwood.	Canada mayflower (<i>maianthemum canadense</i>), Virginia-creeper, white ash and Jack-in-the-pulpit were dominant.	One community is located west of County Road 4, outside of the proposed ROW.	None
FOM6-1	Fresh - Moist Sugar Maple - Hemlock Mixed Forest	S4S5	Dominant species included green ash, eastern hemlock (<i>Tsuga canadensis</i>), sugar maple, trembling aspen and American basswood.	Dominant species included green ash, trembling aspen, sugar maple and common buckthorn.	Dominant species included yellow trout-lily (<i>Erythronium americanum</i>), Kentucky bluegrass and common dandelion.	One community is located east of Highway 404.	
FOM7	Fresh - Moist White Cedar - Hardwood Mixed Forest	SNA	Trembling aspen, eastern white cedar, American basswood and balsam fir (<i>Abies balsamea</i>) was dominant in the canopy layer. Eastern white cedar, American basswood, sugar maple and red maple was dominant in the sub-canopy.	The shrub layer was dominated by common buckthorn, white ash, eastern white cedar and Tartarian honeysuckle.	Common buckthorn, balsam fir, eastern bracken-fern (<i>Pteridium aquilinum</i>) and carex species (<i>Carex spp.</i>) comprised the open ground layer.	One community is located west of Bathurst Street.	None
FOM7-2	Fresh - Moist White Cedar - Hardwood Mixed Forest	S5	Trembling aspen and Norway spruce was dominant in the canopy. Eastern white cedar and trembling aspen were dominant in the sub-canopy.	Alternate-leaved dogwood, Eastern white cedar, glossy buckthorn (<i>Frangula alnus</i>) and Manitoba maple were dominant in the shrub layer.	Canada mayflower, enchanter's nightshade and alternate-leaved dogwood comprised the open ground layer.	One community is located east of 2 nd Concession Road.	None

Vegetation Community Code	Ecological Land Classification Code	S-Rank	Tree Canopy	Shrub Layer	Ground Layer	Location in Study Area	Comments
FOM8-1	Fresh - Moist Poplar Mixed Forest	S5	Trembling aspen and white pine were dominant in the canopy. White ash, trembling aspen and American basswood were dominant in the sub-canopy.	White ash, Eastern cottonwood, common buckthorn and alternate-leaved dogwood were dominant in the shrub layer.	Enchanter's nightshade, common buckthorn, white ash, and Virginia strawberry (<i>Fragaria virginiana</i>) were dominant in the densely vegetated ground layer.	One community is located west of County Road 4, outside of the proposed ROW.	None
MAM2	Mineral Meadow Marsh Ecosite	SNA	Trembling aspen and white birch were dominant in the open canopy. The sub canopy mostly consisted of trembling aspen, Scots pine, balsam poplar and hawthorn species.	Willow species, balsam poplar and red-osier dogwood were dominant.	The ground layer was densely vegetated with grass species, scouring-rush (<i>Equisetum hyemale</i>), flat-top goldenrod, and calico aster (<i>Symphotrichum lateriflorum</i>).	One community located north of Industrial Road.	- This community was complexed with a SWT2 community.
MAM2-2	Reed-canary Grass Mineral Meadow Marsh	S5	Dominant species were hybrid crack willow, trembling aspen, staghorn sumac, willow species, white elm and green ash. The community lacked a defined sub canopy and contained a few tartarian honeysuckle, autumn olive and gray dogwood.	Joe-pye-weed, elecampane (<i>Inula helenium</i>) and flat-top goldenrod dominated.	Reed canary grass, flat-top goldenrod and Canada thistle, and Peppermint (<i>Mentha piperita</i>) were dominant.	One community located east of Highway 400, one community located west of Leslie Street, one community located east of Leslie Street and one community located east of Highway 404.	- Community east of Highway 404 contained a MAS2-1 inclusion.
MAS2-1	Cattail Mineral Shallow Marsh	S5	The community lacked a defined canopy. Green ash, narrow-leaf willow, hybrid crack willow, peach-leaved willow (<i>Salix amygdaloides</i>), staghorn sumac and trembling aspen were dominant in the sub-canopy.	Shrub layer was dominated by broad-leaved Cattail (<i>Typha latifolia</i>), narrow-leaved Cattail (<i>Typha angustifolia</i>) and reed canary grass.	Reed canary grass, purple loosestrife (<i>Lythrum salicaria</i>), Joe-pye-weed, lesser duckweed (<i>Lemna minor</i>), purple loosestrife, bittersweet nightshade (<i>Solanum dulcamara</i>), guelder-rose (<i>Viburnum opulus</i>), Canada blue-grass and small-flowered willow-herb (<i>Epilobium parviflorum</i>) dominated.	One community east of Highway 400, one community west of the Holland River East Branch, one community east of Highway 404 and four communities east of Artesian Industrial Parkway.	- Community east of the Holland River contained a CUM1 inclusion.
MAS3-1	Cattail Organic Shallow Marsh	S5	The community lacked a defined canopy.	Narrow-leaved, glaucous cattail (<i>Typha X glauca</i>), purple loosestrife and jewelweed were dominant.	The community lacked a defined ground layer.	One community east of the Holland River East Branch.	None
OAO	Open Aquatic	SNA	The community lacked a defined canopy.	Broad-leaved cattail and reed canary grass was dominant.	Pond-lily species (<i>Nuphar sp.</i>) and lesser duckweed were sparse within the open water.	One community located west of County Road 4, one community located west of 2 nd Concession Road 2, one community located east of Leslie Street and one community located west of Highway 404. This community type is also associated with the Holland River and Holland River East Branch.	- The OAO community in the East Holland River was complexed with a SAF1-1 community. - The community west of 2 nd Concession Road contained a MAS2-1 inclusion.
SAF1-3	Duckweed Floating-leaved Shallow Aquatic Type	S5	The community lacked a defined canopy	The community lacked a defined shrub layer.	Star duckweed (<i>Lemna triscula</i>) and lesser duckweed was abundant.	One community west Yonge Street.	None
SWD2-2	Green Ash Mineral Deciduous Swamp Type	S5	Green ash, white elm, hybrid crack willow, Freeman's maple and balsam fir were dominant. The subcanopy was dominated by green ash, common buckthorn, and nannyberry.	The community lacked a defined shrub layer.	Ostrich fern, flat-top goldenrod, jewelweed, reed canary grass, devil's beggar-ticks (<i>Bidens frondosa</i>), Forget-me-not (<i>Myosotis scorpioides</i>), fowl manna grass (<i>Glyceria striata</i>) and hemlock water-parsnip (<i>Sium suave</i>) were dominant.	Two communities located east of Artesian Industrial Parkway and one community located east of Bathurst Street.	None
SWD3-1	Maple Mineral Deciduous Swamp Ecosite	S5	The canopy was dominated by red maple, Freeman's maple, white ash and white birch. The sub canopy consisted mostly of red maple. Other abundant species were white ash, white elm and white birch.	White ash, white elm, black cherry and red raspberry were dominant.	Marsh fern (<i>Thelypteris palustris</i>), false nettle (<i>Boehmeria cylindrica</i>), red maple and marsh bedstraw (<i>Galium palustre</i>) were dominant.	One community located west of Yonge Street.	None

Vegetation Community Code	Ecological Land Classification Code	S-Rank	Tree Canopy	Shrub Layer	Ground Layer	Location in Study Area	Comments
SWD3-2	Silver Maple Mineral Deciduous Swamp Type	S5	Silver maple (<i>Acer saccharinum</i>), green ash and red maple were dominant. The subcanopy was dominated with sugar maple, green ash, white elm and red maple.	Common buckthorn and green ash were dominant.	The ground layer mostly consisted of sugar maple, false nettle, dwarf raspberry and sensitive fern.	One community located west of Bathurst Street.	None
SWD3-3	Swamp Maple Mineral Deciduous Swamp Type	S5	Freeman's maple and white ash were dominant. The subcanopy contained Freeman's maple, white elm, and white ash.	White ash, red raspberry, common buckthorn and fly honeysuckle (<i>Lonicera canadensis</i>) were dominant.	Dwarf raspberry, enchanter's nightshade, false nettle and Freeman's maple mostly comprised the ground layer.	One community located west of Yonge Street.	None
SWD4	Mineral Deciduous Swamp Ecosite	SNA	The canopy was mostly comprised of trembling aspen, green ash and large-toothed aspen. The subcanopy was dominated by trembling aspen, green ash, white elm and large-toothed aspen.	Green ash, white elm and riverbank grape were dominant.	Sensitive fern, Canada goldenrod and riverbank grape were dominant.	One community located east of Bathurst Street.	None
SWD4-3	White Birch – Poplar Mineral Deciduous Swamp Type	S5	The canopy was mostly comprised of trembling aspen, green ash, white birch and hybrid crack willow. White cedar, Scots pine and green ash were dominant within the sub-canopy.	Glaucous cattail, broad-leaved cattail, narrow-leaved cattail, common buckthorn and willow species comprised the shrub layer.	The community lacked a defined ground layer.	One community located east of Artesian Industrial Parkway.	None
SWD6-3	Swamp Maple Organic Deciduous Swamp Type	S5	Freeman's maple, ash snags (<i>Fraxinus sp.</i>) and white elm represented the canopy. Freeman's maple, green ash and white elm were dominant in the sub-canopy.	The shrub layer mostly consisted of broad-leaved cattail, red-osier dogwood, gray dogwood and narrow meadow-sweet (<i>Spiraea alba</i>).	Broad-leaved cattail, sensitive fern, marsh fern and marsh-marigold (<i>Caltha palustris</i>) dominated the ground layer.	One community located east of the Holland River East Branch.	- ELC-126 contained a SAF1-3 inclusion.
SWM3-1	Birch - Conifer Mineral Mixed Swamp	S5	Dominant species included trembling aspen, eastern white cedar, silver maple and green ash.	Dominant species included red-osier dogwood, green ash, common buckthorn and riverbank grape.	Dominant species included sensitive fern, sedge species, jewelweed species (<i>Impatiens sp.</i>) and marsh-marigold.	One community located east of Side Road 10.	None
SWT2-2	Missouri Willow Mineral Deciduous Thicket Swamp Type	S5	Narrow-leaf willow, shining willow (<i>Salix lucida</i>), Missouri river willow, hybrid crack willow and dead ash snags comprised the canopy. Hybrid crack willow and ash snags were dominant in the sub canopy.	Glaucous cattail, broad-leaved cattail, calico aster, Kentucky blue-grass, thicket-creeper, narrow-leaved cattail, willow species and red-osier dogwood were dominant.	Grasses, cow vetch, tall goldenrod, Canada goldenrod and willow species were dominant.	One community located east of Artesian Industrial Parkway and one community located east of Side Road 10.	None
SWT2-9	Gray Dogwood Mineral Deciduous Thicket Swamp Type	S3S4	The community lacked a defined canopy. Gray dogwood and Tartarian honeysuckle were dominant in the sub-canopy.	Jewelweed, currant species (<i>Ribes sp.</i>) gray dogwood and Tartarian honeysuckle dominated.	The ground layer was comprised mostly of jewelweed and herb-robert.	One community located west of County Road 4.	None
SWT3-1	Organic Thicket Swamp Ecosite	S5	The canopy consisted mostly of red maple, red oak, white ash, and chock cherry. The sub canopy was dominated by speckled alder (<i>Alnus incana</i>). White ash, red maple, red oak, gray dogwood and glossy buckthorn were abundant.	The shrub layer consisted mostly of speckled alder, white ash, gray dogwood, black cherry and Allegheny blackberry.	The ground layer was dominated by thicket creeper, wild sarsaparilla, enchanter's nightshade, watercress (<i>Nasturtium officinale</i>), wild calla (<i>Calla palustris</i>) and red raspberry.	One community located west of the Holland River East Branch.	None

Appendix C

Plant List

Botanical Name		Plant Species Information							ELC ID#:
Common Name	Scientific Name	Family	CC	CW	SRANK	GRank	COSEWIC	SARO	ELC Code:
Balsam Fir	Abies balsamita	Pinaceae	5	-3	S5	G5			
Manitoba Maple	Acer negundo	Aceraceae	0	0	S5	G5			
Red Maple	Acer rubrum	Aceraceae	4	0	S5	G5			
Silver Maple	Acer saccharinum	Aceraceae	5	-3	S5	G5			
Sugar Maple	Acer saccharum	Aceraceae	4	3	S5	G5			
Mountain Maple	Acer spicatum	Aceraceae	6	3	S5	G5			
(Acer rubrum X Acer saccharinum)	Acer x freemanii	Aceraceae	6	0	SNA	GNA			
Common Yarrow	Achillea millefolium	Asteraceae	3	SE5?		G5			
White Baneberry	Actaea pachypoda	Ranunculaceae	6	5	S5	G5			
Red Baneberry	Actaea rubra	Ranunculaceae	6	3	S5	G5			
White Snakeroot	Ageratina altissima	Asteraceae	5	3	S5	G5			
Hooked Agrimony	Agrimonia gryposepala	Rosaceae	2	3	S5	G5			
Northern Water-plantain	Alisma triviale	Alismatiaceae	1	-5	S5	G5			
Garlic Mustard	Alliaria petiolata	Brassicaceae	0	SE5		GNR			
Wild Leek	Allium tricoccum	Liliaceae	7	3	S4	G5			
Grey Alder	Alnus incana	Betulaceae	6	-3	S5	G5			
Common Ragweed	Ambrosia artemisiifolia	Asteraceae	0	3	S5	G5			
Downy Serviceberry	Amelanchier arborea	Rosaceae	5	3	S5	G5			
American Hog-peanut	Amphicarpaea bracteata	Fabaceae	4	0	S5	G5			
Canada Anemone	Anemonestrum canadense	Ranunculaceae	3	-3	S5	G5			
Tall Anemone	Anemone virginiana	Ranunculaceae	4	3	S5	G5			
American Witch-hazel	Hamamelis virginiana	Hamamelidaceae	6	3	S4S5	G5			
Spreading Dogbane	Apocynum androsaemifolium	Apocynaceae	3	5	S5	G5			
Wild Sarsaparilla	Aralia nudicaulis	Araliaceae	4	3	S5	G5			
Common Burdock	Arctium minus	Asteraceae	3	SE5		GNR			
Jack-in-the-pulpit	Arisaema triphyllum	Araceae	5	-3	S5	G5			
Common Wormwood	Artemisia vulgaris	Asteraceae	5	SE5		GU			
Swamp Milkweed	Asclepias incarnata	Apocynaceae	6	-5	S5	G5			
Common Milkweed	Asclepias syriaca	Apocynaceae	0	5	S5	G5			
Garden Asparagus	Asparagus officinalis	Liliaceae	3	SE5		G5?			
Common Lady Fern	Athyrium filix-femina	Dryopteridaceae	4	0	S5	G5			
Bitter Wintercress	Barbarea vulgaris	Brassicaceae	0	SE5		GNR			
Yellow Birch	Betula alleghaniensis	Betulaceae	6	0	S5	G5			
Paper Birch	Betula papyrifera	Betulaceae	2	3	S5	G5			
Nodding Beggarticks	Bidens cernua	Asteraceae	2	-5	S5	G5			
Devil's Beggarticks	Bidens frondosa	Asteraceae	3	-3	S5	G5			
Small-spike False Nettle	Boehmeria cylindrica	Urticaceae	4	-5	S5	G5			
Smooth Brome	Bromus inermis	Poaceae	5	SE5		G5			
Bluejoint Reedgrass	Calamagrostis canadensis	Poaceae	4	-5	S5	G5			
Wild Calla	Calla palustris	Araceae	8	-5	S5	G5			
Yellow Marsh Marigold	Caltha palustris	Ranunculaceae	5	-5	S5	G5			
Creeping Bellflower	Campanula rapunculoides	Campanulaceae	5	SE5		GNR			
Water Sedge	Carex aquatilis	Cyperaceae	7	-5	S5	G5			
Two-leaved Toothwort	Cardamine diphylla	Brassicaceae	7	3	S5	G5			
Drooping Woodland Sedge	Carex arctata	Cyperaceae	5	5	S5	G5			
Graceful Sedge	Carex gracillima	Cyperaceae	4	3	S5	G5			
Brome-like Sedge	Carex bromoides	Cyperaceae	7	-3	S5	G5			
Porcupine Sedge	Carex hystericina	Cyperaceae	5	-5	S5	G5			
Bladder Sedge	Carex intumescens	Cyperaceae	6	-3	S5	G5			
Lake Sedge	Carex lacustris	Cyperaceae	5	-5	S5	G5			
Hop Sedge	Carex lupulina	Cyperaceae	6	-5	S5	G5			
Long-stalked Sedge	Carex pedunculata	Cyperaceae	5	3	S5	G5			
Pennsylvania Sedge	Carex pennsylvanica	Cyperaceae	5	5	S5	G5			
Cyperus-like Sedge	Carex pseudocyperus	Cyperaceae	6	-5	S5	G5			
Retrorsed Sedge	Carex retrorsa	Cyperaceae	5	-5	S5	G5			
Swollen Beaked Sedge	Carex rostrata	Cyperaceae	10	-5	S4?	G5			
Tussock Sedge	Carex stricta	Cyperaceae	4	-5	S5	G5			
Blue-beech	Carpinus caroliniana	Betulaceae	6	0	S5	G5			
Bitternut Hickory	Carya cordiformis	Juglandaceae	6	0	S5	G5			
Blue Cohosh	Caulophyllum thalictroides	Berberidaceae	5	5	S5	G5			

Botanical Name

Common Name

Balsam Fir
Manitoba Maple
Red Maple
Silver Maple
Sugar Maple
Mountain Maple
(Acer rubrum X Acer
saccharinum)
Common Yarrow
White Baneberry
Red Baneberry
White Snakeroot
Hooked Agrimony
Northern Water-plantain
Garlic Mustard
Wild Leek
Grey Alder
Common Ragweed
Downy Serviceberry
American Hog-peanut
Canada Anemone
Tall Anemone
American Witch-hazel
Spreading Dogbane
Wild Sarsaparilla
Common Burdock
Jack-in-the-pulpit
Common Wormwood
Swamp Milkweed
Common Milkweed
Garden Asparagus
Common Lady Fern
Bitter Wintercress
Yellow Birch
Paper Birch
Nodding Beggarticks
Devil's Beggarticks
Small-spike False Nettle
Smooth Brome
Bluejoint Reedgrass
Wild Calla
Yellow Marsh Marigold
Creeping Bellflower
Water Sedge
Two-leaved Toothwort
Drooping Woodland Sedge
Graceful Sedge
Brome-like Sedge
Porcupine Sedge
Bladder Sedge
Lake Sedge
Hop Sedge
Long-stalked Sedge
Pennsylvania Sedge
Cyperus-like Sedge
Retrorse Sedge
Swollen Beaked Sedge
Tuessock Sedge
Blue-beech
Bitternut Hickory
Blue Cohosh

Botanical Name

Common Name

Balsam Fir
Manitoba Maple
Red Maple
Silver Maple
Sugar Maple
Mountain Maple
(Acer rubrum X Acer
saccharinum)
Common Yarrow
White Baneberry
Red Baneberry
White Snakeroot
Hooked Agrimony
Northern Water-plantain
Garlic Mustard
Wild Leek
Grey Alder
Common Ragweed
Downy Serviceberry
American Hog-peanut
Canada Anemone
Tall Anemone
American Witch-hazel
Spreading Dogbane
Wild Sarsaparilla
Common Burdock
Jack-in-the-pulpit
Common Wormwood
Swamp Milkweed
Common Milkweed
Garden Asparagus
Common Lady Fern
Bitter Wintercress
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Paper Birch
Nodding Beggarticks
Devil's Beggarticks
Small-spike False Nettle
Smooth Brome
Bluejoint Reedgrass
Wild Calla
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Creeping Bellflower
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Two-leaved Toothwort
Drooping Woodland Sedge
Graceful Sedge
Brome-like Sedge
Porcupine Sedge
Bladder Sedge
Lake Sedge
Hop Sedge
Long-stalked Sedge
Pennsylvania Sedge
Cyperus-like Sedge
Retrorse Sedge
Swollen Beaked Sedge
Tuessock Sedge
Blue-beech
Bitternut Hickory
Blue Cohosh

Botanical Name
Common Name
Balsam Fir
Manitoba Maple
Red Maple
Silver Maple
Sugar Maple
Mountain Maple
(Acer rubrum X Acer saccharinum)
Common Yarrow
White Baneberry
Red Baneberry
White Snakeroot
Hooked Agrimony
Northern Water-plantain
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Wild Leek
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Common Burdock
Jack-in-the-pulpit
Common Wormwood
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Small-spike False Nettle
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Bluejoint Reedgrass
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Creeping Bellflower
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Drooping Woodland Sedge
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Porcupine Sedge
Bladder Sedge
Lake Sedge
Hop Sedge
Long-stalked Sedge
Pennsylvania Sedge
Cyperus-like Sedge
Retrorse Sedge
Swollen Beaked Sedge
Tussock Sedge
Blue-beech
Bitternut Hickory
Blue Cohosh

