Environmental Impact Study - 1490 County Road 28 and 1683 Moore Drive, Fraserville, Cavan-Monaghan, County of Peterborough, Ontario

2021-11-29

Prepared for:
Romspen Investment Corp.

Cambium Reference No.: 12579-001

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1.0 Introduction

Cambium Inc. (Cambium) was retained by Romspen Investment Corp. to conduct an Environmental Impact Study - 1490 County Road 28 and 1683 Moore Drive, Fraserville, Cavan-Monaghan, County of Peterborough, Ontario (the Site, Figure 1). The proposed development includes the construction of a subdivision across the two properties. Given the scale and geographic extent of the proposed development, the northern portion of the properties will be considered the Site for this report (Figure 1).

An Environmental Impact Study (EIS; the Study) is required to address potential negative impacts to natural heritage features identified during the preliminary development review process, as required by the Provincial Policy Statement, 2020 (PPS) and Growth Plan for the Greater Golden Horseshoe, 2020 (GPGGH). The Site contains or is adjacent to (within 120 m of) the following mapped natural heritage and hydrologic features: a drainage feature, a watercourse, Cavan Creek Provincially Significant Wetland (PSW), unevaluated wetlands, Significant Woodlands, and habitat for endangered and threatened species. The Site is within Ecoregion 6E of Ontario (Crins, Gray, Uhlig, & Wester, 2009). The property is located outside of the Settlement Areas of the Township of Cavan-Monaghan.

The Site is within the jurisdiction of the Otonabee Region Conservation Authority (ORCA), and their regulated area overlaps the Site due to the presence of wetlands and watercourses on/adjacent to the Site. As the Site contains wetlands and watercourses, the Study will consider regulations on development as imposed by the local Conservation Authority's Regulation under the *Conservation Authorities Act, 1990*.

The *Endangered Species Act, 2007* (ESA) protects endangered or threatened species and their habitats from harm or destruction. Habitat of endangered and threatened species is protected under provincial natural heritage policy; however, it is also the landowner's responsibility to ensure that no harm to these species occurs on their property. This Study includes a habitat-based screening for species of conservation concern to determine if the Site has suitable habitat for any provincial or federal species at risk (SAR).

Cambium has conducted this Study to evaluate reasonably anticipated ecological impacts, positive or negative, that may arise as a result of this proposed development to guide the decision-making process and address approval authority requirements.

1.1 Terms of Reference

The Terms of Reference (TOR) were circulated to ORCA on June 25, 2021. Relevant correspondence and documentation are included in Appendix A.

1.2 Proposed Development and Conceptual Site Plan

The Site occupies approximately 70 ha of land with frontage on Moore Drive and County Road 28. It contains two rural residential homes, agricultural fields and natural areas. Adjacent land uses include residential, commercial (entertainment), agricultural, recreational, and protected wetland.

The proposed development involves the construction of a residential subdivision with over 500 units. A Conceptual Site Plan is provided in Appendix B.

2.0 Applicable Natural Heritage Policy and Regulation

2.1 Provincial Policy Statement, 2020

Section 2.1 of the Provincial Policy Statement (PPS) (Ministry of Municipal Affairs and Housing, 2020) protects the form and function of natural heritage features as defined by the PPS. Natural heritage features included in the PPS are provincially significant wetlands (PSW), significant coastal wetlands, significant woodlands, significant valleylands, significant wildlife habitat (SWH), significant areas of natural and scientific interest (ANSI), fish habitat, and the habitat of endangered and threatened species. Given their significance, development is prohibited within PSWs in Ecoregions 5E, 6E, and 7E and within significant coastal wetlands. Development in fish habitat and the habitat of endangered and threatened species shall only be permitted in accordance with provincial and federal requirements. Development within other natural heritage features and on lands adjacent to all natural heritage features are permitted only if demonstrated that there will be no negative impacts on the feature or their ecological function. Development includes the creation of a new lot, a change in land use, or the construction of buildings and structures requiring approval under the *Planning Act*.

Section 2.2 of the PPS protects the quality and quantity of water, including the form and hydrologic function of sensitive surface water features and sensitive ground water features. Focus is given to maintaining hydrologic linkages and functions at the watershed scale to minimize potential negative impacts, including cross-jurisdictional and cross-watershed impacts of development. Mitigative measures and/or alternative development approaches should be considered for development near water features.

2.2 Growth Plan for the Greater Golden Horseshoe, 2020

The Greater Golden Horseshoe is one of the most dynamic and fast-growing regions in North America. To address the challenges of increased development within the area, the Growth Plan for the Greater Golden Horseshoe, 2020 (GPGGH) builds on the PPS "*to establish a unique land use planning framework for the Greater Golden Horseshoe that supports achievement of complete communities, a thriving economy, a clean and healthy environment,*

and social equity" (Ministry of Municipal Affairs and Housing, 2020). In general, the GPGGH seeks to preserve agricultural lands, water resources, and natural areas by directing growth to settlement areas as defined in municipal Official Plans. The GPGGH contains policies regarding a provincial Natural Heritage System (NHS), key hydrologic features (KHFs), key hydrologic areas (KHAs), and key natural heritage features (KNHFs) (Table 1). Policies that reference the provincial NHS apply once the municipal Official Plan has incorporated the provincial NHS into their schedules; until that time, the policies that reference the NHS will apply outside settlement areas to the natural heritage systems identified in Official Plans that were approved and in effect as of July 1, 2017. Section 4.2.3 of the GPGGH states that, outside of settlement areas, development or site alteration is generally not permitted in KNHFs that are part of the NHS or in KHFs. Section 4.2.4 states that, outside of settlement areas, a proposal for new development or site alteration within 120 metres of a KNHF within the NHS or a KHF will require a natural heritage evaluation or hydrologic evaluation that identifies a suitable vegetation protection zone (i.e., a development setback). For KHFs, fish habitat, and significant woodlands the vegetation protection zone can be no less than 30 m measured from the outside boundary of the feature.

Table 1 Protected Features of the GPGGH

Key Hydrologic Features	Key Natural Heritage Features	
Permanent Streams	Habitat of Endangered and Threatened Species	Significant Wildlife Habitat
Intermittent Streams	Fish Habitat	Sand Barrens
Inland Lakes and their Littoral Zones	Wetlands	Savannahs
Seepage Areas and Springs	Life Science Areas of Natural and Scientific Interest (ANSI)	Tallgrass Prairies
Wetlands	Significant Valleylands	Alvars
	Significant Woodlands	

2.3 Official Plan and Zoning By-Law

The proposed subdivision is subject to the Official Plans for the County of Peterborough and the Township of Cavan Monaghan. Additional details regarding planning and landuse can be

found in planning reports prepared by D.M. Wills Associates Inc. The Site is located outside of the settlement area for Fraserville.

The County of Peterborough Official Plan does not contain Natural Heritage System Mapping. The Cavan Monaghan's Official Plan recognizes a Natural Heritage System. The Official Plan serves to balance the relationship between development and the environment by preserving natural features and ecological systems. It also seeks to ensure development is appropriately set back from significant natural heritage features and to maintain the ecological functions of these features. The Township of Cavan Monaghan, Schedule A designates most of the northern portion of the Site as 'Commercial Entertainment'. Schedule A of the Official Plan designates areas of the PSW and adjacent lands as Natural Core Area and Natural Linkage Area.

2.4 Conservation Authority Regulation

"Conservation Authorities are local watershed management agencies that deliver services and programs to protect and manage impacts on water and other natural resources in partnership with all levels of government, landowners and many other organizations" (Conservation Ontario, 2021). Conservation Authorities each have their own Ontario Regulation under the *Conservation Authorities Act, 1990*. In general, they regulate development within and adjacent to river or stream valleys, Great Lakes and inland lakes shorelines, watercourses, hazardous lands (flood, erosion, unstable soils) and wetlands.

Otonabee Region Conservation Authority regulates these features under Ontario Regulation 167/06: *Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*.

2.5 Endangered Species Act, 2007

Species listed as endangered or threatened on the Species at Risk in Ontario (SARO) list are protected under the provincial *Endangered Species Act*, 2007 (ESA) (Government of Ontario, 2007). Section 9(1) of the ESA prohibits a person from killing, harming, harassing, capturing or taking a member of a species listed as endangered, threatened, or extirpated. Section 10(1) of

the ESA prohibits the damage or destruction of habitat of species listed as endangered or threatened. Protection of special concern species is provided through designation of their habitat as significant wildlife habitat, a provincially protected natural heritage feature.

2.6 Species at Risk Act

The federal *Species at Risk Act* (SARA) was adopted in 2002 to prevent endangered or threatened species from becoming extinct or extirpated, to help in the recovery of endangered, threatened and extirpated species, and to manage species of special concern to help prevent them from becoming endangered or threatened. Habitat which is deemed necessary for the survival/recovery of a listed wildlife species, referred to as Critical Habitat, is protected under Section 56 of the SARA. The SARA applies to all federal lands in Canada; however, at-risk aquatic and migratory bird species located on private property in Ontario also receive protection under the Act.

2.7 Fisheries Act

Works within and adjacent to lakes, watercourses, and other bodies of water containing fish have the potential to impact fish and/or fish habitat. As a result of amendments to the federal *Fisheries Act* in 2019, projects near water that could potentially impact fish or fish habitat are may require Fisheries and Oceans Canada (DFO) review. The primary purpose of the review is to determine whether harmful alteration, disruption, or destruction (HADD) of fish habitat, as defined by the Act, can be avoided. The DFO Fisheries Protection Program provides a Decision Framework and guidance material applicable to these reviews (available on-line at www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html). If it is determined that “HADD” may be unavoidable, the project should be submitted to DFO for review and determination of project approach and conditions of approval.

3.0 Technical Approach and Data Collection Methods

3.1 Background Information Review

As part of a comprehensive desktop exercise, existing background information pertaining to the Site and surrounding landscape was compiled and reviewed to better understand local biophysical conditions. In southern Ontario, readily available data includes orthoimagery, topographic base mapping, and geological records. Natural environment and land use schedules prepared in support of Official Plans and Zoning By-Laws were reviewed to acquire municipal data. Natural area records and species occurrences were obtained from digital resources and reference materials. The comprehensive desktop review for this Site included the following resources:

- Natural Heritage Areas: Make-a-map (Ministry of Natural Resources and Forestry, 2018); Accessed March 05, 2021
- Aquatic Species at Risk Maps - Ontario (Fisheries and Oceans Canada, 2018); Accessed August 30, 2021
- Aquatic Resource Area Summary Data (Government of Ontario, 2015); Accessed August 30, 2021
- Fish ON-Line (Ministry of Natural Resources and Forestry, 2018); Accessed August 30, 2021
- Ontario Reptile and Amphibian Atlas (ORAA) (Ontario Nature, 2018); Accessed August 27, 2021
- Ontario Breeding Birds Atlas (OBBA) (2001-2005) (Bird Studies Canada, 2005); Accessed August 27, 2021
- Conservation Authority regulated area mapping
- County of Peterborough Official Plan (County of Peterborough, 2020); Accessed September 01, 2021

- County of Peterborough: Let me Map (County of Peterborough, 2021); Accessed September 01, 2021

Mapped natural heritage features present in the general area of the Site are shown on Figure 2.

3.1.1 Ministry Consultation

Depending on the natural feature of the Site, ministry consultation may include the Ministry of Northern Development, Mines, Natural Resources, and Forestry (MNDMRF) and the Ministry of Environment, Conservation, and Parks (MECP), as applicable.

In early 2019, the Government of Ontario made changes to the regulating authority on matters related to SAR in the province. The Ministry of Environment, Conservation and Parks (MECP) is now responsible for administering the ESA and providing direction on potential compliance issues. MECP has prepared a guidance document titled *Client's Guide to Preliminary Screening for Species at Risk* (Ministry of the Environment, Conservation and Parks, 2019). This document aims to "help clients better understand their obligation to gather information and complete a preliminary screening for SAR before contacting the Ministry". This document was used to guide the SAR habitat-based screening for the Study.

3.2 Field Investigations

Information gathered through the background information review was used to guide the development of the fieldwork program. The purpose of the site visits was to verify information acquired through existing documentation and to gather additional site-specific information. The following sections detail the methodologies that were applied.

3.2.1 Ecological Land Classification and Vegetation Inventory

The Ecological Land Classification (ELC) System for Southern Ontario (Lee, et al., 1998) was used to classify vegetation communities on the Site. Definitions of vegetation types are derived from the ELC for Southern Ontario First Approximation Field Guide (Lee, et al., 1998) and the revised 2008 tables. ELC units were initially delineated and classified by orthoimagery

interpretation. Field investigations served to confirm the type and extent of communities on the Site through vegetation inventory and soil assessment with a hand auger. Where vegetation communities extend off the Site, classification is done through observation from property boundaries and publically accessible lands.

3.2.2 Wetland Boundary Delineation

In Ontario, wetlands are mapped and evaluated under the Ontario Wetland Evaluation System (OWES). Mapped evaluated wetlands have undergone extensive study and been assessed based on their form and function under four categories: Biological, Social, Hydrological, and Special Features (Ministry of Natural Resources, 2014). Evaluated wetlands that score high enough are deemed Provincially Significant Wetlands (PSW). Evaluated wetlands that did not score high enough to be a PSW are called Locally Significant Wetlands (LSW). The province also maps unevaluated wetlands. These mapped wetlands are approximate; as such, they require field verification in order to confirm their presence and determine their boundaries.

The subject wetland was delineated following provincially approved methods outlined in the Ontario Wetland Evaluation System: Southern Manual, 3rd Ed. (Ministry of Natural Resources, 2014). Fieldwork was carried out by provincially certified Cambium staff.

The Site was visited during the early spring in order to document the extent of surface flooding at that time of year. This information is used to assist with the determination of wetland boundaries during the growing season.

Wetland boundaries were initially delineated and classified by orthoimagery interpretation. The presence/absence of wetlands on the Site was confirmed through field investigations during the growing season (late May through October). Wetland boundaries were determined using the 50% wetland vegetation rule. Where vegetation-based delineation was inconclusive, soil assessment with a hand auger was used to confirm wetland boundaries. Wetland boundaries on and adjacent to the Site were marked with a hand-held GPS unit in the field. The wetland boundaries were flagged in the field.

3.2.3 Surface Water and Drainage Feature Mapping

Presence, location, boundary, and direction of flow were confirmed for all surface water features on and adjacent to the Site through visual investigation. Where feasible, the substrate type and cover features of surface water features were also noted. Indicators of surface drainage, including erosion of soils, gullies, and sediment deposition areas were noted and traced to identify sources of erosion. All watercourse and drainage feature crossings were noted and GPS marked in the field, including bridges, culverts, and bed-level crossings.

3.2.4 Aquatic Habitat Assessment

A roaming visual survey was completed to identify and map all aquatic features on the Site, including waterbodies, watercourses (permanent and intermittent), seeps, springs, and overland drainage paths. Aerial photography and topographic base mapping was reviewed to identify additional aquatic features on adjacent lands that weren't directly accessible. On-site features were characterized based on in-stream and riparian cover, channel structure/morphology, substrates, hydrologic measurements, and indicators of instability, thermal regime, and permanence of flow, where applicable. Definitions and technical criteria referenced in the Ontario Stream Assessment Protocol (OSAP; (Ministry of Natural Resources and Forestry, 2017) were applied to wadeable streams. In addition, all identified aquatic features were assessed to determine their function as habitat for fish. Fish presence, specialized habitat features, and potential barriers to fish movement were documented. All feature crossings including bridges, culverts, and bed-level crossings, were also noted and georeferenced in the field. Finally, any evidence of erosion or sedimentation was noted, and up-gradient areas were investigated to identify potential sources.

3.2.5 Breeding Bird Surveys

Two (2) breeding bird surveys 7-10 days apart were carried out during the peak breeding season between May 24 and July 10. Point counts were complete using components of the Ontario Breeding Bird Atlas (OBBA) Guide for Participants (Ontario Breeding Bird Atlas, 2001) and the Forest Bird Monitoring Program (Cadman, Dewar, & Welsh, 1998) based on habitat

characteristics. As outlined in the OBBA protocol, point counts are to be done between dawn and five (5) hours after dawn, when wind speed is low (<19 km/h) and in the absence of rain or thick fog. All species observations (visual and auditory) were recorded during a five (5) minute period. Each species observed was classified and assigned a code based on the highest level of breeding evidence, as defined by the protocol: Confirmed, Probable, Possible or Observed.

3.2.6 Grassland Bird Surveys

Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*) are SAR listed as threatened on the SARO list. These species prefer natural grasslands and agricultural fields, including pasture, hayfields and abandoned fields (CUM vegetation type under ELC), for breeding and nesting sites. One or both of these species have been recorded in the vicinity of the Site within recent years. Bobolink is an area-sensitive species that requires a minimum area of 5 ha to support breeding habitat, with larger areas generally providing additional habitat benefits (Ministry of Natural Resources and Forestry, 2018). Eastern Meadowlark is not as strongly area sensitive; however, a minimum of 5 ha is also required to support preferred breeding habitat (Ministry of Natural Resources and Forestry, 2018).

To determine if the Site is being used as nesting habitat by Bobolink or Eastern Meadowlark, avian surveys were conducted following the approved MNDMRF protocol for Eastern Meadowlark (Ontario Ministry of Natural Resources, 2013). This protocol is suitable for use with both of these species. This method involves recording Bobolink and Eastern Meadowlark observations via point count location(s) and travelling transects between points. The protocol requires that the Site be visited three times between May 21 and July 3 (the nesting season for both of these species), with survey dates being evenly distributed within this period and conducted within 7-10 days of each other. Surveys are conducted between sunrise and four hours after sunrise when wind speed is low (<19 km/h; Beaufort Wind Scale of 3 or lower) and with light or no precipitation.

3.2.7 Amphibian Breeding Surveys

The presence of frog and toad breeding habitat was determined using auditory surveys following the Marsh Monitoring Program Participant's Handbook for Surveying Amphibians (Bird Studies Canada, 2008). According to the protocol, three (3) amphibian surveys should be conducted between April and July, at least 15 days apart, in order to span the breeding seasons of all species that may be present in an area. Air temperature is the primary factor in determining survey dates, as different species call when air and water temperatures reach certain levels; therefore, nighttime air temperature should be greater than 5°C for the first survey, greater than 10°C for the second survey and greater than 17°C for the third survey. Other weather conditions are also taken into consideration. Conditions are considered appropriate when wind speed is low (<19 km/h; Beaufort Wind Scale of 3 or lower) and there is light or no precipitation occurring (high humidity is ideal but heavier rain can impact ability to hear and differentiate calls). Sample points are established during the first survey, and re-visited during following surveys. At each sample point, calls from all species are aurally surveyed for 3 minutes and noted to the greatest extent possible, on a 100 m semi-circular area in front of the sampling station using call intensity codes established by the protocol:

- Code 0: No calls heard
- Code 1: Calls can be counted individually (calls do not overlap)
- Code 2: Calls overlap, but numbers of individuals can be estimated
- Code 3: Calls overlap and are continuous (full chorus); therefore, a count estimate is unreliable

Recommended monitoring windows for the Site (located between the 43rd and 47th parallels) are 15-30 of April, 15-30 of May, and 15-30th of June.

3.2.8 Habitat-Based Wildlife Surveys

In addition to Breeding Bird and Amphibian Surveys, a habitat-based approach was used to assess potential impacts to wildlife, consistent with standard practice. General habitat information gathered through the field investigations was used to assess the connectivity of the

Site with the surrounding landscape and evaluate the ecological significance of the local area. Cambium staff actively searched for features that may provide specialized habitat for wildlife. These searches included inspecting tree cavities, overturning logs, rocks and debris, and scanning for scat, browse, sheds, and fur. Any evidence of breeding, forage, shelter, or nesting was noted. Species and habitat observations were documented and photographed.

4.0 Characterization of Natural Features and Functions

Data acquired through the background information review and field investigations are summarized in the following sections. Based on the information gathered, an assessment of significance has been completed to identify protected natural heritage features on and adjacent to the Site.

The following field investigations were carried out on the Site and are summarized in Table 2. Representative Site photos are included in Appendix C, and survey stations/areas are shown on Figure 3.

Table 2 Summary of Field Investigations

Date	Time On-Site	Weather	Observer	Activities
2021-04-15	11:15-3:15	5°C, overcast and rainy Wind: 3	T. Jamieson	Ecological Land Classification Wetland Delineation Soil Coring
2021-04-29	20:30-21:45	10°C, light rain Wind: 0 Noise: 0-1	T. Jamieson	Amphibian Survey #1
2021-05-20	21:15-22:45	22°C, clear Wind: 0 Noise: 0	T. Jamieson T. Radimer	Amphibian Survey #2
2021-06-11	5:15-8:15	16°C, overcast Wind: 1 Noise: 1	M. Latter	Grassland Breeding Bird Survey #1
2021-06-15	6:00-9:00	13°C, cloudy Wind: 1	E. Silhanek	Breeding Bird Survey #1

		Noise: 1		
2021-06-17	6:00-8:30	8°C, sunny Wind: 0 Noise: 1	M. Latter	Grassland Breeding Bird Survey #2
2021-06-17	21:45-23:00	18°C, clear Wind: 1 Noise: 1-2	T. Jamieson	Amphibian Survey #3
2021-06-24	7:30-9:30	20°C, sunny Wind: 1 Noise: 0	K. McKitterick	Breeding Bird Survey #2
2021-06-25	6:30-9:00	19°C, overcast Wind: 0 Noise: 1	M. Latter	Grassland Breeding Bird Survey #3 Aquatic Assessment #1
2021-07-08	7:30-11:00	17°C, storm Wind: 2	T. Jamieson	Ecological Land Classification Wetland Delineation
2021-07-09	8:00-11:30	20°C, rain Wind: 2	T. Jamieson	Ecological Land Classification Wetland Delineation
2021-07-14	10:00-15:30	30°C, sunny Wind: 1	T. Jamieson	Ecological Land Classification Wetland Delineation
2021-08-13	8:30-15:00	30°C, overcast Wind: 3	T. Jamieson	Ecological Land Classification Wetland Delineation
2021-08-15	07:45-10:00	16°C, overcast Wind: 0	M. Latter	Aquatic Habitat Assessment #2

		Noise: 1		
2021-09-09	8:00-16:00	18°C, overcast Wind: 1	T. Jamieson Martin Till	Ecological Land Classification Wetland Delineation
2021-09-24	8:00-10:30	13°C, Overcast Wind: 2	T. Jamieson	Ecological Land Classification Wetland Delineation

Notes:

Wind speed is reported as a Beaufort Wind Scale value (0 = 0-2 kph, 1 = 3-5 kph, 2 = 6-11 kph, 3= 12-19 kph, 4 = 20-30 kph, 5 = 31-39 kph, 6 = 40-50 kph).