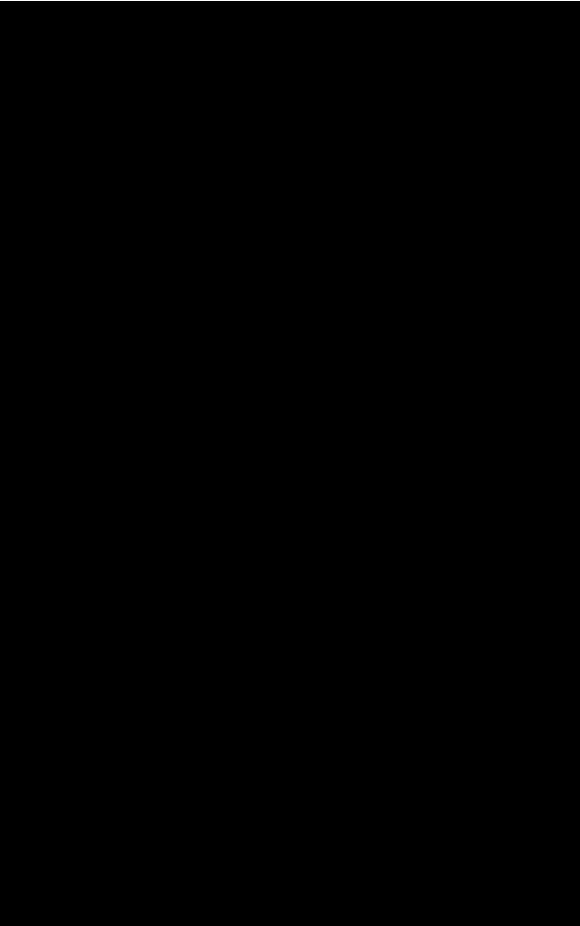
Common Name	Scientific Name	Family	CC	CW	SRANK	GRank	COSEWIC	SARO	ELC Code:
Brown Knapweed	Centaurea jacea	Asteraceae			5 SE5	GNR			
White Turtlehead	Chelone glabra	Scrophulariaceae	7	-5	S5	G5			
Wild Chicory	Cichorium intybus	Asteraceae			3 SE5	GNR			
Spotted Water-hemlock	Cicuta maculata	Apiaceae	6	-5	S5	G5			
Northern Water-hemlock	Cicuta virosa	Apiaceae	0	-5	S47	G5			
Black Walnut	Juglans nigra	Juglandaceae	5	3	S47	G5			
Broad-leaved Enchanter's Nightshade	Circaea canadensis	Onagraceae	2	3	S5	G5			
Canada Thistle	Cirsium arvense	Asteraceae			3 SE5	G5			
Bull Thistle	Cirsium vulgare	Asteraceae			3 SE5	GNR			
Virginia Clematis	Clematis virginiana	Ranunculaceae	3	0	S5	G5			
Yellow Clintonia	Clintonia borealis	Liliaceae	7	0	S5	G5			
Marsh Cinquefoil	Comarum palustre	Rosaceae	7	-5	S5	G5			
Field Bindweed	Convolvulus arvensis	Convolvulaceae			5 SE5	GNR			
Alternate-leaved Dogwood	Cornus alternifolia	Cornaceae	6	3	S5	G5			
Bunchberry	Cornus canadensis	Cornaceae	7	0	S5	G5			
Grey Dogwood	Cornus racemosa	Cornaceae	2	0	S5	G5			
Round-leaved Dogwood	Cornus rugosa	Cornaceae	6	5	S5	G5			
Red-osier Dogwood	Cornus sericea	Cornaceae	2	-3	S5	G5			
American Hazelnut	Corylus americana	Betulaceae	5	3	S5	G5			
English Hawthorn	Crataegus monogyna	Rosaceae			3 SE4	G5			
Dotted Hawthorn	Crataegus punctata	Rosaceae	4	5	S5	G5			
Large Yellow Lady's-slipper	Cypripedium parviflorum var. pubescens	Orchidaceae	5	0	S5	G5T5			
Orchard Grass	Dactylis glomerata	Poaceae			3 SE5	GNR			
Wild Carrot	Daucus carota	Apiaceae			5 SE5	GNR			
Northern Bush-honeysuckle	Diervilla lonicera	Caprifoliaceae	5	5	S5	G5			
Common Teasel	Dipsacus fulvonum	Dipsacaceae			3 SE5	GNR			
Flat-top White Aster	Doellingeria umbellata	Asteraceae	6	-3	S5	G5			
Spinulose Wood Fern	Dryopteris carthusiana	Dryopteridaceae	5	-3	S5	G5			
Crested Wood Fern	Dryopteris cristata	Dryopteridaceae	7	-5	S5	G5			
Marginal Wood Fern	Dryopteris marginalis	Dryopteridaceae	5	3	S5	G5			
Wild Cucumber	Echinocystis lobata	Cucurbitaceae	3	-3	S5	G5			
Common Viper's Bugloss	Echium vulgare	Boraginaceae			5 SE5	GNR			
Russian Olive	Elaeagnus angustifolia	Elaeagnaceae			3 SE3	GNR			
Autumn Olive	Elaeagnus umbellata	Elaeagnaceae			3 SE3	GNR			
Canada Waterweed	Elodea canadensis	Hydrocharitaceae	4	-5	S5	G5			
Bottlebrush Grass	Elymus hystrix	Poaceae	5	5	S5	G5			
Quackgrass	Elymus repens	Poaceae			3 SE5	GNR			
Northern Willowherb	Epilobium ciliatum	Onagraceae	3	-3	S5	G5			
Hairy Willowherb	Epilobium hirsutum	Onagraceae			-3 SE5	GNR			
Small-flowered Hairy Willowherb	Epilobium parviflorum	Onagraceae			3 SE4	GNR			
Field Horsetail	Equisetum arvense	Equisetaceae	0	0	S5	G5			
Common Scouring-rush	Equisetum hyemale	Equisetaceae	2	0	S5	G5			
Bristly Black Currant	Ribes lacustre	Grossulariaceae	7	-3	S5	G5			
Dwarf Scouring-rush	Equisetum scirpoides	Equisetaceae	7	0	S5	G5			
Variogated Scouring-rush	Equisetum variegatum	Equisetaceae	5	-3	S5	G5			
Annual Fleabane	Erigeron annuus	Asteraceae	0	3	S5	G5			
Canada Horseweed	Erigeron canadensis	Asteraceae	0	3	S5	G5			
Philadelphia Fleabane	Erigeron philadelphicus	Asteraceae	1	-3	S5	G5			
Philadelphia Fleabane	Erigeron philadelphicus var. philadelphicus	Asteraceae	1	-3	S5	G5T5			
Large-leaved Aster	Eurybia macrophylla	Asteraceae	5	5	S5	G5			
Common Boneset	Eupatorium perfoliatum	Asteraceae	2	-3	S5	G5			
Grass-leaved Goldenrod	Euthamia graminifolia	Asteraceae	2	0	S5	G5			
Spotted Joe Pye Weed	Eutrochium maculatum	Asteraceae	3	-5	S5	G5			
Spotted Joe Pye Weed	Eutrochium maculatum var. maculatum	Asteraceae	3	-5	S5	G5T5			
Woodland Strawberry	Fragaria vesca	Rosaceae	4	3	S5	G5			
American Beech	Fagus grandifolia	Fagaceae	6	3	S4	G5			
Wild Strawberry	Fragaria virginiana	Rosaceae	2	3	S5	G5			
Glossy Buckthorn	Frangula alnus	Rhamnaceae			0 SE5	GNR			
White Ash	Fraxinus americana	Oleaceae	4	3	S4	G5			
Black Ash	Fraxinus nigra	Oleaceae	7	-3	S3	G5			
Red Ash	Fraxinus pennsylvanica	Oleaceae	3	-3	S4	G5	THR	END	
Common Hemp-nettle	Galeopsis tetrahit	Lamiaceae			3 SE5	GNR			
Smooth Bedstraw	Galium mollugo	Rubiaceae			5 SE5	GNR			

Appendix C: Plant List
Highway 400 to Highway 404

Common Name
Brown Knapweed
White Turtlehead
Wild Chicory
Spotted Water-hemlock
Northern Water-hemlock
Black Walnut
Broad-leaved Enchanter's Nightshade
Canada Thistle
Bull Thistle
Virginia Clematis
Yellow Clintonia
Marsh Cinquefoil
Field Bindweed
Alternate-leaved Dogwood
Bunchberry
Grey Dogwood
Round-leaved Dogwood
Red-osier Dogwood
American Hazelnut
English Hawthorn
Dotted Hawthorn
Large Yellow Lady's-slipper
Orchard Grass
Wild Carrot
Northern Bush-honeysuckle
Common Teasel
Flat-top White Aster
Spinulose Wood Fern
Crested Wood Fern
Marginal Wood Fern
Wild Cucumber
Common Viper's Bugloss
Russian Olive
Autumn Olive
Canada Waterweed
Bottlebrush Grass
Quackgrass
Northern Willowherb
Hairy Willowherb
Small-flowered Hairy Willowherb
Field Horsetail
Common Scouring-rush
Bristly Black Currant
Dwarf Scouring-rush
Variogated Scouring-rush
Annual Fleabane
Canada Horseweed
Philadelphia Fleabane
Philadelphia Fleabane
Large-leaved Aster
Common Boneset
Grass-leaved Goldenrod
Spotted Joe Pye Weed
Spotted Joe Pye Weed
Woodland Strawberry
American Beech
Wild Strawberry
Glossy Buckthorn
White Ash
Black Ash
Red Ash
Common Hemp-nettle
Smooth Bedstraw

Common Name
Brown Knapweed
White Turtlehead
Wild Chicory
Spotted Water-hemlock
Northern Water-hemlock
Black Walnut
Broad-leaved Enchanter's Nightshade
Canada Thistle
Bull Thistle
Virginia Clematis
Yellow Clintonia
Marsh Cinquefoil
Field Bindweed
Alternate-leaved Dogwood
Bunchberry
Grey Dogwood
Round-leaved Dogwood
Red-osier Dogwood
American Hazelnut
English Hawthorn
Dotted Hawthorn
Large Yellow Lady's-slipper
Orchard Grass
Wild Carrot
Northern Bush-honeysuckle
Common Teasel
Flat-top White Aster
Spinulose Wood Fern
Crested Wood Fern
Marginal Wood Fern
Wild Cucumber
Common Viper's Bugloss
Russian Olive
Autumn Olive
Canada Waterweed
Bottlebrush Grass
Quackgrass
Northern Willowherb
Hairy Willowherb
Small-flowered Hairy Willowherb
Field Horsetail
Common Scouring-rush
Bristly Black Currant
Dwarf Scouring-rush
Variegated Scouring-rush
Annual Fleabane
Canada Horseweed
Philadelphia Fleabane
Philadelphia Fleabane
Large-leaved Aster
Common Boneset
Grass-leaved Goldenrod
Spotted Joe Pye Weed
Spotted Joe Pye Weed
Woodland Strawberry
American Beech
Wild Strawberry
Glossy Buckthorn
White Ash
Black Ash
Red Ash
Common Hemp-nettle
Smooth Bedstraw

Common Name
Brown Knapweed
White Turtlehead
Wild Chicory
Spotted Water-hemlock
Northern Water-hemlock
Black Walnut
Broad-leaved Enchanter's Nightshade
Canada Thistle
Bull Thistle
Virginia Clematis
Yellow Clintonia
Marsh Cinquefoil
Field Bindweed
Alternate-leaved Dogwood
Bunchberry
Grey Dogwood
Round-leaved Dogwood
Red-osier Dogwood
American Hazelnut
English Hawthorn
Dotted Hawthorn
Large Yellow Lady's-slipper
Orchard Grass
Wild Carrot
Northern Bush-honeysuckle
Common Teasel
Flat-top White Aster
Spinulose Wood Fern
Crested Wood Fern
Marginal Wood Fern
Wild Cucumber
Common Viper's Bugloss
Russian Olive
Autumn Olive
Canada Waterweed
Bottlebrush Grass
Quackgrass
Northern Willowherb
Hairy Willowherb
Small-flowered Hairy Willowherb
Field Horsetail
Common Scouring-rush
Bristly Black Currant
Dwarf Scouring-rush
Variegated Scouring-rush
Annual Fleabane
Canada Horseweed
Philadelphia Fleabane
Philadelphia Fleabane
Large-leaved Aster
Common Boneset
Grass-leaved Goldenrod
Spotted Joe Pye Weed
Spotted Joe Pye Weed
Woodland Strawberry
American Beech
Wild Strawberry
Glossy Buckthorn
White Ash
Black Ash
Red Ash
Common Hemp-nettle
Smooth Bedstraw



Common Name	Scientific Name	Family	CC	CW	SRANK	GRank	COSEWIC	SARO	ELC Code:
Common Marsh Bedstraw	Galium palustre	Rubiaceae	5	-5	S5	G5			
Three-flowered Bedstraw	Galium triflorum	Rubiaceae	4	3	S5	G5			
Herb-Robert	Ceranium robertianum	Geraniaceae	2	3	S5	G5			
Yellow Avens	Geum aleppicum	Rosaceae	2	0	S5	G5			
Canada Avens	Geum canadense	Rosaceae	3	0	S5	G5			
Wood Avens	Geum urbanum	Rosaceae	5	SE3	G5				
Fowl Mannagrass	Glyceria striata	Poaceae	3	-5	S5	G5			
Butternut	Juglans cinerea	Juglandaceae	6	3	SE2	G3	END	END	
Dame's Rocket	Hesperis matronalis	Brassicaceae	3	SE5	G4G5				
Virginia Waterleaf	Hydrophyllum virginianum	Hydrophyllaceae	6	0	S5	G5			
Common St. John's-wort	Hypericum perforatum	Clusiaceae	5	SE5	GNR				
Common Winterberry	Ilex verticillata	Aquifoliaceae	5	-3	S5	G5			
Spotted Jewelweed	Impatiens capensis	Balsaminaceae	4	-3	S5	G5			
Elecampane	Inula helenium	Asteraceae	3	SE5	GNR				
Harlequin Blue Flag	Iris versicolor	Iridaceae	5	-5	S5	G5			
Eastern Ninebark	Physocarpus opulifolius	Rosaceae	5	-3	S5	G5			
Meadow Horsetail	Equisetum pratense	Equisetaceae	8	-3	S5	G5			
Soft Rush	Juncus effusus	Juncaceae	4	-5	S5	G5			
Path Rush	Juncus tenuis	Juncaceae	0	0	S5	G5			
Common Juniper	Juniperus communis	Cupressaceae	4	3	S5	G5			
Eastern Red Cedar	Juniperus virginiana	Cupressaceae	4	3	S5	G5			
Prickly Lettuce	Lactuca scariola	Asteraceae	3	SE5	GNR				
Canada Wood Nettle	Laportea canadensis	Urticaceae	6	-3	S5	G5			
Rice Cutgrass	Leersia oryzoides	Poaceae	3	-5	S5	G5			
Small Duckweed	Lemna minor	Lemnaceae	5	-5	SE7	G5			
Star Duckweed	Lemna trisulca	Lemnaceae	5	-5	S5	G5			
Common Motherwort	Leonurus cardiaca	Lamiaceae	5	SE5	GNR				
Oxeye Daisy	Leucanthemum vulgare	Asteraceae	5	SE5	GNR				
Butter-and-eggs	Linaria vulgaris	Scrophulariaceae	5	SE5	GNR				
Great Blue Lobelia	Lobelia siphilica	Campanulaceae	6	-3	S5	G5			
Canada Fly Honeysuckle	Lonicera canadensis	Caprifoliaceae	6	3	S5	G5			
Limber Honeysuckle	Lonicera dioica	Caprifoliaceae	5	3	S5	G5			
Morrow's Honeysuckle	Lonicera morrowii	Caprifoliaceae	3	SE3	GNR				
Purple-stemmed Angelica	Angelica atropurpurea	Apiaceae	6	-5	S5	G5			
Tatarian Honeysuckle	Lonicera tatarica	Caprifoliaceae	3	SE5	GNR				
American Water-horehound	Lycopus americanus	Lamiaceae	4	-5	S5	G5			
Northern Water-horehound	Lycopus uniflorus	Lamiaceae	5	-5	S5	G5			
Fringed Yellow Loosestrife	Lysimachia ciliata	Primulaceae	4	-3	S5	G5			
Creeping Yellow Loosestrife	Lysimachia nummularia	Primulaceae	-3	SE5	GNR				
Purple Loosestrife	Lythrum salicaria	Lythraceae	-5	SE5	G5				
Wild Lily-of-the-valley	Maianthemum canadense	Liliaceae	5	3	S5	G5			
Large False Solomon's Seal	Maianthemum racemosum	Liliaceae	4	3	S5	G5			
Common Apple	Malus pumila	Rosaceae	5	SE4	G5				
Pineappleweed	Mattickia discoidea	Asteraceae	3	SE5	G5				
Ostrich Fern	Matteuccia struthiopteris	Dryopteridaceae	5	0	S5	G5			
Black Medick	Medicago lupulina	Fabaceae	3	SE5	GNR				
Alfalfa	Medicago sativa	Fabaceae	5	SE5	GNR				
White Sweet-clover	Mellilotus albus	Fabaceae	3	SE5	G5				
Canada Mint	Monarda canadensis	Lamiaceae	3	-3	S5	G5			
Partridgeberry	Mitchella repens	Rubiaceae	6	3	S5	G5			
Wild Bergamot	Monarda fistulosa	Lamiaceae	6	3	S5	G5			
Wall Lettuce	Mycelis muralis	Asteraceae	5	SE2	GNR				
True Forget-me-not	Mysotis scorpioides	Boraginaceae	-5	SE5	G5				
White Rattlesnakeroot	Nabalus albus	Asteraceae	6	3	S5	G5			
Tall Rattlesnakeroot	Nabalus altilissimus	Asteraceae	5	3	S5	G5			
Watercress	Nasturtium officinale	Brassicaceae	1	-5	SE	GNR			
Common Evening-primrose	Oenothera biennis	Onagraceae	0	3	S5	G5			
Sensitive Fern	Oncoclea sensibilis	Dryopteridaceae	4	-3	S5	G5			
One-sided Wintergreen	Orthilia secunda	Pyrolaceae	5	0	S5	G5			
Royal Fern	Osmunda regalis	Osmundaceae	7	-5	S5	G5			
Cinnamon Fern	Osmundastrum cinnamomeum	Osmundaceae	7	-3	S5	G5			
Eastern Hop-hornbeam	Ostrya virginiana	Betulaceae	4	3	S5	G5			
Upright Yellow Wood-sorrel	Oxalis stricta	Oxalidaceae	0	3	S5	G5			
Old Switch Panicgrass	Panicum virgatum	Poaceae	6	0	S4	G5			
Thicket Creeper	Parthenocissus vitacea	Vitaceae	4	3	S5	G5			

Common Name
Common Marsh Bedstraw
Three-flowered Bedstraw
Herb-Robert
Yellow Avens
Canada Avens
Wood Avens
Fowl Mannagrass
Butternut
Dame's Rocket
Virginia Waterleaf
Common St. John's-wort
Common Winterberry
Spotted Jewelweed
Elecampane
Harlequin Blue Flag
Eastern Ninebark
Meadow Horsetail
Soft Rush
Path Rush
Common Juniper
Eastern Red Cedar
Prickly Lettuce
Canada Wood Nettle
Rice Cutgrass
Small Duckweed
Star Duckweed
Common Motherwort
Oxeye Daisy
Butter-and-eggs
Great Blue Lobelia
Canada Fly Honeysuckle
Limber Honeysuckle
Morrow's Honeysuckle
Purple-stemmed Angelica
Tatarian Honeysuckle
American Water-horehound
Northern Water-horehound
Fringed Yellow Loosestrife
Creeping Yellow Loosestrife
Purple Loosestrife
Wild Lily-of-the-valley
Large False Solomon's Seal
Common Apple
Pineappleweed
Ostrich Fern
Black Medick
Alfalfa
White Sweet-clover
Canada Mint
Partridgeberry
Wild Bergamot
Wall Lettuce
True Forget-me-not
White Rattlesnakeroot
Tail Rattlesnakeroot
Watercress
Common Evening-primrose
Sensitive Fern
One-sided Wintergreen
Royal Fern
Cinnamon Fern
Eastern Hop-hornbeam
Upright Yellow Wood-sorrel
Old Switch Panicgrass
Thicket Creeper

Appendix C: Plant List
Highway 400 to Highway 404

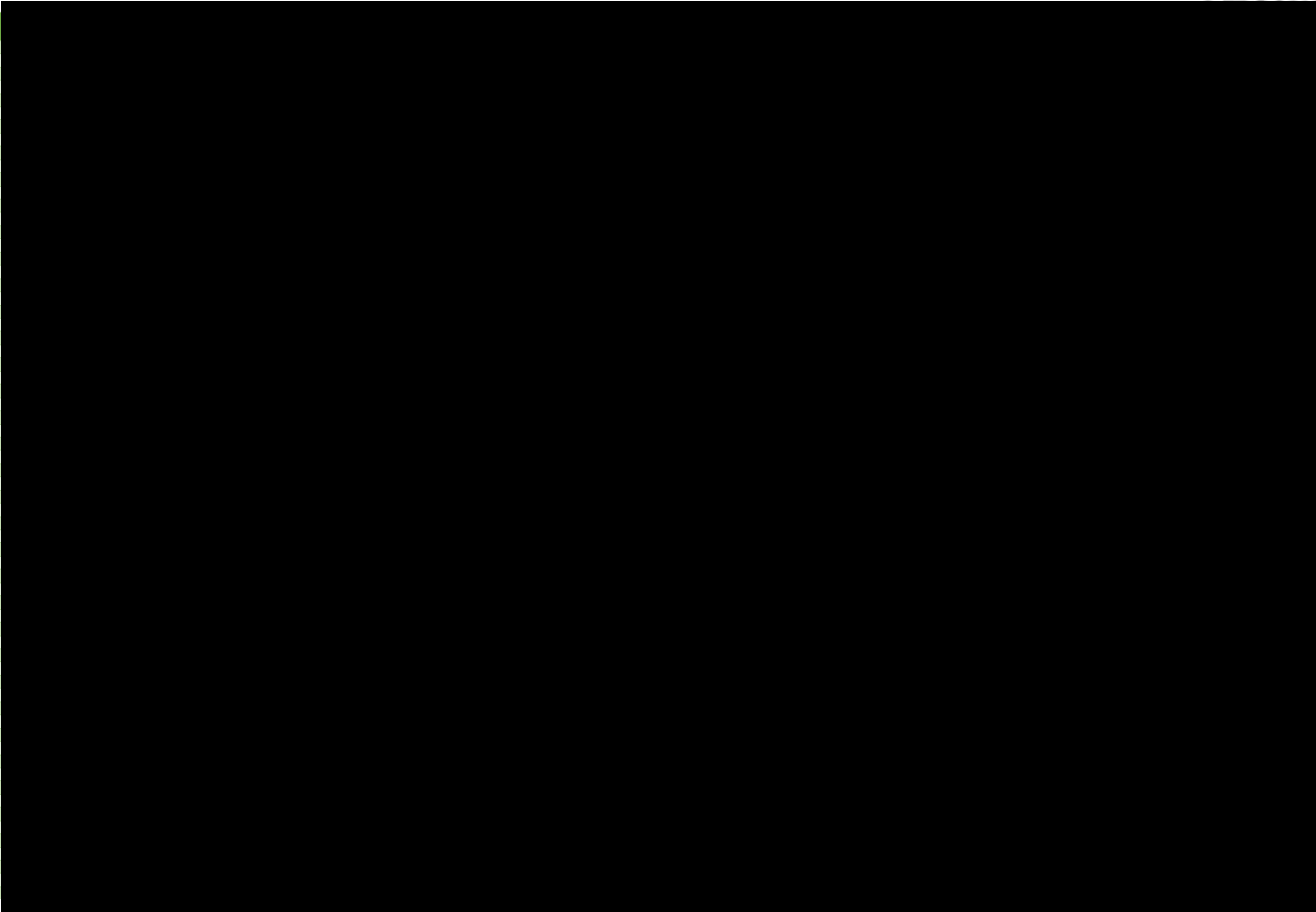
Common Name
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Dame's Rocket
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Eastern Hop-hornbeam
Upright Yellow Wood-sorrel
Old Switch Panicgrass
Thicket Creeper

Appendix C: Plant List
 Highway 400 to Highway 404 Link (Bradford Bypass)