Noise is reported based on background noise levels: Index 0 – no appreciable effect, 1 – slightly affecting sampling, 2 – moderately affecting sampling, 3 – seriously affecting sampling, 4 – profoundly affecting sampling.

4.1 Landscape Position and Topography

The Site is located within the Mixedwood Plains Ecozone: Lake Simcoe Rideau Ecoregion 6E, which extends southward from a line connecting Lake Huron in the west to the Ottawa River in the east, including Ottawa, Kingston, Peterborough, Barrie, Tobermory, Kitchener, and Toronto. This ecoregion is characterized by mixed geology that includes shallow soil areas such as alvar and bedrock plains and deep soil areas such as the Oak Ridges Moraine. It falls within the Great Lakes-St. Lawrence Forest Region, including deciduous and mixed forests; however, over 50% of the landscape in this Ecoregion is currently in use as agricultural land (Lee, et al., 1998).

The site's topography extends from 200 m above sea level (ASL) to 215 m ASL. Overall, the Site is relatively flat but contains many small lowland areas of variable size and an upland area towards the middle of the Site. To the south, it slopes slightly downwards towards the Cavan Creek Wetland. Detailed topographic mapping is provided under separate cover.

4.2 Vegetation Communities

The vegetation communities on-site include terrestrial and aquatic habitats. The site contains large agricultural fields, woodlands, and wetlands. The vegetation communities on the Site are summarized in Table 3 and are mapped on Figure 3. A list of identified species and representative photos for each community are provided in Appendix C.

Table 3 Vegetation Communities

No.	ELC Code	Community Description	Community Type	S - Rank
1	CUM1	Mineral Cultural Meadow	Terrestrial	SNA
2	MAS2-1	Cattail Mineral Shallow Marsh	Wetland	S5
3	SWT2-2	Willow Mineral Thicket Swamp	Wetland	S5
4	SWM1-1	White Cedar – Hardwood Mineral Mixed Swamp	Wetland	S5
5	SWT2-2	Willow Mineral Thicket Swamp	Wetland	S5
6	FOD7-2	Fresh – Moist Ash Lowland Deciduous Forest	Terrestrial	S4S5
7	CUM1	Mineral Cultural Meadow	Terrestrial	NA
8	MAS2-1	Cattail Mineral Shallow Marsh	Wetland	S5
9	FOM4-2	Dry – Fresh White Cedar – Poplar Mixed Forest	Terrestrial	S5
10	SWD	Silver Maple Mineral Deciduous Swamp	Wetland	S5
11	FOD6-5	Fresh – Moist Sugar Maple – Hardwood Deciduous Forest	Terrestrial	S5
12	SWT2-2	Willow Mineral Thicket Swamp	Wetland	S5
13	CUM1	Mineral Cultural Meadow	Terrestrial	NA
14	FOM7-2	Moist – Fresh White Cedar – Hardwood Mixed Forest	Terrestrial	S5
15	SWDM4-5	Poplar Mineral Deciduous Swamp	Wetland	S5

16	SWM3-2	Poplar – Conifer Mineral Mixed Swamp	Wetland	S5
17	SWT2-2	Willow Mineral Thicket Swamp	Wetland	S5
18	SWT2-2	Willow Mineral Thicket Swamp	Wetland	S5
19	FODM11	Naturalized Deciduous Hedgerow	Terrestrial	NA
20	MAS2-1	Cattail Mineral Shallow Marsh	Wetland	S5
	OAGM1	Annual Row Crops	Terrestrial	NA
	OAGM4	Open Pasture	Terrestrial	NA

A search for butternut (*Juglans cinerea*; provincially endangered) was completed as part of the vegetation survey; no butternut were identified.

4.2.1 Significant Woodlands

Portions of the woodlands adjacent to the PSW and associated wetlands are mapped as significant woodlands within Schedule B “Natural Heritage System and Environmental Constraints” of Cavan Monaghan’s Official Plan (Cavan-Monaghan, 2021). The Cavan Monaghan Official Plan recognizes significant woodlands as a key natural heritage feature within their jurisdiction. The Township defines significant woodlands as;

> *"an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to the site quality, species composition, or past management history* (Cavan-Monaghan, 2021)*."*

The township’s Official Plan states in Section 3.26 (L):

> *“It is recognized that the mapping of Significant Woodlands on Schedule B and B1 is based on high level photography. For this reason the location and significance of the*

woodlands needs to be assessed on site and through consultation with the Conservation Authority and the Township. Where lands shown as Significant Woodlands on Schedule B and Schedule B-1 are determined to not be significant, development of the lands may proceed in accordance with the policies of this section of the Plan."

Cambium consulted the Township on September 20, 2021, to determine if criteria had been established to define significant woodlands. The Planning Authority has not established criteria to define significant woodlands within their jurisdictions. Upon advice from the Township, Cambium consulted ORCA to determine which criteria should be used to evaluate significant woodlands. Based on discussions with ORCA (September 30, 2021), it was agreed that the criteria outlined in the *Greenbelt Plan-Technical Definitions for Key Natural Heritage Features-Technical Paper 1* could be used to determine woodland significance [hereafter referred to as Technical Paper 1] (Government of Ontario, 2012). The criteria of the North Area in Technical Paper 1 is used to evaluate significant woodlands on the Site because this area of the Greenbelt plan is similar to the local physiography and landcover surrounding the Site.

4.2.1.1 Woodland Criteria

The woodlands within or adjacent to the PSW in ELC communities 4, 9, 10, 11, 14, and 16 meet the definition of a woodland as the tree crown cover is over 60% of the ground area, and the average width is greater than 40 m. These woodlands are 4 hectares or more and are located wholly or partially within 30 meters of the PSW. ELC communities 9, 10, and 11 formed a woodland with an area of 4 hectares and located inside the PSW and within 30 m of the PSW. ELC communities 10, 14 and 16 form a woodland with an area of 5 hectares and is located inside and within 30 m of the PSW. ELC community 4 is a woodland with an area of 4.6 ha and is located within the PSW. ELC communities 4, 9, 10, 11, 14 and 16 are deemed significant woodlands as they meet the size and proximity criteria of Technical Paper 1 (Government of Ontario, 2012). The significant woodlands are shown on Figure 3.

4.3 Wetland Delineation

The Cavan Creek Wetland (PSW) is located on the northwestern portion of the Site and the southern portion of the Site (Figure 3). The 1337 ha PSW extends across the landscape as a wetland complex. It is comprised of swamp communities (98%) and some marginal marsh (2%) communities. It provides breeding and feeding habitat to provincially significant species, including the Northern Harrier and habitat for regionally significant species, including frog species, Snapping Turtle, colonial waterbirds, furbearer species, and spawning fish (MNR, 1987). Cavan Creek is known to support a coldwater fishery which includes habitat for Brown Trout and Brook Trout. The aquatic area layer of Land Inventory Ontario did not contain any fisheries data for the wetland or watercourses on Site.

The PSW features score a 766 according to OWES. A breakdown of the scoring is provided;

- The Biological Component scored 197, stemming from diverse vegetative communities within the wetland and surrounding habitat.
- The Social Component scored 209, due to the provision of timber, commercial fishing opportunities, the presence of furbearers and other important species, and the provision of educational opportunities to surrounding communities and institutions.
- The Hydrological Component scored 185 since although it does not connect to large Ontario waterbodies or rivers, it covers a high portion of its local catchment basin.
- Finally, based on habitat provision for regionally and provincially important species, it scored 250 in its Special Features Component.

Provincial mapping shows unevaluated wetland features on and adjacent to the Site (Figure 2).

Field investigations confirmed the wetland areas on the Site; confirmed features are shown on Figure 3. Wetland boundaries were determined using vegetation cover, comprised of over 50% wetland species, as well as by soil core samples. GPS points marked the wetland boundaries. The field-verified wetland boundaries resulted in minor additions to the mapped wetlands around the primary wetland features and identification of additional wetlands on the eastern portion of the Site. The Ontario Wetland Evaluation System (OWES) groups closely spaced

wetlands that are functionally related into a wetland complex (Ministry of Natural Resources, 2014). The MNRF is responsible for formally reviewing and approving all changes to PSW boundaries. The unevaluated wetlands and recently identified wetlands in ELC communities 5,8,15, and 17 are all considered PSW for this study.

4.4 Aquatic Habitat Assessment and Fish Habitat

Cavan Creek is classified as a cold-water system containing species such as Brook Trout and Brown Trout. Cavan Creek watershed contains many swamps and outlets into the Otonabee River.

Aquatic Habitat Assessments were completed on April 15, 2021, June 25, 2021, and August 15, 2021. These assessments identified four aquatic features: one headwater drainage feature (on Site), one intermittent unnamed watercourse within the northwestern PSW (on Site), one intermittent unnamed watercourse within the southern PSW (on Site and adjacent lands) and one intermittent unnamed watercourse within the adjacent lands (120 m). These features are shown on Figure 3.

The headwater drainage feature (HDF) did not have flowing or standing water during any field survey. The HDF is primarily a vegetated swale, approximately 2 metres wide, between two agricultural fields. The HDF likely conveys water each year for a brief period during the spring freshet. The HDF contributes water to the northwestern PSW and associated intermittent watercourse. Based on its ephemeral hydrology and absence of a defined channel, the DHF does not provide direct fish habitat.

The intermittent watercourse located in the northwest corner of the Site receives water from the HDF and ponded areas in ELC community 3. The intermittent watercourse flows north through ELC community 4 (SWM1-1), meets the roadside ditch along Moore Drive and passes through a corrugated steel pipe (CSP) under Moore Drive (Figure 3). Portions of ELC community 4 are flooded and may provide seasonal fish habitat within the wetland. Thus, the intermittent watercourse within this community is considered potential fish habitat.

Mapping indicates an intermittent watercourse flows westerly from the southern PSW. This feature could not be ground-truthed because it was inaccessible by foot within the middle of a cattail mineral march (ELC community 20). Orthoimagery indicates that a watercourse is present where the intermittent watercourse is shown; therefore, this feature is considered an intermittent watercourse for this study. Land Inventory Ontario dataset did not contain any records of fish species associated with the Site. The intermittent watercourse looks to connect to a tributary of Cavan Creek approximately 1000 m west of the Site. It is unknown if there are any vertical barriers to fish movement between Cavan Creek and the Site. For this report, the aquatic habitat within ELC Community 20, a cattail mineral marsh, is considered fish habitat.

Mapping indicates an intermittent watercourse is present on the east side of County Road 28, within the adjacent lands to the Site. Field work confirmed that no watercourse was present on the Site that contributes to this feature. The watercourse appears to originate from the roadside ditch on the west side of County Road 28, flows under the road through a culvert, and continues east through a farmer's field.

4.5 Wildlife Survey Results

Incidental wildlife surveys were recorded during all Site visits. These included American Crow (*Corvus brachyrhynchos*), American Goldfinch (*Spinus tristis*), American Robin (*Turdus migratorius*), Barn Swallow (*Hirundo rustica*), Brown Thrasher (*Toxostoma rufum*), Common Grackle (*Quiscalus quiscula*), Common Yellowthroat (*Geothylpis trichas*), Mallard (*Anas platyrhynchos*), Eastern Kingbird (*Tyrannus tyrannus*), Eastern Meadowlark (*Sturnella magna*), Mourning Dove (*Zenaida macroura*), Ovenbird (*Seiurus aurocapilla*), Red-winged Blackbird (*Agelaius phoeniceus*), Ruffed Grouse (*Bonasa umbellus*), Savannah Sparrow (*Passerculus sandwichensis*), Tree Swallow (*Tachycineta bicolor*), White-throated Sparrow (*Zonotrichia albicollis*), Yellow Warbler (*Dendroica petechia*), Eastern Cottontail (*Sylvilagus floridanus*), and Muskrat (*Ondatra zibethicus*).

Candidate bat maternity roost surveys using woodland subplots were not completed because the woodland communities on Site will not be subject to site alteration or development. Although not applying the subplot methodology, woodlands were inspected for potential bat

roost trees during the field surveys for ELC community delineation. Suitable bat trees containing cavities for maternity roosts were not observed on-Site. Open areas above ELC community 20 within the southern wetland offer suitable bat foraging habitat for insects.

4.5.1 Birds

OBBA breeding bird surveys were completed as a part of the current study, as detailed in Appendix D. Bird species observed on or adjacent to the Site, breeding evidence, federal and provincial status and s-ranks are provided in Appendix D. A total of eight (8) species had probable or confirmed breeding evidence (shaded cells in Appendix D). Species with probable or confirmed breeding evidence **on the Site** included:

- One (1) SAR: Eastern Meadowlark (*Sturnella magna*). Details regarding grassland bird survey results are provided in Section 4.7.1.
- Severn (7) common bird species: Common Yellowthroat (*Geothlypis trichas),* Mourning Dove (*Zenaida macroura),* Red-winged Blackbird (*Agelaius phoeniceus)*, Song Sparrow (*Melospiza melodia),* Eastern Kingbird (*Tyrannus tyrannus*), American Robin (*Turdus migratorius*), and Red-eyed Vireo (*Vireo olivaceus*).

4.5.2 Amphibians

Amphibian breeding surveys were completed, and a total of 5 species were identified on or adjacent to the Site, as shown in Table 4 (bold species were located on the Site). Of these, 3 had call level codes of 3 including American Toad (*Bufo americanus*), Gray Tree Frog (*Hyla versicolor*), Spring Peeper (*Pseudacris crucifer*). None of the species observed are federal or provincial SAR.

Table 4 Summary of Amphibian Survey Results

Sample Point	Survey Direction	Species	Maximum Call Intensity	# of Individuals	Inside or Outside 100 m Sample Plot
1	N	**Spring Peeper**	3	N/A	Inside

		American Toad	2	3	Inside
		Green Frog	1	1	Inside
		Gray Tree Frog	3	N/A	Inside
2	SE	**Spring Peeper**	3	N/A	Both
		Gray Tree Frog	3	N/A	Outside
3	S	**Gray Tree Frog**	1	1	Inside
4	S	**Spring Peeper**	2	3	Inside
		Green Frog	1	1	Inside
		Gray Tree Frog	2	4	Inside
		American Toad	1	1	Outside
5	N	**Spring Peeper**	3	N/A	Inside
		American Toad	3	N/A	Inside
		Green Frog	2	8	Inside
		Leopard Frog	1	2	Inside
6	NW	**Spring Peeper**	3	N/A	Inside
		Gray Tree Frog	3	N/A	Inside
		American Toad	3	N/A	Inside

Notes: "-" indicates no calls heard

A summary of Significant Wildlife Habitat (SWH) is provided for amphibians;

- Marsh Monitoring Point 1: confirmed SWH for Amphibian Breeding Habitat (Woodland) within ELC Community 4 (SWM1-1).
- Marsh Monitoring Point 5: confirmed SWH for Amphibian Breeding Habitat (Woodland) within ELC community 16 (SWM3-2).
- Marsh Monitoring Point 6: confirmed SWH for Amphibian Breeding Habitat (Wetlands) within ELC community 20 (MAS2-1).

4.6 Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) guidance documents produced by the MNDMRF were used as a guide to identify and confirm SWH on the Site (MNR, 2000). The Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (Ministry of Natural Resources and Forestry,

2015) apply to the proposed works. Information gathered during the background review, and field investigations were compared to SWH criteria to identify SWH at the Site. As noted in Section 4.5.2, portions of the Site are considered SWH as Amphibian Breeding Habitat (Wetland and Woodland). ELC community 20 is considered candidate SWH as a potential Snapping Turtle wintering area. Additional details regarding candidate SWH for turtle wintering areas are provided in Section 4.7.2.

4.7 Species of Conservation Concern

A list of species of conservation concern, including species at risk, with the potential to occur in the general vicinity of the Site, has been compiled based on known species' ranges, habitat requirements, and review of background information sources (as listed in Section 3.1). In addition, the list has been augmented with direct field observations from the current study, as detailed in the previous sections. Cambium has employed a habitat-based screening, supplemented with targeted field surveys when necessary, to identify suitable habitat for species located on or adjacent to the Site. A detailed habitat suitability analysis is provided in Appendix E, and a discussion of the results is provided below.

No Critical Habitat for aquatic species at risk listed under SARA was identified in the watercourses on the Site or adjacent lands.

4.7.1 Endangered and Threatened Species

The following sections discuss endangered and threatened species.

4.7.1.1 Barn Swallow

Barn Swallows are listed as threatened both federally and provincially. They require open habitats, including grassy fields, pastures, crops, shorelines, cottage areas, or wetlands, which are also closely associated with human populations. This swallow typically nests inside structures such as abandoned barns or other buildings with sufficient openings or road culverts. Two barns are present on the property, as shown on Figure 3. Barn 1 is located on the eastern portion of the Site within the rural residential property that fronts onto County Road

28. Barn 1 has collapsed and does not provide suitable habitat for Barn Swallow life processes. Barn 2 is located on adjacent lands to the south within the Kawartha Downs Raceway property, is standing, and provides potential habitat for Barn Swallow. The Site plan does not propose the removal of Barn 2. If there are plans to alter or remove Barn 2, an inspection of the barn interior is required to ensure compliance with the ESA. A third barn is located off-site, beyond the 120 m adjacent lands, at 1680 Moore Drive. The suitability of the third barn for Barn Swallow nesting is not known as this was located on private lands which were inaccessible for this study.

On June 24, 2021, a Barn Swallow was observed foraging above the cattails, just south of the swamp, within ELC community 3 (SWT2-2). A Barn Swallow was observed flying over ELC community 3 (SWT2-2) on June 25, 2021. Based on these observations, ELC Communities 1, 2 and 3 represent foraging habitat for this species

4.7.1.2 Blanding's Turtle

Blanding's Turtle is listed as threatened both federally and provincially. They spend most of their life cycle in large wetlands or shallow lakes with high densities of water plants, nutrient-rich water, and organic sediment (Environment_Canada, 2016). The species also use terrestrial habitats for portions of their lifecycle, including movements between habitats, aestivation, and nesting. Blanding's Turtles utilize permanent and seasonal wetlands, including marshes, swamps, bogs, fens, beaver-regulated wetlands, vernal pools, and shallow waters. The biophysical attributes of these aquatic habitat features include the presence of stagnant or slow-flowing water, soft organic substrates, emergent/floating/submergent vegetation, and basking sites (e.g., hummocks, shoreline, vegetation mats, emergent logs, and rocks). These aquatic features are used for the life cycle activities of mating, thermoregulation, foraging, summer inactivity, and movement. Permanent or seasonal wetlands must have free (i.e., unfrozen) water and soft organic substrates to provide suitable conditions for overwintering.

Background information was reviewed and no element occurrence records for Blanding's Turtles were present within the 200 km^2 encompassing the Site. The Cavan Creek wetland

data record for the PSW does not contain any records for Blanding's Turtle. No Blanding's Turtles were observed during the field investigations. While the PSW contains potentially suitable habitat, the lack of species observations on the Site and within the larger landscape makes it unlikely that this species is present. Therefore, Blanding's Turtle is considered absent from the Site and will not be discussed further in this report.

4.7.1.3 Eastern Meadowlark and Bobolink

Eastern Meadowlarks are listed federally and provincially as threatened. They build their nests on the ground, camouflaged and woven with long grasses, as found in pasture and hayfield, orchard, shrubby field, and other open area habitats. Grassland breeding bird surveys were completed as a part of the current study. Areas of suitable habitat were present on the Site, consisting of cultural meadow communities with uncut grass.

Table 5 Grassland Breeding Bird Survey Results

Survey Point	Species	# Individuals	Breeding Evidence
1	Eastern Meadowlark	1	S
2	Eastern Meadowlark	2	T; P
3	Eastern Meadowlark	4	T; F; N
4	Eastern Meadowlark	2	T; P
5	Eastern Meadowlark	2	T

S: heard calling
T: heard calling on two consecutive visits, probable breeding
F: foraging, probable breeding
P: pair observed, confirmed breeding
N: nesting, confirmed breeding

Eastern Meadowlarks were observed and heard calling during all three field visits. Table 5 provides a summary of targeted grassland bird surveys. Probable or confirmed nesting was also observed during the two later field visits at grassland survey points 2,3,4, and 5 confirming their use of the Site as probable breeding habitat. Eastern Meadowlarks were observed calling at grassland survey point 1 on a single survey. Therefore, the habitat surrounding grassland survey point 1 is not considered probable or confirmed breeding habitat for Eastern Meadowlark. No Bobolinks were observed during field surveys.

4.7.1.4 SAR Bats

The Tri-colored Bat is small, with pale brown with orange-red forearms, muzzle, and ears. It is named for the black, yellow, and brown hairs on its back. It is considered rare in this region of Ontario, which is at the northernmost limit of the natural range. These bats prefer to nest in foliage, tree cavities and woodpecker holes but are occasionally found in buildings, though this is not their preferred habitat. Winter hibernation takes place in caves, mines and deep crevices. Tri-colored Bats prefer an open forest habitat type in proximity to water.

The Eastern Small-footed Myotis has fur with black roots and shiny brown tips, and very small feet. The Eastern Small-footed Myotis will roost in various habitats in the spring and summer, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. They change their roosting locations daily and hunt at night for insects. They hibernate in winter, often in caves and abandoned mines choosing colder and drier sites than other similar bats (1).

The Little Brown Myotis has glossy brown fur and a fleshy projection covering the entrance to its ears. This species roosts in trees and buildings, often selecting attics, abandoned buildings and barns for summer colonies where they can raise their young. Little Brown Bats hibernate from October/November to March/April, most often in caves or abandoned mines that are humid and remain above freezing (1).

There were no records of SAR bats on or adjacent to the Site. Suitable bat trees containing cavities for maternity roosts were not observed on-Site. The wetlands, in particular ELC community 20, would provide suitable foraging habitat for all three species of bats. Barn 1 has collapsed and does not provide suitable habitat for bats. Barn 2 is a structure for bat roosting for the Tri-coloured Bat, Eastern Small-footed Myotis and Little Brown Myotis. If alteration or removal of Barn 2 is proposed, the barn's interior should be inspected for the presence of bats to ensure compliance with the ESA. No suitable habitat is present on or adjacent to the Site to support bat hibernation requirements.

4.7.2 Special Concern Species

The Eastern Ribbonsnake is slender with three bright yellow stripes running down its back and sides and a white crescent in front of each eye. This snake is usually found close to water as they are strong swimmers, often fleeing predators by diving into shallow water. It prefers wetland habitats where its prey species, frogs and small fish, are abundant. Over winter, they congregate in underground burrows or rock crevices to hibernate (1). No records of Eastern Ribbonsnake were documented for the Site or surrounding landscape. Eastern Ribbonsnake was not encountered during field investigations. This species is considered absent from the site and will not be further discussed in this report.

The Snapping Turtle, with its large, serrated carapace, small plastron, and spiked tail, is Canada's largest freshwater turtle (5). It spends most of its life in water, preferring shallow water with soft mud and leaf litter, and will travel upland to gravel or sandy embankments, roadsides, along railway lines or beaches to lay its eggs (1). The NHIC contains a record of Snapping Turtle at the Site. No turtles or turtle nests were observed during the field investigations. ELC Community 20 within the southern portion of the PSW has suitable biophysical elements to support Snapping Turtle foraging, overwintering, mating and thermoregulation. ELC Community 20 represents candidate SWH for turtle overwintering. In particular, the areas of open water and cattails would provide suitable habitat for Snapping Turtle. No turtles or turtle nests were observed during the field investigation.

The Midland Painted Turtle is listed as Special Concern federally. It uses waterbodies such as ponds, marshes, lakes, and slow-moving creeks with a soft-bottom and aquatic vegetation as its habitat. Background information contained records of this species on and adjacent to the Site (Ministry of Natural Resources and Forestry, 2018). ELC Community 20 within the southern portion of the PSW provides suitable habitat for this species. No Midland Painted Turtles were observed during site visits.

The Monarch Butterfly uses a variety of habitats with wildflowers, including habitats such as ELC communities 1 and 13, but requires milkweed plants as a food source for their caterpillars.

Monarch Butterflies were not observed during site visits. Therefore, the Site is not considered habitat for this species.

The Yellow-banded Bumble Bee is a habitat generalist and therefore could use ELC Communities 1 and 13, as they contain herbaceous plants that provide pollen and nectar. The Yellow-banded Bumble Bees were not observed during site visits and are considered absent from the Site.

5.0 Impact Assessment and Mitigation Measures

The Site occupies approximately 70 ha of land with frontage on Moore Drive and County Road 28. It contains two rural residential homes, agricultural fields and natural areas. The proposed development involves the construction of a residential subdivision with over 500 units.

The following sections address potential impacts to protected features identified on and adjacent to the Site that may result from the proposed development and site alteration:

- Wetlands: PSW
- Watercourses and Fish Habitat
- Significant Woodlands
- Significant Wildlife Habitat
- Habitat of Endangered or Threatened Species

No other natural heritage features protected by provincial policy were confirmed on or adjacent to the Site.

Avoidance, mitigation measures and best management practices have been recommended to ensure that the integrity of the current existing natural features is protected and enhanced. These recommendations will ensure the ecological functions of the natural heritage features are not negatively impacted during or following construction.

5.1 Provincially Significant Wetlands

Cavan Creek PSW and additional adjacent wetland units are present on the Site. Direct impacts to the wetlands would occur if wetland draining, infilling or removal occurs; no direct impacts to the wetland are proposed. Indirect impacts to the wetlands can include altered hydrology and the introduction of non-native plants, and construction-related impacts.

A 30 m Vegetation Protection Zone (VPZ) is recommended for the wetlands on the Site and adjacent lands, as shown on Figure 4. The proposed lot lines of the subdivision should all be located outside of the 30 m VPZ. The 30 m VPZ is considered sufficient to protect the existing

form and function of the PSW and local wetland features provided that the area be maintained as the existing natural cover and be allowed to naturally self-sustain (i.e., a buffer area where no vegetation removals or grading is allowed). Tree removal within the VPZ should be limited to the removal of hazard trees if required. Natural revegetation and native tree planting within the field portion of the VPZ are recommended to enhance the function of these buffer lands. An ecologist, biologist or forester should prepare a landscape plan to enhance the VPZ with native plants.

The retention of the wetlands and implementation of a VPZ will maintain the wetland's natural core and natural linkage functions. The natural heritage system will remain connected to the larger landscape. The proposed development is not anticipated to negatively impact the natural heritage system of Cavan Monaghan. The VPZ will positively impact the natural heritage system by creating a robust buffer to the existing natural heritage and hydrologic features.

Runoff from the Site is expected to increase with the introduction of impermeable surfaces (i.e., building roofs, roadways, and walkways) and compacted surfaces with reduced infiltration capacity. Measures to increase infiltration of run-off from these surfaces should be encouraged and, where possible, included in the Site Plan for the development. Eaves trough downspouts should be directed to vegetated areas (such as lawn, or gardens) and not onto hardened surfaces, to encourage infiltration. It is anticipated that a hydrogeological study will be prepared (i.e., required) in support of the subject development application. This study should specifically address potential stormwater-related impacts to the hydrological regime of the surrounding wetlands, through a feature-based water balance study.

A sediment and erosion control (ESC) plan should be prepared for the Site before site alteration commences. Before any construction activities occur, it is essential that perimeter Erosion and Sediment Control (ESC) fencing be installed around construction areas within 30 m of wetlands. ESC fencing should be properly keyed into the ground and securely fastened to vertical supports spaced ≤ 2 m apart. This key control measure will help prevent sediment from entering surface water features (i.e., wetlands and the watercourse) in the surrounding landscape. All ESC fencing should be regularly maintained and kept in good working condition

until the area has been stabilized and successfully revegetated. Any observed overland drainage channels originating from the Site that may or may not have arisen due to erosion should be directed to a check dam structure before discharging to off-site areas.

5.2 Watercourses and Fish Habitat

As detailed in Section 4.4, four aquatic features are present on and adjacent to the Site: one headwater drainage feature (on Site), one intermittent unnamed watercourse within the northwestern PSW (on Site), one intermittent unnamed watercourse within the southern PSW (on Site and adjacent lands) and one intermittent unnamed watercourse within the adjacent lands (120 m).

A 30 m setback is recommended for the HDF, and lands within the setback will provide a Vegetation Protection Zone (VPZ). The 30 m wetland setback from the northern PSW boundary and southern PSW boundary will serve as a VPZ for the intermittent watercourse located within the PSW. No setback is provided for the mapped intermittent watercourse on adjacent lands as it is a roadside drainage ditch. The intermittent watercourse within the southern PSW receives a 30 m setback from the wetland boundary and the significant woodlands.

No in-water work is proposed within any of the watercourses on or adjacent to the Site. Therefore, no direct impacts are anticipated to these key hydrological features. Furthermore, no direct or indirect impacts to these features are associated with the placement of new lot lines to accommodate the proposed subdivision.

Site alteration (e.g., clearing of vegetation, grading) and construction activities can expose soils and sediment that could be transported downslope to watercourse features, thereby causing indirect impacts to those features. As such, no additional mitigation measures are recommended for sediment transport for the proposed development. A sediment and erosion control (ESC) plan, as detailed in Section 5.1, should be developed before site alteration. ESC measures should be installed outside the VPZ and 30 m setbacks from wetlands, watercourses and significant woodland setbacks.

5.3 Significant Woodlands

ELC communities 4, 9, 10, 11, 14 and 16 were confirmed as significant woodlands under this Study. The proposed development is recommended to be located entirely outside of the significant woodlands and associated 30 m setback (i.e., the VPZ). The 30 m setback from Significant Woodlands will protect their form and function. No development, site alteration or structures, including stormwater management facilities, should be proposed within the VPZ. Tree removal within the VPZ should be limited to the removal of hazard trees if required. An ecologist, biologist or forester should prepare a landscape plan to enhance the VPZ with native plants. Provided the mitigation measures are followed, the proposed development is not anticipated to negatively impact the woodlands or their ecological functions.

5.4 Significant Wildlife Habitat

The following significant wildlife habitat was identified on the site;

- Potential SWH as Snapping Turtle overwintering habitat within ELC community 20, within the southern PSW
- Amphibian Breeding Habitat
    - confirmed SWH for Amphibian Breeding Habitat (Woodland) within ELC Community 4 (SWM1-1).
    - Marsh Monitoring Point 5: confirmed SWH for Amphibian Breeding Habitat (Woodland) within ELC community 16 (SWM3-2).
    - Marsh Monitoring Point 6: confirmed SWH for Amphibian Breeding Habitat (Wetlands) within ELC community 20 (MAS2-1).

Development activities that result in the draining or filling of wetlands and woodland ponds will destroy the function of the pond and surrounding land for amphibian life processes (MNR, 2000).. Development on adjacent lands can negatively impact breeding pond function if it alters water quality or quantity. Development on adjacent lands to the amphibian breeding habitat can negatively impact the local amphibian population if the development separates the

breeding habitat from the summer or winter habitat (MNR, 2014). Residential developments may result in the release of contaminants (i.e. sediments, nutrients, gasoline and oil, salt) in surface runoff which may affect nearby breeding ponds given the sensitivity of amphibians to aquatic toxins (MNR, 2014).

The recommendation to located development entirely outside of the PSW and woodlands will protect amphibian breeding habitat. The associated 30 m setbacks from these features will protect the form and function of amphibian breeding habitats. The effects of development on breeding pond function can be made less severe by ensuring local water levels are not negatively affected or contaminated. The storm water management report prepared for the development should ensure water quality and quantity on the Site are maintained post-development.

Provided the recommended avoidance and mitigation measures are followed, the proposed development and site alteration is not anticipated to negatively impact the amphibian breeding habitats or their ecological functions.

ELC Community 20 within the southern PSW has suitable biophysical elements to support Snapping Turtle and Painted Turtle foraging, overwintering, mating and thermoregulation life requirements. This community represents candidate SWH as a potential turtle wintering area. No development is proposed within the wetland habitat of these species. A 30 m wetland setback has been applied to prevent development on lands adjacent to the PSW.

Indirect impacts to Snapping Turtle and Painted Turtle could occur if they entered the work area during construction. Turtles and snakes are particularly vulnerable to construction-related impacts on sites adjacent to wetlands, watercourses, and waterbodies.

ESC fencing can also function as wildlife exclusion fencing. To function as a wildlife exclusion measure, fencing should be installed around the entire perimeter of the construction area prior to the earlier of May 1 or commencement of Site preparation to keep turtles and snakes from entering the construction area. This fencing should be made of light-duty silt fence, staked at regular intervals, trenched-in at least 10-20 cm below ground, with an above-ground height of at least 60 cm.

The silt fence should be inspected regularly to ensure that it remains in good condition: and any downed areas, rips, or holes should be repaired or replaced immediately. The construction area should also be actively inspected for turtles and snakes each day before the start of work throughout the duration of construction.

As the Site is located adjacent to the potential turtle habitat, workers should be aware of the nesting season for turtles, which extends from May 15 to August 15. All stockpiled materials should be kept inside the exclusion fencing area and ideally should be covered and well secured around the base to prevent turtles from nesting in loose substrates. Should any nesting turtles be encountered, work should stop immediately, and the turtle should be left to finish nesting undisturbed. The turtle should be photographed and the nest marked to ensure it is not disturbed during construction or until eggs have hatched (late August – September). If a nest is laid in a stockpile or other area that requires disturbance, Cambium should be contacted to determine if the nest can be relocated.

If any individuals are encountered, they should be photographed and allowed time to move out of harm's way. Species at Risk observations, including most species of snakes and turtles, should be reported to the Natural Heritage Information Centre.

5.5 Habitat of Endangered and Threatened Species

5.5.1 Eastern Meadowlark Habitat

This Study confirmed the presence of Eastern Meadowlark and their nesting habitat on the Site (Figure 3). Eastern Meadowlark is listed as a Threatened species provincially and federally. The proposed development will avoid portions of the Eastern Meadowlark habitat. The proposed development will damage or destroy up to 9.2 ha of Eastern Meadowlark nesting habitat on the Site.

Under the *Endangered Species Act (ESA)*, the Ministry of the Environment, Conservation and Parks (MECP) can grant different types of permits or other authorizations for activities that would otherwise not be allowed, with conditions that are aimed at protecting and recovering species at risk. The proposed development is subject to a regulatory exemption under Ontario

Regulation (O. Reg.) 242/08 following Sections 23.6 (Bobolink / Eastern Meadowlark). Section 23.6 of O. Reg. 242/08 applies to any activity to develop land in an area that is the habitat of Bobolink or Eastern Meadowlark. The size of Eastern Meadowlark habitat that will be damaged or destroyed on the Site is less than 30 hectares. Thus, provided the proponent can satisfy all conditions set out in subsection 23.6 (4), the development of the subdivision can proceed in compliance with provincial legislation to use Section 23.6 towards exemption from the ESA. The proponent using this exemption must create an area of new habitat larger than the area of habitat that was damaged or destroyed.

Before commencing site alteration, the proponent must;

1. Submit a Notice of Activity Form to MECP.
2. Prepare a habitat management plan in accordance with subsections (5) and (6) of Section 23.6.
3. Avoid impacts to the species and their habitat during the nesting season: May 1 to July 31 of any year.

Provided the proponent adheres to the requirements of O. Reg. 242/08, the proposed development would comply with the ESA.

5.5.2 Barn Swallow

Barn Swallow is listed as a Threatened species provincially and federally. On June 24, 2021, a Barn Swallow was observed foraging above the cattails, just south of the swamp, within ELC community 3 (SWT2-2). A Barn Swallow was observed flying over ELC community 3 (SWT2-2) on June 25, 2021. ELC Communities 1, 2 and 3 represent foraging habitat for this species.

A general habitat description is a technical document prepared by the Ontario Government to provide greater clarity on the area of habitat protected for a SAR based on the general habitat definition found in the ESA. The Ontario Government has developed a general habitat description (GHD) or Barn Swallow (MECP, 2018). The GHD provides the following habitat categories;

- Category 1: the nest.
- Category 2: The area within 5 m of the nest.
- Category 3: The area between 5 m and 200 m of the nest.

Category 3 habitat has the highest tolerance for alteration. Barn Swallows depend on this area for various life processes, including rearing, feeding, and resting. As aerial insectivores, they depend on nearby open areas that provide good sources of flying insects such as waterbodies, pastures with livestock and woodland edges. One study found that the average distance travelled by Barn Swallows while feeding their first brood was 188 m, and this distance is influenced by weather conditions (MECP, 2018).

Activities in general habitat can continue as long as the function of these areas for the species is maintained and individuals of the species are not killed, harmed or harassed (MECP, 2018). The proposed development is not likely to kill, harm or harassment of Barn Swallows. The proposed development retains the primary foraging habitat for this species, including ELC communities 2 and 3, plus a 30 m setback from these wetlands. The wetlands are considered high-quality feeding habitat as it produces ample quantities of insect biomass. The proposed development is anticipated to remove the potential Category 3 foraging habitat for Barn Swallow. As Category 3 habitat has the highest tolerance to alteration, it is not anticipated that its removal will negatively impact the species. The retention of foraging habitat in ELC communities 2 and 3 will maintain the function of foraging habitat for Barn Swallow on the Site.

5.5.3 SAR Bats

Forested habitat on Site could provide suitable roosting habitat for Tri-coloured Bat and Little Brown Myotis. The wetlands, in particular ELC community 20, would provide suitable foraging habitat for all three species of bats. No suitable habitat is present to support bat hibernation requirements. No development is proposed within the wetlands and significant woodlands on Site. The retention of these natural heritage and hydrological features pro-actively avoids adverse effects on bats and their habitat. No impacts to bats or bat habitat within the Site's natural features are anticipated from the proposed development. If Barn 2 is proposed to be

altered or removed, it should be inspected for the presence of bats to ensure compliance with the ESA.

5.6 Best Management Practice: Migratory Birds

Nesting birds are protected under the Migratory Birds Convention Act, 1994. Vegetation clearing on the Site should occur outside the breeding bird season, which extends from April 15 to August 15 in the local area (as per Environment and Climate Change Canada Guidelines).

If vegetation clearing occurs between April 15 and August 15, the vegetation should be investigated by a qualified biologist to confirm if any nests are present. Vegetation clearing can proceed provided there are no active nests. If active nests are confirmed, the nests should be left undisturbed until young have fledged or the nest is determined to be inactive.

If construction is planned to proceed during the breeding season, the area should be investigated for the presence of breeding birds and nests containing eggs or young before Site alteration. Nests discovered should be left undisturbed until young have fledged or the nest is determined to be inactive.

6.0 Policy Compliance

Based on the key natural heritage and hydrologic features identified on or adjacent to the Site and the findings of the field investigations detailed herein, the Site's proposed development complies with the PPS and GPGGH. Compliance with applicable natural heritage policy is summarized Table 6 and Table 7.

Specifically for the PPS, the proposed development meets Section 2.1 as follows:

a) Development and site alteration is not proposed within the PSW.

b) Development and site alteration is not proposed within significant woodlands.

c) Development and site alteration is not proposed in SWH.

d) Development and site alteration is not proposed in fish habitat.

e) Development and site alteration within habitat of threatened species has been designed in accordance with provincial and federal requirements.

f) Development and site alteration on lands adjacent to the PSW, significant woodlands, SWH and fish habitat has recommended development setbacks that ensure no negative impacts to the natural features or their ecological functions.

Specifically, for the GPGGH, the proposed development meets Section 4.2.3.1 as follows:

a) Outside of settlement areas, development and site alteration is not proposed within a key hydrologic feature.

Specifically, for the GPGGH, the proposed development meets Section 4.2.4.1 as follows:

a) VPZ is of sufficient width to protect the hydrologic features and their functions from the impacts of the proposed development.

b) VPZ is established to achieve and be maintained as natural self-sustaining vegetation; and

c) For key hydrologic features and fish habitat, the VPZ is no less than 30 m from the outside boundary of the key hydrologic feature.

Table 6 GPGGH Policy Compliance Summary

Key Hydrologic Features	On Site	On Adjacent Lands	Meets Associated Policy
Wetland	Yes	Yes	Yes, 4.2.3.1
	Explanation: The proposed development is located outside of the PSW and local wetland features. The 30 m VPZ is of sufficient width to protect the wetland features and their ecological functions. The VPZ will be maintained with natural vegetation. The proposed development should comply with the recommendations herein to ensure no negative impacts to wetlands.		
Streams (permanent/intermittent)	Yes	Yes	Yes 4.2.3.1
	Explanation: The proposed development will maintain a minimum setback of 30 metres from each stream as measured from the outside boundary of the key hydrological feature. A vegetation protection zone will be established within the setback to protect the stream and its functions from the impacts of the proposed development.		
Lands Adjacent to Key Hydrologic Features	Yes	Yes	4.2.4.1 (a-c)
	The VPZ will be of sufficient width to protect key hydrologic features and their functions. The VPZ is established to achieve and be maintained as natural self-sustaining vegetation. The VPZ will be a minimum width of 30 metres measured from the outside boundary of key hydrologic features. Development and site alteration is not permitted within the VPZ.		

Table 7 PPS Policy Compliance Summary

Natural Heritage Features	On Site	On Adjacent Lands	Meets Associated Policy
Fish Habitat	Potentially	Potentially	Yes
	Explanation: Development and site alteration will be located outside of the potential fish habitat. A minimum setback of 30 m will be maintained from the potential fish habitat for any proposed development and site alteration.		
Significant Wildlife Habitat (including habitat of special concern species)	Yes	Yes	Yes
	Explanation: Development and site alteration will be located entirely outside of SWH (amphibian breeding habitat). The proposed development will apply 30 m setbacks to significant woodlands and wetlands to ensure no negative impacts on these natural heritage features or their ecological functions.		
Habitat of Threatened and Endangered Species	Yes	Yes	Yes
	Explanation: Under the *Endangered Species Act*, the Ministry of the Environment, Conservation and Parks (MECP) can grant different types of permits or other authorizations for activities that would otherwise not be allowed, with conditions that are aimed at protecting and recovering species at risk. The proposed development will apply regulatory exemptions under Ontario Regulation 242/08, Section 23.6 (Bobolink / Eastern Meadowlark). The proponent will provide the Ministry with a Notice of Activity Form for their activities that will impact SAR (Eastern Meadowlark) and their habitat. The proponent will follow the requirements of O. Reg. 242/08 to ensure their activity receives exemption from the ESA and will take actions to protect and recover SAR.		
Significant Woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River)	Yes	Yes	N/A
	Explanation: Development and site alteration will be located entirely outside of areas identified as Significant Woodlands. A 30 m vegetation protective buffer area has been applied to lands adjacent to the Significant Woodlands. The proposed development will not lead to a reduction of the size of or fragmentation of Significant Woodlands.		