Common Name	Scientific Name	Family	CC	CW	SRANK	GRank	COSEWIC	SARO	ELC Code:
Wild Parsnip	<i>Pastinaca sativa</i>	Apiaceae			5 SE5	GNR			
Spotted Lady's-thumb	<i>Persicaria maculosa</i>	Polygonaceae			-3 SE5	G3G5			
Reed Canarygrass	<i>Phalaris arundinacea</i>	Poaceae	0		-3 S5	G5			
Common Timothy	<i>Phleum pratense</i>	Poaceae			3 SE5	GNR			
European Reed	<i>Phragmites australis</i> ssp. <i>australis</i>	Poaceae			-3 SE5	G5T5			
Red Pine	<i>Pinus resinosa</i>	Pinaceae		8	3 S5	G5			
Virginia False Dragonhead	<i>Physostegia virginiana</i>	Lamiaceae		8	-3 S4	G5			
Norway Spruce	<i>Picea abies</i>	Pinaceae			5 SE3	G5			
Blue Spruce	<i>Picea pungens</i>	Pinaceae			3 SE1	G5			
White Spruce	<i>Picea glauca</i>	Pinaceae			6 3 S5	G5			
Dwarf Cleanweed	<i>Pilea pumila</i>	Utriculariaceae		5	-3 S5	G5			
Meadow Hawkweed	<i>Pilosella caespitosa</i>	Asteraceae			5 SE5	GNR			
Spreading Goldenrod	<i>Solidago patula</i>	Asteraceae		8	-5 S4	G5			
Eastern White Pine	<i>Pinus strobus</i>	Pinaceae		4	3 S5	G5			
Scots Pine	<i>Pinus sylvestris</i>	Pinaceae			3 SE5	GNR			
English Plantain	<i>Plantago lanceolata</i>	Plantaginaceae			3 SE5	G5			
Common Plantain	<i>Plantago major</i>	Plantaginaceae			3 SE5	G5			
Rugel's Plantain	<i>Plantago rugelii</i>	Plantaginaceae		1	0 S5	G5			
Canada Bluegrass	<i>Poa compressa</i>	Poaceae			3 SE5	GNR			
Fowl Bluegrass	<i>Poa palustris</i>	Poaceae		5	-3 S5	G5			
Kentucky Bluegrass	<i>Poa pratensis</i>	Poaceae		0	3 S5	G5			
May-apple	<i>Podophyllum peltatum</i>	Berberidaceae		5	3 S5	G5			
Hairy Solomon's Seal	<i>Polygonatum pubescens</i>	Liliaceae		5	5 S5	G5			
Christmas Fern	<i>Polystichum acrostichoides</i>	Dryopteridaceae		5	3 S5	G5			
Balsam Poplar	<i>Populus balsamifera</i>	Salicaceae		4	-3 S5	G5			
Eastern Cottonwood	<i>Populus deltoides</i>	Salicaceae		4	0 S5	G5			
Large-toothed Aspen	<i>Populus grandidentata</i>	Salicaceae		5	3 S5	G5			
Trembling Aspen	<i>Populus tremuloides</i>	Salicaceae		2	0 S5	G5			
Rough Cinquefoil	<i>Potentilla norvegica</i>	Rosaceae		0	0 S5	G5			
Sulphur Cinquefoil	<i>Potentilla recta</i>	Rosaceae			5 SE5	GNR			
Old-field Cinquefoil	<i>Potentilla simplex</i>	Rosaceae		3	3 S5	G5			
Common Self-heal	<i>Prunella vulgaris</i>	Lamiaceae		0	0 S5	G5			
Sweet Cherry	<i>Prunus avium</i>	Rosaceae			5 SE4	GNR			
Pin Cherry	<i>Prunus pensylvanica</i>	Rosaceae		3	3 S5	G5			
Black Cherry	<i>Prunus serotina</i>	Rosaceae		3	3 S5	G5			
Chokecherry	<i>Prunus virginiana</i>	Rosaceae		2	3 S5	G5			
Bracken Fern	<i>Pteridium aquilinum</i>	Dicranellaceae		2	3 S5	G5			
Round-leaved Pyrola	<i>Pyrola americana</i>	Pyrolaceae		7	0 S47	G5			
Shinleaf	<i>Pyrola elliptica</i>	Pyrolaceae		5	5 S5	G5			
Stout Woodreed	<i>Cinna arundinacea</i>	Poaceae		7	-3 S4	G5			
Bur Oak	<i>Quercus macrocarpa</i>	Fagaceae		5	3 S5	G5			
Northern Red Oak	<i>Quercus rubra</i>	Fagaceae		6	3 S5	G5			
Kitchen-leaved Buttercup	<i>Ranunculus abortivus</i>	Ranunculaceae		2	0 S5	G5			
Common Buttercup	<i>Ranunculus acris</i>	Ranunculaceae			0 SE5	G5			
Northern Swamp Buttercup	<i>Ranunculus caricetorum</i>	Ranunculaceae		5	-5 S5	G5T5			
Cursed Buttercup	<i>Ranunculus sceleratus</i>	Ranunculaceae		2	-5 S5	G5			
European Buckthorn	<i>Rhamnus cathartica</i>	Rhamnaceae			0 SE5	GNR			
Staghorn Sumac	<i>Rhus typhina</i>	Anacardiaceae		1	3 S5	G5			
American Black Currant	<i>Ribes americanum</i>	Grossulariaceae		4	-3 S5	G5			
Eastern Prickly Gooseberry	<i>Ribes cynosbati</i>	Grossulariaceae		4	3 S5	G5			
Swamp Fly-honeysuckle	<i>Lonicera oblongifolia</i>	Caprifoliaceae		8	-5 S5	G5			
European Red Currant	<i>Ribes rubrum</i>	Grossulariaceae			5 SE5	G4G5			
Black Locust	<i>Robinia pseudoacacia</i>	Fabaceae			3 SE5	G5			
Multiflora Rose	<i>Rosa multiflora</i>	Rosaceae			3 SE5	GNR			
Allegheny Blackberry	<i>Rubus allegheniensis</i>	Rosaceae		2	3 S5	G5			
Red Raspberry	<i>Rubus idaeus</i>	Rosaceae		2	3 S5	G5			
Black Raspberry	<i>Rubus occidentalis</i>	Rosaceae		2	5 S5	G5			
Purple-flowering Raspberry	<i>Rubus odoratus</i>	Rosaceae		3	5 S5	G5			
Dwarf Raspberry	<i>Rubus pubescens</i>	Rosaceae		4	-3 S5	G5			
Black-eyed Susan	<i>Rudbeckia hirta</i>	Asteraceae		0	3 S5	G5			
Curled Dock	<i>Rumex crispus</i>	Polygonaceae			0 SE5	GNR			
Bitter Dock	<i>Rumex obtusifolius</i>	Polygonaceae			-3 SE5	GNR			
Broad-leaved Arrowhead	<i>Sagittaria latifolia</i>	Alismataceae		4	-5 S5	G5			
Peach-leaved Willow	<i>Salix amygdaloides</i>	Salicaceae		6	-3 S5	G5			
Bebb's Willow	<i>Salix bebbiana</i>	Salicaceae		4	-3 S5	G5			

Common Name
Wild Parsnip
Spotted Lady's-thumb
Reed Canarygrass
Common Timothy
European Reed
Red Pine
Virginia False Dragonhead
Norway Spruce
Blue Spruce
White Spruce
Dwarf Cleanweed
Meadow Hawkweed
Spreading Goldenrod
Eastern White Pine
Scots Pine
English Plantain
Common Plantain
Rugel's Plantain
Canada Bluegrass
Fowl Bluegrass
Kentucky Bluegrass
May-apple
Hairy Solomon's Seal
Christmas Fern
Balsam Poplar
Eastern Cottonwood
Large-toothed Aspen
Trembling Aspen
Rough Cinquefoil
Sulphur Cinquefoil
Old-field Cinquefoil
Common Self-heal
Sweet Cherry
Pin Cherry
Black Cherry
Chokecherry
Bracken Fern
Round-leaved Pyrola
Shinleaf
Stout Woodreed
Bur Oak
Northern Red Oak
Kidney-leaved Buttercup
Common Buttercup
Northern Swamp Buttercup
Cursed Buttercup
European Buckthorn
Staghorn Sumac
American Black Currant
Eastern Prickly Gooseberry
Swamp Fly-honeysuckle
European Red Currant
Black Locust
Multiflora Rose
Allegheny Blackberry
Red Raspberry
Black Raspberry
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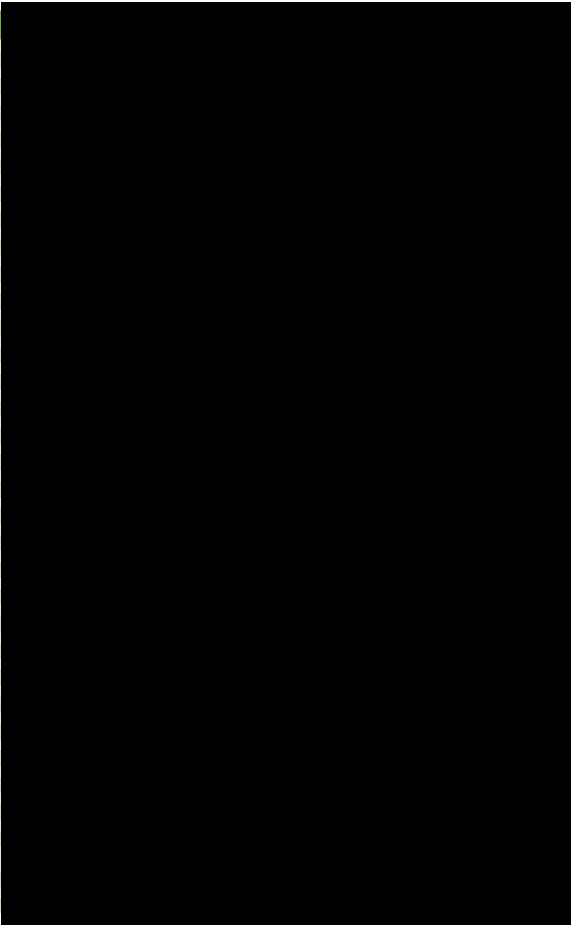


Common Name	Scientific Name	Family	CC	CW	SRANK	GRank	COSEWIC	SARO	ELC Code:
Pussy Willow	Salix discolor	Salicaceae		3	-3	S5	G5		
Cottony Willow	Salix eriocephala	Salicaceae		4	-3	S5	G5		
Sandbar Willow	Salix interior	Salicaceae		1	-3	S5	G5		
Shining Willow	Salix lucida	Salicaceae		5	-3	S5	G5		
Meadow Willow	Salix petiolaris	Salicaceae		3	-3	S5	G5		
Salix species	Salix sp.	Salicaceae							
(Salix alba X Salix euxina)	Salix x fragilis	Salicaceae			0	SNA	GNA		
Black Elderberry	Sambucus nigra	Caprifoliaceae		0	-3	SEH	G5		
Red Elderberry	Sambucus racemosa	Caprifoliaceae		5	3	S5	G5		
Bloodroot	Sanguinaria canadensis	Papaveraceae		5	3	S5	G5		
Dark-green Bulrush	Scirpus atrovirens	Cyperaceae		3	-5	S5	G5		
Common Woolly Bulrush	Scirpus cyperinus	Cyperaceae		4	-5	S5	G5		
Marsh Skullcap	Scutellaria galericulata	Lamiaceae		6	-5	S5	G5		
Mad-dog Skullcap	Scutellaria lateriflora	Lamiaceae		5	-5	S5	G5		
Green Foxtail	Setaria viridis	Poaceae			5	SE5	GNR		
Bladder Campion	Silene vulgaris	Caryophyllaceae			5	SE5	GNR		
Common Water-parsnip	Sium suave	Apiaceae		4	-5	S5	G5		
Herbaceous Carrionflower	Smilax herbacea	Smilacaceae		5	0	S4F	G5		
Bristly Greenbriar	Smilax tannoides	Smilacaceae		6	0	S5	G5		
Bittersweet Nightshade	Solanum dulcamara	Solanaceae			0	SE5	GNR		
Tall Goldenrod	Solidago altissima	Asteraceae		1	3	S5	G5		
Blue-stemmed Goldenrod	Solidago casia	Asteraceae		5	3	S5	G5		
Canada Goldenrod	Solidago canadensis	Asteraceae		1	3	S5	G5		
Zizag Goldenrod	Solidago flexicaulis	Asteraceae		6	3	S5	G5		
Giant Goldenrod	Solidago gigantea	Asteraceae		4	-3	S5	G5		
Early Goldenrod	Solidago juncea	Asteraceae		3	5	S5	G5		
Grey-stemmed Goldenrod	Solidago nemoralis	Asteraceae		2	5	S5	G5		
White Heath Aster	Symphotrichum ericoides	Asteraceae		4	3	S5	G5		
Rough-stemmed Goldenrod	Solidago rugosa	Asteraceae		4	0	S5	G5		
Field Sow-thistle	Sonchus arvensis	Asteraceae			3	SE5	GNR		
European Mountain-ash	Sorbus aucuparia	Rosaceae			5	SE4	G5		
White Meadowsweet	Spiraea alba	Rosaceae		3	-3	S5	G5		
Heart-leaved Aster	Symphotrichum cordifolium	Asteraceae		5	5	S5	G5		
White Oak	Quercus alba	Fagaceae		6	3	S5	G5		
Panicled Aster	Symphotrichum lanceolatum	Asteraceae		3	-3	S5	G5		
Eastern Panicled Aster	Symphotrichum lanceolatum ssp. lanceolatum	Asteraceae		3	-3	S5	G5T5		
Calico Aster	Symphotrichum lateriflorum	Asteraceae		3	0	S5	G5		
New England Aster	Symphotrichum novae-angliae	Asteraceae		2	-3	S5	G5		
Purple-stemmed Aster	Symphotrichum puniceum var. puniceum	Asteraceae		6	-5	S5	G5T5		
Common Lilac	Syringa vulgaris	Oleaceae			5	SE5	GNR		
Common Tansy	Tanacetum vulgare	Asteraceae			5	SE5	GNR		
Common Dandelion	Taraxacum officinale	Asteraceae			3	SE5	G5		
Canada Yew	Taxus canadensis	Taxaceae		7	3	S4	G5		
Early Meadow-rue	Thalictrum dioicum	Ranunculaceae		6	3	S5	G5		
Tall Meadow-rue	Thalictrum pubescens	Ranunculaceae		5	-3	S5	G5		
Marsh Fern	Thelypteris palustris	Thelypteridaceae		5	-3	S5	G5		
Eastern White Cedar	Thuja occidentalis	Cupressaceae		4	-3	S5	G5		
Heart-leaved Foamflower	Tiarella cordifolia	Saxifragaceae		6	3	S5	G5		
Basswood	Tilia americana	Tiliaceae		4	3	S5	G5		
Poison Ivy	Toxicodendron radicans	Anacardiaceae		2	0	S5	G5		
Western Poison Ivy	Toxicodendron radicans var. rydbergii	Anacardiaceae		2	0	S5	G-T5		
Meadow Goatsbeard	Tragopogon pratensis	Asteraceae			5	SE5	GNR		
Red Clover	Trifolium pratense	Fabaceae			3	SE5	GNR		
White Clover	Trifolium repens	Fabaceae			3	SE5	GNR		
Red Trillium	Trillium erectum	Liliaceae		6	3	S5	G5		
White Trillium	Trillium grandiflorum	Liliaceae		5	3	S5	G5		
Eastern Hemlock	Tsuga canadensis	Pinaceae		7	3	S5	G5		
Coltsfoot	Tussilago farfara	Asteraceae			3	SE5	GNR		
Narrow-leaved Cattail	Typha angustifolia	Typhaceae			-5	SE5	G5		
Broad-leaved Cattail	Typha latifolia	Typhaceae		1	-5	S5	G5		
(Typha angustifolia X Typha latifolia)	Typha x glauca	Typhaceae			-5	SNA	GNA		
White Elm	Ulmus americana	Ulmaceae		3	-3	S5	G4		
Siberian Elm	Ulmus pumila	Ulmaceae			3	SE3	GNR		
Stinging Nettle	Urtica dioica	Urticaceae		2	0	S5	G5		

Common Name
Pussy Willow
Cottony Willow
Sandbar Willow
Shining Willow
Meadow Willow
Salix species
(Salix alba X Salix euixina)
Black Elderberry
Red Elderberry
Bloodroot
Dark-green Bulrush
Common Woolly Bulrush
Marsh Skullcap
Mad-dog Skullcap
Green Foxtail
Bladder Campion
Common Water-parsnip
Herbaceous Carrionflower
Bristly Greenbriar
Bittersweet Nightshade
Tall Goldenrod
Blue-stemmed Goldenrod
Canada Goldenrod
Zigzag Goldenrod
Giant Goldenrod
Early Goldenrod
Grey-stemmed Goldenrod
White Heath Aster
Rough-stemmed Goldenrod
Field Sow-thistle
European Mountain-ash
White Meadowsweet
Heart-leaved Aster
White Oak
Panicled Aster
Eastern Panicled Aster
Calico Aster
New England Aster
Purple-stemmed Aster
Common Lilac
Common Tansy
Common Dandelion
Canada Yew
Early Meadow-rue
Tall Meadow-rue
Marsh Fern
Eastern White Cedar
Heart-leaved Foamflower
Basswood
Poison Ivy
Western Poison Ivy
Meadow Goatsbeard
Red Clover
White Clover
Red Trillium
White Trillium
Eastern Hemlock
Coltsfoot
Narrow-leaved Cattail
Broad-leaved Cattail
(Typha angustifolia X Typha latifolia)
White Elm
Siberian Elm
Stinging Nettle

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Blue-stemmed Goldenrod
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White Heath Aster
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Heart-leaved Foamflower
Basswood
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Western Poison Ivy
Meadow Goatsbeard
Red Clover
White Clover
Red Trillium
White Trillium
Eastern Hemlock
Coltsfoot
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Red Clover
White Clover
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White Trillium
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Coltsfoot
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Broad-leaved Cattail
(Typha angustifolia X Typha latifolia)
White Elm
Siberian Elm
Stinging Nettle



Common Name	Scientific Name	Family	CC	CW	SRANK	GRank	COSEWIC	SARO	ELC Code:
Common Mullen	Verbascum thapsus	Scrophulariaceae			5 SE5	GNR			
Blue Vervain	Verbena hastata	Verbenaceae	4	-3	S5	G5			
White Vervain	Verbena urticifolia	Verbenaceae	4	0	S5	G5			
Maple-leaved Viburnum	Viburnum acerifolium	Caprifoliaceae	6	5	S5	G5			
Nannyberry	Viburnum lentago	Caprifoliaceae	4	0	S5	G5			
Cranberry Viburnum	Viburnum opulus	Caprifoliaceae	5	-3	S5	G5			
Tufted Vetch	Vicia cracca	Fabaceae			5 SE5	GNR			
European Swallowwort	Vincetoxicum rossicum	Apocynaceae			5 SE5	GNR			
Yellow Violet	Viola pubescens	Violaceae	5	3	S5	G5			
Riverbank Grape	Vitis riparia	Vitaceae	0	0	S5	G5			

Floristic Summary and Analysis for Entire Study Area			
Summary			
Total Species:	327	N/A	
Native Species:	241	74%	
Introduced Species:	85	26%	
Invasive Species:	36	11%	
ESA Status			
END	2	1%	
THR	0	0%	
SC	0	0%	
COSEWIC Status			
END	1	0%	
THR	1	0%	
SC	0	0%	
Provincially Rare (S-rank of S1-S3)			
S1	0	0%	
S1?	0	0%	
S1S2	0	0%	
S1S3	0	0%	
S2	0	0%	
S2?	1	0%	
S2S3	0	0%	
S2S4	0	0%	
S3	1	0%	
S3?	0	0%	
S3S4	0	0%	
Total S1-S3:	2	1%	
Co-efficient of Conservatism and Floral Quality Index			
Co-efficient of Conservatism (CC) 4.20 (average):			
CC 0 to 3		77	32%
CC 4 to 6	lowest sensitivity	139	58%
CC 7 to 8	moderate sensitivity	24	10%
CC 9 to 10	high sensitivity	1	0%
CC 9 to 10	highest sensitivity		
Floral Quality Index (FQI)		65.25	
Presence of Wetland Species			
Wetness Value (CW) (average):			
upland		50	15%
facultative upland	0.46	114	35%
facultative	5	49	15%
facultative wetland	2 to 4	62	19%
obligate wetland	1 to -1	51	16%
	-2 to -4		
	-5		

Floristic Summary and Analysis Per ELC						
Summary						
Total Species:	39	87	59	43	53	21
Native Species:	33	80	50	38	46	19
Introduced Species:	6	7	9	5	7	2
Invasive Species:	2	4	6	2	5	2
ESA Status						
END	1	1	0	0	0	1
THR	0	0	0	0	0	0
SC	0	0	0	0	0	0
COSEWIC Status						
END	1	0	0	0	0	0
THR	0	1	0	0	0	1
SC	0	0	0	0	0	0
Provincially Rare (S-rank of S1-S3)						
S1	0	0	0	0	0	0
S1?	0	0	0	0	0	0
S1S2	0	0	0	0	0	0
S1S3	0	0	0	0	0	0
S2	0	0	0	0	0	0
S2?	1	0	0	0	0	0
S2S3	0	0	0	0	0	0
S2S4	0	0	0	0	0	0
S3	0	1	0	0	0	1
S3?	0	0	0	0	0	0
S3S4	0	0	0	0	0	0
Total S1-S3:	1	1	0	0	0	1
Co-efficient of Conservatism and Floral Quality Index						
Co-efficient of Conservatism						
CC 0 to 3	3.55	4.58	3.82	3.63	4.39	3.63
CC 4 to 6	13	20	19	15	12	8
CC 7 to 8	20	52	30	21	32	10
CC 9 to 10	0	7	1	2	2	1
CC 9 to 10	0	1	0	0	0	0
Floral Quality Index (FQI)						
FQI:	20.37	40.92	27.01	22.39	29.78	15.83
Presence of Wetland Species						
Wetness Value (CW) (ave)						
upland	1.64	0.34	2.12	1.53	1.36	0.14
facultative upland	6	8	7	3	6	1
facultative	19	32	36	24	26	8
facultative wetland	7	17	10	9	9	4
obligate wetland	6	22	6	7	12	7
	1	8	0	0	0	1

Common Name	
Common Mullen	
Blue Vervain	
White Vervain	
Maple-leaved Viburnum	
Nannyberry	
Cranberry Viburnum	
Tufted Vetch	
European Swallowwort	
Yellow Violet	
Riverbank Grape	

Floristic Summary and Analysis for Entire Study Area

Summary

Total Species:	50	92	30	31	37	42	26	26	49	30	37	24	19	68	112	84	29
Native Species:	50	74	28	24	28	35	25	23	46	24	32	21	15	38	64	52	23
Introduced Species:	0	18	2	7	9	7	1	3	3	6	5	3	4	30	48	32	6
Invasive Species:	0	12	1	4	3	6	0	2	2	4	3	3	3	14	19	16	4

ESA Status

END	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
THR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COSEWIC Status

END	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
THR	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
SC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Provincially Rare (S-rank of S1-S3)

S1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S1?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S1S2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S1S3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S2?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
S2S3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S2S4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S3	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
S3?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S3S4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total S1-S3:	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0

Co-efficient of Conservatism and Floral Quality Index

Co-efficient of Conservatism (CC)

(average):	4.26	3.55	4.21	3.54	3.59	3.31	3.92	4.13	4.17	3.29	3.63	3.95	3.13	2.38	2.62	2.57	2.35
CC 0 to 3	14	33	9	11	13	18	10	7	12	12	14	9	8	28	41	33	17
CC 4 to 6	34	35	18	13	14	15	15	14	30	12	17	12	6	8	22	20	6
CC 7 to 8	2	6	1	0	2	2	0	2	4	0	1	0	1	1	0	0	0
CC 9 to 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Floral Quality Index (FQI)	30.12	30.57	22.30	17.35	18.98	19.61	19.60	19.81	28.31	16.13	20.51	18.11	12.14	14.66	20.95	18.50	11.26

Presence of Wetland Species

Wetland Value (CW) (average):

upland	1.00	0.26	1.37	0.68	0.73	0.71	1.42	2.35	0.55	0.63	1.14	1.33	0.89	1.15	1.34	1.43	0.79
facultative upland	5	11	1	2	3	5	2	2	4	2	4	4	1	16	24	10	4
facultative	21	30	18	13	18	15	14	19	18	10	17	9	9	24	44	41	9
facultative wetland	12	18	5	8	4	10	5	3	12	11	7	6	4	8	18	16	8
obligate wetland	11	22	6	6	9	10	5	2	14	7	8	5	5	13	14	16	8
obligate wetland	1	11	0	2	3	2	0	0	1	0	1	0	0	7	12	1	0

Common Name
Common Mullein
Blue Vervain
White Vervain
Maple-leaved Viburnum
Nannyberry
Cranberry Viburnum
Tufted Vetch
European Swallowwort
Yellow Violet
Riverbank Grape

**Floristic Summary and
Analysis for Entire Study Area**

Summary																	
Total Species:	41	111	39	23	36	9	80	44	50	21	27	22	38	26	21	39	10
Native Species:	20	70	26	15	28	4	68	42	46	21	20	17	31	22	17	34	9
Introduced Species:	21	41	13	8	8	5	12	2	4	0	7	5	7	4	4	5	1
Invasive Species:	11	19	7	5	7	3	11	1	3	0	6	6	6	3	6	3	1
ESA Status																	
END	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0
THR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COSEWIC Status																	
END	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
THR	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
SC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Provincially Rare (S-rank of S1-S3)																	
S1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S1?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S1S2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S1S3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S2?	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
S2S3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S2S4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
S3?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S3S4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total S1-S3:	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0

**Co-efficient of Conservatism
and Floral Quality Index**

Co-efficient of Conservatism (CC)																	
(average):	2.20	3.13	3.42	2.73	2.75	1.25	3.64	4.52	3.98	4.48	2.95	2.00	3.75	3.73	3.13	4.65	2.44
CC 0 to 3	14	38	12	10	18	4	28	10	17	6	12	13	11	10	9	8	7
CC 4 to 6	6	31	14	4	10	0	39	28	25	14	8	3	19	10	6	20	2
CC 7 to 8	0	1	0	1	0	0	0	4	4	1	0	0	2	2	1	6	0
CC 9 to 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Floral Quality Index (FQI)																	
FQI:	9.84	26.18	17.45	10.59	14.55	2.50	30.03	29.32	26.98	20.51	13.19	8.25	20.88	17.48	12.88	27.10	7.33

Presence of Wetland Species

Wetness Value (CW) (average):																	
upland	2.05	1.25	2.05	2.43	1.97	2.78	-1.51	-0.98	-1.90	-1.90	-0.81	-0.82	-2.11	-1.08	-1.62	-3.05	-0.50
facultative upland	9	18	7	4	7	2	2	3	0	1	1	0	0	2	1	0	0
facultative	20	49	20	14	17	6	17	11	7	4	8	5	7	8	5	1	3
facultative wetland	5	16	7	3	7	0	15	7	3	5	6	4	4	1	8	3	3
obligate wetland	7	21	5	2	5	1	24	17	17	9	7	6	17	9	8	14	3
obligate wetland	0	7	0	0	0	0	22	7	16	5	6	4	10	5	6	16	1

Common Name	
Common Mullen	
Blue Vervain	
White Vervain	
Maple-leaved Viburnum	
Nannyberry	
Cranberry Viburnum	
Tufted Vetch	
European Swallowwort	
Yellow Violet	
Riverbank Grape	

Floristic Summary and Analysis for Entire Study Area Summary							
Total Species:	16	71	29	64	14	11	27
Native Species:	14	43	17	44	11	9	20
Introduced Species:	1	27	11	19	3	2	7
Invasive Species:	1	17	9	13	5	1	8
ESA Status							
END	0	0	0	0	0	0	0
THR	0	0	0	0	0	0	0
SC	0	0	0	0	0	0	0
COSEWIC Status							
END	0	0	0	0	0	0	0
THR	0	0	0	0	0	0	0
SC	0	0	0	0	0	0	0
Provincially Rare (S-rank of S1-S3)							
S1	0	0	0	0	0	0	0
S1?	0	0	0	0	0	0	0
S1S2	0	0	0	0	0	0	0
S1S3	0	0	0	0	0	0	0
S2	0	0	0	0	0	0	0
S2?	0	0	0	0	0	0	0
S2S3	0	0	0	0	0	0	0
S2S4	0	0	0	0	0	0	0
S3	0	0	0	0	0	0	0
S3?	0	0	0	0	0	0	0
S3S4	0	0	0	0	0	0	0
Total S1-S3:	0	0	0	0	0	0	0
Co-efficient of Conservatism and Floral Quality Index							
Co-efficient of Conservatism (CC) (average):	2.43	2.72	3.50	2.84	3.00	4.44	2.25
CC 0 to 3	10	29	8	26	5	2	14
CC 4 to 6	4	14	8	18	5	7	6
CC 7 to 8	0	0	0	0	0	0	0
CC 9 to 10	0	0	0	0	0	0	0
Floral Quality Index (FQI)	9.09	17.84	14.43	18.84	9.95	13.33	10.06
Presence of Wetland Species							
Wetland Value (CW) (average):	-0.73	-0.09	-2.64	-0.22	-3.50	-3.18	-2.30
upland	1	10	0	5	0	0	1
facultative upland	3	18	5	22	0	0	3
facultative	4	12	2	9	1	2	5
facultative wetland	5	20	8	15	8	5	7
obligate wetland	2	10	13	12	5	4	11

Glossary

Rarity Ranks	
RANK	DEFINITION
EXP	Extirpated - A wildlife species that no longer exists in the wild in Canada, but exists elsewhere.
END	Endangered - A wildlife species facing imminent extirpation or extinction.
THR	Threatened - A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
SC	Special Concern - A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.