7.0 Summary of Mitigation, Compensation, and Best Practices

In summary, the following recommendations are provided for the proposed developments at the Site:

1. Ensure all relevant permits, approvals and authorizations are obtained before any site alteration or construction activities commence.
2. Before commencing site alteration, submit a Notice of Activity to MECP for Eastern Meadowlark and develop a habitat management plan.
3. Site Plans for the proposed developments should include the 30 m VPZ from wetlands and watercourses and significant woodlands, as shown on Figure 4.
4. An ESC plan should be developed for the Site. All ESC / Wildlife Exclusion fencing should be located outside the 30 m VPZs.
5. A stormwater management plan should be developed to maintain water quality and quantity for amphibian breeding habitats.
6. The 30 m VPZ should be maintained as the existing natural cover and be allowed to naturally self-sustain (i.e., a buffer area where no vegetation removals or grading is allowed). Tree removal within the VPZ should be limited to the removal of hazard trees if required.
7. Prior to the earlier of May 1 or commencement of Site preparation activities (grading, placement of fill), ESC / Wildlife Exclusion fencing should be installed along the perimeter of the construction area parallel to the southern PSW.
8. ESC / Wildlife Exclusion fencing should consist of light-duty silt fencing, staked at regular intervals, trenched in at least 10-20 cm and with an above-ground height of at least 60 cm. These should remain in place for the duration of the development until the Site has been successfully revegetated and soils have stabilized. Any observed overland drainage channels originating from the Site that may or may not have arisen due to erosion should be directed to a check dam structure before discharging to off-site areas.

9. Natural vegetation on the Site, including both open and treed habitats, should be maintained to the extent possible. Vegetation removals should be limited to the areas required for construction.
10. Vegetation clearing on the Site should occur outside the breeding bird season, which extends from April 15 to August 15 in the local area (as per Environment and Climate Change Canada Guidelines).
11. If vegetation clearing occurs between April 15 and August 15, the vegetation should be investigated by a qualified biologist to confirm if any bird nests are present. Vegetation clearing can proceed provided there are no active nests. If active nests are confirmed, the nests should be left undisturbed until young have fledged or the nest is determined to be inactive.
12. If construction is planned to proceed during the breeding season, the area should be investigated for the presence of breeding birds, and nests containing eggs or young before Site alteration commences. Nests discovered should be left undisturbed until young have fledged or the nest is determined to be inactive
13. The construction area should be inspected for turtles daily prior to the beginning of work. Any turtles observed at the Site should be photographed and allowed to move out of harm's way.
14. Due to the nearby wetlands, workers should be aware of the nesting season for turtles which extends from May 15 to August 15. Should any nesting turtles be encountered, work should stop immediately, and the turtle should be left to finish nesting undisturbed. The turtle should be photographed, and the nest marked to ensure it is not disturbed during construction until it has hatched (late August – September). If a nest is laid in a stockpile or other area that requires disturbance, Cambium should be contacted to determine if the nest can be relocated.
15. A landscape plan should be developed for the VPZ to plant native tree and shrub species suitable to the surrounding treed habitats to help facilitate rapid revegetation and slow the encroachment of non-native or invasive species.

16. No dumping or yard waste disposal should occur within the natural habitats on the Site to maintain the natural state and avoid introducing non-native or invasive species.
17. Construction activities that require earthworks (e.g., grading, excavation) should be scheduled to avoid dates of heavy rainfall events and times of high runoff volumes.
18. Any suspected or confirmed SAR discovered on the property must be left undisturbed as required by the *Endangered Species Act*, 2007. If any SAR individuals are encountered, they should be photographed and allowed time to move out of harm's way. SAR observations should be reported to the Natural Heritage Information Centre.

8.0 Closing

In closing, potential negative impacts associated with the proposed development and site alteration can be appropriately minimized, provided that the recommendations outlined in Section 7.0 are followed. The information presented herein demonstrates that the proposed development can be carried out in a way that will not adversely impact natural heritage and hydrologic features and functions identified on or adjacent to the subject Site. Furthermore, the proposed development complies with applicable provincial policy.

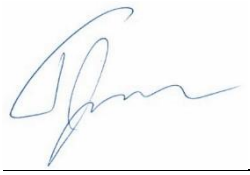
Respectfully submitted,

Cambium Inc.

Matthew Wheeler, B.A. Hons.
Senior Ecologist / Project Manager

Andrea Hicks, M.Sc.
Natural Science Group Manager

Ernie Silhanek, F&W Dipl.,
Senior Ecologist



Tyler Jamieson, M.Sc.
Biological/Ecological Technologist

Keegan McKitterick
Ecologist / Project Coordinator

Myles Latter, Hons. B.A., Dipl.
Project Coordinator

P:\12500 to 12599\12579-001 RIC (KDL Lands) Inc. - Site Development & Servicing Constraints - Kawartha Downs\Deliverables\REPORT - EIS\2021-11-29 RPT EIS Kawartha Downs_Final.docx

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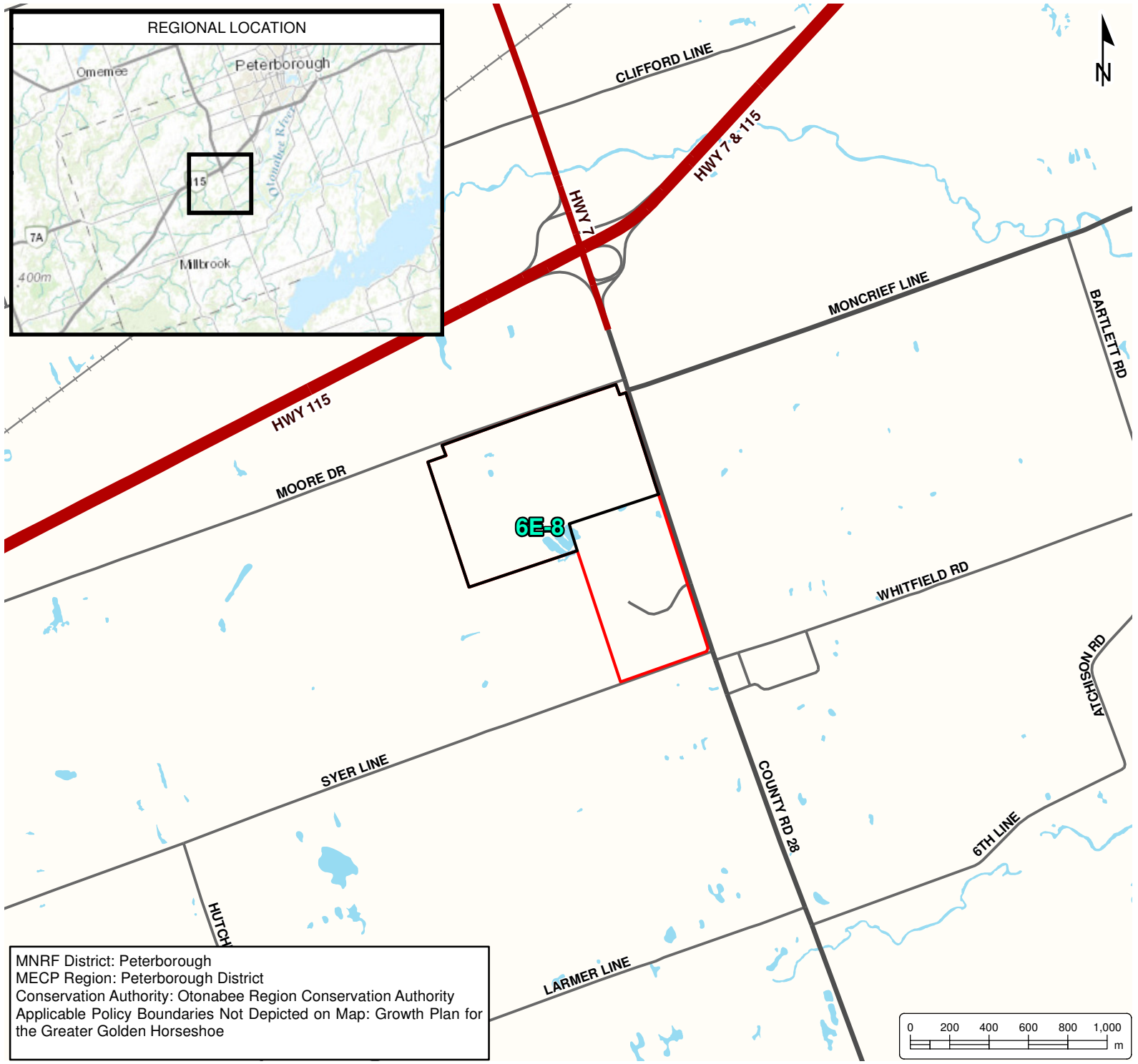
Glossary of Terms

ANSI: Area of Natural and Scientific Interest
ARA: Aquatic Resources Area
ARA: Aggregate Resources Act
AS: Agricultural System
ATK: Aboriginal Traditional Knowledge
BMA: Bear Management Area
BMP: Best Management Practice
CA: Conservation Authority
CEAA: Canadian Environmental Assessment Act/Agency
CFA: Canadian Forestry Association
CFIP: Community Fisheries Involvement Program
CFS: Canadian Forestry Service
CHU: Critical Habitat Unit
CH: Cultural Heritage
CLI: Canada Land Inventory
CLU: Crown Land Use
COSSARO: Committee on the Status of Species at Risk in Ontario
CR: Conservation Reserve
CWIP: Community Wildlife Involvement Program
CWS: Canadian Wildlife Service
DFO: Fisheries and Oceans Canada
EA: Environmental Assessment
EAA: Environmental Assessment Act
EAB: Emerald Ash Borer
EBR: Environmental Bill of Rights
EIA: Environmental Impact Assessment
EIS: Environmental Impact Study/Statement
ELC: Ecological Land Classification System
ELUP: Ecological Land Use Plan
END: Endangered species
EPA: Environmental Protection Act
ER: Environmental Registry
ESA: Endangered Species Act (2007)
ESA: Environmentally Sensitive Area
ESC: Erosion and Sediment Control
GIS: Geographic Information System
GLSL: Great Lakes – St. Lawrence
GPGGH: Growth Plan for the Greater Golden Horseshoe
GPS: Global Positioning System
HSA: Habitat Suitability Analysis
HIS: Habitat Suitability Index
KHA: Key Hydrologic Areas
KHF: Key Hydrologic Features
KNHF: Key Natural Heritage Features
LCFSP: Licence to Collect Fish for Scientific Purposes
LIO: Land Information Ontario
LRIA: Lake and Rivers Improvement Act
LUP: Land Use Permit or Plan
MA: Management Area
MAFA: Moose Aquatic Feeding Area
MCEA: Municipal Class Environmental Assessment
MECP: Ontario Ministry of Environment, Conservation and Parks
MNDMRF: Ontario Ministry of Natural Resources and Forestry
NER: Natural Environment Report
NHIC: Natural Heritage Information Centre
NHIS: Natural Heritage Information System
NHS: Natural Heritage System
OBM: Ontario Base Map
OFIS: Ontario Fisheries Information System
OLI: Ontario Land Inventory
OMAFRA: Ontario Ministry of Agriculture, Food and Rural Affairs
OWES: Ontario Wetland Evaluation System
PPS: Provincial Policy Statement (2014)
PSW: Provincially Significant Wetland
RLUP: Regional Land Use Plan
RMP: Regional Management Plan
R.P.F.: Registered Professional Forester
SAR: Species at Risk
SARO: Species at Risk in Ontario
SC: Special Concern species

F&W: Fish and Wildlife
FA: Fisheries Act (Federal)
FEC: Forest Ecosystem Classification
FMP: Forest Management Plan
FRI: Forest Resources Inventory
FWCA: Fish and Wildlife Conservation Act
GGH: Greater Golden Horseshoe
GHP: General Habitat Protection
SWH: Significant Wildlife Habitat
SWM: Stormwater Management
THR: Threatened species
TOR: Terms of Reference
TPP: Tree Preservation Plan
WIA: Woodlands Improvement Act
WMU: Wildlife Management Unit

Appended Figures



MNRF District: Peterborough
MECP Region: Peterborough District
Conservation Authority: Otonabee Region Conservation Authority
Applicable Policy Boundaries Not Depicted on Map: Growth Plan for the Greater Golden Horseshoe

ENVIRONMENTAL IMPACT STUDY

ROMSPEN INVESTMENT CORPORATION

Kawartha Downs and Speedway
Fraserville, Ontario

LEGEND

- Highway
- Major Road
- Minor Road
- Railroad
- Water Area
- Ecodistrict
- Site (70.66 ha) (approximate)
- Subject Property (111.03 ha) (approximate)

Notes:
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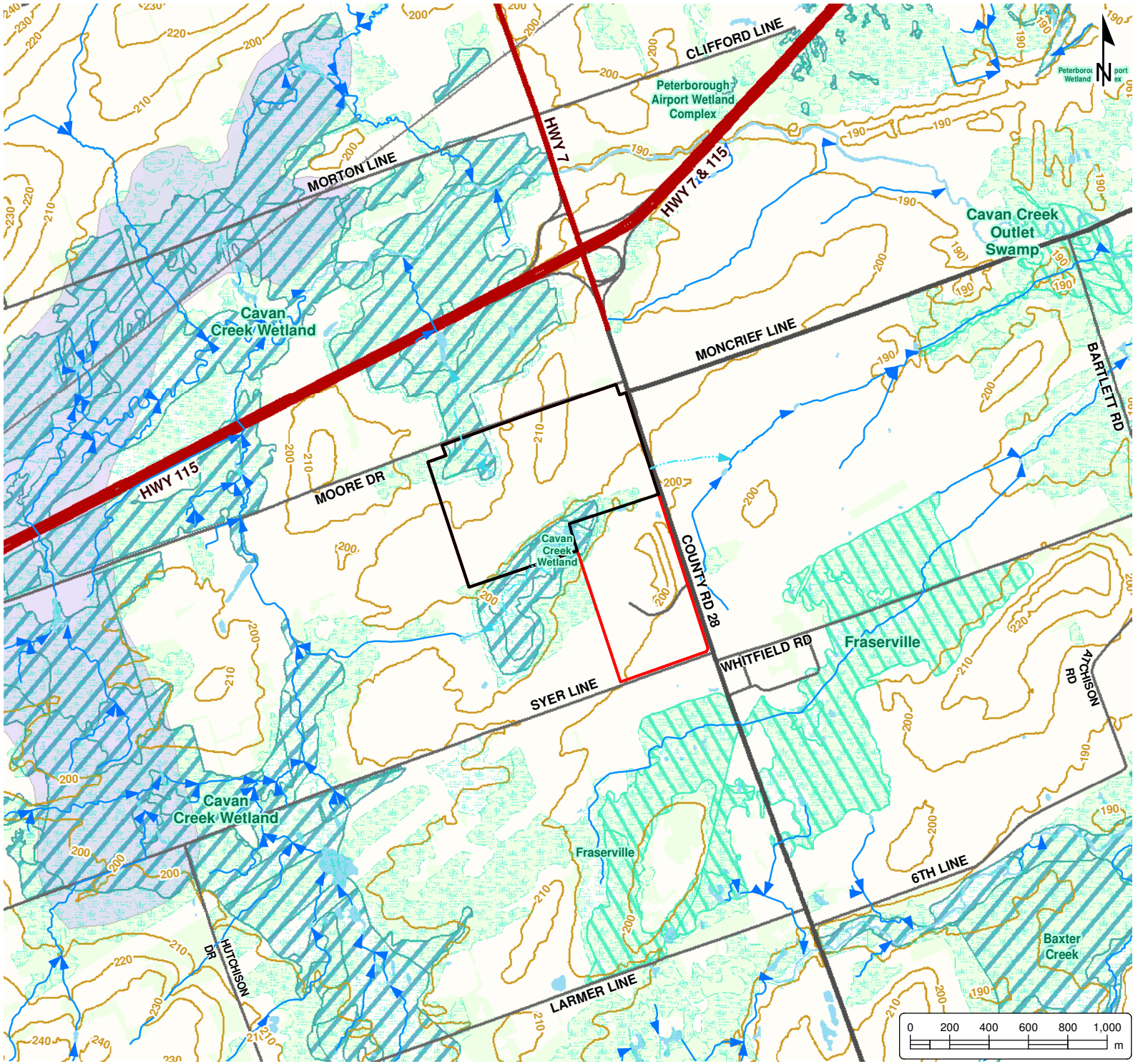
SITE LOCATION AND SPECIAL PLANNING AREAS

Project No.: 12579-001		Date: September 2021 Rev.:	
Scale: 1:27,500		Projection: NAD 1983 UTM Zone 17N	
Created by: MAT	Checked by: MW	Figure:	1

O:\GIS\MXDs\12500-12999\12579-001 RIC (KDL Lands) Inc. - Site Development & Servicing Constraints - Kawartha Downs\2021-09-17 EIS FIG 1 - Site Location and Special Planning Areas.mxd



ENVIRONMENTAL IMPACT STUDY

ROMSPEN INVESTMENT CORPORATION

Kawartha Downs and Speedway

Fraserville, Ontario

LEGEND

- Highway
- Major Road
- Minor Road
- Railroad
- Watercourse, Permanent
- Watercourse, Intermittent
- Contour 10m Interval (Major)
- Contour 10m Interval (Minor)
- Wooded Area
- Unevaluated Wetlands
- Locally Significant Wetlands
- Provincially Significant Wetlands
- Water Area
- ANSI, Life Science
- Site (70.66 ha) (approximate)
- Subject Property (111.03 ha) (approximate)

Notes:

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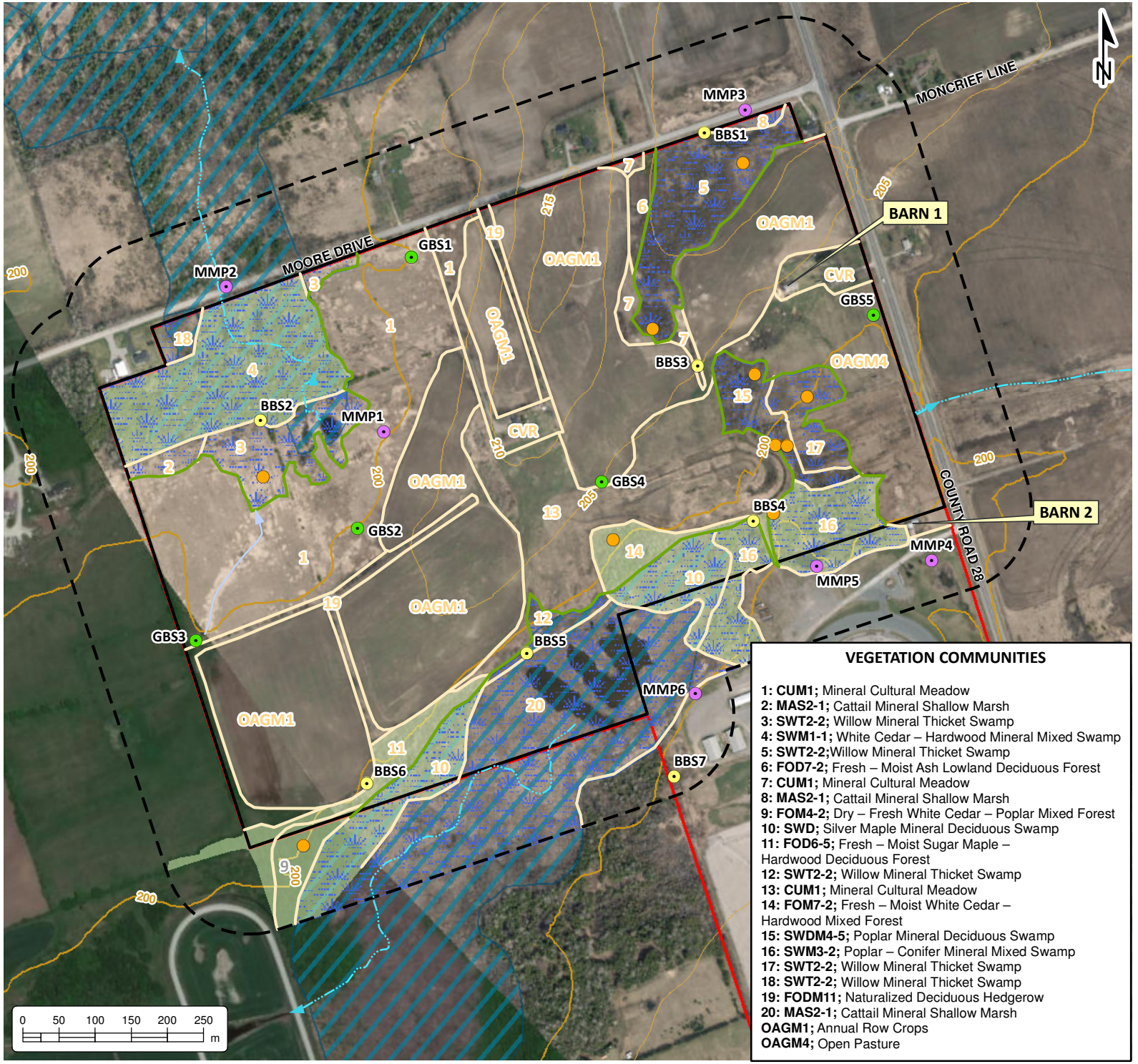
LOCAL NATURAL HERITAGE FEATURES