SARO Status	
RANK	DEFINITION
EXP	Extirpated - A species that no longer exists in the wild in Ontario but still occurs elsewhere.
END	Endangered - A species facing imminent extinction or extirpation in Ontario.
THR	Threatened - A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.
SC	Special Concern - A species with characteristics that make it sensitive to human activities or natural events.

Global (G) Conservation Status Ranks	
GLOBAL RANK	DEFINITION
GX	Presumed Extinct (species) - Not located despite intensive searches and virtually no likelihood of rediscovery Presumed Eliminated (ecosystems, i.e., ecological communities and systems) - Eliminated throughout its range, due to loss of key dominant and characteristic taxa and/or elimination of the sites and ecological processes on which the type depends
GH	Possibly Extinct (species) or Possibly Eliminated (ecosystems) - Known from only historical occurrences but still some hope of rediscovery. Examples of evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume
G1	Critically Imperiled - At very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other
G2	Imperiled - At high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
G3	Vulnerable - At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other
G4	Apparently Secure - At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a
G5	Secure - At very low risk of extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.

Variant Global Conservation Status Ranks	
RANK	DEFINITION
G#G#	Range Rank - A numeric range rank (e.g., G2G3, G1G3) is used to indicate uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g.,
GU	Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible (when the range of uncertainty is three consecutive ranks or less), a range rank (e.g., G2G3) should be used to
GNR	Unranked - Global rank not yet assessed.
GNA	Not Applicable - A conservation status rank is not applicable because the species or ecosystem is not a suitable target for conservation activities. A global conservation status rank may be not applicable for several reasons, related to its relevance as a conservation target. For species, typically the species is a hybrid without conservation value, or of domestic origin. For ecosystems, the type is typically non-native (e.g., many ruderal

Coefficient of Conservatism Values	
CC Value	DESCRIPTION
0-3	species found in a wide variety of communities, including disturbed sites
4-6	species associated with a specific community, but tolerate moderate disturbance
7-8	species associated with a community in an advanced successional stage, tolerant of minor disturbances
9-10	species with a high degree of fidelity to a narrow range of synecological parameters

Coefficient of Wetness				
CW VALUE	ABBRV.	INDICATOR STATUS	% OCCUR. IN WETLANDS	DEFINITION
-5	OBL	Obligate Wetland	99	Almost always occur in wetlands. With few exceptions, these plants (herbaceous or woody) are found in standing water or seasonally saturated soils (14 or more consecutive days) near the surface.
-4	FACW+			
-3	FACW	Facultative Wetland	67-99	Usually occur in wetlands, but may occur in non-wetlands. These plants predominately occur with hydric soils, often in geomorphic settings where water saturates the soils or floods the soil surface at least seasonally.
-2	FACW-			
-1	FAC+			
0	FAC	Facultative	34-66	Occur in wetlands and nonwetlands. These plants can grow in hydric, mesic, or xeric habitats. The occurrence of these plants in different habitats represents responses to a variety of environmental variables other than just hydrology, such as shade tolerance, soil pH, and elevation, and they have a wide tolerance of soil moisture conditions.
1	FAC-			
2	FACU+			
3	FACU	Facultative Upland	1-33	Usually occur in non-wetlands, but may occur in wetlands. These plants predominately occur on drier or more mesic sites in geomorphic settings where water rarely saturates the soils or
4	FACU-			
5	UPL	Obligate Upland	1	Almost never occur in wetlands. These plants occupy mesic to xeric non-wetland habitats. They almost never occur in standing water or saturated soils. Typical growth forms include herbaceous,

"+" or "-" signs have been attached to the three Facultative categories to express exaggerated tendencies for those species. The "+" sign denotes that the species generally has a greater estimated probability of occurring in wetlands than species having the general indicator category, but a lesser estimated probability of occurring in wetlands than those having the next higher general indicator. The "-" sign denotes that the species generally has a lesser estimated probability of occurring in wetlands than those having the general indicator status, but a greater estimated probability of occurring in wetlands than those having the next lowest general indicator.

Floral Quality Index
Vegetation species and community sensitivity was assessed through the application of coefficient of conservatism values (CC), assigned to each native species in southern Ontario (Oldham, et. al, 1995). The value of CC, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance and fidelity to specific habitat integrity. The occurrence of species with a CC of 9 or 10 can be good indicators of undisturbed conditions such as mature forests, fens or bogs

Rank Qualifiers	
RANK	DEFINITION
?	Inexact Numeric Rank - Denotes inexact numeric rank; this should not be used with any of the Variant Global Conservation Status Ranks or GX or GH.
Q	Questionable taxonomy that may reduce conservation priority - Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The "Q" modifier is only used at a global level.
C	Captive or Cultivated Only - Taxon or ecosystem at present is presumed or possibly extinct or eliminated in the wild across their entire native range but is extant in cultivation, in captivity, as a naturalized population (or populations) outside their native range, or as a reintroduced population or ecosystem restoration, not yet established. The "C" modifier is only used at a global level and not at a national or subnational level. Possible ranks are GXC

Intraspecific Taxon Global Conservation Status Ranks	
RANK	DEFINITION
T#	Intraspecific Taxon (trinomial) - The status of intraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1. A T subrank cannot imply the subspecies or variety is more abundant than the species, for example, a G1T2 subrank should not occur. A vertebrate animal population (e.g., listed under the U.S. Endangered Species Act or assigned candidate status) may be tracked as an intraspecific.

Provincial Status	
RANK	DEFINITION
S1	Critically Imperiled—Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province
S2	Imperiled—Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province
S3	Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation
S4	Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5	Secure—Common, widespread, and abundant in the nation or state/province
SNR	Unranked—Nation or state/province conservation status not yet assessed
SNR	Unrankable—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends

LOCAL RANK	DEFINITION
I	introduced; thought to have been present in the Carolinian Zone or individual CZ area prior to European settlement; believed to be deliberately or inadvertently introduced to the CZ by
C	common
U	uncommon
R	rare
H	historic records only (generally >30 years)
X	present; status unknown or not specified in source lists
?	unconfirmed report
hyb	hybrid

Appendix D

Breeding Bird Results

Common Name	Scientific Name	G-Rank ¹	S-Rank ²	SARA Status ³	COSEWIC Status ⁴	ESA Status ⁵
Alder Flycatcher	<i>Empidonax alnorum</i>	G5	S5B			
American Crow	<i>Corvus brachyrhynchos</i>	G5	S5			
American Goldfinch	<i>Carduelis tristis</i>	G5	S5			
American Robin	<i>Turdus migratorius</i>	G5	S5			
Baltimore Oriole	<i>Icterus galbula</i>	G5	S4B			
Barn Swallow	<i>Hirundo rustica</i>	G5	S4B	THR	SC	SC
Belted Kingfisher	<i>Ceryle alcyon</i>	G5	S5B,S4N			
Black-capped Chickadee	<i>Poecile atricapillus</i>	G5	S5			
Blue Jay	<i>Cyanocitta cristata</i>	G5	S5			
Blue-winged Warbler	<i>Vermivora pinus</i>	G5	S4B			
Bobolink	<i>Dolichonyx oryzivorus</i>	G5	S4B	THR	THR	THR
Canada Goose	<i>Branta canadensis</i>	G5	S5			
Cedar Waxwing	<i>Bombycilla cedrorum</i>	G5	S5			
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	G5	S5B			
Chipping Sparrow	<i>Spizella passerina</i>	G5	S5B,S3N			
Clay-colored Sparrow	<i>Spizella pallida</i>	G5	S4B			
Common Grackle	<i>Quiscalus quiscula</i>	G5	S5			
Common Yellowthroat	<i>Geothlypis trichas</i>	G5	S5B,S3N			
Eastern Kingbird	<i>Tyrannus tyrannus</i>	G5	S4B			
Eastern Meadowlark	<i>Sturnella magna</i>	G5	S4B,S3N	THR	THR	THR
Eastern Phoebe	<i>Sayornis phoebe</i>	G5	S5B			
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	G5	S4B,S3N			
Eastern Wood-Pewee	<i>Contopus virens</i>	G5	S4B	SC	SC	SC
European Starling	<i>Sturnus vulgaris</i>	G5	SNA			
Field Sparrow	<i>Spizella pusilla</i>	G5	S4B,S3N			
Gray Catbird	<i>Dumetella carolinensis</i>	G5	S5B,S3N			
Great Blue Heron	<i>Ardea herodias</i>	G5	S4			
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	G5	S5B			
Green Heron	<i>Butorides virescens</i>	G5	S4B			
Hairy Woodpecker	<i>Picoides villosus</i>	G5	S5			
House Finch	<i>Carpodacus mexicanus</i>	G5	SNA			
House Wren	<i>Troglodytes aedon</i>	G5	S5B			
Indigo Bunting	<i>Passerina cyanea</i>	G5	S5B			
Killdeer	<i>Charadrius vociferus</i>	G5	S4B			
Mallard	<i>Anas platyrhynchos</i>	G5	S5			
Marsh Wren	<i>Cistothorus palustris</i>	G5	S4B,S3N			
Mourning Dove	<i>Zenaidura macroura</i>	G5	S5			
Northern Cardinal	<i>Cardinalis cardinalis</i>	G5	S5			
Northern Flicker	<i>Colaptes auratus</i>	G5	S5			
Northern Mockingbird	<i>Mimus polyglottos</i>	G5	S4			
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	G5	S4B			
Northern Waterthrush	<i>Seiurus noveboracensis</i>	G5	S5B			
Osprey	<i>Pandion haliaetus</i>	G5	S5B			
Ovenbird	<i>Seiurus aurocapillus</i>	G5	S5B			
Pileated Woodpecker	<i>Dryocopus pileatus</i>	G5	S5			

Common Name	Scientific Name	G-Rank ¹	S-Rank ²	SARA Status ³	COSEWIC Status ⁴	ESA Status ⁵
Purple Finch	<i>Haemorhous purpureus</i>	G5	S5			
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	G5	S5			
Red-eyed Vireo	<i>Vireo olivaceus</i>	G5	S5B			
Red-tailed Hawk	<i>Buteo jamaicensis</i>	G5	S5		NAR	NAR
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	G5	S5			
Savannah Sparrow	<i>Passerculus sandwichensis</i>	G5	S5B,S3N			
Song Sparrow	<i>Melospiza melodia</i>	G5	S5			
Swamp Sparrow	<i>Melospiza georgiana</i>	G5	S5B,S4N			
Tree Swallow	<i>Tachycineta bicolor</i>	G5	S4S5B			
Veery	<i>Catharus fuscescens</i>	G5	S5B			
Vesper Sparrow	<i>Pooecetes gramineus</i>	G5	S4B			
Warbling Vireo	<i>Vireo gilvus</i>	G5	S5B			
White-breasted Nuthatch	<i>Sitta carolinensis</i>	G5	S5			
White-throated Sparrow	<i>Zonotrichia albicollis</i>	G5	S5			
Wild Turkey	<i>Meleagris gallopavo</i>	G5	S5			
Wood Thrush	<i>Hylocicla mustelina</i>	G4	S4B	THR	THR	SC
Yellow Warbler	<i>Dendroica petechia</i>	G5	S5B			
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	G5	S5B,S3N			

Legend: Breeding Bird Evidence (OBBA 2001)

Observed

X - Species observed in its breeding season (no evidence of breeding).

Possible

H - Species observed in its breeding season in suitable habitat

S - Singing male present or breeding calls heard, in its breeding season in suitable nesting habitat

Probable

T - Permanent territory presumed through registration of territorial song on at least 2 days, a week or more apart at the same place

P - Pair observed in suitable nesting habitat during the species' breeding season.

D - Courtship or display between a male and a female or 2 males, including courtship, feeding or copulation.

V - Visiting probably nest site.

A - Agitated behaviour or anxiety calls of an adult.

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 egg shell found (occupied or laid within the period of the study).

FY - Recently fledged young or downy young, including young incapable of sustained flight.

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. Confirmed.