Project No.:	12579-001	Date:	September 2021
		Rev.:	
Scale:	1:27,500	Projection:	NAD 1983 UTM Zone 17N
Created by:	MAT	Checked by:	MW
Figure:	2		

O:\GIS\MXDs\12500-12999\12579-001 RIC (KDL Lands) Inc. - Site Development & Servicing Constraints - Kawartha Downs\2021-09-17 EIS FIG 2 - Local Natural Heritage Features.mxd



ENVIRONMENTAL IMPACT STUDY

ROMSPEN INVESTMENT CORPORATION

Kawartha Downs and Speedway
Fraserville, Ontario

LEGEND

- Soil Point
- Grassland Bird Survey Stations
- Amphibian Survey Point
- Breeding Bird Survey Station
- 120m Adjacent Lands
- Headwater Drainage Feature
- Intermittent Watercourse
- Contour 5m Interval (Major)
- Contour 5m Interval (Minor)
- Vegetation Community
- Verified Wetland Boundary
- Wetland Community
- Significant Woodlands
- Provincially Significant Wetland
- Site (70.66) (approximate)
- Subject Property (111.03 ha) (approximate)

VEGETATION COMMUNITIES

1: CUM1; Mineral Cultural Meadow
2: MAS2-1; Cattail Mineral Shallow Marsh
3: SWT2-2; Willow Mineral Thicket Swamp
4: SWM1-1; White Cedar – Hardwood Mineral Mixed Swamp
5: SWT2-2;Willow Mineral Thicket Swamp
6: FOD7-2; Fresh – Moist Ash Lowland Deciduous Forest
7: CUM1; Mineral Cultural Meadow
8: MAS2-1; Cattail Mineral Shallow Marsh
9: FOM4-2; Dry – Fresh White Cedar – Poplar Mixed Forest
10: SWD; Silver Maple Mineral Deciduous Swamp
11: FOD6-5; Fresh – Moist Sugar Maple – Hardwood Deciduous Forest
12: SWT2-2; Willow Mineral Thicket Swamp
13: CUM1; Mineral Cultural Meadow
14: FOM7-2; Fresh – Moist White Cedar – Hardwood Mixed Forest
15: SWDM4-5; Poplar Mineral Deciduous Swamp
16: SWM3-2; Poplar – Conifer Mineral Mixed Swamp
17: SWT2-2; Willow Mineral Thicket Swamp
18: SWT2-2; Willow Mineral Thicket Swamp
19: FODM11; Naturalized Deciduous Hedgerow
20: MAS2-1; Cattail Mineral Shallow Marsh
OAGM1; Annual Row Crops
OAGM4; Open Pasture

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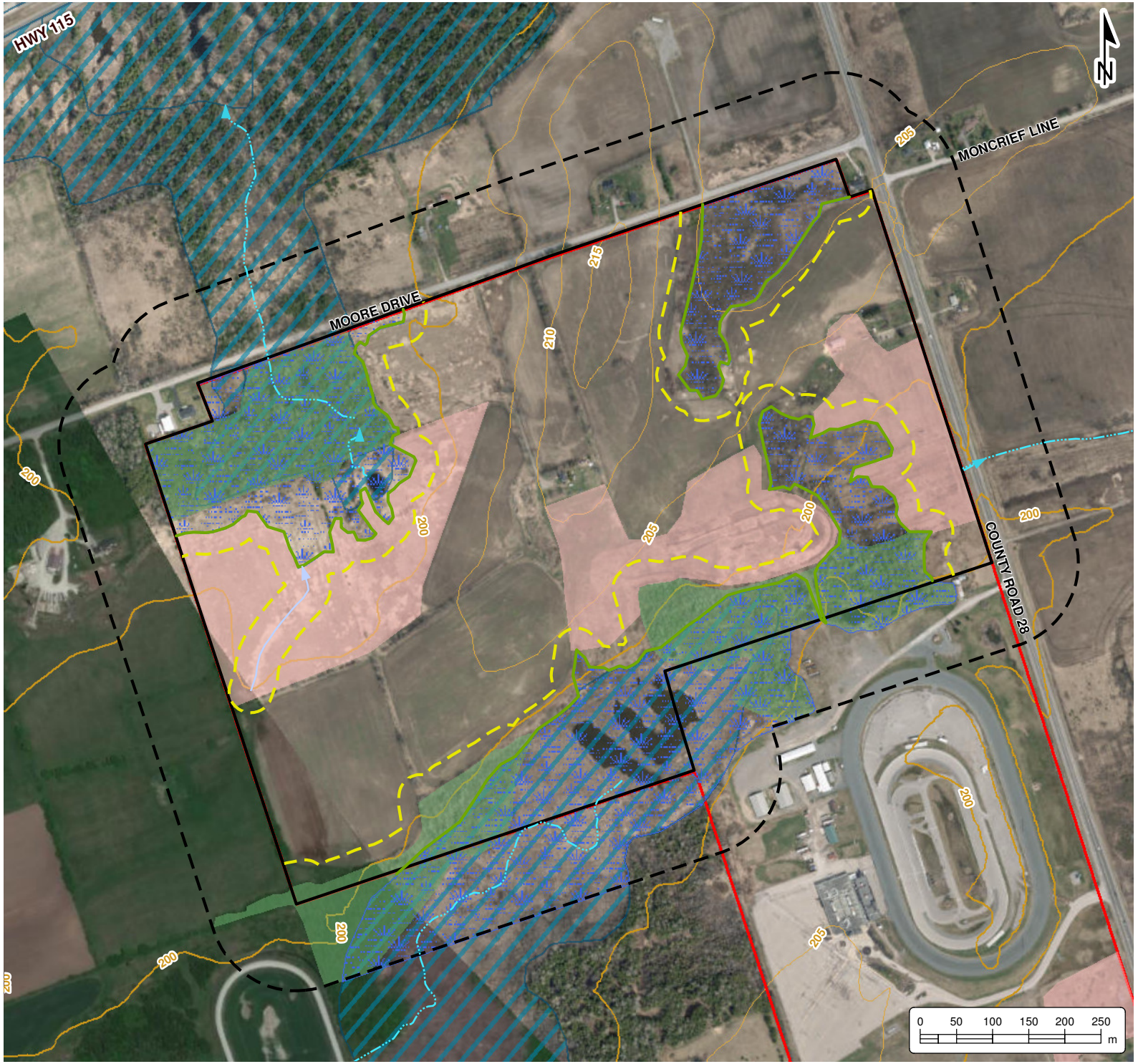
SITE NATURAL HERITAGE FEATURES AND SURVEY LOCATIONS

Project No.:	12579-001	Date:	September 2021
		Rev.:	
Scale:	1:7,500	Projection:	NAD 1983 UTM Zone 17N
Created by:	MAT	Checked by:	MW
Figure:	3		

O:\GIS\MXDs\12500-12999\12579-001 RIC (KDL Lands) Inc. - Site Development & Servicing Constraints - Kawartha Downs\2021-09-17 EIS FIG 3 - Site Natural Heritage Features.mxd



ENVIRONMENTAL IMPACT STUDY

ROMSPEN INVESTMENT CORPORATION

Kawartha Downs and Speedway

Fraserville, Ontario

LEGEND

- 30m Development Wetland Setback
- 120m Adjacent Lands
- Headwater Drainage Feature
- Intermittent Watercourse
- Contour 5m Interval (Major)
- Contour 5m Interval (Minor)
- Verified Wetland Boundary
- Eastern Meadowlark Breeding Habitat
- Significant Woodland
- Wetland Community
- Provincially Significant Wetland
- Site (70.66) (approximate)
- Subject Property (111.03 ha) (approximate)

Notes:

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NATURAL HERITAGE CONSTRAINTS

Project No.: 12579-001		Date: September 2021	Rev.:
Scale: 1:7,500		Projection: NAD 1983 UTM Zone 17N	
Created by: MAT	Checked by: MW	Figure: 4	

O:\GIS\MXDs\12500-12999\12579-001 RIC (KDL Lands) Inc. - Site Development & Servicing Constraints - Kawartha Downs\2021-09-17 EIS FIG 4 - Natural Heritage Constraints.mxd

Appendix A
Correspondence

Matthew Wheeler

From: Matthew Wheeler
Sent: September 29, 2021 8:38 AM
To: 'Matt Wilkinson'; Jasmine Gibson
Cc: Andrea Hicks
Subject: RE: Kawartha Downs (12579-001)

Hi Matt,

Thank you for providing a rapid response. We have used ELC to map woodland features and to determine their ecological contribution to the area.

The planning authority has not developed and applied a set of evaluation criteria to determine significant woodlands. I agree that the determination of woodland significance should use the most stringent criteria and policies. I have reviewed the NHRM, ORMCP-Technical Paper 7, and the Greenbelt Plan-Technical Paper 1 to consider which might offer the most protection for the feature. Below I offer considerations for each reference document.

Oak Ridges Moraine Conservation Plan-Technical Paper 7
The limitation of using this tool is that the size thresholds for woodlands are based on land use categories (i.e., Countryside or Settlement Areas). We don't have a good parallel for the land use categories at this Site located and outside of the Oak Ridges Moraine area. This makes it difficult to apply the size thresholds to the Site.

Natural Heritage Reference Manual (NHRM)
The County of Peterborough is approximately 39% woodland cover by area. Thus, to meet the size criteria would require a woodland of 50 ha in size or larger to be considered significant. For other evaluation criteria in Table 7-2, a sample range of woodland size thresholds for significance are listed. For example, the threshold range for proximity to other woodlands or other habitats is 0.5 to 20 hectares. A threshold toward the lower part of the range would be appropriate for a planning area with little forest cover, whereas a higher threshold would be suitable for a planning area with greater forest cover. For the Ecological Function Criteria (Table 7-2), this would require the woodlands to meet a minimum size threshold of 15-20 hectares to be considered significant. Therefore, using the NHRM is unlikely for the woodlands to meet the minimum area thresholds for the Ecological Function Criteria (i.e., woodland interior, proximity to other woodlands, linkages, etc.).

Greenbelt Plan—Technical Definitions for Key Natural Heritage Features-Technical Paper 1
The Greenbelt plan is more representative of the geographic area and planning context for this Site, in particular the North Area (i.e., north of the ORMCP area). The criteria used to assess woodland significance are well-defined regarding minimum area thresholds and other criteria (e.g., natural composition, age/tree size, proximity, rarity). The minimum size values for Significant Woodland criteria ranges from 0.5 ha to 10 ha. Technical Paper 1 provides a definition of "significant" which is shared by the CM OP and the PPS. This technical paper was intended to designate significant features in rural areas in similar geographies settings to Peterborough County. These criteria used to define Significant Woodlands seem to be the more stringent than the criteria of the ORMCP and the NHRM.

I'm really trying to understand the best way to evaluate Significant Woodlands within Peterborough County. For this site I have reviewed the available resources listed above. The criteria outlined in the Greenbelt Plan Technical Paper 1, for the North Area, appears to offer the most applicable and stringent criteria to evaluate Significant Woodlands. I would welcome the opportunity to have a Zoom or Teams meeting with you to hear your thoughts. It's important to have a consistent approach to Significant Woodlands because they are a commonly encountered feature on many properties. I look forward to speaking with you.

Kind regards, Matt Wheeler

From: Matt Wilkinson <mwilkinson@otonabeeconservation.com>
Sent: September 27, 2021 2:07 PM
To: Matthew Wheeler <Matthew.Wheeler@cambium-inc.com>
Cc: Jasmine Gibson <jgibson@otonabeeconservation.com>
Subject: RE: Kawartha Downs (12579-001)

Hi Matt,

The Growth Plan and PPS apply to the application and the most stringent policy and definition applies. With respect to assessing Significance of Woodlands, you should use the Natural Heritage Reference Manual and would recommend using the parameters outlined in the ORMCP Technical Paper #7.

It is expected that the ELC protocol is implemented to map the feature, as well as its ecological contribution to the area; the review must look at the feature as a whole from a landscape perspective not as it may be confined by lot fabric boundaries. A woodland's proximity to water, its inclusion into other NHS, habitat provisions and other functions makes it significant regardless of size and forestry contributions.

The document you attached has been used by our office in the past to review EISs and emphasizes the Natural Heritage Reference Manual criteria – it is a tool to help assess features and functions. You could incorporate the principles from this document in consideration of the relevant policies and documents that best apply to the area and application.

Also, *if* the woodland supports threatened and endangered habitat you will need to consult with MECP before submitting the EIS. this is in keeping with the intent of PPS 2.1.2, 2.1.5 and 2.1.8.

I hope that answers your question.
Best,
Matt

Matt Wilkinson
Planner
705-745-5791 x213
mwilkinson@otonabeeconservation.com

From: Matthew Wheeler <Matthew.Wheeler@cambium-inc.com>
Sent: September 27, 2021 12:05 PM
To: Matt Wilkinson <mwilkinson@otonabeeconservation.com>
Cc: Jasmine Gibson <jgibson@otonabeeconservation.com>; Cambium Admin <CambiumAdmin@cambium-inc.com>
Subject: RE: Kawartha Downs (12579-001)

Hi Matt,

The township's Official Plan states in Section 3.26 (L), "*It is recognized that the mapping of Significant Woodlands on Schedule B and B1 is based on high level photography. For this reason the location and significance of the woodlands needs to be assessed on site and through consultation with the Conservation Authority and the Township. Where lands shown as Significant Woodlands on Schedule B and Schedule B-1 are determined to not be significant, development of the lands may proceed in accordance with the policies of this section of the Plan*"

I left you a voicemail this morning inquiring about the criteria for evaluation of significant woodlands. I spoke with Karen Ellis, township planner, last week regarding Significant Woodlands. She noted I should speak with ORCA regarding criteria to use to determine woodland significance. I am requesting the use of the Greenbelt Plan's *Technical Definitions and Criteria for Key Natural Heritage Features in the Natural Heritage System of the Protected Countryside Area—Technical Paper 1 (2012, see pages 16-19)* to determine woodland significance. This technical paper provides a clear definition of criteria for determining significance including; size, natural composition, age or tree size, proximity and rarity. Please let me know if ORCA is in support of using the defined criteria in this technical paper to determine woodland significance.

I recognize you are busy and can keep any discussions short if you would like to discuss.

Cheers, Matt Wheeler

From: Matt Wilkinson <mwilkinson@otonabeeconservation.com>
Sent: September 17, 2021 12:32 PM
To: Matthew Wheeler <Matthew.Wheeler@cambium-inc.com>
Cc: Jasmine Gibson <jgibson@otonabeeconservation.com>
Subject: Kawartha Downs

Hi Matt,
I got your voicemail about Sig woodlot Criteria in CM.
According to the definition section of the CM OP, *Significant… in regard to woodlands, an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history;*
The PPS has the same requirement (see 4.6) to evaluate features based on provincial criteria (Natural Heritage Reference Manual) prior to a planning decision to demonstrate consistency with PPS 2.1.2, 2.1.5 and 2.1.8.

Hope that helps.

Best,
Matt

Matt Wilkinson
Planner
705-745-5791 x213
mwilkinson@otonabeeconservation.com

Matthew Wheeler

From: Karen Ellis <kellis@cavanmonaghan.net>
Sent: September 20, 2021 10:45 AM
To: Matthew Wheeler
Subject: [Possible SPAM] RE: Significant Woodlands--Kawartha Downs

Categories: Reference

Hi Matthew:

In the definitions section of the Township of Cavan Monaghan Official Plan, you will find the meaning of "Significant" as it pertains to a number of features. For woodlands, Significant means:

"an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to the site quality, species composition, or past management history."

Section 3.26 of the Plan also speaks to Woodlot, Tree Preservation, Replacement and Enhancement. You might want to have a look at these policies as well.

A link to the Township Official Plan is provided below:

https://www.cavanmonaghan.net/en/build-and-invest/resources/Documents/Cavan-Monaghan-Official-Plan-Consolidated.pdf

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

Regards.

Karen Ellis
Director of Planning
Township of Cavan Monaghan
988 County Road 10
Millbrook ON L0A 1G0

Tel: 705-932-9334

All Township facilities are closed including the Municipal Office, staff are still available to assist by phone or email.

COVID-19 UPDATES - For information and to subscribe to ongoing updates please visit our Township website COVID-19 page at https://www.cavanmonaghan.net/en/live-here/covid-19.aspx

Peterborough Public Health – 705-743-1000 x401 https://www.peterboroughpublichealth.ca/

-----Original Message-----
From: noreply@cavanmonaghan.net [mailto:noreply@cavanmonaghan.net] On Behalf Of Matthew Wheeler
Sent: Thursday, September 16, 2021 3:46 PM
To: Karen Ellis <kellis@cavanmonaghan.net>
Subject: Significant Woodlands--Kawartha Downs

Hi Karen,

I am undertaking an EIS for the lands north of Kawartha Downs raceway. The Township's OP designates Significant Woodlands. What criteria has the Township applied to define areas as Signficant Woodlands? Feel free to give me a call 613-876-1515 or email matthew.wheeler@cambium-inc.com.

Kind regards, Matthew Wheeler

Origin: https://www.cavanmonaghan.net/Modules/contact/search.aspx?s=XXkoMuLgth04ehFw9W5T2AeQuAleQuAl
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This email was sent to you by Matthew Wheeler<matthew.wheeler@cambium-inc.com> through https://www.cavanmonaghan.net/.

Matthew Wheeler

From: Matt Wilkinson <mwilkinson@otonabeeconservation.com>
Sent: June 28, 2021 6:41 AM
To: Matthew Wheeler
Cc: Jasmine Gibson; Donald Allin; Katie Jane Harris
Subject: RE: Technical Review, RE: EIS Terms of Reference--Kawartha Downs Racetrack and Lands to the North (12579)

Hi Matt,
Thanks for the chance to review and discuss the proposed Terms of Reference (ToR) for an EIS at the Kawartha Downs property and the site to the north.

In the absence of a development proposal, it is difficult to provide best advice, but it appears that the ToR below is quite extensive and tries to covering all relevant PPS policies. Two caveats to consider: 1) species targeted surveys may be required to address MECP/ESA requirements to satisfy PPS 2.1.7; and 2) fisheries assessments may require collection of physical, biological and chemical data and should be assessed using the 'Evaluation, Classification and Management of Headwater Drainage Features Guidelines' (TRCA/CVC 2014), which helps triage the data collected in the field for management strategies, etc.

As the subject property is outside a noted settlement area, Growth Plan Policy require a study area of 120m from the site, and a minimum VPZ of 30m buffer/setback be applied to all key hydrologic features.
The site is regulated under Ontario Regulation 167/06 and permits for site alteration and/ or construction will be required in this area..

Once, the development proposal is known, please reconnect with Otonabee Conservation staff so that we can provide best advice regarding regulatory policy compliance.

Best,
Matt

Matt Wilkinson
Planner
705-745-5791 x213
mwilkinson@otonabeeconservation.com

From: Matthew Wheeler <Matthew.Wheeler@cambium-inc.com>
Sent: June 25, 2021 1:37 PM
To: Matt Wilkinson <mwilkinson@otonabeeconservation.com>; Paul Finigan <pfinigan@otonabeeconservation.com>
Cc: Cambium File <file@cambium-inc.com>
Subject: RE: EIS Terms of Reference--Kawartha Downs Racetrack and Lands to the North (12579)

Hi Matt,

It was good to speak with you this afternoon (June 25, 2021). A map of the Site is attached for a development at the Kawartha Downs property and lands to the north. The concept plan has not been developed for this project. I will circulate a concept plan for the proposed development when it is prepared.

If you could kindly review and comment on the suitability of the following proposed Terms of Reference for the EIS, that would be greatly appreciated.

- Consult with the ORCA staff, as required, to determine their interest/concerns regarding the proposed works and scope of work requirements.
- Compile and review applicable background information and environmental mapping pertaining to the Site.
- Conduct an aquatic habitat assessment, to identify and characterize any hydrologic features of significance (e.g., wetlands, seeps, springs, etc.) on the Site.
- Conduct two (2) vascular plants surveys on the Site in late spring and mid-summer, to provide a two-season vegetation inventory.
- Classify existing vegetation communities on the Site, according to the Ecological Land Classification System for Southern Ontario (Lee et. al., 1998), and evaluate them for sensitivity, rarity, and botanical quality.
- Delineate any wetland boundaries following the Ontario Wetland Evaluation System (OWES) for Southern Ontario (Ministry of Natural Resources, 2013). As required, a site meeting will be held with ORCA staff, for field verification of wetland mapping.
- Undertake a Species at Risk (SAR) screening to assess for potential SAR habitat and evaluate compliance with the provincial Endangered Species Act, 2007.
- Record observations of wildlife occurrences and assess wildlife habitat function, including significant wildlife habitat on the Site. Any evidence of breeding, forage, shelter or nesting sites, and/or travel corridors will be noted. This includes two (2) breeding bird surveys, three (3) grassland bird surveys and three (3) amphibian surveys.
- Identify, assess, and include detailed descriptions of the natural features and functions identified on the Site and adjacent lands.
- Map key natural heritage and hydrologic features, vegetation communities, and other environmental features (watercourses, wetlands, areas of groundwater discharge, wildlife habitat, etc.) and proposed development on current, high quality aerial imagery.
- Provide an assessment of the potential impacts of the proposed development on natural features and their related ecological and hydrologic functions.
- Demonstrate conformity with the applicable policies and plans within the ORCA watershed, including: Conservation Authorities Act and O. Reg. 167/06.
- Develop an appropriate avoidance, mitigation, and/or restoration strategy, to address the potential impacts identified.
- Complete one (1) final report with supporting figures for circulation for approval to ORCA, which includes a CV of all qualified practitioners..

Please let me know if you have any comments or suggested revisions to the above.

Kind regards, Matthew Wheeler

Matthew Wheeler
Project Manager/Senior Ecologist

Cambium Inc. - Kingston
p: | **c:** 613.876.1515 | **toll:** 866.217.7900 | **w:** cambium-inc.com

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From: Matthew Wheeler
Sent: June 25, 2021 12:19 PM
To: 'Matt Wilkinson' <mwilkinson@otonabeeconservation.com>
Cc: Paul Finigan <pfinigan@otonabeeconservation.com>
Subject: RE: Scope EIS--Kawartha Downs Racetrack and Lands to the North (12579)

Hi Matt,

I'm hoping to speak with you this afternoon about Terms of Reference for an EIS for Kawartha Downs and lands to the north. You can reach me on my cell at 613-876-1515. I can keep our call brief and send a follow-up email with more details.

Thanks, Matt Wheeler

Appendix B
Conceptual Site Plan

Appendix C
Vegetation Species List

VEGETATION COMMUNITY CLASSIFICATION: CUM1 COMMUNITY #: 1 LOCATION: Kawartha Downs COORDINATES: 44.2140179, -78.4006544

PROJECT NUMBER: 12579-001 DATE: July 08, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Balsam Poplar	*Populus balsamifera*	*Salicaceae*	-3	4			S5
Canada Bluegrass	*Poa compressa*	*Poaceae*	3				SNA
Canada Goldenrod	*Solidago canadensis var. canadensis*	*Asteraceae*	3	1			S5
Canada Thistle	*Cirsium arvense*	*Asteraceae*	3				SNA
Common Timothy	*Phleum pratense ssp. pratense*	*Poaceae*	3				SNA
European Buckthorn	*Rhamnus cathartica*	*Rhamnaceae*	0				SNA
Garden Bird's-foot Trefoil	*Lotus corniculatus*	*Fabaceae*	3				SNA
Grass-leaved Goldenrod	*Euthamia graminifolia*	*Asteraceae*	0	2			S5
Kentucky Bluegrass	*Poa pratensis ssp. pratensis*	*Poaceae*	3				SNA
Oxeye Daisy	*Leucanthemum vulgare*	*Asteraceae*	5				SNA
Pale-spike Lobelia	*Lobelia spicata*	*Campanulaceae*	0	8			S4
Red Ash	*Fraxinus pennsylvanica*	*Oleaceae*	-3	3			S4
Smooth Brome	*Bromus inermis*	*Poaceae*	5				SNA
Swamp Milkweed	*Asclepias incarnata ssp. incarnata*	*Apocynaceae*	-5	6			S5
Tufted Vetch	*Vicia cracca*	*Fabaceae*	5				SNA
Wild Carrot	*Daucus carota*	*Apiaceae*	5				SNA

NOTES: Cultural Meadow. Dominated by terrestrial species.

VEGETATION COMMUNITY CLASSIFICATION: CUM1

COMMUNITY #: 1

LOCATION: Kawartha Downs

COORDINATES: 44.2140179, -78.4006544

PROJECT NUMBER: 12579-001

DATE: July 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: SWD3-2 COMMUNITY #: 10 LOCATION: Kawartha Downs COORDINATES: 44.2088104, -78.4007189

PROJECT NUMBER: 12579-001 DATE: July 14, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
American Water-horehound	*Lycopus americanus*	*Lamiaceae*	-5	4			S5
Dwarf Raspberry	*Rubus pubescens*	*Rosaceae*	-3	4			S5
Nannyberry	*Viburnum lentago*	*Caprifoliaceae*	0	4			S5
Paper Birch	*Betula papyrifera*	*Betulaceae*	3	2			S5
Sensitive Fern	*Onoclea sensibilis*	*Dryopteridaceae*	-3	4			S5
Silver Maple	*Acer saccharinum*	*Aceraceae*	-3	5			S5
Speckled Alder	*Alnus incana ssp. rugosa*	*Betulaceae*	-3	6			S5
Spotted Joe Pye Weed	*Eutrochium maculatum var. maculatum*	*Asteraceae*	-5	3			S5
Swamp Red Currant	*Ribes triste*	*Grossulariaceae*	-5	6			S5
Trembling Aspen	*Populus tremuloides*	*Salicaceae*	0	2			S5

NOTES: Silver Maple and Poplar dominate.

VEGETATION COMMUNITY CLASSIFICATION: SWD3-2

COMMUNITY #: 10

LOCATION: Kawartha Downs

COORDINATES: 44.2088104, -78.4007189

PROJECT NUMBER: 12579-001

DATE: July 14, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: FOD6-5 COMMUNITY #: 11 LOCATION: Kawartha Downs COORDINATES: 44.3173021, -78.3056648

PROJECT NUMBER: 12579-001 DATE: July 14, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Alternate-leaved Dogwood	*Cornus alternifolia*	*Cornaceae*	3	6			S5
Basswood	*Tilia americana*	*Tiliaceae*	3	4			S5
Bracken Fern	*Pteridium aquilinum*	*Dennstaedtiaceae*	3	2			S5
Broad-leaved Helleborine	*Epipactis helleborine*	*Orchidaceae*	3				SNA
Eastern Prickly Gooseberry	*Ribes cynosbati*	*Grossulariaceae*	3	4			S5
Eastern White Cedar	*Thuja occidentalis*	*Cupressaceae*	-3	4			S5
European Buckthorn	*Rhamnus cathartica*	*Rhamnaceae*	0				SNA
Poison Ivy	*Toxicodendron radicans*	*Anacardiaceae*	0	2			S5
Red Ash	*Fraxinus pennsylvanica*	*Oleaceae*	-3	3			S4
Riverbank Grape	*Vitis riparia*	*Vitaceae*	0	0			S5
Sugar Maple	*Acer saccharum*	*Aceraceae*	3	4			S5
Trembling Aspen	*Populus tremuloides*	*Salicaceae*	0	2			S5
White Spruce	*Picea glauca*	*Pinaceae*	3	6			S5

NOTES: Dominant cover is trees, over 60% cover. Dominated by Maple, Poplar, and Ash.

VEGETATION COMMUNITY CLASSIFICATION: FOD6-5

COMMUNITY #: 11

LOCATION: Kawartha Downs

COORDINATES: 44.3173021, -78.3056648

PROJECT NUMBER: 12579-001

DATE: July 14, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: SWT2-2 COMMUNITY #: 12 LOCATION: Kawartha Downs COORDINATES: 44.222246, -78.3950653

PROJECT NUMBER: 12579-001 DATE: July 14, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Balsam Poplar	*Populus balsamifera*	*Salicaceae*	-3	4			S5
Bebb's Willow	*Salix bebbiana*	*Salicaceae*	-3	4			S5
Cottony Willow	*Salix eriocephala*	*Salicaceae*	-3	4			S5
Crack Willow	*Salix euxina*	*Salicaceae*	0				SNA
Sensitive Fern	*Onoclea sensibilis*	*Dryopteridaceae*	-3	4			S5
Swamp Milkweed	*Asclepias incarnata ssp. incarnata*	*Apocynaceae*	-5	6			S5
Tall Goldenrod	*Solidago altissima*	*Asteraceae*	3	1			S5
Trembling Aspen	*Populus tremuloides*	*Salicaceae*	0	2			S5

NOTES: Willow Thicket Swamp. On margins of larger wetland area.

VEGETATION COMMUNITY CLASSIFICATION: SWT2-2

COMMUNITY #: 12

LOCATION: Kawartha Downs

COORDINATES: 44.222246, -78.3950653

PROJECT NUMBER: 12579-001

DATE: July 14, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: CUM1 COMMUNITY #: 13 LOCATION: Kawartha Downs COORDINATES: 44.222246, -78.3950653

PROJECT NUMBER: 12579-001 DATE: July 14, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Alfalfa	*Medicago sativa ssp. sativa*	*Fabaceae*	5				SNA
Annual Fleabane	*Erigeron annuus*	*Asteraceae*	3	0			S5
Black-eyed Susan	*Rudbeckia hirta var. pulcherrima*	*Asteraceae*	3	0			S5
Bladder Campion	*Silene vulgaris*	*Caryophyllaceae*	5				SNA
Canada Goldenrod	*Solidago canadensis var. canadensis*	*Asteraceae*	3	1			S5
Common Milkweed	*Asclepias syriaca*	*Apocynaceae*	5	0			S5
Common Mullein	*Verbascum thapsus ssp. thapsus*	*Scrophulariaceae*	5				SNA
Common St. John's-wort	*Hypericum perforatum ssp. perforatum*	*Clusiaceae*	5				SNA
Common Timothy	*Phleum pratense ssp. pratense*	*Poaceae*	3				SNA
Cottony Willow	*Salix eriocephala*	*Salicaceae*	-3	4			S5
Deptford Pink	*Dianthus armeria ssp. armeria*	*Caryophyllaceae*	5				SNA
European Swallowwort	*Vincetoxicum rossicum*	*Apocynaceae*	5				SNA
Garden Bird's-foot Trefoil	*Lotus corniculatus*	*Fabaceae*	3				SNA
Grass-leaved Goldenrod	*Euthamia graminifolia*	*Asteraceae*	0	2			S5
Kentucky Bluegrass	*Poa pratensis ssp. pratensis*	*Poaceae*	3				SNA
New England Aster	*Symphyotrichum novae-angliae*	*Asteraceae*	-3	2			S5
Panicled Aster	*Symphyotrichum lanceolatum*	*Asteraceae*	-3	3			S5
Red Clover	*Trifolium pratense*	*Fabaceae*	3				SNA
Redtop	*Agrostis gigantea*	*Poaceae*	-3				SNA
Tufted Vetch	*Vicia cracca*	*Fabaceae*	5				SNA
White Heath Aster	*Symphyotrichum ericoides var. ericoides*	*Asteraceae*	3	4			S5
White Sweet-clover	*Melilotus albus*	*Fabaceae*	3				SNA
Wild Carrot	*Daucus carota*	*Apiaceae*	5				SNA

VEGETATION COMMUNITY CLASSIFICATION: CUM1

COMMUNITY #: 13

LOCATION: Kawartha Downs

COORDINATES: 44.222246, -78.3950653

PROJECT NUMBER: 12579-001

DATE: July 14, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

NOTES: Cultural Meadow.

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: FOM7-2 COMMUNITY #: 14 LOCATION: Kawartha Downs COORDINATES: 44.220528, -78.3925769

PROJECT NUMBER: 12579-001 DATE: July 14, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Bracken Fern	*Pteridium aquilinum*	*Dennstaedtiaceae*	3	2			S5
Common Apple	*Malus pumila*	*Rosaceae*	5				SNA
Common Milkweed	*Asclepias syriaca*	*Apocynaceae*	5	0			S5
Eastern Prickly Gooseberry	*Ribes cynosbati*	*Grossulariaceae*	3	4			S5
Eastern White Cedar	*Thuja occidentalis*	*Cupressaceae*	-3	4			S5
European Buckthorn	*Rhamnus cathartica*	*Rhamnaceae*	0				SNA
European Swallowwort	*Vincetoxicum rossicum*	*Apocynaceae*	5				SNA
Grass-leaved Goldenrod	*Euthamia graminifolia*	*Asteraceae*	0	2			S5
Grass-leaved Goldenrod	*Euthamia graminifolia*	*Asteraceae*	0	2			S5
Grey Dogwood	*Cornus racemosa*	*Cornaceae*	0	2			S5
Red Ash	*Fraxinus pennsylvanica*	*Oleaceae*	-3	3			S4
Riverbank Grape	*Vitis riparia*	*Vitaceae*	0	0			S5
Sensitive Fern	*Onoclea sensibilis*	*Dryopteridaceae*	-3	4			S5
Spotted Joe Pye Weed	*Eutrochium maculatum var. maculatum*	*Asteraceae*	-5	3			S5
Tall Goldenrod	*Solidago altissima*	*Asteraceae*	3	1			S5
Trembling Aspen	*Populus tremuloides*	*Salicaceae*	0	2			S5
Virginia Creeper	*Parthenocissus quinquefolia*	*Vitaceae*	3	6			S4?
White Elm	*Ulmus americana*	*Ulmaceae*	-3	3			S5

NOTES: Lowland Cedar, Poplar, Ash

VEGETATION COMMUNITY CLASSIFICATION: FOM7-2 COMMUNITY #: 14 LOCATION: Kawartha Downs COORDINATES: 44.220528, -78.3925769

PROJECT NUMBER: 12579-001 DATE: July 14, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: SWDM4-5 COMMUNITY #: 15 LOCATION: Kawartha Downs COORDINATES: 44.2137743, -78.3939462

PROJECT NUMBER: 12579-001 DATE: August 13, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Balsam Poplar	*Populus balsamifera*	*Salicaceae*	-3	4			S5
Bebb's Willow	*Salix bebbiana*	*Salicaceae*	-3	4			S5
Calico Aster	*Symphyotrichum lateriflorum*	*Asteraceae*	0	3			S5
Common Milkweed	*Asclepias syriaca*	*Apocynaceae*	5	0			S5
Cylindrical Anemone	*Anemone virginiana var. cylindroidea*	*Ranunculaceae*	3	4			SU
Eastern White Cedar	*Thuja occidentalis*	*Cupressaceae*	-3	4			S5
European Buckthorn	*Rhamnus cathartica*	*Rhamnaceae*	0				SNA
Field Horsetail	*Equisetum arvense*	*Equisetaceae*	0	0			S5
Purple-stemmed Aster	*Symphyotrichum puniceum var. puniceum*	*Asteraceae*	-5	6			S5
Red Ash	*Fraxinus pennsylvanica*	*Oleaceae*	-3	3			S4
Red-osier Dogwood	*Cornus sericea*	*Cornaceae*	-3	2			S5
Riverbank Grape	*Vitis riparia*	*Vitaceae*	0	0			S5
Sensitive Fern	*Onoclea sensibilis*	*Dryopteridaceae*	-3	4			S5
Silky Dogwood	*Cornus obliqua*	*Cornaceae*	-3	2			S5
Swamp Red Currant	*Ribes triste*	*Grossulariaceae*	-5	6			S5
Tall Goldenrod	*Solidago altissima*	*Asteraceae*	3	1			S5
Trembling Aspen	*Populus tremuloides*	*Salicaceae*	0	2			S5
White Elm	*Ulmus americana*	*Ulmaceae*	-3	3			S5

NOTES: Dominated by Poplar. Thick shrub understory consisting of Willow and Dogwood. Soils indicate moist (5) moisture regime.

VEGETATION COMMUNITY CLASSIFICATION: SWDM4-5 COMMUNITY #: 15 LOCATION: Kawartha Downs COORDINATES: 44.2137743, -78.3939462

PROJECT NUMBER: 12579-001 DATE: August 13, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: SWM3-2 COMMUNITY #: 16 LOCATION: Kawartha Downs COORDINATES: 44.1475118, -78.3596133

PROJECT NUMBER: 12579-001 DATE: August 13, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Balsam Poplar	*Populus balsamifera*	*Salicaceae*	-3	4			S5
Bebb's Willow	*Salix bebbiana*	*Salicaceae*	-3	4			S5
Coltsfoot	*Tussilago farfara*	*Asteraceae*	3				SNA
Common Reed	*Phragmites australis*	*Poaceae*	-3	0			S4?
Cottony Willow	*Salix eriocephala*	*Salicaceae*	-3	4			S5
Eastern White Cedar	*Thuja occidentalis*	*Cupressaceae*	-3	4			S5
European Buckthorn	*Rhamnus cathartica*	*Rhamnaceae*	0				SNA
Grass-leaved Goldenrod	*Euthamia graminifolia*	*Asteraceae*	0	2			S5
Narrow-leaved Cattail	*Typha angustifolia*	*Typhaceae*	-5				SNA
Panicled Aster	*Symphyotrichum lanceolatum*	*Asteraceae*	-3	3			S5
Purple Loosestrife	*Lythrum salicaria*	*Lythraceae*	-5				SNA
Pussy Willow	*Salix discolor*	*Salicaceae*	-3	3			S5
Red Ash	*Fraxinus pennsylvanica*	*Oleaceae*	-3	3			S4
Red Clover	*Trifolium pratense*	*Fabaceae*	3				SNA
Red-osier Dogwood	*Cornus sericea*	*Cornaceae*	-3	2			S5
Riverbank Grape	*Vitis riparia*	*Vitaceae*	0	0			S5
Sensitive Fern	*Onoclea sensibilis*	*Dryopteridaceae*	-3	4			S5
Silver Maple	*Acer saccharinum*	*Aceraceae*	-3	5			S5
Tall Goldenrod	*Solidago altissima*	*Asteraceae*	3	1			S5
Trembling Aspen	*Populus tremuloides*	*Salicaceae*	0	2			S5
Virginia Creeper	*Parthenocissus quinquefolia*	*Vitaceae*	3	6			S4?
White Elm	*Ulmus americana*	*Ulmaceae*	-3	3			S5

NOTES: Mixed swamp. Dominant cover is trees, over 60% cover. Dominated by Poplar, Eastern White Cedar, and Ash.

VEGETATION COMMUNITY CLASSIFICATION: SWM3-2

COMMUNITY #: 16

LOCATION: Kawartha Downs

COORDINATES: 44.1475118, -78.3596133

PROJECT NUMBER: 12579-001

DATE: August 13, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: SWT2-2 COMMUNITY #: 17 LOCATION: Kawartha Downs COORDINATES: 44.2284256, -78.389733

PROJECT NUMBER: 12579-001 DATE: August 13, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Autumn Willow	*Salix serissima*	*Salicaceae*	-5	6			S5
Balsam Poplar	*Populus balsamifera*	*Salicaceae*	-3	4			S5
Bebb's Willow	*Salix bebbiana*	*Salicaceae*	-3	4			S5
Calico Aster	*Symphyotrichum lateriflorum var. lateriflorum*	*Asteraceae*	0	3			S5
Canada Bluegrass	*Poa compressa*	*Poaceae*	3				SNA
Common Scouring-rush	*Equisetum hyemale ssp. affine*	*Equisetaceae*	0	2			S5
Common Self-heal	*Prunella vulgaris ssp. vulgaris*	*Lamiaceae*	0				SNA
Cottony Willow	*Salix eriocephala*	*Salicaceae*	-3	4			S5
Crack Willow	*Salix euxina*	*Salicaceae*	0				SNA
Grass-leaved Goldenrod	*Euthamia graminifolia*	*Asteraceae*	0	2			S5
Red-osier Dogwood	*Cornus sericea*	*Cornaceae*	-3	2			S5
Spotted Joe Pye Weed	*Eutrochium maculatum var. maculatum*	*Asteraceae*	-5	3			S5
Tall Goldenrod	*Solidago altissima*	*Asteraceae*	3	1			S5
Trembling Aspen	*Populus tremuloides*	*Salicaceae*	0	2			S5
Wild Carrot	*Daucus carota*	*Apiaceae*	5				SNA

NOTES: Willow thicket swamp. Soils indicate moist (5) moisture regime. Area likely cleared for agricultural purposes and left to regrow.

VEGETATION COMMUNITY CLASSIFICATION: SWT2-2

COMMUNITY #: 17

LOCATION: Kawartha Downs

COORDINATES: 44.2284256, -78.389733

PROJECT NUMBER: 12579-001

DATE: August 13, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: SWT2-2 COMMUNITY #: 18 LOCATION: Kawartha Downs COORDINATES: 44.2191355, -78.4046628

PROJECT NUMBER: 12579-001 DATE: September 24, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Basswood	*Tilia americana*	*Tiliaceae*	3	4			S5
Bebb's Willow	*Salix bebbiana*	*Salicaceae*	-3	4			S5
Crack Willow	*Salix euxina*	*Salicaceae*	0				SNA
European Buckthorn	*Rhamnus cathartica*	*Rhamnaceae*	0				SNA
Grass-leaved Goldenrod	*Euthamia graminifolia*	*Asteraceae*	0	2			S5
Panicled Aster	*Symphyotrichum lanceolatum*	*Asteraceae*	-3	3			S5
Purple Loosestrife	*Lythrum salicaria*	*Lythraceae*	-5				SNA
Pussy Willow	*Salix discolor*	*Salicaceae*	-3	3			S5
Red Ash	*Fraxinus pennsylvanica*	*Oleaceae*	-3	3			S4
Red-osier Dogwood	*Cornus sericea*	*Cornaceae*	-3	2			S5
Reed Canarygrass	*Phalaris arundinacea var. arundinacea*	*Poaceae*	-3	0			S5
Riverbank Grape	*Vitis riparia*	*Vitaceae*	0	0			S5
Spotted Jewelweed	*Impatiens capensis*	*Balsaminaceae*	-3	4			S5
Trembling Aspen	*Populus tremuloides*	*Salicaceae*	0	2			S5

NOTES: Patch of thicket swamp at northwest corner of property. Very thick vegetation. Willows dominate.