Appendix E

Species at Risk Habitat Assessment

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat	Associated ELC Communities	Known Species Range	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Probability of Occurrence
Amphibians	Western Chorus Frog (Great Lakes / St. Lawrence - Canadian Shield population) <i>Pseudacris triseriata</i>	No Status	THR Schedule 1	THR	The Western Chorus Frog is primarily a lowland terrestrial species. In marshes or wooded wetland areas, it is found on the ground or in low shrubs and grasses. It is a poor climber. Like all other frogs, the Western Chorus Frog requires both terrestrial and aquatic habitats in close proximity. For breeding and tadpole development, it requires seasonally dry temporary ponds devoid of predators, particularly fish. The Western Chorus Frog is very rarely found in permanent ponds. Although it uses aquatic habitat during the breeding season, the Western Chorus Frog is a poor swimmer. The species hibernates in its terrestrial habitat, under rocks, dead trees, or leaves, or in loose soil or animal burrows, even though these sites are sometimes flooded.	FE, MAS, MAM, SA, BO, FE, or CUM with vernal standing water.	In Canada, the Western Chorus Frog is found in southern Ontario and southwestern Quebec. In southern Ontario, its range is bounded by the United States border in the south, Georgian Bay in the northwest, and south of Algonquin Park and up the Ottawa River valley to the vicinity of Espanville in the east. There are approximately 100 locations, divided into two distinct populations: the Carolinian population (southwestern Ontario) and the Great Lakes/St. Lawrence-Canadian Shield population (other regions of Ontario and Quebec).	Ontario Reptile and Amphibian Atlas (ORAA)	Yes, forest and wetland sites are present within the Study Area.	Yes; Candidate habitat for western chorus frog was observed throughout the wetland communities present within the Study Area. The species was not observed during field investigations. Targeted surveys for western chorus frog were not completed during preliminary field investigations.	Medium; Targeted surveys following the western chorus frog detection survey protocol for Ontario (Blazinger Environmental) are required to determine the presence or absence of western chorus frog in the Study Area.
Birds	Bald Eagle <i>Haliaeetus leucocephalus</i>	SC	No Status	Not at Risk	Bald Eagles nest in a variety of habitats and forest types, almost always near a major lake or river where they do most of their hunting. While fish are their main source of food, Bald Eagles can easily catch prey up to the size of ducks, and frequently feed on dead animals, including White-tailed Deer. They usually nest in large trees such as pine and poplar. During the winter, Bald Eagles sometimes congregate near open water such as the St. Lawrence River, or in places with a high deer population where carcasses might be found.	FOC, FOM, FOD, SWC, SWM and SWD. Nests typically located near major bodies of water.	Bald Eagles are widely distributed throughout North America. In Ontario, they nest throughout the north, with the highest density in the northwest near Lake of the Woods. Historically they were also relatively common in southern Ontario, especially along the shore of Lake Erie, but this population was all but wiped out 50 years ago. After an intensive re-introduction program and environmental clean-up efforts, the species has rebounded and can once again be seen in much of its former southern Ontario range.	Ministry of Environment, Conservation and Parks (MECP)	Yes; suitable nesting habitat may be present along the banks of the East and West branches of the Holland River.	No; although suitable habitat was present within the Study Area, species not observed during field investigations which included breeding bird surveys.	Low; species unlikely occurs within the study area given lack of suitable habitat and observations during field investigations.
Birds	Bank Swallow <i>Riparia riparia</i>	THR	THR Schedule 1	THR	Bank Swallows nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable. The birds breed in colonies ranging from several to a few thousand pairs. The Bank Swallow breeds in a wide variety of natural and artificial sites with vertical banks, including riverbanks, lake and ocean bluffs, aggregate pits, road cuts, and stock piles of soil. Sand-silt substrates are preferred for excavating nest burrows. Breeding sites tend to be somewhat ephemeral due to the dynamic nature of bank erosion. Breeding sites are often situated near open terrestrial habitat used for aerial foraging (e.g., grasslands, meadows, pastures, and agricultural cropland). Large wetlands are used as communal nocturnal roost sites during post-breeding, migration, and subarctic tundra.	BL in addition to river and lake banks, and stable sand and gravel piles.	The Bank Swallow is found all across southern Ontario, with sparser populations scattered across northern Ontario. The largest populations are found along the Lake Erie and Lake Ontario shorelines, and the Saugeen River (which flows into Lake Huron). In North America, it breeds widely across the northern two-thirds of the U.S., north to the treeline. It breeds in all Canadian provinces and territories, except perhaps Nunavut.	MECP, Natural Heritage Information Center (NHIC), Ontario Breeding Bird Atlas (OBBA)	Yes; suitable nesting habitat may be present along the banks of the East and West branches of the Holland River.	No; neither species nor suitable habitat was observed during field investigation including breeding bird surveys.	Low; species unlikely occurs within the study area given lack of suitable habitat and observations during field investigations.
Birds	Barn Swallow <i>Hirundo rustica</i>	SC	THR Schedule 1	SC	Barn Swallows often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges, and in culverts. The species is attracted to open structures that include ledges where they can build their nests, which are often re-used from year to year. They prefer unpainted, rough-out wood, since the mud does not adhere as well to smooth surfaces. Before European colonization, Barn Swallows nested mostly in caves, holes, crevices, and ledges in cliff faces. Following European settlement, they shifted largely to nesting in and on artificial structures, including barns and other buildings, garages, houses, bridges, and road culverts. Barn Swallows prefer various types of open habitats for foraging, including grassy fields, pastures, various kinds of agricultural crops, lake and river shorelines, cleared rights-of-way, cottage areas and farmyards, islands, wetlands, and subarctic tundra.	TPO, CUM1, MAM, MAS, OAO, SAS1, SAM1, SAF1; containing or adjacent structures that are suitable for nesting.	The Barn Swallow may be found throughout southern Ontario and can range as far north as Hudson Bay, wherever suitable locations for nests exist. The Barn Swallow has become closely associated with human rural settlements. It breeds across much of North America south of the treeline, south to central Mexico. In Canada, it is known to breed in all provinces and territories.	MECP, NHIC, OBBA	Yes; species observed during the 1997 EA field investigations. Suitable nesting habitat (barns and culverts) present within the Study Area.	Yes; Individuals were observed foraging within the Study Area but no nests were found. Suitable nesting habitat (barns and culverts) present within the Study Area.	High; species and suitable habitat confirmed present within the study area during field investigations.
Birds	Black Tern <i>Chlidonias niger</i>	SC	No Status	Not at Risk	Black Terns build floating nests in loose colonies in shallow marshes, especially in cattails.	MAS2-1 and OAO. These two communities must be present immediately adjacent each other and with sufficient water to provide suitable nesting habitat.	The Black Tern breeds in the temperate regions of Europe, and in North America where it ranges from northern British Columbia and Alberta south to Arizona and Kansas and east to New Brunswick. In Ontario, Black Terns are found scattered throughout the province, but breed mainly in the marshes along the edges of the Great Lakes.	NHIC, OBBA	Yes; suitable nesting habitat may be present along the banks of the East and West branches of the Holland River.	No; although suitable habitat was present within the Study Area, species not observed during field investigations which included breeding bird surveys.	Low; species unlikely occurs within the study area given lack of observations during field investigations.
Birds	Bobolink <i>Dolichonyx oryzivorus</i>	THR	THR Schedule 1	THR	Historically, Bobolinks lived in North American tallgrass prairie and other open meadows. With the clearing of native prairies, Bobolinks moved to living in hayfields. Bobolinks often build their small nests on the ground in dense grasses. Both parents usually tend to their young, sometimes with a third Bobolink helping. Most of this prairie was converted to agricultural land over a century ago, and at the same time the forests of eastern North America were cleared to hayfields and meadows that provided habitat for the birds. Since the conversion of the prairie to cropland and the clearing of the eastern forests, the Bobolink has nested in forage crops (e.g., hayfields and pastures dominated by a variety of species, such as clover, timothy, Kentucky bluegrass, and broadleaved plants). The Bobolink also occurs in various grassland habitats including wet prairie, graminoid peatlands, and abandoned fields dominated by tall grasses, remnants of uncultivated virgin prairie (tall-grass prairie), no-till cropland, small-grain fields, restored surface mining sites, and irrigated fields in arid regions. It is generally not abundant in short-grass prairie, alfalfa fields, or in row crop monocultures (e.g., corn, soybean, wheat), although its use of alfalfa may vary with region.	TPO, TPS, CUM1 and MAM2.	The Bobolink breeds across North America. In Ontario, it is widely distributed throughout most of the province south of the boreal forest, although it may be found in the north where suitable habitat exists. The breeding range of the Bobolink in North America includes the southern part of all Canadian provinces from British Columbia to Newfoundland and Labrador and south to the northwestern, north-central and northeastern U.S.	MECP, NHIC, OBBA	Yes; species observed during the 1997 EA field investigations. CUM communities and agricultural fields present within the Study Area.	Yes; Bobolink was observed incidentally. All agricultural fields present within the Study Area may provide future opportunities for nesting depending on the crops selected in a given year (i.e. lightly grazed pastures, young hayfields or alfalfa fields).	High; species and suitable habitat confirmed present within the study area during field investigations.
Birds	Canada Warbler <i>Cardellina canadensis</i>	SC	THR Schedule 1	THR	The Canada Warbler breeds in a range of deciduous and coniferous, usually wet forest types, all with a well-developed, dense shrub layer. Dense shrub and understory vegetation help conceal Canada Warbler nests that are usually located on or near the ground on mossy logs or roots, along stream banks or on hummocks. It is also found in riparian shrub forests on slopes and in ravines and in old-growth forests with canopy openings and a high density of shrubs, as well as in stands regenerating after natural disturbances, such as forest fires, or anthropogenic disturbances, such as logging. Canada Warbler habitat is believed to be in decline, especially in South America, where the Canada Warbler overwinters. Habitat loss has also been observed in the eastern part of its breeding range, where wet forests have been drained for urban development or farming.	FOC3, FOC4, FOM6, FOM7, FOM8, FOD6, FOD7, FOD8, FOD9, SWC, SWM and SWD with a well-developed shrub layer.	The Canada Warbler only breeds in North America and 80% of its known breeding range is in Canada. Its primary breeding range is in the Boreal Shield, extending north into the Hudson Plains and south into the Mixedwood Plains. Although the Canada Warbler breeds at low densities across its range, in Ontario it is most abundant along the Southern Shield. The Canada Warbler breeds primarily across much of southeastern Canada, the northeastern United States, the Great Lakes region. In Canada, it breeds in all provinces and territories except Nunavut and Newfoundland and Labrador.	EA, OBBA	Yes; species observed during the field investigations for the 1997 Environmental Assessment. Forest and swamp communities present within the Study Area.	No; although suitable habitat was present within the Study Area, species not observed during field investigations which included breeding bird surveys.	Low; species unlikely occurs within the study area given lack of observations during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat	Associated ELC Communities	Known Species Range	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Probability of Occurrence
Birds	Chimney Swift <i>Chaetura pelagica</i>	THR	THR Schedule 1	THR	Before European settlement, Chimney Swifts mainly nested on cave walls and in hollow trees or tree cavities in old growth forests. However, due to the land clearing associated with colonization, hollow trees became increasingly rare, which led Chimney Swifts to move into house chimneys. Today, they are more likely to be found in and around urban settlements where they nest and roost (rest or sleep) in chimneys and other masonry structures. It is likely that a small portion of the population continues to use hollow trees. They also tend to stay close to water as this is where the flying insects they eat congregate. The Chimney Swift spends the major part of the day in flight feeding on insects. In the northern part of the breeding range, the Chimney Swift favours sites where the ambient temperature is relatively stable.	TPO, CUM1, MAM, MAS, OAO, SAS1, SAM1, SAF1 containing or adjacent structures with suitable nesting habitat (i.e. chimneys).	The Chimney Swift breeds in eastern North America, possibly as far north as southern Newfoundland. In Ontario, it is most widely distributed in the Carolinian zone in the south and southwest of the province, but has been detected throughout most of the province south of the 49th parallel. The Chimney Swift breeds mainly in eastern North America, from southern Canada down to Texas and Florida. The species breeds in east central Saskatchewan, southern Manitoba, southern Ontario, southern Quebec, New Brunswick, Nova Scotia, and possibly in Prince Edward Island and	OBBA	Yes, urban areas with potentially suitable buildings for nesting present within the Study Area. Foraging habitat in the form of CUM, MAM, MAS, OAO and SAM present within the Study Area.	No; although suitable habitat was present within the Study Area, species not observed during field investigations which included breeding bird surveys. Buildings with potentially suitable chimneys for nesting and roosting may be present within the Study Area. Foraging habitat in the form of cultural meadows, marshes and open or shallow water are also present within the Study Area.	Medium; while the species was not observed during field investigations, targeted surveys were not completed in buildings where suitable habitat for chimney swift may be present.
Birds	Common Nighthawk <i>Chordeiles minor</i>	SC	THR Schedule 1	SC	Traditional Common Nighthawk habitat consists of open areas with little to no ground vegetation, such as logged or burned-over areas, forest clearings, rock barns, peat bogs, lakeshores, and mine tailings. Although the species also nests in cultivated fields, orchards, urban parks, mine tailings, and along gravel roads and railways, they tend to occupy natural sites. The Common Nighthawk nests in a wide range of open, vegetation-free habitats, including dunes, beaches, recently harvested forests, rocky outcrops, grasslands, pastures, marshes, and river banks. This species also inhabits mixed and coniferous forests. The Common Nighthawk probably benefited from the newly-opened habitats created by the massive deforestation associated with the arrival of European settlers in eastern Canada and United States. The appearance of gravel roads contributed to the expansion of the Common Nighthawk's habitat in North America.	SD, BB, RB, CUM, BO, FOM, FOC and FOD with openings with little vegetation.	The range of the Common Nighthawk spans most of North and Central America. In Canada, the species is found in all provinces and territories except Nunavut. In Ontario, the Common Nighthawk occurs throughout the province except for the coastal regions of James Bay and Hudson Bay.	EA, OBBA	Yes, species observed during the field investigations for the 1997 Environmental Assessment. Forest and meadow communities present within the Study Area.	Yes; Candidate habitat within the Study Area was noted in the cultural thicket, plantation, woodland and meadow communities east of County Road 4, in the coniferous forest community (FOC4) located between 2nd Concession Road and Leslie Street, the cultural woodland community west of Yonge Street and in the cultural woodland community adjacent to Highway 404. Targeted crepuscular bird surveys were not completed during the preliminary field investigations.	Medium; while species was not observed during field investigations targeted crepuscular bird surveys were not completed in suitable habitat.
Birds	Eastern Meadowlark <i>Sturnella magna</i>	THR	THR Schedule 1	THR	Eastern Meadowlarks breed primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Small trees, shrubs, or fence posts are used as elevated song perches. Eastern Meadowlarks prefer grassland habitats, including native prairies and savannahs, as well as non-native pastures, hayfields, weedy meadows, herbaceous fenoways, and airfields.	TPO, TPS, CUM1, CUS, and MAMZ with elevated song perches.	In Ontario, the Eastern Meadowlark is primarily found south of the Canadian Shield but it also inhabits the Lake Nipissing, Timiskaming, and Lake of the Woods areas. Including all subspecies, the Eastern Meadowlark's global breeding range extends from central and eastern North America, south through parts of South America. However, there is only one subspecies in Canada and the neighbouring northeastern U.S. In Canada, the bulk of the population breeds in southern Ontario.	MECP, NHIC OBBA	Yes, species observed during the 1997 EA field investigations. CUM communities and agricultural fields present within the Study Area.	Yes; Confirmed breeding habitat was identified during field investigations.	High; species and suitable habitat confirmed present within the study area during field investigations.
Birds	Eastern Whip-poor-will <i>Antrostomus vociferus</i>	THR	THR Schedule 1	THR	The Eastern Whip-poor-will is usually found in areas with a mix of open and forested areas, such as savannahs, open woodlands, or openings in more mature deciduous, coniferous, and mixed forests. It forages in these open areas and uses forested areas for roosting (resting and sleeping) and nesting. It lays its eggs directly on the forest floor, where its colouring means it will easily remain undetected by visual predators. Whip-poor-will breeding habitat is not dependent upon species composition, but rather on forest structure, although common tree associations in both summer and winter are pine and oak. The species shuns both wide-open spaces and dense forest. It prefers to nest in semi-open forests or patchy forests with clearings, such as barns or forests that are regenerating following major disturbances. Other necessary breeding habitat elements are thought to involve ground-level vegetation and woodland size. Individuals will often feed in nearby shrubby pastures or wetlands with perches. Areas with decreased light levels where forest canopies are closed are generally not occupied, perhaps because of reduced forage success for this aerial-feeding insectivore.	TPS, TPW, CUW, FOD, FOC and FOM where open areas are present.	The Eastern Whip-poor-will's breeding range includes two widely separate areas. It breeds throughout much of eastern North America, reaching as far north as southern Canada. In Ontario they breed as far north as the shore of Lake Superior. Although Eastern Whip-poor-wills were once widespread throughout the central Great Lakes region of Ontario, their distribution in this area is now fragmented.	OBBA	Yes, forest and meadow communities present within the Study Area.	Yes; Candidate habitat within the Study Area was noted in the cultural thicket, plantation, woodland and meadow communities east of County Road 4, in the coniferous forest community (FOC4) located between 2nd Concession Road and Leslie Street, the cultural woodland community west of Yonge Street and in the cultural woodland community adjacent to Highway 404. Targeted crepuscular bird surveys were not completed during the preliminary field investigations.	Medium; while species was not observed during field investigations targeted crepuscular bird surveys were not completed in suitable habitat.
Birds	Eastern Wood-pewee <i>Contopus virens</i>	SC	SC Schedule 1	SC	The Eastern Wood-pewee lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in intermediate-age mature forest stands with little understory vegetation. During migration, a variety of habitats are used, including forest edges and early successional clearings.	FOC, FOM, FOD, SWD, SWM and CUW .	The Eastern Wood-pewee is found across most of southern and central Ontario, and in northern Ontario as far north as Red Lake, Lake Nipigon, and Timmins. The breeding range of the Eastern Wood-pewee covers much of south-central and eastern North America.	2002 Environmental Assessment (EA), OBBA	Yes, species observed during the field investigations for the 1997 Environmental Assessment. Forest and swamp communities present within the Study Area.	Yes; Eastern Wood-pewee was recorded during breeding bird surveys and incidentally in several of the deciduous, coniferous and mixed forests and swamps that are intersected by the proposed ROW. In total, Eastern Wood-pewee was recorded at 10 breeding bird stations including BBS-02, 03, 04, 06, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.	High; species and suitable habitat confirmed present within the study area during field investigations.
Birds	Golden-winged Warbler <i>Vermivora chrysoptera</i>	SC	THR Schedule 1	THR	Golden-winged Warblers prefer to nest in areas with young shrubs surrounded by mature forest – locations that have recently been disturbed, such as field edges, hydro or utility right-of-ways, or logged areas. In their breeding areas, Golden-winged Warblers seem to be fond of regeneration zones where young shrubs grow, surrounded by mature forest, and characterized by plant succession of 10 to 30 years. The warblers frequent clusters of herbaceous plants and low bushes (where they place their nests, which are built on the ground). They favour environments where the trees are spread out, as well as the forest edge, and use this setting for perching, singing, and looking for food. Golden-winged Warblers are found in dry uplands, swamp forests, and marshes. This warbler shows a preference for beaver ponds and burned-out or intermittently cultivated areas.	FO, SW, MAM, CUT, CUS, and RBT with relatively recent disturbance/regeneration adjacent to large, mature forest.	The Golden-winged Warbler is found in southern Saskatchewan, Manitoba, Ontario, and Quebec, as well as the north-eastern United States. In Ontario, these birds breed in central-eastern Ontario, as far south as Lake Ontario and the St. Lawrence River, and as far north as the northern edge of Georgian Bay. Golden-winged Warblers have also been found in the Lake of the Woods area near the Manitoba border, and around Long Point on Lake Erie. Golden-winged Warblers nest primarily in the northeastern United States, southeastern Saskatchewan, southwestern Manitoba, southwestern Ontario and far southwestern Quebec. In Ontario, they breed from the far southwest of the province north as far as the centre of the Nipissing region, the southern part of the Sudbury and Algoma districts, and the southwest part of the Rainy River district, near Lake of the Woods.	EA, OBBA	Yes; species observed during the field investigations for the 1997 Environmental Assessment. Forested areas located adjacent to areas of previous disturbance (cultural meadows, cultural thickets) are present within the Study Area.	No; although suitable habitat was present within the Study Area, species not observed during field investigations which included breeding bird surveys.	Low; species unlikely occurs within the study area given lack of observations during field investigations.

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Birds	Grasshopper Sparrow <i>Savannah</i> Grasshopper Sparrow (pretensis subspecies; Eastern Grasshopper Sparrow) <i>Ammodramus savannarum pretensis</i>	SC	SC Schedule 1	SC	It lives in open grassland areas with well-drained, sandy soil. It will also nest in hayfields and pasture, as well as alvars, prairies, and occasionally grain crops such as barley. It prefers areas that are sparsely vegetated. Its nests are well-hidden in the field and woven from grasses in a small cup-like shape. The Grasshopper Sparrow is a short-distance migrant and leaves Ontario in the fall to migrate to the southeastern United States and Central America for the winter. In Canada, the Eastern Grasshopper Sparrow typically breeds in large human-created grasslands (5 ha or greater), such as pastures and hayfields, and natural prairies, such as alvars, characterized by well-drained, often poor soil dominated by relatively low,	ALO, TPO, and CUM.	The Grasshopper Sparrow can be found throughout southern Ontario, but only occasionally on the Canadian Shield. It is most common where grasslands, hay, or pasture dominate the landscape. In Canada, the breeding range of the Eastern Grasshopper Sparrow includes extreme southern Quebec and southern Ontario, with the vast majority of birds occurring in Ontario.	OBBA	Yes, cultural meadow communities and agricultural fields present within the Study Area.	No; although suitable habitat was present within the Study Area, species not observed during field investigations which included breeding bird surveys.	Low; species unlikely occurs within the study area given lack of observations during field investigations.
Birds	Henslow's Sparrow <i>Centropyx henslowii</i>	END	END Schedule 1	END	In Ontario, the Henslow's Sparrow lives in open fields with tall grasses, flowering plants, and a few scattered shrubs. It has also been found in abandoned farm fields, pastures, and wet meadows. It tends to avoid fields that have been grazed, burned, or are crowded with trees and shrubs. It prefers extensive, dense, tall grasslands where it can more easily conceal its small ground nest. Henslow's Sparrows occupy open fields. The vegetation of these areas includes tall grasses that are interspersed with tall herbaceous plants, or shrubby species. It prefers undisturbed areas with dense living grasses and a dense thatch of dead grasses. The species may occupy hayfields, but if the hay is cut early, the nests are destroyed and the resulting losses are severe. Only areas that remain undisturbed for several years appear to be more successfully colonized. The precise amount of remaining suitable habitat in Ontario is unknown.	TPO, CUM, and MAM that are a minimum of 30 ha in size with vegetation that is over 30cm in height with a thick thatch layer and a lack of emergent woody vegetation.	The Henslow's Sparrow breeds in the northeastern and east-central United States, and reaches its northeastern limit in Ontario. It was once fairly common in scattered areas of suitable habitat south of the Canadian Shield. However, steep declines since the 1960s have all but wiped this bird out as a breeding species in Ontario. A few are still seen each spring at migration hotspots such as Point Pelee National Park, and a few may breed at selected locations. In Canada, it now occurs in southern Ontario. Historical information indicates that the species probably occurred in natural prairie areas and that forest clearing in the 1800s probably led to an expanded range for a time. In addition to southern	OBBA	Yes, cultural meadow communities are present within the Study Area.	No; although suitable habitat was present within the Study Area, species not observed during field investigations which included breeding bird surveys.	Low; the record is greater than 20 years old and is considered historic. Species unlikely occurs within the study area given that occurrence record is considered historical.
Birds	Least Bittern <i>Icthyophaga exilis</i>	THR	THR Schedule 1	THR	In Ontario, the Least Bittern is found in a variety of wetland habitats, but strongly prefers cattail marshes with a mix of open pools and channels. This bird builds its nest above the marsh water in stands of dense vegetation, hidden among the cattails. The nests are almost always built near open water, which is needed for foraging. This species eats mostly frogs, small fish, and aquatic insects. The Least Bittern breeds strictly in marshes dominated by emergent vegetation surrounded by areas of open water. Most breeding grounds in Canada are dominated by cattails, but breeding also occurs in areas with other robust emergent plants and in shrubby swamps. The presence of stands of dense vegetation is essential for nesting because the nests of Least Bittern sit on platforms of stiff stems. The nests are almost always within 10 m of open water. Open water is also needed for foraging, because Least Bitterns forage by ambushing their prey in shallow water near marsh edges, often from platforms that they construct out of bent vegetation. Access to clear water is essential for the birds to see their prey. This small heron prefers large marshes that have relatively stable water levels throughout the nesting period. Adults can raise nests somewhat to deal with rising waters, but persistent or sudden increases will flood nests. Conversely, drops in water level can reduce foraging opportunities and increase the species' exposure to predators. Needs for wintering habitat are less specific, and appear to be met by a wide variety of wetlands—not only emergent marshes like those used for breeding, but also brackish and saline swamps. Habitat use during migration is poorly known, but presumably is similar to breeding and wintering habitat.	MAS2-1, MAS3-1, SA and OAO.	In Ontario, the Least Bittern is mostly found south of the Canadian Shield, especially in the central and eastern part of the province. Small numbers also breed occasionally in northwest Ontario. This species has disappeared from much of its former range, especially in southwestern Ontario, where wetland loss has been most severe. The Least Bittern breeds from southern Canada to South America. In Canada, the Least Bittern has been observed in every province, but most individuals occur in Ontario. The species breeds primarily in southern Ontario.	MECP, NHIC	Yes; marsh communities located along the shores of the East and West branches of the Holland River. The river provides open water needed for foraging.	Yes; suitable vegetation communities for least bittern were observed along the banks of the Holland River where large continuous areas of cattail marsh communities were present. Targeted surveys (i.e., call playback surveys) required to confirm species presence/absence were not completed during the preliminary field investigations.	Medium; while species was not observed during field investigations targeted marsh breeding bird call back surveys were not completed in suitable habitat.
Birds	Louisiana Waterthrush <i>Parkesia motacilla</i>	THR	THR Schedule 1	THR	The Louisiana Waterthrush is usually found in steep, forested ravines with fast-flowing streams. The Louisiana Waterthrush occupies specialized habitat, showing a strong preference for nesting along relatively pristine headwater streams and wetlands situated in large tracts of mature forest. Although it prefers running water (especially clear, coldwater streams), it also inhabits heavily wooded swamps with vernal or semi-permanent pools, where its territories can overlap with its sister species the Northern Waterthrush. It is often classified as both an area-sensitive forest species, and a riparian-obligate species. Louisiana Waterthrush nests are constructed within niches in steep stream banks, in the roots of uprooted trees, or in mossy logs and stumps, usually within a few metres of water.	FOD, FOM, and SWD with fast flowing coldwater streams or large pools of open water.	The Louisiana Waterthrush summer range extends from the lower Great Lakes south to Georgia and west to Kansas. In Canada, the Louisiana Waterthrush breeds only in southern Ontario, along the Niagara Escarpment, in woodlands along Lake Erie, and scattered locations elsewhere. In Canada, the Louisiana Waterthrush breeds in southern Ontario, where it is considered a rare, but regular local summer resident. The bulk of the Canadian population is concentrated in two areas of Ontario: the Norfolk Sand Plain region bordering the north shore of Lake Erie, and the central Niagara Escarpment between Hamilton and Owen Sound.	EA	Yes; species observed during the 1997 EA field investigations. Forested and swamp communities present within the Study Area in the vicinity of both the East and West branches of the Holland River.	No; although suitable habitat was present within the Study Area, species not observed during field investigations which included breeding bird surveys.	Low; species unlikely occurs within the study area given lack of observations during field investigations.
Birds	Peregrine Falcon <i>Falco peregrinus</i>	SC	SC Schedule 1	Not At Risk	Peregrine Falcons usually nest on tall, steep cliff ledges close to large bodies of water. Although most people associate Peregrine Falcons with rugged wilderness, some of these birds have adapted well to city life. Urban peregrines raise their young on ledges of tall buildings, even in busy downtown areas. Cities offer peregrines a good year-round supply of pigeons and starlings to feed on.	CLO	Although Peregrine Falcons now nest in and around Toronto and several other southern Ontario cities, the majority of Ontario's breeding population is found around Lake Superior in northwestern Ontario.	MECP	No; Suitable cliff habitat is not anticipated within the Study Area.	No; neither species nor suitable habitat was observed during field investigation including breeding bird surveys.	Low; species unlikely occurs within the study area given lack of observations during field investigations.
Birds	Red-headed Woodpecker <i>Melanerpes erythrocephalus</i>	END	THR Schedule 1	END	The Red-headed Woodpecker lives in open woodland and woodland edges, and is often found in parks, golf courses, and cemeteries. These areas typically have many dead trees, which the bird uses for nesting and perching. A few of these birds will stay the winter in woodlands in southern Ontario if there are adequate supplies of nuts. The Red-headed Woodpecker is found in a variety of habitats, including oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, beaver ponds, and burns.	TPS, TPW, CUW, FOD1, FOD2, FOD4-1, FOD6, FOD7, and FOD9 that are open and have an abundance of dead trees.	The Red-headed Woodpecker is found across southern Ontario, where it is widespread but rare. In Canada, its range includes southern Saskatchewan, Manitoba, Ontario, and Quebec.	NHIC, OBBA	Yes; forested communities present within the Study Area.	No; although suitable habitat was present within the Study Area, species not observed during field investigations which included breeding bird surveys.	Low; species unlikely occurs within the study area given lack of observations during field investigations.
Birds	Wood Thrush <i>Hylocichla mustelina</i>	SC	THR Schedule 1	THR	The Wood Thrush lives in mature deciduous and mixed (conifer-deciduous) forests. They seek moist stands of trees with well-developed undergrowth and tall trees for singing perches. These birds prefer large forests, but will also use smaller stands of trees. They build their nests in living saplings, trees, or shrubs, usually in sugar maple or American beech. In Canada, the Wood Thrush nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. This species prefers large forest mosaics, but may also nest in small forest fragments.	FOD and FOM that are greater than 1 ha in size.	The Wood Thrush is found all across southern Ontario. It is also found, but less common, along the north shore of Lake Huron, as far west as the southeastern tip of Lake Superior. There is a very small population near Lake of the Woods in northwestern Ontario, and there have been scattered sightings in the mixed forest of northern Ontario. The Wood Thrush breeds in southeastern Canada from southern Ontario east to Nova Scotia.	EA, NHIC, OBBA	Yes; species observed during the field investigations for the 1997 Environmental Assessment. Forested communities greater than 1 ha present within the study area.	Yes; wood thrush was also recorded in the eastern half of the Study Area at stations BBS-16 and 18.	High; species and suitable habitat confirmed present within the study area during field investigations.