VEGETATION COMMUNITY CLASSIFICATION: SWT2-2

COMMUNITY #: 18

LOCATION: Kawartha Downs

COORDINATES: 44.2191355, -78.4046628

PROJECT NUMBER: 12579-001

DATE: September 24, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: FODM11 COMMUNITY #: 19 LOCATION: Kawartha Downs COORDINATES: 44.2142672, -78.4044981

PROJECT NUMBER: 12579-001 DATE: September 24, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Balsam Poplar	*Populus balsamifera*	*Salicaceae*	-3	4			S5
Basswood	*Tilia americana*	*Tiliaceae*	3	4			S5
Common Lilac	*Syringa vulgaris*	*Oleaceae*	5				SNA
Common Milkweed	*Asclepias syriaca*	*Apocynaceae*	5	0			S5
Eastern White Cedar	*Thuja occidentalis*	*Cupressaceae*	-3	4			S5
European Buckthorn	*Rhamnus cathartica*	*Rhamnaceae*	0				SNA
European Swallowwort	*Vincetoxicum rossicum*	*Apocynaceae*	5				SNA
Grey Dogwood	*Cornus racemosa*	*Cornaceae*	0	2			S5
Manitoba Maple	*Acer negundo*	*Aceraceae*	0	0			S5
New England Aster	*Symphyotrichum novae-angliae*	*Asteraceae*	-3	2			S5
Riverbank Grape	*Vitis riparia*	*Vitaceae*	0	0			S5
Smooth Brome	*Bromus inermis*	*Poaceae*	5				SNA
Spotted Joe Pye Weed	*Eutrochium maculatum var. maculatum*	*Asteraceae*	-5	3			S5
Sugar Maple	*Acer saccharum*	*Aceraceae*	3	4			S5
Tall Goldenrod	*Solidago altissima*	*Asteraceae*	3	1			S5
Virginia Creeper	*Parthenocissus quinquefolia*	*Vitaceae*	3	6			S4?
White Elm	*Ulmus americana*	*Ulmaceae*	-3	3			S5

NOTES: Woody vegetation is patchy in some spots.

VEGETATION COMMUNITY CLASSIFICATION: FODM11

COMMUNITY #: 19

LOCATION: Kawartha Downs

COORDINATES: 44.2142672, -78.4044981

PROJECT NUMBER: 12579-001

DATE: September 24, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: MAS2-1 COMMUNITY #: 2 LOCATION: Kawartha Downs COORDINATES: 44.2125167, -78.4036315

PROJECT NUMBER: 12579-001 DATE: July 08, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
American Water-horehound	*Lycopus americanus*	*Lamiaceae*	-5	4			S5
Balsam Poplar	*Populus balsamifera*	*Salicaceae*	-3	4			S5
Bebb's Willow	*Salix bebbiana*	*Salicaceae*	-3	4			S5
Cottony Willow	*Salix eriocephala*	*Salicaceae*	-3	4			S5
Crack Willow	*Salix euxina*	*Salicaceae*	0				SNA
Grass-leaved Goldenrod	*Euthamia graminifolia*	*Asteraceae*	0	2			S5
Narrow-leaved Cattail	*Typha angustifolia*	*Typhaceae*	-5				SNA
Panicled Aster	*Symphyotrichum lanceolatum*	*Asteraceae*	-3	3			S5
Purple Loosestrife	*Lythrum salicaria*	*Lythraceae*	-5				SNA
Purple-stemmed Aster	*Symphyotrichum puniceum var. puniceum*	*Asteraceae*	-5	6			S5
Spotted Joe Pye Weed	*Eutrochium maculatum var. maculatum*	*Asteraceae*	-5	3			S5
Trembling Aspen	*Populus tremuloides*	*Salicaceae*	0	2			S5
White Willow	*Salix alba*	*Salicaceae*	-3				SNA

NOTES: Cattails dominate.

VEGETATION COMMUNITY CLASSIFICATION: MAS2-1

COMMUNITY #: 2

LOCATION: Kawartha Downs

COORDINATES: 44.2125167, -78.4036315

PROJECT NUMBER: 12579-001

DATE: July 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: MAS2-1 COMMUNITY #: 20 LOCATION: Kawartha Downs COORDINATES: 44.216466, -78.4007345

PROJECT NUMBER: 12579-001 DATE: September 24, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Broad-leaved Cattail	*Typha latifolia*	*Typhaceae*	-5	1			S5
Common Reed	*Phragmites australis ssp. australis*	*Poaceae*	-3				SNA
Narrow-leaved Cattail	*Typha angustifolia*	*Typhaceae*	-5				SNA

NOTES: Dominated by cattails. Access restricted due to dense vegetation and standing water.

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: SWT2-2 COMMUNITY #: 3 LOCATION: Kawartha Downs COORDINATES: 44.222246, -78.3950653

PROJECT NUMBER: 12579-001 DATE: July 08, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Bebb's Willow	*Salix bebbiana*	*Salicaceae*	-3	4			S5
Broad-leaved Cattail	*Typha latifolia*	*Typhaceae*	-5	1			S5
Common Boneset	*Eupatorium perfoliatum*	*Asteraceae*	-3	2			S5
Common Woolly Bulrush	*Scirpus cyperinus*	*Cyperaceae*	-5	4			S5
Cottony Willow	*Salix eriocephala*	*Salicaceae*	-3	4			S5
Crack Willow	*Salix euxina*	*Salicaceae*	0				SNA
Sedge species	*Carex spp.*	*Cyperaceae*	-	-			-
Grass-leaved Goldenrod	*Euthamia graminifolia*	*Asteraceae*	0	2			S5
Narrow-leaved Cattail	*Typha angustifolia*	*Typhaceae*	-5				SNA
Panicled Aster	*Symphyotrichum lanceolatum*	*Asteraceae*	-3	3			S5
Purple Loosestrife	*Lythrum salicaria*	*Lythraceae*	-5				SNA
Spotted Joe Pye Weed	*Eutrochium maculatum var. maculatum*	*Asteraceae*	-5	3			S5
Swamp Milkweed	*Asclepias incarnata ssp. incarnata*	*Apocynaceae*	-5	6			S5
Trembling Aspen	*Populus tremuloides*	*Salicaceae*	0	2			S5

NOTES: Shrub relative cover over 25% - sparse in some areas. Delineated based on dominance of wetland vegetation/presence of standing water (i.e. ponds)

VEGETATION COMMUNITY CLASSIFICATION: SWT2-2

COMMUNITY #: 3

LOCATION: Kawartha Downs

COORDINATES: 44.222246, -78.3950653

PROJECT NUMBER: 12579-001

DATE: July 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: SWM1-1 COMMUNITY #: 4 LOCATION: Kawartha Downs COORDINATES: 44.21499, -78.4023481

PROJECT NUMBER: 12579-001 DATE: July 08, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Alder-leaved Buckthorn	*Endotropis alnifolia*	*Rhamnaceae*	-5	7			S5
American Water-horehound	*Lycopus americanus*	*Lamiaceae*	-5	4			S5
Eastern White Cedar	*Thuja occidentalis*	*Cupressaceae*	-3	4			S5
European Swallowwort	*Vincetoxicum rossicum*	*Apocynaceae*	5				SNA
Grey Dogwood	*Cornus racemosa*	*Cornaceae*	0	2			S5
Nodding Beggarticks	*Bidens cernua*	*Asteraceae*	-5	2			S5
Northern Water-horehound	*Lycopus uniflorus*	*Lamiaceae*	-5	5			S5
Northern Water-plantain	*Alisma triviale*	*Alismataceae*	-5	1			S5
Paper Birch	*Betula papyrifera*	*Betulaceae*	3	2			S5
Purple Loosestrife	*Lythrum salicaria*	*Lythraceae*	-5				SNA
Red Ash	*Fraxinus pennsylvanica*	*Oleaceae*	-3	3			S4
Reed Canarygrass	*Phalaris arundinacea var. arundinacea*	*Poaceae*	-3	0			S5
Sensitive Fern	*Onoclea sensibilis*	*Dryopteridaceae*	-3	4			S5
Silver Maple	*Acer saccharinum*	*Aceraceae*	-3	5			S5
Spotted Joe Pye Weed	*Eutrochium maculatum var. maculatum*	*Asteraceae*	-5	3			S5
Stinging Nettle	*Urtica dioica*	*Urticaceae*	0	2			S5
Swamp Milkweed	*Asclepias incarnata ssp. incarnata*	*Apocynaceae*	-5	6			S5
Trembling Aspen	*Populus tremuloides*	*Salicaceae*	0	2			S5
White Elm	*Ulmus americana*	*Ulmaceae*	-3	3			S5

NOTES: Lots of pooling in community. Dominant cover is trees, over 60%. Dominated by Cedar. Silver maple in gaps.

VEGETATION COMMUNITY CLASSIFICATION: SWM1-1

COMMUNITY #: 4

LOCATION: Kawartha Downs

COORDINATES: 44.21499, -78.4023481

PROJECT NUMBER: 12579-001

DATE: July 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: SWT2-2 COMMUNITY #: 5 LOCATION: Kawartha Downs COORDINATES: 44.2239285, -78.3915105

PROJECT NUMBER: 12579-001 DATE: July 09, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Balsam Poplar	*Populus balsamifera*	*Salicaceae*	-3	4			S5
Bebb's Willow	*Salix bebbiana*	*Salicaceae*	-3	4			S5
Black-eyed Susan	*Rudbeckia hirta var. pulcherrima*	*Asteraceae*	3	0			S5
Canada Goldenrod	*Solidago canadensis var. canadensis*	*Asteraceae*	3	1			S5
Common Milkweed	*Asclepias syriaca*	*Apocynaceae*	5	0			S5
Common Woolly Bulrush	*Scirpus cyperinus*	*Cyperaceae*	-5	4			S5
Common Yarrow	*Achillea millefolium*	*Asteraceae*	3				SNA
Cottony Willow	*Salix eriocephala*	*Salicaceae*	-3	4			S5
Dwarf Raspberry	*Rubus pubescens*	*Rosaceae*	-3	4			S5
European Buckthorn	*Rhamnus cathartica*	*Rhamnaceae*	0				SNA
Grass-leaved Goldenrod	*Euthamia graminifolia*	*Asteraceae*	0	2			S5
Grey Dogwood	*Cornus racemosa*	*Cornaceae*	0	2			S5
Oxeye Daisy	*Leucanthemum vulgare*	*Asteraceae*	5				SNA
Purple Loosestrife	*Lythrum salicaria*	*Lythraceae*	-5				SNA
Pussy Willow	*Salix discolor*	*Salicaceae*	-3	3			S5
Red Ash	*Fraxinus pennsylvanica*	*Oleaceae*	-3	3			S4
Red-osier Dogwood	*Cornus sericea*	*Cornaceae*	-3	2			S5
Sensitive Fern	*Onoclea sensibilis*	*Dryopteridaceae*	-3	4			S5
Spotted Joe Pye Weed	*Eutrochium maculatum var. maculatum*	*Asteraceae*	-5	3			S5
Trembling Aspen	*Populus tremuloides*	*Salicaceae*	0	2			S5
Tufted Vetch	*Vicia cracca*	*Fabaceae*	5				SNA
White Elm	*Ulmus americana*	*Ulmaceae*	-3	3			S5
Wild Carrot	*Daucus carota*	*Apiaceae*	5				SNA
Yellow Avens	*Geum aleppicum*	*Rosaceae*	0	2			S5

NOTES: Wetland species dominate. Terrestrials found in the margins. Soils indicate wetland (moisture regime 5; moist).

VEGETATION COMMUNITY CLASSIFICATION: SWT2-2

COMMUNITY #: 5

LOCATION: Kawartha Downs

COORDINATES: 44.2239285, -78.3915105

PROJECT NUMBER: 12579-001

DATE: July 09, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: FOD7-2 COMMUNITY #: 6 LOCATION: Kawartha Downs COORDINATES: 44.216744, -78.3966872

PROJECT NUMBER: 12579-001 DATE: July 09, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
European Buckthorn	*Rhamnus cathartica*	*Rhamnaceae*	0				SNA
European Swallowwort	*Vincetoxicum rossicum*	*Apocynaceae*	5				SNA
Grey Dogwood	*Cornus racemosa*	*Cornaceae*	0	2			S5
Hemp Dogbane	*Apocynum cannabinum var. cannabinum*	*Apocynaceae*	0	3			S5
Red Ash	*Fraxinus pennsylvanica*	*Oleaceae*	-3	3			S4
Riverbank Grape	*Vitis riparia*	*Vitaceae*	0	0			S5
White Elm	*Ulmus americana*	*Ulmaceae*	-3	3			S5

NOTES: Young Ash forest on slope down to wetland.

VEGETATION COMMUNITY CLASSIFICATION: FOD7-2

COMMUNITY #: 6

LOCATION: Kawartha Downs

COORDINATES: 44.216744, -78.3966872

PROJECT NUMBER: 12579-001

DATE: July 09, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: CUM1 COMMUNITY #: 7 LOCATION: Kawartha Downs COORDINATES: 44.223636, -78.3915105

PROJECT NUMBER: 12579-001 DATE: July 09, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Black Medick	*Medicago lupulina*	*Fabaceae*	3				SNA
Canada Goldenrod	*Solidago canadensis var. canadensis*	*Asteraceae*	3	1			S5
Canada Thistle	*Cirsium arvense*	*Asteraceae*	3				SNA
Common Lamb's-quarters	*Chenopodium album*	*Chenopodiaceae*	3				SNA
Common Milkweed	*Asclepias syriaca*	*Apocynaceae*	5	0			S5
Common Ragweed	*Ambrosia artemisiifolia*	*Asteraceae*	3	0			S5
Deptford Pink	*Dianthus armeria ssp. armeria*	*Caryophyllaceae*	5				SNA
Early Buttercup	*Ranunculus fascicularis*	*Ranunculaceae*	3	9			S4
European Swallowwort	*Vincetoxicum rossicum*	*Apocynaceae*	5				SNA
Field Sow-thistle	*Sonchus arvensis*	*Asteraceae*	3				SNA
Grass-leaved Goldenrod	*Euthamia graminifolia*	*Asteraceae*	0	2			S5
Grey Dogwood	*Cornus racemosa*	*Cornaceae*	0	2			S5
Reed Canarygrass	*Phalaris arundinacea var. arundinacea*	*Poaceae*	-3	0			S5
Riverbank Grape	*Vitis riparia*	*Vitaceae*	0	0			S5
Smooth Brome	*Bromus inermis*	*Poaceae*	5				SNA
Spotted Joe Pye Weed	*Eutrochium maculatum var. maculatum*	*Asteraceae*	-5	3			S5
Sulphur Cinquefoil	*Potentilla recta*	*Rosaceae*	5				SNA
Tufted Vetch	*Vicia cracca*	*Fabaceae*	5				SNA
White Campion	*Silene latifolia*	*Caryophyllaceae*	5				SNA
Wild Carrot	*Daucus carota*	*Apiaceae*	5				SNA

NOTES: Cultural Meadow community in margins of agricultural field.

VEGETATION COMMUNITY CLASSIFICATION: CUM1 COMMUNITY #: 7 LOCATION: Kawartha Downs COORDINATES: 44.223636, -78.3915105

PROJECT NUMBER: 12579-001 DATE: July 09, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: MAS2-1

COMMUNITY #: 8

LOCATION: Kawartha Downs

COORDINATES: 44.2168756, -78.3927627

PROJECT NUMBER: 12579-001

DATE: July 09, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Bebb's Willow	*Salix bebbiana*	*Salicaceae*	-3	4			S5
Narrow-leaved Cattail	*Typha angustifolia*	*Typhaceae*	-5				SNA
Purple Loosestrife	*Lythrum salicaria*	*Lythraceae*	-5				SNA
Reed Canarygrass	*Phalaris arundinacea var. arundinacea*	*Poaceae*	-3	0			S5

NOTES: Marsh community on Moore Drive.

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: FOM4-2 COMMUNITY #: 9 LOCATION: Kawartha Downs COORDINATES: 44.2088104, -78.4007189

PROJECT NUMBER: 12579-001 DATE: July 14, 2021 PROJECT MANAGER: Matthew Wheeler FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

Common Name	Scientific Name	Family	CoW	CoC	SARA	SARO	S-Rank
Broad-leaved Helleborine	*Epipactis helleborine*	*Orchidaceae*	3				SNA
Eastern White Cedar	*Thuja occidentalis*	*Cupressaceae*	-3	4			S5
European Swallowwort	*Vincetoxicum rossicum*	*Apocynaceae*	5				SNA
Indian-pipe	*Monotropa uniflora*	*Monotropaceae*	3	6			S5
Red Ash	*Fraxinus pennsylvanica*	*Oleaceae*	-3	3			S4
Trembling Aspen	*Populus tremuloides*	*Salicaceae*	0	2			S5

NOTES: Dominant cover is trees, over 60% cover. Dominated by Cedar and Poplar.

VEGETATION COMMUNITY PHOTOS:

Appendix D
Bird Species List

VEGETATION COMMUNITY CLASSIFICATION: Marsh

LOCATION: Kawartha Downs

COORDINATES: 44.2168382, -78.3927653

POINT COUNT #: 1

PROJECT NUMBER: 12579-001

DATES: June 15, 2021 / June 24, 2021

PROJECT MANAGER: Matt Wheeler

FIELD STAFF: Ernie Silhanek, Keegan McKitterick

FIELD SHEET – Bird Species List

June 15, 2021

Common Name	Scientific Name	Family	SARA	SARO	S-Rank	Breeding Evidence
American Crow	*Corvus brachyrhynchos*	*Corvidae*			S5B	X
Common Grackle	*Quiscalus quiscula*	*Icteridae*			S5B	H
Common Yellowthroat	*Geothlypis trichas*	*Parulidae*			S5B	S
Great Blue Heron	*Ardea herodias*	*Ardeidae*			S4	X
Northern Cardinal	*Cardinalis cardinalis*	*Cardinalidae*			S5	S
Red-winged Blackbird	*Agelaius phoeniceus*	*Icteridae*			S4	P
Song Sparrow	*Melospiza melodia*	*Passerellidae*			S5B	S
Swamp Sparrow	*Melospiza georgiana*	*Passerellidae*			S5B	S
Willow Flycatcher	*Empidonax traillii*	*Tyrannidae*			S5B	S

June 24, 2021

Common Name	Scientific Name	Family	SARA	SARO	S-Rank	Breeding Evidence
American Robin	*Turdus migratorius*	*Turdidae*			S5B	X
Common Yellowthroat	*Geothlypis trichas*	*Parulidae*			S5B	T
Mourning Dove	*Zenaida macroura*	*Columbidae*			S5	P
Red-winged Blackbird	*Agelaius phoeniceus*	*Icteridae*			S4	D
Song Sparrow	*Melospiza melodia*	*Passerellidae*			S5B	T
Swamp Sparrow	*Melospiza georgiana*	*Passerellidae*			S5B	H
Willow Flycatcher	*Empidonax traillii*	*Tyrannidae*			S5B	H

VEGETATION COMMUNITY CLASSIFICATION: Marsh | LOCATION: Kawartha Downs | COORDINATES: 44.2168382, -78.3927653 | POINT COUNT #: 1

PROJECT NUMBER: 12579-001 | DATES: June 15, 2021 June 24, 2021 | PROJECT MANAGER: Matt Wheeler | FIELD STAFF: Ernie Silhanek Keegan McKitterick

FIELD SHEET – Bird Species List

X = Species observed in its breeding season (no breeding evidence)
H = Species observed in its breeding season in suitable nesting habitat
S= Singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat
P= Pair observed in their breeding season in suitable nesting habitat
T= Permanent territory presumed through registration of territorial song on at least 2 days, a week apart, at the same place
D= Courtship or display between a male and a female or 2 males, including courtship feeding or copulation
V= Visiting probable nest site
X = Species observed in its breeding season (no breeding evidence)
CF= Adult carrying food for young
NE= Nest containing eggs

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
DD= Distraction display or injury feigning
NU= Used nest or egg shell found (occupied or laid within the period of study)
FY= Recently fledged young or downy young, including young incapable to sustain flight
AE= Adults leaving or entering nest site in circumstances indicating occupied nest
FS= Adult carrying faecal sac
NY= Nest with young seen or heard

Shaded cells indicate probable or confirmed breeding by the species within the vegetation community.

NOTES: Willow Thicket SWT along roadside.