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Birds	Yellow Rail <i>Coturnix noveboracensis</i>	SC	SC Schedule 1	SC	Yellow Rails are secretive birds and live deep in the reeds, sedges, and marshes of shallow wetlands, where they nest on the ground. The marshy areas used by Yellow Rails have an overlying dry mat of dead vegetation that is used to make roofs for nests. Nesting Yellow Rails are typically found in marshes dominated by sedges, true grasses, and rushes, where there is little or no standing water (generally 0-12 cm water depth), and where the substrate remains saturated throughout the summer. They can be found in damp fields and meadows, on the floodplains of rivers and streams, in the herbaceous vegetation of bogs, and at the upper levels (drier margins) of estuarine and salt marshes. A greater diversity of habitat types is used during migration and winter than during the breeding season.	MAS	The Yellow Rail ranges across much of central Canada. In Ontario, it is mainly found in the Hudson Bay Lowlands region, and is only found in localized marshes in southern Ontario. The breeding status of Yellow Rail in boreal regions south of the Hudson Bay Lowlands is uncertain. Except for a very small area in Mexico where a few birds may still breed, the Yellow Rail breeds exclusively in Canada and the northern U.S. Its breeding distribution appears to be quite local and disjunct. The Canadian breeding range includes the Mackenzie District of the Northwest Territories, eastern Alberta, central Saskatchewan, most of Manitoba and Ontario, the southern half of Quebec, all of New Brunswick, and northern Nova Scotia. Habitat availability has declined and is still declining throughout its southern breeding range and relatively small wintering range. In certain parts of the Hudson/James Bay region, habitat may be declining as a result of habitat degradation by Snow Geese (<i>Chen caerulescens</i>).	NHIC	Yes, suitable nesting habitat may be present along the banks of the East and West branches of the Holland River.	No; although suitable habitat was present within the Study Area, species not observed during field investigations which included breeding bird surveys.	Low; the record is greater than 20 years old and is considered historic. Species unlikely occurs within the study area given that occurrence record is considered historical.
Insects	Monarch <i>Danaus plexippus</i>	SC	SC Schedule 1	END	Throughout their life cycle, Monarchs use three different types of habitat. Only the caterpillars feed on milkweed plants and are confined to meadows and open areas where milkweed grows. Adult butterflies can be found in more diverse habitats where they feed on nectar from a variety of wildflowers. Milkweeds (numerous species) are the sole food plant for Monarch caterpillars. These plants grow predominantly in open and periodically disturbed habitats such as roadsides, fields, wetlands, prairies, and open forests. Milkweeds are often planted outside their native range, and sometimes wayward Monarchs are observed at these patches. Monarchs require staging areas which are used to rest, feed, and avoid inclement weather during migration. In Canada, they are found along the north shores of the Great Lakes where Monarchs roost in trees before crossing large areas of open water.	AI, TP, and CUM where milkweed plants are present.	The Monarch's range extends from Central America to southern Canada. In Canada, Monarchs are most abundant in southern Ontario and Quebec where milkweed plants and breeding habitat are widespread. During late summer and fall, Monarchs from Ontario migrate to central Mexico where they spend the winter months. During migration, groups of Monarchs numbering in the thousands can be seen along the north shores of Lake Ontario and Lake Erie. The overall native range of the Monarch occurs from Central America northward through the continental United States to southern Canada, and from the Atlantic Coast westward to the Pacific Coast. The Canadian range of occurrence includes portions of all ten provinces and the Northwest Territories. Monarchs are loosely divided into eastern and western subgroups based on their migratory routes and overwintering sites. Eastern Monarchs breed from Alberta east to Nova Scotia and migrate south to overwinter in the mountains of Central Mexico. The breeding range in Canada is south of the 50° latitude in Ontario, Quebec, and the Maritimes. Each fall hundreds of thousands of Monarchs migrate through Long Point in southern Ontario but it's unknown what proportion of the Canadian population these individuals represent.	Ontario Butterfly Atlas (OBA)	Yes; cultural meadow communities are present within the Study Area.	Yes; Monarch (<i>Danaus plexippus</i>) was observed incidentally within the Study Area and confirmed habitat (i.e. communities with sufficient milkweed populations) was observed along sections of the Highway 400 and Highway 404 ROWs and within the Reed-canary Grass Mineral Meadow Marsh (MAMZ-2) community west of Leslie Street.	High; species and suitable habitat confirmed present within the study area during field investigations.
Mammals	Eastern Small-footed Myotis (Eastern Small-footed Bat) <i>Myotis leibii</i>	END	N/A	N/A	In the spring and summer, Eastern Small-footed Bats will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. These bats often change their roosting locations every day. At night, they hunt for insects to eat, including beetles, mosquitoes, moths, and flies. In the winter, these bats hibernate, most often in caves and abandoned mines. They seem to choose colder and drier sites than similar bats and will return to the same spot each year.	FOD, FOM, and FOD where suitable roosting (i.e. cavity trees and trees with loose bark) habitat is available, CCA, CCR, CL, and structures such as barns.	The Eastern Small-footed Bat has been found from south of Georgian Bay to Lake Erie and east to the Pembroke area. There are also records from the Bruce Peninsula, the Espanola area, and Lake Superior Provincial Park. Most documented sightings are of bats in their winter hibernation sites.	Bat Conservation International (BCI)	Yes; forested communities that may contain potentially suitable tree cavities for roosting present within the Study Area. Suitable rock piles and outcrops for roosting may also be present within the study area.	Yes; forested communities with suitable roosting habitat were present within the Study Area. Targeted surveys for Species at Risk bats (i.e. acoustic monitoring) were not completed during preliminary field investigations.	Medium; while species was not observed during field investigations targeted acoustic monitoring surveys were not completed in suitable habitat.
Mammals	Little Brown Myotis (Little Brown Bat) <i>Myotis lucifugus</i>	END	END Schedule 1	END	Bats are nocturnal. During the day they roost in trees and buildings. They often select attics, abandoned buildings, and barns for summer colonies where they can raise their young. Bats can squeeze through very tiny spaces (as small as six millimetres across) and this is how they access many roosting areas. Little Brown Bats hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing. Their specific physiological requirements limit the number of suitable sites for overwintering. In the east, large numbers (i.e., >3000 bats) of several species typically overwinter in relatively few hibernacula. In the west, there are fewer known hibernacula, and numbers appear lower per site. Females establish summer maternity colonies, often in buildings or large-diameter trees. Foraging occurs over water, along waterways, and forest edges. Large open fields or clearcuts generally are avoided. In autumn, bats return to hibernacula, which may be hundreds of kilometres from their summering areas, swarm near the entrance, mate, and then enter that hibernaculum, or travel to different hibernacula to overwinter.	FOD, FOM, and FOD where suitable roosting (i.e. cavity trees and trees with loose bark) habitat is available, CCA, CCR, CL, and structures such as barns.	The Little Brown Bat is widespread in southern Ontario and found as far north as Moose Factory and Favourable Lake. In Canada, <i>Myotis lucifugus</i> occurs from Newfoundland to British Columbia, and northwest to near the treeline in Labrador, Northwest Territories and Yukon.	BCI	Yes; forested communities that may contain potentially suitable tree cavities for roosting present within the Study Area.	Yes; forested communities with suitable roosting habitat were present within the Study Area. Targeted surveys for Species at Risk bats (i.e. acoustic monitoring) were not completed during preliminary field investigations.	Medium; while species was not observed during field investigations targeted acoustic monitoring surveys were not completed in suitable habitat.
Mammals	Northern Myotis (Northern Long-eared Bat) <i>Myotis septentrionalis</i>	END	END Schedule 1	END	Northern Myotis are associated with boreal forests, choosing to roost under loose bark and in the cavities of trees. These bats hibernate from October or November to March or April. The Northern Myotis overwinters in cold and humid hibernacula (caves/mines). Their specific physiological requirements limit the number of suitable sites for overwintering. In the east, large numbers (i.e., >3000 bats) of several species typically overwinter in relatively few hibernacula. In the west, there are fewer known hibernacula, and numbers appear lower per site. Females establish summer maternity colonies in buildings or large-diameter trees. Foraging occurs along waterways, forest edges, and in gaps in the forest. Large open fields or clearcuts generally are avoided. In autumn, bats return to hibernacula, which may be hundreds of kilometres from their summering areas, swarm near the entrance, mate, and then enter that hibernaculum, or travel to different hibernacula to overwinter.	FOC, FOM, FOD, SWC, SWM, and SWD where suitable roosting (i.e. cavity trees and trees with loose bark) habitat is available, CCA, and structures such as barns.	The Northern Myotis is found throughout forested areas in southern Ontario, to the north shore of Lake Superior and occasionally as far north as Moosonee, and west to Lake Nipigon. In Canada, <i>Myotis septentrionalis</i> occurs from Newfoundland to British Columbia, and northwest to near the treeline in Labrador, Northwest Territories, and Yukon.	BCI	Yes; forested communities that may contain potentially suitable tree cavities for roosting present within the Study Area.	Yes; forested communities with suitable roosting habitat were present within the Study Area. Targeted surveys for Species at Risk bats (i.e. acoustic monitoring) were not completed during preliminary field investigations.	Medium; while species was not observed during field investigations targeted acoustic monitoring surveys were not completed in suitable habitat.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat	Associated ELC Communities	Known Species Range	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Probability of Occurrence
Mammals	Tri-colored Bat <i>Perimyotis subflavus</i>	END	END Schedule 1	END	<p>During the summer, the Tri-colored Bat is found in a variety of forested habitats. It forms day roosts and maternity colonies in older forest and occasionally in barns or other structures. They forage over water and along streams in the forest. Tri-colored Bats eat flying insects and spiders gleaned from webs. At the end of the summer they travel to a location where they swarm. It is generally near the cave or underground location where they will overwinter. They overwinter in caves where they typically roost by themselves rather than part of a group.</p> <p>The Tri-colored Bat overwinters in cold and humid hibernacula (caves/mines). Their specific physiological requirements limit the number of suitable sites for overwintering. In the east, large numbers (i.e., >3000 bats) of several species typically overwinter in relatively few hibernacula. In the west, there are fewer known hibernacula, and numbers appear lower per site. Females establish summer maternity colonies in buildings or large-diameter trees. Foraging occurs over water, along waterways, and forest edges. Large open fields or clearcuts generally are avoided. In autumn, bats return to hibernacula, which may be hundreds of kilometres from their summering areas, swarm near the entrance, mate, and then enter that hibernaculum, or travel to different hibernacula to overwinter.</p>	FOD and FOM, where suitable roosting (i.e. cavity trees and trees with loose bark) habitat is available, CCA, and structures such as barns.	<p>This bat is found in southern Ontario and as far north as Espanola near Sudbury. Because it is very rare, it has a scattered distribution. It is also found from eastern North America down to Central America.</p> <p>In Canada, <i>Perimyotis subflavus</i> occurs in Nova Scotia, New Brunswick, Quebec, and Ontario.</p>	BCI	Yes, forested communities that may contain potentially suitable tree cavities for roosting present within the Study Area.	Yes, forested communities with suitable roosting habitat were present within the Study Area. Targeted surveys for Species at Risk bats (i.e. acoustic monitoring) were not completed during preliminary field investigations.	Medium; while species was not observed during field investigations targeted acoustic monitoring surveys were not completed in suitable habitat.
Plants	Black ash <i>Fraxinus nigra</i>	END	THR	THR	Black ash is predominantly a wetland species of swamps, floodplains and fens. It has an intermediate light requirement and a tendency toward greater abundance in more alkaline sites. Most sites in which it is dominant are flood prone, where its high tolerance of seasonal flooding appears to offer a competitive advantage. Black ash also occurs widely in moist upland forests, but generally at lower densities than in wet areas.	SWC, SWD, SWM, SWT	In Ontario, black ash is widespread and grows everywhere except the Far North.	MECP	Yes; swamp communities present within the Study Area.	Yes; Black ash was observed in the Study Area during field investigations. The location of black ash observations are provided in Table 4 of the main report. As a detailed tree inventory was not completed for the proposed ROW any moist forest, swamp of swamp thicket community where black ash has not already been observed should be considered candidate habitat for black ash.	High; species and suitable habitat confirmed present within the study area during field investigations.
Plants	Butternut <i>Juglans cinerea</i>	END	END Schedule 1	END	<p>In Ontario, butternut usually grows alone or in small groups in deciduous forests. It prefers moist, well-drained soil and is often found along streams. It is also found on well-drained gravel sites and rarely on dry, rocky soil. This species does not do well in the shade, and often grows in sunny openings and near forest edges.</p> <p>Butternut occurs primarily in neutral to calcareous soils of pH 5.5 to 8, often in regions with underlying limestone, and is generally absent from acidic regions. It tends to reach greatest abundance in rich well-drained mesic loams in floodplains, streambanks, terraces, and ravine slopes, but can occur in a wide range of other situations. In closed-canopy stands, it must be in the overstory to thrive. Seedling establishment, growth, and survival to maturity are most frequent in stand openings, riparian zones, and forest edges.</p>	FOD and mature hedgerows. Soil: dry rocky or moist (4, 5, 6) to fresh (2, 3).	<p>Butternut can be found throughout central and eastern North America. In Ontario, this species is found throughout the southwest, north to the Bruce Peninsula, and south of the Canadian Shield.</p> <p>Butternut's native Canadian range is restricted to southern Ontario and Quebec (primarily south of the area bounded by Georgian Bay, the Ottawa Valley, and the Quebec City region), and western and southern portions of New Brunswick.</p>	MECP, NHIC, EA	Yes, species observed during the 1987 EA field investigations. Forested communities present within the study area.	Yes; butternut were observed in the Study Area during field investigations. Location and number of butternuts observed are provided in Table 4 of the main report. As a detailed tree inventory was not completed for the proposed ROW any cultural thicket, cultural woodland or forest community where butternut has not already been observed should be considered candidate habitat for butternut.	High; species and suitable habitat confirmed present within the study area during field investigations.
Reptiles	Blanding's Turtle (Great Lakes / St. Lawrence population) <i>Emydoidea blandingii</i>	THR	THR Schedule 1	END	<p>Blanding's Turtles live in shallow water, usually in large wetlands and shallow lakes with lots of water plants. It is not unusual, though, to find them hundreds of metres from the nearest water body, especially while they are searching for a mate or traveling to a nesting site. Blanding's Turtles hibernate in the mud at the bottom of permanent water bodies from late October until the end of April.</p> <p>In the Great Lakes/St. Lawrence population, Blanding's Turtles are often observed using clear water, eutrophic wetlands. Blanding's Turtles have strong site fidelity but may use several connected water bodies throughout the active season. Females nest in a variety of substrates including sand, organic soil, gravel, cobblestone, and soil-filled crevices of rock outcrops. Adults and juveniles overwinter in a variety of water bodies that maintain pools averaging about 1 m in depth; however, hatching turtles have been observed hibernating terrestrially during their first winter. Reported mean home ranges generally fall between 10-60 ha (maximum 382 ha) or 1000-2500 m (maximum 7000 m); however, most studies likely underestimate Blanding's Turtle home range size because few have utilized GPS loggers to track daily movements throughout one or more entire active seasons.</p>	SWT2, SWT3, SWD, SWM, MAS2, SAS1, SAM1, where open water is present.	<p>The Blanding's Turtle is found in and around the Great Lakes Basin, with isolated populations elsewhere in the United States and Canada. In Canada, the Blanding's Turtle is separated into the Great Lakes-St. Lawrence population and the Nova Scotia population. Blanding's Turtles can be found throughout southern, central, and eastern Ontario.</p> <p>In its Canadian range, the Great Lakes/St. Lawrence population of the Blanding's Turtle occurs primarily in southern Ontario (with isolated reports as far north as Timmins) and southern Quebec (with isolated reports occurring as far north as the Abitibi-Témiscamingue region and as far east as the Capitale-Nationale region in Québec). Across the North American range, Blanding's Turtles mainly occur in small, isolated subpopulations that maintain a few dozen to approximately 100 turtles.</p>	ORAA	Yes; swamp and marsh communities present within the study area. Large wetland areas also present within the Study Area (Holland Marsh Wetland Complex PSW).	Yes; wetland communities that provide suitable habitat for Blanding's turtle were observed along the Holland River and Holland River East Branch. Targeted surveys for Blanding's turtle were not completed during preliminary field investigations.	Medium; while species was not observed during field investigations targeted visual encounter surveys were not completed in suitable habitat.
Reptiles	Northern Map Turtle <i>Graptemys geographica</i>	SC	SC Schedule 1	SC	<p>The Northern Map Turtle inhabits rivers and lakeshores where it basks on emergent rocks and fallen trees throughout the spring and summer. In winter, the turtles hibernate on the bottom of deep, slow-moving sections of river. They require high-quality water that supports the female's mollusc prey. Their habitat must contain suitable basking sites, such as rocks and deadheads, with an unobstructed view from which a turtle can drop immediately into the water if startled.</p> <p>The Northern Map Turtle inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as rocks and logs) and exposure to the sun for at least part of the day.</p>	OAO, SA with emergent rocks and fallen trees suitable habitat for prey.	<p>The Northern Map Turtle's range extends from the Great Lakes region west to Oklahoma and Kansas, south to Louisiana, and east to the Adirondack and Appalachian mountain barrier. In Canada, it is found in southwestern Quebec and southern Ontario. In southern Ontario, it lives primarily on the shores of Georgian Bay, Lake St. Clair, Lake Erie, and Lake Ontario, and along larger rivers including the Thames, Grand, and Ottawa.</p> <p>It reaches its northern limit in southern Ontario and southwestern Quebec, where it is associated with the Great Lakes Basin and the St. Lawrence River.</p>	ORAA	Yes; suitable habitat may be present along the banks of the East and West branches of the Holland River.	Yes; suitable habitat was observed during field investigations within the Holland River and Holland River East Branch. Although suitable habitat was present within the Study Area, the species were not observed during field investigations. Targeted visual encounter surveys for turtles were not completed within the Study Area.	Medium; while species was not observed during field investigations targeted visual encounter surveys were not completed in suitable habitat.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat	Associated ELC Communities	Known Species Range	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Probability of Occurrence
Reptiles	Snapping Turtle <i>Chelydra serpentina</i>	SC	SC Schedule 1	SC	<p>Snapping Turtles spend most of their lives in water. They prefer shallow waters so they can hide under the soft mud and leaf litter, with only their noses exposed to the surface to breathe. During the nesting season, from early to mid summer, females travel overland in search of a suitable nesting site, usually gravelly or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams, and aggregate pits.</p> <p>Although Snapping Turtles have been observed in shallow water in almost every kind of freshwater habitat, the preferred habitat of the species is characterized by slow-moving water with a soft mud bottom and dense aquatic vegetation. Established populations are most often located in ponds, sloughs, shallow bays or river edges, and slow streams, or areas combining several of these wetland habitats. Individual turtles will persist in urbanized water bodies, such as golf course ponds and irrigation canals, but it is unlikely that a population could become established in such habitats. The Snapping Turtle can occur in highly polluted waterways, but environmental contamination is known to reduce the already low reproductive output of this species. Basking on offshore logs and protruding rocks can be common in Snapping Turtles, depending on environmental temperature. Females generally nest on sand or gravel banks along waterways. Upon emergence from the nest in early fall, hatching Snapping Turtles usually move to water, after which they bury themselves under leaf litter or debris. Snapping Turtles overwinter underwater, buried beneath logs, sticks or overhanging banks in small streams that flow continuously throughout the winter. They can also hibernate buried in deep mud in marshy areas or beneath floating mats of vegetation. Snapping Turtle habitat is diminishing in both quantity and quality in Canada, with losses primarily due to conversion of wetlands to agriculture and urban development.</p>	OAO, SA near gravelly or sandy areas.	<p>The Snapping Turtle's range extends from Ecuador to Canada. The Snapping Turtle's range is contracting.</p> <p>In Canada, the species is widespread from Nova Scotia to southeastern Saskatchewan, though it is absent from northwestern Ontario, where summers are likely too cool for Snapping Turtle embryos to complete development successfully. The Snapping Turtle is therefore present in mainland Nova Scotia, southern New Brunswick, southern and central Quebec, southern and central Ontario, southern Manitoba, and southeastern Saskatchewan, primarily in the Qu'Appelle watershed.</p>	OAAA	Yes, species observed during the field investigations for the 1997 Environmental Assessment. Swamp, marsh and open water communities present within the study area. Large wetland areas also present within the Study Area (Holland Marsh Wetland Complex PSW).	Yes; suitable habitat was observed during field investigations in the wetland communities present along the banks of the Holland River and Holland River East Branch. Candidate habitat was also noted in the Open Aquatic community west of 2nd Concession Road and the OAO community east of Leslie Street.	Medium; while species was not observed during field investigations targeted visual encounter surveys were not completed in suitable habitat.

Glossary

- EXP ESA - Extirpated - a species that no longer exists in the wild in Ontario but still occurs elsewhere.
- SARA - Extirpated - a wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
- END ESA - Endangered - a species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's Endangered Species Act.
- SARA - Endangered - a wildlife species that is facing imminent extirpation or extinction.
- THR ESA - Threatened - a species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.
- SARA - Threatened - a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
- SC ESA - Special Concern (formerly Vulnerable) - a species with characteristics that make it sensitive to human activities or natural events.
- SARA - Special Concern - a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
- ESA Endangered Species Act
- SARA Species at Risk Act (Federal)
- Schedule 1 The official list of species that are classified as extirpated, endangered, threatened, and of special concern.
- Schedule 2 Species listed in Schedule 2 are species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
- Schedule 3 Species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
- COSEWIC Committee on the Status of Endangered Wildlife in Canada - a committee of experts that assesses and designates which wild species are in some danger of disappearing from Canada.

Appendix F

Significant Wildlife Habitat Assessment

SWH Ecoregion 6E Criterion Schedule – January 2015

Table 1.1 Seasonal Concentration Areas of Animals.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area Based on Background Review	Confirmed Habitat Found Within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
<p>Waterfowl Stopover and Staging Areas (Terrestrial)</p> <p><u>Rationale:</u> Habitat important to migrating waterfowl.</p>	American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Mallard Northern Pintail Northern Shoveler American Wigeon Gadwall	CUM1 CUT1 Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.	<ul style="list-style-type: none"> Fields with sheet water during Spring (mid-March to May). Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available cxlviii. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. Reports and other information available from Conservation Authorities Sites documented through waterfowl planning processes (e.g. EHJV implementation plan) Field Naturalist Clubs Ducks Unlimited Canada Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area 	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”ccxi <ul style="list-style-type: none"> Any mixed species aggregations of 100E or more individuals required. The flooded field ecosite habitat plus a 100-300m radius area, dependant on local site conditions and adjacent land use is the significant wildlife habitat Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). SWHMiST_Index #7 provides development effects and mitigation measures. 	<p>Yes;</p> <p>Cultural meadow, cultural thicket and large agricultural fields are present within the Study Area.</p>	<p>Candidate;</p> <p>No significant concentrations of waterfowl were found within the Study Area during field investigations. However, targeted surveys were not completed. Agricultural fields within the Study Area may experience suitable amounts of spring melt and/or flooding to be considered significant stopover and staging areas for waterfowl.</p>	As targeted surveys were not completed and suitable habitat was observed, this type of SWH may be present within the Study Area and remains candidate.
<p>Waterfowl Stopover and Staging Areas (Aquatic)</p> <p><u>Rationale:</u> Important for local and migrant waterfowl populations during the spring or fall migration or both periods</p>	Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	<ul style="list-style-type: none"> Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water) 	Studies carried out and verified presence of: <ul style="list-style-type: none"> Aggregations of 100E or more of listed species for 7 daysE, results in > 700 waterfowl use days. Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH cxlix The combined area of the ELC ecosites and a 100m radius area is the SWH cxlviii Wetland area and shorelines 	<p>Yes;</p> <p>Shallow marsh, shallow aquatic and deciduous swamp communities are present within the Holland Marsh Wetland Complex and the Holland River East and West branch.</p>	<p>Candidate;</p> <p>Aggregations of waterfowl in the vicinity of the Holland River were not observed during field investigations; however, migratory bird surveys were not completed. Candidate habitat is present within the large cattail</p>	As targeted surveys were not completed and suitable habitat was observed, this type of SWH may be present within the Study Area and remains candidate.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area Based on Background Review	Confirmed Habitat Found Within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
combined. Sites identified are usually only one of a few in the eco-district.	Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback Ruddy Duck		<u>Information Sources</u> <ul style="list-style-type: none"> Environment Canada. Naturalist clubs often are aware of staging/stopover areas. OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. Sites documented through waterfowl planning processes (e.g. EHJV implementation plan) Ducks Unlimited projects Element occurrence specification by Nature Serve: http://www.natureserve.org Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area 	associated with sites identified within the SWHTG cxlviii Appendix K cxlix are significant wildlife habitat. <ul style="list-style-type: none"> Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). SWHMiSTcxlix Index #7 provides development effects and mitigation measures. 		marsh community present along the banks of the Holland River.	
Shorebird Migratory Stopover Area <u>Rationale:</u> High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	<ul style="list-style-type: none"> Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH. <u>Information Sources</u> <ul style="list-style-type: none"> Western hemisphere shorebird reserve network. Canadian Wildlife Service (CWS) Ontario Shorebird Survey. Bird Studies Canada Ontario Nature Local birders and naturalist clubs Natural Heritage Information Center (NHIC) Shorebird Migratory Concentration Area 	Studies confirming: <ul style="list-style-type: none"> Presence of 3 or more of listed species and > 1000☉ shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) Whimbrel stop briefly (<24hrs) during spring migration, any site with >100☉ Whimbrel used for 3 years or more is significant. The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area cxlviii Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi SWHMiSTcxlix Index #8 provides development effects and mitigation measures. 	No; Suitable shoreline habitat is not present within the Study Area.	N/A.	This type of SWH is not likely present within the Study Area.
Raptor Wintering Area <u>Rationale:</u>	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel	<u>Hawks/Owls:</u> Combination of ELC Community Series; need to	<ul style="list-style-type: none"> The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for 	Studies confirm the use of these habitats by: <ul style="list-style-type: none"> One or more Short-eared Owls or; One or more Bald Eagles or; 	Yes; Qualifying ecosites are present within	Candidate; The required number of indicator species	As targeted surveys were not completed and suitable habitat was observed, this type of SWH may be present within the Study Area and

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area Based on Background Review	Confirmed Habitat Found Within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
Sites used by multiple species, a high number of individuals and used annually are most significant	Snowy Owl Special Concern: Short-eared Owl Bald Eagle	have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM; CUT; CUS; CUW. <u>Bald Eagle:</u> Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).	wintering raptors. <ul style="list-style-type: none"> Raptor wintering sites (hawk/owl) need to be > 20 ha cxlviii, cxlix with a combination of forest and upland. xvi, xvii, xviii, xix, xx, xxi. Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands Field area of the habitat is to be wind swept with limited snow depth or accumulation. Eagle sites have open water, large trees and snags available for roosting cxlix <u>Information Sources:</u> <ul style="list-style-type: none"> OMNRF Ecologist or Biologist Field Naturalist Clubs Natural Heritage Information Center (NHIC) Raptor Winter Concentration Area Data from Bird Studies Canada Results of Christmas Bird Counts Reports and other information available from Conservation Authorities. 	At least 10 individuals and two of the listed hawk/owl species ⑤. <ul style="list-style-type: none"> To be significant a site must be used regularly (3 in 5 years) cxlix for a minimum of 20 days by the above number of birds⑤. The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area⑤ Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” SWHMiST Index #10 and #11 provides development effects and mitigation measures. 	and adjacent to the Study Area and are of sufficient size.	was not observed during field investigations. However, targeted raptor overwintering surveys were not completed. Candidate Raptor Wintering Habitat was identified in the naturalized area located directly west of County Road 4. This area is greater than 20 ha in size and provides a combination of deciduous forest, mixed forest, woodland, thicket and meadow vegetation communities.	remains candidate.
Bat Hibernacula <u>Rationale:</u> Bat hibernacula are rare habitats in all Ontario landscapes.	Big Brown Bat Tri-coloured Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	<ul style="list-style-type: none"> Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. Active mine sites should not be considered as SWH The locations of bat hibernacula are relatively poorly known. <u>Information Sources:</u> <ul style="list-style-type: none"> OMNRF for possible locations and contact for local experts Natural Heritage Information Center (NHIC) Bat Hibernaculum Ministry of Northern Development and Mines for location of mine shafts. Clubs that explore caves (e.g. Sierra Club) University Biology Departments 	<ul style="list-style-type: none"> All sites with confirmed hibernating bats are SWH ⑤. The habitat area includes a 200m radius around the entrance of the hibernaculum, ⑤ for most development types and 1000m for wind farms. Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”. SWHMiST Index #1 provides development effects and mitigation measures. 	No; There are no caves, mine shafts or underground foundations and Karsts present within the Study Area.	N/A.	This type of SWH is not likely present within the Study Area.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area Based on Background Review	Confirmed Habitat Found Within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
			with bat experts.				
Bat Maternity Colonies <u>Rationale:</u> Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	<ul style="list-style-type: none"> Maternity colonies can be found in tree cavities, vegetation and often in buildings xxii, xxv, xxvi, xxvii, xxxi (buildings are not considered to be SWH). Maternity roosts are not found in caves and mines in Ontario. Maternity colonies located in Mature deciduous or mixed forest stands, with >10/ha large diameter (>25cm dbh) wildlife trees Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred, <p><u>Information Sources:</u></p> <ul style="list-style-type: none"> OMNRF for possible locations and contact for local experts University Biology Departments with bat experts. 	<ul style="list-style-type: none"> Maternity Colonies with confirmed use by; <ul style="list-style-type: none"> >10 Big Brown Bats[Ⓔ] >5 Adult Female Silver-haired Bats[Ⓔ] The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies[Ⓔ]. Evaluation methods for maternity colonies should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”. SWHMiSTIndex #12 provides development effects and mitigation measures. 	Yes; Forest communities are present within the Study Area.	Candidate; Forest communities with suitable roost habitat are present within the Study Area. Targeted acoustic monitoring surveys have not been conducted.	As targeted surveys were not completed and suitable habitat was observed, this type of SWH may be present within the Study Area and remains candidate.
Turtle Wintering Areas <u>Rationale:</u> Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	Midland Painted Turtle <u>Special Concern:</u> Northern Map Turtle Snapping Turtle	Midland Painted Turtles; ELC Community Classes; SW, MA, OA and SA, ELC Community Series; FEO and BOO Northern Map Turtle; Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	<ul style="list-style-type: none"> For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen cix, cx, cxi, cxii Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH. <p><u>Information Sources:</u></p> <ul style="list-style-type: none"> EIS studies carried out by Conservation Authorities. Local field naturalists and experts, as well as university 	<ul style="list-style-type: none"> Presence of 5 over-wintering Midland Painted Turtles is significant[Ⓔ]. One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant[Ⓔ]. The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May) cvii. 	Yes; Open water and wetland communities are present within the Study Area.	Candidate; Suitable habitat for overwintering turtles was observed within the wetland communities present along both the Holland River and Holland River East Branch. Targeted surveys were not completed. Four Midland Painted Turtles were observed basking within the Holland River East Branch during ELC surveys completed in August, 2020.	As targeted surveys were not completed and suitable habitat was observed, this type of SWH may be present within the Study Area and remains candidate.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area Based on Background Review	Confirmed Habitat Found Within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
			<p>herpetologists may also know where to find some of these sites.</p> <ul style="list-style-type: none"> • OMNRF Ecologist or Biologist • Field Naturalist clubs • Natural Heritage Information Center (NHIC) 	<ul style="list-style-type: none"> • Congregation of turtles is more common where wintering areas are limited and therefore significant cix, cx, cxi, cxii. • SWHMiSTcxlix Index #28 provides development effects and mitigation measures for turtle wintering habitat. 			
<p>Reptile Hibernaculum</p> <p>Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.</p>	<p>Snakes: Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake</p> <p>Special Concern: Milksnake Eastern Ribbonsnake</p> <p>Lizard: Special Concern (Southern Shield population): Five-lined Skink</p>	<p>For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats.</p> <p>Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator.</p> <p>For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1 FOC3</p>	<ul style="list-style-type: none"> • For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line xliv, l, li, lii, cxii. • Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. • Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures . <p>Information Sources:</p> <ul style="list-style-type: none"> • In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g. old dug wells). • Reports and other information available from Conservation Authorities. • Field Naturalists clubs • University herpetologists • Natural Heritage Information 	<p>Studies confirming:</p> <ul style="list-style-type: none"> • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (e.g. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct)Ⓔ • Note: If there are Special Concern Species present, then site is SWH • Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e. strong hibernation site fidelity). Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30 m radius area is the SWHⒺ • SWHMiSTcxlix Index #13 provides development effects and mitigation measures for snake hibernacula. • Presence of any active hibernaculum for skink is significant. • SWHMiSTcxlix Index #37 provides development effects and mitigation measures for five-lined skink wintering habitat. 	<p>Yes;</p> <p>Hibernacula may be present in any vegetation community.</p>	<p>Candidate;</p> <p>Candidate reptile hibernaculum sites were observed within the FOD5-1 community east of Side Road 10, the CUW1 community west of County Road 4 and the CUT1 community east of Artesian Industrial Parkway. Eastern garter snake was observed within the cultural meadow community located west of the Holland River East Branch, however, no suitable hibernaculum was identified during field investigations. Visual encounter surveys were not completed as part of the field investigations.</p>	<p>As targeted surveys were not completed and suitable habitat was observed, this type of SWH may be present within the Study Area and remains candidate.</p>

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area Based on Background Review	Confirmed Habitat Found Within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
			Center (NHIC) <ul style="list-style-type: none"> OMNRF ecologist or biologist may be aware of locations of wintering skinks 				
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff) Rationale: Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow population are declining in Ontario.	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles. Cliff faces, bridge abutments, silos, barns. Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	<ul style="list-style-type: none"> Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. Does not include a licensed/permitted Mineral Aggregate Operation. <u>Information Sources</u> <ul style="list-style-type: none"> Reports and other information available from Conservation Authorities. Ontario Breeding Bird Atlas Bird Studies Canada; <i>NatureCounts</i> http://www.birdscanada.org/birdmon/ Field Naturalist Clubs. 	Studies confirming: <ul style="list-style-type: none"> Presence of 1 or more nesting sites with 8 or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. A colony identified as SWH will include a 50m radius habitat area from the peripheral nests Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" SWHMiSTIndex #4 provides development effects and mitigation measures 	No; Although habitat may be present in the Study Area, it is likely to be man made and/or disturbed or recently disturbed and therefore does not qualify.	No; Rough-winged Swallows and Cliff Swallows were not observed and no exposed or eroding banks observed during field investigations.	This type of SWH is not likely present within the Study Area.
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs) Rationale: Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	<ul style="list-style-type: none"> Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. Most nests in trees are 11 to 15 m from ground, near the top of the tree. <u>Information Sources</u> <ul style="list-style-type: none"> Ontario Breeding Bird Atlas, colonial nest records. Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF). Natural Heritage Information Center (NHIC) Mixed Wader Nesting Colony Aerial photographs can help 	Studies confirming: <ul style="list-style-type: none"> Presence of 5 or more active nests of Great Blue Heron or other listed species. The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH cc, ccvii Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells SWHMiST Index #5 	Yes; Swamp wetland communities are present within the Study Area.	No; Nests of indicator species were not observed during field investigations.	This type of SWH is not likely present within the Study Area.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area Based on Background Review	Confirmed Habitat Found Within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
			identify large heronries. <ul style="list-style-type: none"> • Reports and other information available from CAs. • MNRF District Offices. • Local naturalist clubs. 	provides development effects and mitigation measures.			
Colonially - Nesting Bird Breeding Habitat (Ground) <u>Rationale:</u> Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1 – 6; MAS1 – 3; CUM CUT CUS	<ul style="list-style-type: none"> • Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. • Brewers Blackbird colonies are found loosely on the ground in low bushes in close proximity to streams and irrigation ditches within farmlands. <u>Information Sources</u> <ul style="list-style-type: none"> • Ontario Breeding Bird Atlas, rare/colonial species records. • Canadian Wildlife Service • Reports and other information available from CAs. • Natural Heritage Information Center (NHIC) Colonial Waterbird Nesting Area • MNRF District Offices. • Field Naturalist clubs. 	Studies confirming: <ul style="list-style-type: none"> • Presence of > 25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Ternⓔ. • Presence of 5 or more pairs for Brewer's Blackbirdⓔ. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significantⓔ. • The edge of the colony and a minimum 150m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH , • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi • SWHMiSTcxlix Index #6 provides development effects and mitigation measures. 	No; No rocky islands or peninsulas associated with a large lake or river are present within the Study Area.	No; Suitable habitat was not identified in the Study Area during field investigations and no active nests found during field investigations.	This type of SWH is not likely present within the Study Area.
Migratory Butterfly Stopover Areas <u>Rationale:</u> Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	Painted Lady Red Admiral <u>Special Concern</u> Monarch	Combination of ELC Community Series; need to have present one Community Series from each land class: <u>Field:</u> CUM CUT CUS <u>Forest:</u> FOC FOD FOM CUP	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario cxlix. <ul style="list-style-type: none"> • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south xxxii, xxxiii, xxxiv, xxxv, xxxvi. • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat 	Studies confirm: <ul style="list-style-type: none"> • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct). MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day, significant variation can occur between years and multiple years of sampling should occur xl, xlii. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. 	No; The Study Area is more than 5km away from Lake Ontario and Lake Erie.	No; The Study Area is more than 5km away from Lake Ontario and Lake Erie.	This type of SWH is not likely present within the Study Area.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area Based on Background Review	Confirmed Habitat Found Within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
		Anecdotal, a candidate site for butterfly stopover will have a history of butterflies being observed.	<p>cxlviii, cxlix.</p> <ul style="list-style-type: none"> Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes xxxvii, xxxviii, xxxix, xl, xli. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> OMNRF (NHIC) Agriculture Canada in Ottawa may have list of butterfly experts. Field Naturalist Clubs Toronto Entomologists Association Conservation Authorities 	<ul style="list-style-type: none"> MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant.Ⓔ SWHMiST Index #16 provides development effects and mitigation measures. 			
<p>Landbird Migratory Stopover Areas</p> <p><u>Rationale:</u> Sites with a high diversity of species as well as high numbers are most significant.</p>	<p>All migratory songbirds.</p> <p>Canadian Wildlife Service Ontario website: http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D-1</p> <p>All migrant raptors species:</p> <p>Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)</p>	<p>All Ecosites associated with these ELC Community Series;</p> <p>FOC FOM FOD SWC SWM SWD</p>	<p>Woodlots need to be >10 haⒺ in size and within 5 km iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv of Lake Ontario.</p> <ul style="list-style-type: none"> If multiple woodlands are located along the shoreline those Woodlands <2km from Lake Ontario are more significant Sites have a variety of habitats; forest, grassland and wetland complexes. The largest sites are more significant Woodlots and forest fragments are important habitats to migrating birds, these features located along the shore and located within 5km of Lake Ontario are Candidate SWH. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Bird Studies Canada Ontario Nature Local birders and naturalist club Ontario Important Bird Areas (IBA) Program 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Use of the habitat by >200 birds/day and with >35 spp with at least 10 bird spp. recorded on at least 5 different survey datesⒺ. This abundance and diversity of migrant bird species is considered above average and significant. Studies should be completed during spring (Apr/May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" SWHMiST Index #9 provides development effects and mitigation measures. 	<p>No;</p> <p>The Study Area is more than 5km away from Lake Ontario and Lake Erie.</p>	<p>No;</p> <p>The Study Area is more than 5km away from Lake Ontario and Lake Erie.</p>	<p>This type of SWH is not likely present within the Study Area.</p>
<p>Deer Yarding Areas</p> <p><u>Rationale:</u> Winter habitat for deer is considered to be the main limiting</p>	<p>White-tailed Deer</p>	<p>Note: OMNRF to determine this habitat.</p> <p>ELC Community Series providing a thermal cover component for a</p>	<ul style="list-style-type: none"> Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred 	<p>No Studies Required:</p> <ul style="list-style-type: none"> Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths > 40cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH. lvi, 	<p>Yes;</p> <p>MNRF has confirmed the presence of this SWH within the Study Area. Stratum 2 Deer</p>	<p>Confirmed;</p> <p>Confirmed by MNRF.</p>	<p>This type of SWH habitat is confirmed within the Study Area.</p>

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area Based on Background Review	Confirmed Habitat Found Within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
factor for northern deer populations. In winter, deer congregate in "yards" to survive severe winter conditions. Deer yards typically have a long history of annual use by deer; yards typically represent 10-15% of an areas summer range.		deer yard would include; FOM, FOC, SWM and SWC. Or these ELC Ecosites; CUP2 CUP3 FOD3 CUT	to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20 cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30 cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter. <ul style="list-style-type: none"> The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%cxv. OMNRF determines deer yards following methods outlined in "Selected Wildlife and Habitat Features: Inventory Manual" cxv Woodlots with high densities of deer due to artificial feeding are not significantⒺ. 	lvii, lviii, lix, lx, Ⓔ <ul style="list-style-type: none"> Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNRF will be available at local MNRF offices or via Land Information Ontario (LIO). Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNRF will complete these field investigations. cxv If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. SWHMiSTcxlix Index #2 provides development effects and mitigation measures. 	Wintering Areas are present within large portions of the wooded areas present between the Holland River and Holland River East Branch and along the east bank of the Holland Rivers East Branch.		
Deer Winter Congregation Areas Rationale: Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable	White-tailed Deer	All Forested Ecosites with these ELC Community Series; FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50 ha may also be used.	<ul style="list-style-type: none"> Woodlots will typically be >100 ha in sizeⒺ. Woodlots <100ha may be considered as significant based on MNRF studies or assessment. Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands. If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule. Large woodlots > 100ha and up to 1500 ha are known to be used 	Studies confirm: <ul style="list-style-type: none"> Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF. Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF Ⓔ Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques, ground or road surveys. or a 	Yes; MNRF has confirmed the presence of this SWH within the Study Area. Stratum 2 Deer Wintering Areas are present within large portions of the wooded areas present between the Holland River and Holland River East Branch and along the east bank	Confirmed; Confirmed by MNRF.	This type of SWH habitat is confirmed within the Study Area.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area Based on Background Review	Confirmed Habitat Found Within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
woodlands to reduce or avoid the impacts of winter conditions cxlviii.			<p>annually by densities of deer that range from 0.1-1.5 deer/ha.</p> <ul style="list-style-type: none"> Woodlots with high densities of deer due to artificial feeding are not significant[Ⓔ]. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> MNRF District Offices. LIO/NRVIS 	<p>pellet count deer density survey.</p> <ul style="list-style-type: none"> If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. SWHMiST Index #2 provides development effects and mitigation measures. 	of the Holland Rivers East Branch.		

Table 1.2.1 Rare Vegetation Communities.

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area	Conclusions
	ELC Ecosite Code	Habitat Description	Detailed Information and Sources	Defining Criteria			
<p>Cliffs and Talus Slopes</p> <p>Rationale: Cliffs and Talus Slopes are extremely rare habitats in Ontario.</p>	<p>Any ELC Ecosite within Community Series:</p> <p>TAO TAS TAT CLO CLS CLT</p>	<p>A Cliff is vertical to near vertical bedrock >3m in height.</p> <p>A Talus Slope is rock rubble at the base of a cliff made-up of coarse rocky debris.</p>	<p>Most cliff and talus slopes occur along the Niagara Escarpment.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> The Niagara Escarpment Commission has detailed information on location of these habitats. OMNRF District Natural Heritage Information Center (NHIC) has location information available on their website Field Naturalist clubs Conservation Authorities 	<ul style="list-style-type: none"> Confirm any ELC Vegetation Type for Cliffs or Talus Slopes SWHMiSTIndex #21 provides development effects and mitigation measures. 	<p>No;</p> <p>No cliff or talus communities were identified within the Study Area.</p>	<p>No;</p> <p>No cliff or talus communities were identified within the Study Area.</p>	<p>This type of SWH is not likely present within the Study Area.</p>
<p>Sand Barren</p> <p>Rationale: Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry</p>	<p>ELC Ecosites: SBO1 SBS1 SBT1</p> <p>Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always < 60%.</p>	<p>Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered, but less than 60%.</p>	<p>A sand barren area >0.5ha in size[Ⓔ].</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> OMNRF Districts. Natural Heritage Information Center (NHIC) has location information available on their website. Field Naturalist clubs Conservation Authorities 	<ul style="list-style-type: none"> Confirm any ELC Vegetation Type for Sand Barrens Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.)[Ⓔ]. SWHMiSTIndex #20 provides development effects and mitigation measures. 	<p>No;</p> <p>No sand barren communities were identified within the Study Area.</p>	<p>No;</p> <p>No sand barren communities were identified within the Study Area.</p>	<p>This type of SWH is not likely present within the Study Area.</p>
<p>Alvar</p> <p>Rationale: Alvars are extremely rare habitats in Ecoregion 6E. Most alvars in Ontario are in Ecoregions 6E and 7E. Alvars in 6E are small and highly localized just north of the Palaeozoic-Precambrian contact.</p>	<p>ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2</p> <p>Five Alvar Indicator Species: 1) <i>Carex crawei</i></p>	<p>An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover</p>	<p>An Alvar site > 0.5 ha in size lxxv.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Alvars of Ontario (2000), Federation of Ontario Naturalists. Ontario Nature – Conserving Great Lakes Alvars. Natural Heritage Information Center (NHIC) has location information 	<ul style="list-style-type: none"> Field studies that identify four of the five[Ⓔ] Alvar Indicator Species at a Candidate Alvar site is Significant. Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses lxxv 	<p>No;</p> <p>No alvar communities were identified within the Study Area</p>	<p>No;</p> <p>No alvar communities were identified within the Study Area</p>	<p>This type of SWH is not likely present within the Study Area.</p>

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area	Conclusions
	ELC Ecosite Code	Habitat Description	Detailed Information and Sources	Defining Criteria			
	2) <i>Panicum philadelphicum</i> 3) <i>Eleocharis compressa</i> 4) <i>Scutellaria parvula</i> 5) <i>Trichostema brachiatum</i> These indicator species are very specific to Alvars within Ecoregion 6E@cxlix	varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover lxxviii.	available on their website <ul style="list-style-type: none"> OMNRF Districts Feld Naturalist clubs. Conservation Authorities. 	<ul style="list-style-type: none"> SWHMiSTcxlix Index #17 provides development effects and mitigation measures. 			
Old Growth Forest Rationale: Due to historic logging practices, extensive old growth forest is rare in the Ecoregion. Interior habitat provided by old growth forests is required by many wildlife species.	Forest Community Series: FOD FOC FOM SWD SWC SWM	Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Woodland areas 30 ha or greater in size or with at least 10 ha interior habitat assuming 100 m buffer at edge of forest @. <u>Information Sources</u> <ul style="list-style-type: none"> OMNRF Forest Resource Inventory mapping OMNRF Districts. Field Naturalist clubs Conservation Authorities Sustainable Forestry Licence (SFL) companies will possibly know locations through field operations. Municipal forestry departments 	Field Studies will determine: <ul style="list-style-type: none"> If dominant trees species of the are >140 years old, then the area containing these trees is Significant Wildlife Habitat The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut stumps will not be present) The area of forest ecosites combined or an eco-element within an ecosite that contains the old growth characteristics is the SWH. Determine ELC vegetation types for the forest area containing the old growth characteristics lxxviii SWHMiSTcxlix Index #23 provides development effects and mitigation measures. 	No; No old growth forest communities were identified within the Study Area.	No; No old growth forest communities were identified within the Study Area.	This type of SWH is not likely present within the Study Area.
Savannah Rationale: Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%.lxxix, lxxx, lxxxi, lxxxii, lxxxiii	No minimum size to site @ Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. <u>Information Sources</u> <ul style="list-style-type: none"> Natural Heritage 	Field studies confirm one or more of the Savannah indicator species listed in cxlix Appendix N should be present @. Note: Savannah plant spp. list from Ecoregion 6E should be used cxlviii. <ul style="list-style-type: none"> Area of the ELC Ecosite is the SWH. Site must not be dominated by 	No; No savannah communities were identified within the Study Area.	No; No savannah communities were identified within the Study Area.	This type of SWH is not likely present within the Study Area.

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area	Conclusions
	ELC Ecosite Code	Habitat Description	Detailed Information and Sources	Defining Criteria			
			<p>Information Center (NHIC) has location information available on their website</p> <ul style="list-style-type: none"> • OMNRF Districts • Feld Naturalist clubs. • Conservation Authorities. 	<p>exotic or introduced species (<50% vegetative cover are exotic sp.).</p> <ul style="list-style-type: none"> • SWHMiSTIndex #18 provides development effects and mitigation measures. 			
<p>Tallgrass Prairie</p> <p><u>Rationale:</u> Tallgrass Prairies are extremely rare habitats in Ontario.</p>	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. lxxix, lxxx, lxxxi, lxxxii, lxxxiii	<p>No minimum size to site (E). Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Natural Heritage Information Center (NHIC) has location information available on their website • OMNRF Districts • Feld Naturalist clubs. • Conservation Authorities. 	<p>Field studies confirm one or more of the Prairie indicator species listed in cxlix Appendix N should be present (E). Note: Prairie plant spp. list from Ecoregion 6E should be used cxlviii</p> <ul style="list-style-type: none"> • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • SWHMiSTcxlix Index #19 provides development effects and mitigation measures. 	No; No tall grass prairie communities were identified within the Study Area.	No; No tall grass prairie communities were identified within the Study Area.	This type of SWH is not likely present within the Study Area.
<p>Other Rare Vegetation Communities</p> <p><u>Rationale:</u> Plant communities that often contain rare species which depend on the habitat for survival.</p>	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG cxlviii. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	<p>ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M cxlviii</p> <p>The OMNRF/NHIC will have up to date listing for rare vegetation communities.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Natural Heritage Information Center (NHIC) has location information available on their website • OMNRF Districts • Feld Naturalist clubs. • Conservation Authorities. 	<p>Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG cxlviii.</p> <ul style="list-style-type: none"> • Area of the ELC Vegetation Type polygon is the SWH. • SWHMiST Index #37 provides development effects and mitigation measures. 	No; No rare vegetation communities were identified within the Study Area.	Confirmed; An FOD2-3 community (S3S4) was confirmed within the Study Area, west of County Road 4.	This type of SWH habitat is confirmed within the Study Area.

Table 1.2.2 Specialized Habitats of Wildlife considered SWH.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
<p>Waterfowl Nesting Area</p> <p>Rationale: Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.</p>	<p>American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard</p>	<p>All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4</p> <p>Note: includes adjacency to Provincially Significant Wetlands</p>	<p>A waterfowl nesting area extends 120 m cxlx from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur cxlx.</p> <ul style="list-style-type: none"> Upland areas should be at least 120 m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests. Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Ducks Unlimited staff may know the locations of particularly productive nesting sites. OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. Reports and other information available from Conservation Authorities. 	<p>Studies confirmed:</p> <ul style="list-style-type: none"> Presence of 3 or more nesting pairs for listed species excluding Mallards[Ⓔ], or; Presence of 10 or more nesting pairs for listed species including Mallards[Ⓔ]. Any active nesting site of an American Black Duck is considered significant. Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m cxlxviii from the wetland and will provide enough habitat for waterfowl to successfully nest. SWHMiSTcxlx Index #25 provides development effects and mitigation measures. 	<p>Yes;</p> <p>Wetland communities adjacent to upland habitat were identified within the Study Area.</p>	<p>No;</p> <p>The number of required nesting indicator species was not met at any of the vegetation communities within the Study Area during field investigations and breeding bird surveys.</p>	<p>This type of SWH is not likely present within the Study Area.</p>
<p>Bald Eagle and Osprey Nesting, Foraging and Perching Habitat</p> <p>Rationale: Nest sites are fairly uncommon in Eco-region 6E and are used annually by these species. Many suitable</p>	<p>Osprey Special Concern Bald Eagle</p>	<p>ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands</p>	<p>Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water.</p> <ul style="list-style-type: none"> Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree’s canopy. Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). <p><u>Information Sources</u></p>	<p>Studies confirm the use of these nests by:</p> <ul style="list-style-type: none"> One or more active Osprey or Bald Eagle nests in an area. Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand 	<p>Yes;</p> <p>Qualifying vegetation communities adjacent to wetlands and rivers are present within the Study Area.</p>	<p>No;</p> <p>An osprey nesting platform was observed along the banks of the Holland River, south of Hochreiter Road, outside of the proposed right-of-way (ROW) limits. Non-humanmade nests of the two indicator species was not observed during field investigations.</p>	<p>This type of SWH is not likely present within the Study Area.</p>

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.			<ul style="list-style-type: none"> Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario. MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat. Nature Counts, Ontario Nest Records Scheme data. OMNRF Districts. Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in Ontario for species documented Reports and other information available from Conservation Authorities. Field Naturalists clubs 	<p>is the SWH , maintaining undisturbed shorelines with large trees within this area is important .</p> <ul style="list-style-type: none"> For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. Area of the habitat from 400-800m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat cvi To be significant a site must be used annually. When found inactive, the site must be known to be inactive for > 3 years or suspected of not being used for >5 years before being considered not significant. ccvii Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid-March to mid-August. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”ccxi SWHMISTcxlx Index #26 provides development effects and mitigation measures 			
<p>Woodland Raptor Nesting Habitat</p> <p><u>Rationale:</u> Nests sites for these species are rarely identified; these area sensitive habitats and are often used annually by</p>	Northern Goshawk Cooper’s Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	<p>May be found in all forested ELC Ecosites.</p> <p>May also be found in SWC, SWM, SWD and CUP3</p>	<p>All natural or conifer plantation woodland/forest stands >30ha with >10ha of interior habitat lxxxviii, lxxxix, xc, xci, xciii, xciv, xcv,xcvi, cxxxiii.</p> <p>Interior habitat determined with a 200m buffer cxlviii</p> <ul style="list-style-type: none"> Stick nests found in a variety of intermediate-aged to mature coniferous, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of 1 or more active nests from species list is considered significant. Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha area of habitat is the SWH. (the 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest) Barred Owl – A 200m radius around the nest is the SWH ccvii. Broad-winged Hawk and Coopers Hawk – A 100m radius around the nest is the 	<p>Yes;</p> <p>Forest communities identified within the Study Area are large enough to meet the size requirement for significance</p>	<p>Candidate;</p> <p>Several forest and swamp communities found in the vicinity of the Holland River and the East Holland River are part of a larger forest systems that meet the size criteria to be considered candidate habitat. No nests of indicator species were observed during site investigations. However, raptor specific surveys were not completed.</p>	As targeted surveys were not completed and suitable habitat was observed, this type of SWH may be present within the Study Area and remains candidate.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
			<u>Information Sources</u> <ul style="list-style-type: none"> • OMNRF Districts. • Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada. • Reports and other information available from Conservation Authorities. 	SWH ccvii. <ul style="list-style-type: none"> • Sharp-Shinned Hawk – A 50m radius around the nest is the SWH ccvii. • Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWHMiST cxlix Index #27 provides development effects and mitigation measures. 			
Turtle Nesting Areas <u>Rationale:</u> These habitats are rare and when identified will often be the only breeding site for local populations of turtles.	Midland Painted Turtle <u>Special Concern Species</u> Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100m) cxlviii or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1	<ul style="list-style-type: none"> • Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. <u>Information Sources</u> <ul style="list-style-type: none"> • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). • Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them. • Natural Heritage Information Center (NHIC) • Field Naturalist clubs 	Studies confirm: <ul style="list-style-type: none"> • Presence of 5 or more nesting Midland Painted Turtles[ⓔ] • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH[ⓔ]. • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependant on slope, riparian vegetation and adjacent land use is the SWH cxlviii • Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30-100m area of habitat. cxlix • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method. • SWHMiST cxlix Index #28 provides development effects and mitigation measures for turtle nesting habitat. 	Yes; Vegetation communities where exposed mineral soil may be present adjacent to wetlands and rivers are present within the Study Area.	Candidate; Suitable conditions for turtle nesting were observed in the CUM1-1 community located west of the Holland River East Branch.	As targeted surveys were not completed and suitable habitat was observed, this type of SWH may be present within the Study Area and remains candidate.
Seeps and Springs	Wild Turkey Ruffed Grouse Spruce Grouse	Seeps/Springs are areas where ground water comes to the	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system	Field Studies confirm: <ul style="list-style-type: none"> • Presence of a site with 2 or more[ⓔ] seeps/springs should 	Yes; Forested ecosites are	Confirmed; Seepage areas were	This type of SWH habitat is confirmed within the Study Area.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
<p>Rationale: Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.</p>	White-tailed Deer Salamander spp.	surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	cxvii, cxlix. <ul style="list-style-type: none"> Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species cxix, cxx, cxxi, cxxii, cxiii, cxiv <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Topographical Map. Thermography. Hydrological surveys conducted by Conservation Authorities and MOE. Field Naturalists clubs and landowners. Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped. 	be considered SWH. <ul style="list-style-type: none"> The area of an ELC forest ecosite or an Ecoelement within ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat. SWHMiST Index #30 provides development effects and mitigation measures 	present within the Study Area. The presence of seeps within the Study Area was noted in the 1997 EA.	observed in the SWT3-1 community west of the Holland River East Branch.	
<p>Amphibian Breeding Habitat (Woodland).</p> <p>Rationale: These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations</p>	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians	<ul style="list-style-type: none"> Presence of a wetland, pond or woodland pool (including vernal pools) >500m² (about 25m diameter) within or adjacent (within 120m) to a woodland (no minimum size). clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx Some small wetlands may not be mapped and may be important breeding pools for amphibians. Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. OMNRF District. OMNRF wetland evaluations Field Naturalist clubs Canadian Wildlife Service Amphibian Road Call Survey Ontario Vernal Pool Association: http://www.ontariovernalpools.org 	Studies confirm: <ul style="list-style-type: none"> Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog species with Call Level Codes of 3(⊕). A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. The habitat is the wetland area plus a 230m radius of woodland area lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx, lxxi. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. SWHMiST Index #14 provides development effects and mitigation measures. 	Yes; Forested and swamp ecosites are present within the Study Area.	No; Numbers of indicator species heard within the Study Area did not meet the criteria of significance.	This type of SWH is not likely present within the Study Area.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
<p>Amphibian Breeding Habitat (Wetlands)</p> <p>Rationale: Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Central Ontario landscapes.</p>	<p>Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog</p>	<p>ELC Community Classes SW, MA, FE, BO, OA and SA.</p> <p>Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands.</p>	<ul style="list-style-type: none"> Wetlands >500m² (about 25m diameter) ccvii), supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats clxxxii. Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. Bullfrogs require permanent water bodies with abundant emergent vegetation. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Ontario Herpetofaunal Summary Atlas (or other similar atlases) Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. OMNRF Districts and wetland evaluations Reports and other information available from Conservation Authorities. 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3Ⓔ. Ⓔ; Wetland with confirmed breeding Bullfrogs are significantⒺ. The ELC ecosite wetland area and the shoreline are the SWH. A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. SWHMIST Index #15 provides development effects and mitigation measures. 	<p>Yes;</p> <p>Forested and swamp ecosites are present within the Study Area.</p>	<p>Confirmed;</p> <p>The required number of indicator species were recorded calling with a Call Code Level of 3 at both stations AMP-01 and AMP-02. A chorus of American Toads and Spring Peepers were recorded at AMP-01 on April 10, 2021 and a chorus of Wood Frogs and spring peepers were recorded at AMP-02 during the same evening.</p>	<p>This type of SWH habitat is confirmed within the Study Area.</p>
<p>Woodland Area-Sensitive Bird Breeding Habitat</p> <p>Rationale: Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for</p>	<p>Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren</p> <p>Special Concern: Cerulean Warbler</p>	<p>All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD</p>	<ul style="list-style-type: none"> Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs. old) forest stands or woodlots >30 ha. cv, cxxxi, cxxxii, cxxxiii, cxxxiv, cxxxv, cxxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvi, clvii, clviii, clix, Interior forest habitat is at least 200 m from forest edge habitat. clxiv <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Local bird clubs. Canadian Wildlife Service (CWS) for the location of forest bird monitoring. 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. Ⓔ Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH.Ⓔ Conduct field investigations in spring and early summer when birds are singing and defending their territories. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” 	<p>Yes;</p> <p>Forested ecosites within the Study Area are large enough to provide interior forest habitat.</p>	<p>No;</p> <p>Numbers of indicator species observed did not meet criteria for significance.</p>	<p>This type of SWH is not likely present within the Study Area.</p>

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area	Conclusions
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria			
area sensitive interior forest song birds.	Canada Warbler		<ul style="list-style-type: none"> Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species Reports and other information available from Conservation Authorities. 	<ul style="list-style-type: none"> SWHMiST Index #34 provides development effects and mitigation measures. 			

Table 1.3. Habitats of Species of Conservation Concern considered SWH.

Wildlife	Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area	Conclusions
		ELC Ecosite	Habitat Criteria and Information Sources	Defining Criteria			
<p>Marsh Breeding Bird Habitat</p> <p>Rationale: Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.</p>	<p>American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan</p> <p>Special Concern: Black Tern Yellow Rail</p>	<p>MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1</p> <p>For Green Heron: All SW, MA and CUM1 sites.</p>	<ul style="list-style-type: none"> Nesting occurs in wetlands. All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present. For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> OMNRF District and wetland evaluations. Field Naturalist clubs Natural Heritage Information Center (NHIC) Records. Reports and other information available from Conservation Authorities. Ontario Breeding Bird Atlas. 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species (E). Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH (E). Area of the ELC ecosite is the SWH. Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” SWHMiST Index #35 provides development effects and mitigation measures 	<p>Yes;</p> <p>Qualifying wetland ecosites are present within the Study Area.</p>	<p>Candidate;</p> <p>Large shallow marsh (MAS) and swamp thicket (SWT) communities present along the banks of the Holland River and Holland River East Branch present suitable characteristics for use by local and migrant waterfowl populations during the spring or fall migration. Green Heron (BBS-15) and Marsh Wren (BBS-10) were both observed during breeding bird surveys. However, confirmed nesting was not observed for either species. Targeted surveys (i.e., call playback surveys) are required to confirm the presence/absence of Marsh Breeding Bird Habitat indicator species.</p>	<p>As targeted surveys were not completed and suitable habitat was observed, this type of SWH may be present within the Study Area and remains candidate.</p>
<p>Open Country Bird Breeding Habitat</p> <p>Rationale: This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.</p>	<p>Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow</p> <p>Special Concern Short-eared Owl</p>	<p>CUM1 CUM2</p>	<ul style="list-style-type: none"> Large grassland areas (includes natural and cultural fields and meadows) >30 ha clxiv, clxv, clxvi, clxvii, clxviii, clxix. Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years) (E). Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. The Indicator bird species are area sensitive requiring larger grassland areas than the 	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> Presence of nesting or breeding of 2 or more of the listed species. (E) A field with 1 or more breeding Short-eared Owls is to be considered SWH. The area of SWH is the contiguous ELC ecosite field areas. Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” SWHMiST Index #32 provides development effects and mitigation measures 	<p>Yes;</p> <p>Suitable cultural meadow habitat that meets size thresholds is present within the Study Area.</p>	<p>No;</p> <p>Vesper Sparrow was likely nesting within the meadow at BBS-05 and BBS-06. However, two or more of the listed species were not found nesting within the Study Area. Numbers of indicator species observed did not meet criteria for significance.</p>	<p>This type of SWH is not likely present within the Study Area</p>

Wildlife	Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area	Conclusions
		ELC Ecosite	Habitat Criteria and Information Sources	Defining Criteria			
			<p>common grassland species.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs. • Ontario Breeding Bird Atlas • Reports and other information available from Conservation Authorities. 				
<p>Shrub/Early Successional Bird Breeding Habitat</p> <p><u>Rationale:</u> This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records cxcix.</p>	<p><u>Indicator Spp:</u> Brown Thrasher Clay-coloured Sparrow</p> <p><u>Common Spp.</u> Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher</p> <p>Special Concern: Yellow-breasted Chat Golden-winged Warbler</p>	<p>CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species</p>	<p>Large field areas succeeding to shrub and thicket habitats >10ha clixiv in size.</p> <ul style="list-style-type: none"> • Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years) clix. • Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species clixiii. • Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs. • Ontario Breeding Bird Atlas • Reports and other information available from Conservation Authorities. 	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species. clix • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. clix • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • SWHMiST Index #33 provides development effects and mitigation measures. 	<p>Yes;</p> <p>Based on the completed aerial photo interpretation for the Study Area, suitable ecosites are present but do not meet the size criteria for significance. However, suitable ecosites may be found to be of sufficient size during preliminary field investigations.</p>	<p>No;</p> <p>A cultural thicket community is in proximity to both breeding bird station BBS-05, BBS- 06 and BBS- 07 where Clay-colored Sparrow was observed calling. Probable breeding evidence for Clay-colored Sparrow was recorded at BBS-07.</p> <p>Numbers of indicator species observed did not meet criteria for significance.</p>	<p>This type of SWH is not likely present within the Study Area</p>
<p>Terrestrial Crayfish</p> <p><u>Rationale:</u> Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. ccii</p>	<p>Chimney or Digger Crayfish; (<i>Fallicambarus fodiens</i>)</p> <p>Devil Crayfish or Meadow Crayfish; (<i>Cambarus diogenes</i>)</p>	<p>MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM</p>	<p>Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish.</p> <ul style="list-style-type: none"> • Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not 	<p>Studies Confirm:</p> <ul style="list-style-type: none"> • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites • Area of ELC ecosite or an Ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only 	<p>Yes;</p> <p>Suitable meadows and marshes are within Study Area.</p>	<p>Confirmed;</p> <p>Terrestrial Crayfish chimneys were observed in the SWT2-9 community west of County Road 4.</p> <p>Candidate habitat for Terrestrial Crayfish was observed within the wetland communities adjacent to the Holland</p>	<p>This type of SWH was confirmed present within the Study Area.</p>

Wildlife	Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area	Conclusions
		ELC Ecosite	Habitat Criteria and Information Sources	Defining Criteria			
		CUM1 with inclusions of above meadow marsh or swamp ecosites can be used by terrestrial crayfish.	too moist so that the tunnel is well formed. <u>Information Sources</u> <ul style="list-style-type: none"> Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998 	indicator of presence, observance or collection of individuals is very difficult cci <ul style="list-style-type: none"> SWHMiST cxlix Index #36 provides development effects and mitigation measures. 		River and Holland River East Branch.	
Special Concern and Rare Wildlife Species <u>Rationale:</u> These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre.	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites Ixxviii <u>Information Sources</u> <ul style="list-style-type: none"> Natural Heritage Information Centre (NHIC) will have Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data. NHIC Website "Get Information" : http://nhic.mnr.gov.on.ca Ontario Breeding Bird Atlas Expert advice should be sought as many of the rare spp. have little information available about their requirements. 	Studies Confirm: <ul style="list-style-type: none"> Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH; this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat. SWHMiST Index #37 provides development effects and mitigation measures. 	Yes; There are records of Special Concern and Rare species within or in the vicinity of the Study Area	Confirmed; A total of four Special Concern and Rare Wildlife Species were observed in the Study Area; Barn Swallow, Eastern Wood-pewee, Monarch and Wood Thrush. A habitat assessment for Species of Conservation Concern is provided in Appendix E.	This type of SWH was confirmed present within the Study Area.

Table 1.4 Animal Movement Corridors

Habitat	SPECIES	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Present within the Study Area	Conclusions
		ELC Eco-sites	Habitat Criteria and Information Sources	Defining Criteria			
<p>Amphibian Movement Corridors</p> <p><u>Rationale:</u> Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.</p>	<p>Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog</p>	<p>Corridors may be found in all ecosites associated with water.</p> <ul style="list-style-type: none"> Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1 	<p>Movement corridors between breeding habitat and summer habitat clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, clxxx, clxxxi.</p> <p>Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat –Wetland) of this Schedule (E).</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> MNRF District Office. Natural Heritage Information Center (NHIC). Reports and other information available from Conservation Authorities. Field Naturalist Clubs. 	<ul style="list-style-type: none"> Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant cxlix Corridors should have at least 15m of vegetation on both sides of waterway cxlix or be up to 200m wide cxlix of woodland habitat and with gaps <20mcxlix . Shorter corridors are more significant than longer corridors; however amphibians must be able to get to and from their summer and breeding habitat cxlix. SWHMiST cxlix Index #40 provides development effects and mitigation measures 	<p>Yes;</p> <p>Amphibian Breeding Habitat – Wetland was confirmed within the Study Area.</p>	<p>No;</p> <p>Areas of confirmed Amphibian Breeding Habitat (Wetland) in the Study Area are directly adjacent to upland communities with no connecting corridor present.</p>	<p>This type of SWH is not likely present within the Study Area</p>
<p>Deer Movement Corridors</p> <p><u>Rationale:</u> Corridors important for all species to be able to access seasonally important life-cycle habitats or to access new habitat for dispersing individuals by minimizing their vulnerability while travelling.</p>	<p>White-tailed Deer</p>	<p>Corridors may be found in all forested ecosites.</p> <p>A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors.</p>	<p>Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule. (E)</p> <ul style="list-style-type: none"> A deer wintering habitat identified by the OMNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges). <p><u>Information Sources</u></p> <ul style="list-style-type: none"> MNRF District Office. 	<ul style="list-style-type: none"> Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas. Corridors that lead to a deer wintering habitat should be unbroken by roads and residential areas. Corridors should be at least 200m wide with gaps < 20m and if following riparian area with at least 15m of vegetation on both sides of waterway. Shorter corridors are more significant than longer 	<p>Yes;</p> <p>Qualifying ecosites and Stratum II Deer Wintering Areas are present within the Study Area.</p>	<p>No;</p> <p>While confirmed Deer Wintering Areas are in close proximity to both banks of the Holland River East Branch this section of river is unlikely to provide conditions suitable to be considered SWH. This is largely based upon the residential and commercial developments present both north and south of the alignment. Additionally, the alignment intersects the northern extent of the Wintering Area to the west and the southern extent of the</p>	<p>This type of SWH is not likely present within the Study Area</p>

Habitat	SPECIES	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Present within the Study Area	Conclusions
		ELC Eco-sites	Habitat Criteria and Information Sources	Defining Criteria			
			<ul style="list-style-type: none"> Natural Heritage Information Center (NHIC). Reports and other information available from Conservation Authorities. Field Naturalist Clubs. 	<p>corridors, cxlix.</p> <ul style="list-style-type: none"> SWHMiST cxlix Index #39 provides development effects and mitigation measures 		<p>Wintering Area to the east of the river with little habitat present directly north or south of the respective areas in which deer would be traveling to or from. The proposed ROW intersects the center portion of the third Deer Wintering Area present in the Study Area with no suitable movement corridor habitat present adjacent to the feature in the Study Area. .</p>	

Table 1.5.1 Significant Wildlife Habitat Exceptions for Ecodistricts within EcoRegion 6E

EcoDistrict	Wildlife Habitat and Species	Candidate SWH			Confirmed SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area	Conclusions
		Ecosites	Habitat Description	Habitat Criteria and Information	Defining Criteria			
<p>6E-14</p> <p>Rationale: The Bruce Peninsula has an isolated and distinct population of black bears. Maintenance of large woodland tracts with mast-producing tree species is important for bears. clxxxvi, ccxvii</p>	<p>Mast Producing Areas</p> <p>Black Bear</p>	<p>All Forested habitat represented by ELC Community Series:</p> <p>FOM FOD</p>	<ul style="list-style-type: none"> Black bears require forested habitat that provides cover, winter hibernation sites, and mast-producing tree species. Forested habitats need to be large enough to provide cover and protection for black bears. 	<p>Woodland ecosites >30ha with mast-producing tree species, either soft (cherry) or hard (oak and beech),</p> <p><u>Information Sources</u> Important forest habitat for black bears may be identified by OMNRF.</p>	<p>All woodlands > 30ha with a 50% composition of these ELC Vegetation[ⓔ] Types are considered significant: FOM1-1 FOM2-1 FOM3-1 FOD1-1 FOD1-2 FOD2-1 FOD2-2 FOD2-3 FOD2-4 FOD4-1 FOD5-2 FOD5-3 FOD5-7 FOD6-5</p> <p>SWHMiST cxlix Index #3 provides development effects and mitigation measures.</p>	<p>No;</p> <p>The Study Area is not within Ecodistrict 6E-14</p>	<p>No;</p> <p>The Study Area is not within Ecodistrict 6E-14</p>	<p>This type of SWH is not present within the Study Area.</p>
<p>6E- 17</p> <p>Rationale: Sharp-tailed grouse only occur on Manitoulin Island in Eco-region 6E, Leks are an important habitat to maintain their population</p>	<p>Lek</p> <p>Sharp-tailed Grouse</p>	<p>CUM CUS CUT</p>	<ul style="list-style-type: none"> The lek or dancing ground consists of bare, grassy or sparse shrubland. There is often a hill or rise in topography. Leks are typically a grassy field/meadow >15ha with adjacent shrublands and >30ha with adjacent deciduous woodland. Conifer trees within 500m are not tolerated. 	<p>Grasslands (field/meadow) are to be >15ha when adjacent to shrubland and >30ha when adjacent to deciduous woodland ccxix.</p> <ul style="list-style-type: none"> Grasslands are to be undisturbed with low intensities of agriculture (light grazing or late haying) Leks will be used annually if not destroyed by cultivation or invasion by woody plants or tree planting <p><u>Information Sources</u></p> <ul style="list-style-type: none"> OMNRF district office Bird watching clubs Local landowners Ontario Breeding Bird Atlas 	<p>Studies confirming lek habitat are to be completed from late March to June.</p> <ul style="list-style-type: none"> Any site confirmed with sharp-tailed grouse courtship activities is considered significant[ⓔ] The field/meadow ELC ecosites plus a 200 m radius area with shrub or deciduous woodland is the lek habitat[ⓔ] SWHMiST Index #32 provides 	<p>No;</p> <p>The Study Area is not within Ecodistrict 6E-14</p>	<p>No;</p> <p>The Study Area is not within Ecodistrict 6E-14</p>	<p>This type of SWH is not present within the Study Area.</p>

					development effects and mitigation measures			
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