VEGETATION COMMUNITY CLASSIFICATION: Marsh

LOCATION: Kawartha Downs

COORDINATES: 44.2168382, -78.3927653

POINT COUNT #: 1

PROJECT NUMBER: 12579-001

DATES: June 15, 2021 / June 24, 2021

PROJECT MANAGER: Matt Wheeler

FIELD STAFF: Ernie Silhanek, Keegan McKitterick

FIELD SHEET – Bird Species List

VEGETATION COMMUNITY PHOTOS:

June 15, 2021

VEGETATION COMMUNITY CLASSIFICATION: Forest

LOCATION: Kawartha Downs

COORDINATES: 44.2101392, -78.4053737

POINT COUNT #: 2

PROJECT NUMBER: 12579-001

DATES: June 15, 2021 – June 24, 2021

PROJECT MANAGER: Matt Wheeler

FIELD STAFF: Ernie Silhanek, Keegan McKitterick

FIELD SHEET – Bird Species List

June 15, 2021

Common Name	Scientific Name	Family	SARA	SARO	S-Rank	Breeding Evidence
American Goldfinch	*Spinus tristis*	*Fringillidae*			S5B	X
American Robin	*Turdus migratorius*	*Turdidae*			S5B	H
Common Grackle	*Quiscalus quiscula*	*Icteridae*			S5B	H
Common Yellowthroat	*Geothlypis trichas*	*Parulidae*			S5B	S
Eastern Kingbird	*Tyrannus tyrannus*	*Tyrannidae*			S4B	P
Mourning Dove	*Zenaida macroura*	*Columbidae*			S5	X
Red-winged Blackbird	*Agelaius phoeniceus*	*Icteridae*			S4	H

June 24, 2021

Common Name	Scientific Name	Family	SARA	SARO	S-Rank	Breeding Evidence
American Robin	*Turdus migratorius*	*Turdidae*			S5B	X
Barn Swallow	*Hirundo rustica*	*Hirundinidae*	THR	THR	S5B	X
Common Grackle	*Quiscalus quiscula*	*Icteridae*			S5B	X
Common Yellowthroat	*Geothlypis trichas*	*Parulidae*			S5B	T
Red-winged Blackbird	*Agelaius phoeniceus*	*Icteridae*			S4	P

X = Species observed in its breeding season (no breeding evidence)
H = Species observed in its breeding season in suitable nesting habitat
S= Singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat
P= Pair observed in their breeding season in suitable nesting habitat
T= Permanent territory presumed through registration of territorial song on at least 2 days, a week apart, at the same place
D= Courtship or display between a male and a female or 2 males, including courtship feeding or copulation
V= Visiting probable nest site
X = Species observed in its breeding season (no breeding evidence)
CF= Adult carrying food for young
NE= Nest containing eggs

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
DD= Distraction display or injury feigning
NU= Used nest or egg shell found (occupied or laid within the period of study)
FY= Recently fledged young or downy young, including young incapable to sustain flight
AE= Adults leaving or entering nest site in circumstances indicating occupied nest
FS= Adult carrying faecal sac
NY= Nest with young seen or heard

Shaded cells indicate probable or confirmed breeding by the species within the vegetation community.

NOTES: Forest to the north, Willow Thicket to the south.

VEGETATION COMMUNITY CLASSIFICATION: Forest

LOCATION: Kawartha Downs

COORDINATES: 44.2101392, -78.4053737

POINT COUNT #: 2

PROJECT NUMBER: 12579-001

DATES: June 15, 2021 June 24, 2021

PROJECT MANAGER: Matt Wheeler

FIELD STAFF: Ernie Silhanek Keegan McKitterick

FIELD SHEET – Bird Species List

VEGETATION COMMUNITY PHOTOS:

Taken June 15, 2021

VEGETATION COMMUNITY CLASSIFICATION: Forest

LOCATION: Kawartha Downs

COORDINATES: 44.2369069, -78.3783565

POINT COUNT #: 3

PROJECT NUMBER: 12579-001

DATES: June 15, 2021 June 24, 2021

PROJECT MANAGER: Matt Wheeler

FIELD STAFF: Ernie Silhanek Keegan McKitterick

FIELD SHEET – Bird Species List

June 15, 2021

Common Name	Scientific Name	Family	SARA	SARO	S-Rank	Breeding Evidence
American Crow	*Corvus brachyrhynchos*	*Corvidae*			S5B	X
American Robin	*Turdus migratorius*	*Turdidae*			S5B	H
Black-capped Chickadee	*Poecile atricapillus*	*Paridae*			S5	H
Blue Jay	*Cyanocitta cristata*	*Corvidae*			S5	H
Common Grackle	*Quiscalus quiscula*	*Icteridae*			S5B	H
Red-winged Blackbird	*Agelaius phoeniceus*	*Icteridae*			S4	A
Song Sparrow	*Melospiza melodia*	*Passerellidae*			S5B	S

June 24, 2021

Common Name	Scientific Name	Family	SARA	SARO	S-Rank	Breeding Evidence
American Robin	*Turdus migratorius*	*Turdidae*			S5B	X
Baltimore Oriole	*Icterus galbula*	*Icteridae*			S4B	S
Red-winged Blackbird	*Agelaius phoeniceus*	*Icteridae*			S4	D
Song Sparrow	*Melospiza melodia*	*Passerellidae*			S5B	T

X = Species observed in its breeding season (no breeding evidence)
H = Species observed in its breeding season in suitable nesting habitat
S= Singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat
P= Pair observed in their breeding season in suitable nesting habitat
T= Permanent territory presumed through registration of territorial song on at least 2 days, a week apart, at the same place
D= Courtship or display between a male and a female or 2 males, including courtship feeding or copulation
V= Visiting probable nest site
X = Species observed in its breeding season (no breeding evidence)
CF= Adult carrying food for young
NE= Nest containing eggs

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
DD= Distraction display or injury feigning
NU= Used nest or egg shell found (occupied or laid within the period of study)
FY= Recently fledged young or downy young, including young incapable to sustain flight
AE= Adults leaving or entering nest site in circumstances indicating occupied nest
FS= Adult carrying faecal sac
NY= Nest with young seen or heard

Shaded cells indicate probable or confirmed breeding by the species within the vegetation community.

NOTES: Forest and soy crop.

VEGETATION COMMUNITY CLASSIFICATION: Forest

LOCATION: Kawartha Downs

COORDINATES: 44.2369069, -78.3783565

POINT COUNT #: 3

PROJECT NUMBER: 12579-001

DATES: June 15, 2021 – June 24, 2021

PROJECT MANAGER: Matt Wheeler

FIELD STAFF: Ernie Silhanek, Keegan McKitterick

FIELD SHEET – Bird Species List

VEGETATION COMMUNITY PHOTOS:

Taken June 15, 2021

VEGETATION COMMUNITY CLASSIFICATION: Swamp

LOCATION: Kawartha Downs

COORDINATES: 44.2095465, -78.400762

POINT COUNT #: 4

PROJECT NUMBER: 12579-001

DATES: June 15, 2021 June 24, 2021

PROJECT MANAGER: Matt Wheeler

FIELD STAFF: Ernie Silhanek, Keegan McKitterick

FIELD SHEET – Bird Species List

June 15, 2021

Common Name	Scientific Name	Family	SARA	SARO	S-Rank	Breeding Evidence
American Crow	*Corvus brachyrhynchos*	*Corvidae*			S5B	X
American Robin	*Turdus migratorius*	*Turdidae*			S5B	X
Common Yellowthroat	*Geothlypis trichas*	*Parulidae*			S5B	S
Great Blue Heron	*Ardea herodias*	*Ardeidae*			S4	X
Mourning Dove	*Zenaida macroura*	*Columbidae*			S5	X
Red-winged Blackbird	*Agelaius phoeniceus*	*Icteridae*			S4	P
Song Sparrow	*Melospiza melodia*	*Passerellidae*			S5B	S
Swamp Sparrow	*Melospiza georgiana*	*Passerellidae*			S5B	S

June 24, 2021

Common Name	Scientific Name	Family	SARA	SARO	S-Rank	Breeding Evidence
American Goldfinch	*Spinus tristis*	*Fringillidae*			S5B	X
Chestnut-sided Warbler	*Setophaga pensylvanica*	*Parulidae*			S5B	S
Common Yellowthroat	*Geothlypis trichas*	*Parulidae*			S5B	T
Great Blue Heron	*Ardea herodias*	*Ardeidae*			S4	H
Mourning Dove	*Zenaida macroura*	*Columbidae*			S5	X
Red-eyed Vireo	*Vireo olivaceus*	*Vireonidae*			S5B	S
Red-winged Blackbird	*Agelaius phoeniceus*	*Icteridae*			S4	D
Song Sparrow	*Melospiza melodia*	*Passerellidae*			S5B	T

VEGETATION COMMUNITY CLASSIFICATION:	Swamp	LOCATION:	Kawartha Downs	COORDINATES:	44.2095465, -78.400762	POINT COUNT #:	4
PROJECT NUMBER:	12579-001	DATES:	June 15, 2021 June 24, 2021	PROJECT MANAGER:	Matt Wheeler	FIELD STAFF:	Ernie Silhanek Keegan McKitterick

FIELD SHEET – Bird Species List

X = Species observed in its breeding season (no breeding evidence)
H = Species observed in its breeding season in suitable nesting habitat
S= Singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat
P= Pair observed in their breeding season in suitable nesting habitat
T= Permanent territory presumed through registration of territorial song on at least 2 days, a week apart, at the same place
D= Courtship or display between a male and a female or 2 males, including courtship feeding or copulation
V= Visiting probable nest site
X = Species observed in its breeding season (no breeding evidence)
CF= Adult carrying food for young
NE= Nest containing eggs

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
DD= Distraction display or injury feigning
NU= Used nest or egg shell found (occupied or laid within the period of study)
FY= Recently fledged young or downy young, including young incapable to sustain flight
AE= Adults leaving or entering nest site in circumstances indicating occupied nest
FS= Adult carrying faecal sac
NY= Nest with young seen or heard

Shaded cells indicate probable or confirmed breeding by the species within the vegetation community.

NOTES: Area near large ponds.

VEGETATION COMMUNITY CLASSIFICATION:	Swamp	LOCATION:	Kawartha Downs	COORDINATES:	44.2095465, -78.400762	POINT COUNT #:	4
PROJECT NUMBER:	12579-001	DATES:	June 15, 2021 June 24, 2021	PROJECT MANAGER:	Matt Wheeler	FIELD STAFF:	Ernie Silhanek Keegan McKitterick

FIELD SHEET – Bird Species List

VEGETATION COMMUNITY PHOTOS:

Taken June 15, 2021

VEGETATION COMMUNITY CLASSIFICATION: Forest | LOCATION: Kawartha Downs | COORDINATES: 44.2156464, -78.4009838 | POINT COUNT #: 5

PROJECT NUMBER: 12579-001 | DATES: June 15, 2021 June 24, 2021 | PROJECT MANAGER: Matt Wheeler | FIELD STAFF: Ernie Silhanek Keegan McKitterick

FIELD SHEET – Bird Species List

June 15, 2021

Common Name	Scientific Name	Family	SARA	SARO	S-Rank	Breeding Evidence
American Crow	*Corvus brachyrhynchos*	*Corvidae*			S5B	X
American Robin	*Turdus migratorius*	*Turdidae*			S5B	H
Black-capped Chickadee	*Poecile atricapillus*	*Paridae*			S5	H
Blue Jay	*Cyanocitta cristata*	*Corvidae*			S5	H
European Starling	*Sturnus vulgaris*	*Sturnidae*			SNA	H
Great Crested Flycatcher	*Myiarchus crinitus*	*Tyrannidae*			S4B	H

June 24, 2021

Common Name	Scientific Name	Family	SARA	SARO	S-Rank	Breeding Evidence
American Crow	*Corvus brachyrhynchos*	*Corvidae*			S5B	X
American Goldfinch	*Spinus tristis*	*Fringillidae*			S5B	X
American Robin	*Turdus migratorius*	*Turdidae*			S5B	P
Eastern Kingbird	*Tyrannus tyrannus*	*Tyrannidae*			S4B	H
Mourning Dove	*Zenaida macroura*	*Columbidae*			S5	X
Northern Flicker	*Colaptes auratus*	*Picidae*			S4B	S
Red-winged Blackbird	*Agelaius phoeniceus*	*Icteridae*			S4	X
Song Sparrow	*Melospiza melodia*	*Passerellidae*			S5B	S
Warbling Vireo	*Vireo gilvus*	*Vireonidae*			S5B	S
Yellow Warbler	*Setophaga petechia*	*Parulidae*			S5B	S

VEGETATION COMMUNITY CLASSIFICATION:	Forest	LOCATION:	Kawartha Downs	COORDINATES:	44.2156464, -78.4009838	POINT COUNT #:	5
PROJECT NUMBER:	12579-001	DATES:	June 15, 2021 June 24, 2021	PROJECT MANAGER:	Matt Wheeler	FIELD STAFF:	Ernie Silhanek Keegan McKitterick

FIELD SHEET – Bird Species List

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NU= Used nest or egg shell found (occupied or laid within the period of study)
FY= Recently fledged young or downy young, including young incapable to sustain flight
AE= Adults leaving or entering nest site in circumstances indicating occupied nest
FS= Adult carrying faecal sac
NY= Nest with young seen or heard

Shaded cells indicate probable or confirmed breeding by the species within the vegetation community.

NOTES: Forest, open area, and thicket; south end of the property.

VEGETATION COMMUNITY CLASSIFICATION: Forest

LOCATION: Kawartha Downs

COORDINATES: 44.2156464, -78.4009838

POINT COUNT #: 5

PROJECT NUMBER: 12579-001

DATES: June 15, 2021 / June 24, 2021

PROJECT MANAGER: Matt Wheeler

FIELD STAFF: Ernie Silhanek, Keegan McKitterick

FIELD SHEET – Bird Species List

VEGETATION COMMUNITY PHOTOS:

June 15, 2021

VEGETATION COMMUNITY CLASSIFICATION: Cultural Woodland | LOCATION: Kawartha Downs | COORDINATES: 44.2111992, -78.4071509 | POINT COUNT #: 6

PROJECT NUMBER: 12579-001 | DATES: June 15, 2021 June 24, 2021 | PROJECT MANAGER: Matt Wheeler | FIELD STAFF: Ernie Silhanek Keegan McKitterick

FIELD SHEET – Bird Species List

June 15, 2021

Common Name	Scientific Name	Family	SARA	SARO	S-Rank	Breeding Evidence
American Crow	*Corvus brachyrhynchos*	*Corvidae*			S5B	X
American Robin	*Turdus migratorius*	*Turdidae*			S5B	H
Blue Jay	*Cyanocitta cristata*	*Corvidae*			S5	H
Common Grackle	*Quiscalus quiscula*	*Icteridae*			S5B	H
European Starling	*Sturnus vulgaris*	*Sturnidae*			SNA	H
Northern Cardinal	*Cardinalis cardinalis*	*Cardinalidae*			S5	S
Red-eyed Vireo	*Vireo olivaceus*	*Vireonidae*			S5B	S

June 24, 2021

Common Name	Scientific Name	Family	SARA	SARO	S-Rank	Breeding Evidence
American Robin	*Turdus migratorius*	*Turdidae*			S5B	S
Chestnut-sided Warbler	*Setophaga pensylvanica*	*Parulidae*			S5B	S
Hairy Woodpecker	*Picoides villosus*	*Picidae*			S5	H
Northern Flicker	*Colaptes auratus*	*Picidae*			S4B	S
Red-eyed Vireo	*Vireo olivaceus*	*Vireonidae*			S5B	T
Red-winged Blackbird	*Agelaius phoeniceus*	*Icteridae*			S4	X
Song Sparrow	*Melospiza melodia*	*Passerellidae*			S5B	S

X = Species observed in its breeding season (no breeding evidence)
H = Species observed in its breeding season in suitable nesting habitat
S= Singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat
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NE= Nest containing eggs

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N= Nest-building or excavation of nest hole
DD= Distraction display or injury feigning
NU= Used nest or egg shell found (occupied or laid within the period of study)
FY= Recently fledged young or downy young, including young incapable to sustain flight
AE= Adults leaving or entering nest site in circumstances indicating occupied nest
FS= Adult carrying faecal sac
NY= Nest with young seen or heard

Shaded cells indicate probable or confirmed breeding by the species within the vegetation community.

VEGETATION COMMUNITY CLASSIFICATION:	Cultural Woodland	LOCATION:	Kawartha Downs	COORDINATES:	44.2111992, -78.4071509	POINT COUNT #:	6
PROJECT NUMBER:	12579-001	DATES:	June 15, 2021 June 24, 2021	PROJECT MANAGER:	Matt Wheeler	FIELD STAFF:	Ernie Silhanek Keegan McKitterick

FIELD SHEET – Bird Species List

NOTES:

VEGETATION COMMUNITY PHOTOS:

Taken June 15, 2021

Appendix E

Species of Conservation Concern Screening

APPENDIX: Species of Conservation Concern - County of Peterborough

COMMON NAME	SCIENTIFIC NAME	Federal	Provincial		SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
		SARA	SARO	S-RANK				
Birds								
Bald Eagle	*Haliaeetus leucocephalus*	No Status	SC	S2N,S4B	The Bald Eagle is a bird of prey with a white head, neck and tail, a massive bright yellow beak, powerful legs, and a wingspan of over 2 m. It nests in a variety of habitats and forest types, almost always near a major lake or river where they do most of their hunting. These nests are usually on islands in freshwater lakes or in large trees such as the pine and poplar. During the winter, they may also be found near open bodies of water that do not freeze (1).	No	Known to occur in the general area	No further consideration required
Bank Swallow	*Riparia riparia*	THR	THR	S4B	The Bank Swallow is a small songbird of around 12 cm long with a distinctive dark breast band, that flies with quick and erratic wingbeats (1). It nests in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. This can include banks of rivers and lakes, bluffs, active sand and gravel pits, road cuts and stockpiles of soils. However, they prefer sand-silt substrates for excavating their nest burrows. They often use large wetlands as communal nocturnal roosts post-breeding or during wintering periods (2).	Yes: on-site and adjacent lands	Confirmed absent through targeted surveys	No further consideration required
Barn Swallow	*Hirundo rustica*	THR	THR	S4B	The Barn Swallow is a mid-sized songbird with steel-blue backs and wings, glossy in males, and a line of white spots across its upper tail. It lives in a variety of open habitats for foraging, such as grassy fields, pastures, certain agricultural crops, shorelines, cottage areas, wetlands, or subarctic tundra (2). They prefer to nest within human made structures such as barns, bridges, and culverts. Barn Swallow nests are cup-shaped and made of mud, typically attached to horizontal beams or vertical walls underneath an overhang (1).	Yes: on-site and adjacent lands	Incidental observation on-site	Confirmed habitat for endangered or threatened species on-site
Black Tern	*Chlidonias niger*	No Status	SC	S3B	The Black Tern is a small waterbird with a forked tail, straight pointed bill, slender shape, and black head during breeding season. It builds floating nests in loose colonies in shallow marshes, with a preference for cattails. They breed primarily in the marshes along the edges of the Great Lakes, but may also use wetlands further north if suitable (1).	Yes: on-site	Confirmed absent through targeted surveys	No further consideration required
Bobolink	*Dolichonyx oryzivorus*	THR	THR	S4B	The Bobolink is a mid-sized songbird of tan colour with black stripes, except for males during summer breeding season who are black with a white back and yellow collar. It prefers tall, grassy meadows, hayfields and some croplands, and feeds (largely on insects) on the ground in dense grasses (1). It tends to nest in forage crops: hayfields and pastures dominated by species including clover, bluegrass, and broadleaf plants (2).	Yes: on-site and adjacent lands	Confirmed absent through targeted surveys	No further consideration required
Canada Warbler	*Cardellina canadensis*	THR	SC	S4B	The Canada Warbler is a small songbird with bright yellow underparts and bluish-grey back and tail (1). It can be found in a variety of forest types, but is most abundant in moist, mixed forests with a well-developed, dense shrub layer. Nests are usually located on or near the ground on mossy logs, and along stream banks (3).	Yes: on-site	Confirmed absent through targeted surveys	No further consideration required
Cerulean Warbler	*Setophaga cerulea*	END	THR	S3B	The Cerulean Warbler, a small songbird, is blue-green with white eyebrows and two prominent white wing bars (1). It requires relatively large tracts of mature deciduous forest (>100 ha), and nests in older, second-growth deciduous forests. During breeding season, it is found in relatively large tracts of mature deciduous forests that feature large, tall trees and an open understorey (4).	No	Known to occur in the general area	No further consideration required

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COMMON NAME	SCIENTIFIC NAME	Federal	Provincial		SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
		SARA	SARO	S-RANK				
Chimney Swift	*Chaetura pelagica*	THR	THR	S4B,S4N	The Chimney Swift is a small bird, between 12 and 14 cm, with a brown, cigar-shaped body, slender wings, and an erratic flight pattern. Prior to settlement, the Chimney Swift would mainly nest in cave walls and hollow trees. Now, it is found mostly near urban and suburban areas where the presence of chimneys or other manmade structures provide nesting and roosting habitat. They also tend to stay in habitat close to the water (1).	Yes: on-site	Confirmed absent through targeted surveys	No further consideration required
Common Nighthawk	*Chordeiles minor*	THR	SC	S4B	The Common Nighthawk is a medium-sized bird with long, pointed wings, a long tail with a notch, and and large eyes. Its plumage of dark brown with black and white specks blends with its roost site. It is typically found in open areas such as gravel beaches, rock outcrops and burned woodlands, that have little to no ground vegetation. This species can also be found in highly disturbed locations such as clear cuts, mine tailing areas, cultivated fields, urban parks, gravel roads, and orchards (1).	No	Known to occur in the general area	No further consideration required
Eastern Meadowlark	*Sturnella magna*	THR	THR	S4B	The Eastern Meadowlark is a medium-sized migratory songbird with a bright yellow throat and belly, a black V shape on its chest, and a pointed bill. It prefers pastures and hayfields, but is also found to breed in orchards, shrubby fields, human-use areas such as airports and roadsides, or other open areas. The Eastern Meadowlark can nest from early May to mid-August, in nests that are built on the ground and well-camouflaged with a roof woven from grasses (1).	Yes: on-site and adjacent lands	Confirmed habitat on-site through targeted surveys	Confirmed habitat for endangered or threatened species on-site
Eastern Whip-poor-will	*Antrostomus vociferus*	THR	THR	S4B	The Eastern Whip-poor-will is a medium-sized bird with mottled brown and grey feathers to blend in with its surroundings, a large flattened head, and small bill. They are usually found in areas with a mix of open and forested areas such as patchy forests with clearings, forests that are regenerating after major disturbances, savannahs, open woodlands or openings in more mature forests. Breeding habitat is dependent on forest structure rather than composition, although common tree associations are pine and oak, and it nests directly on the forest floor (2). The species prefers to nest in semi-open or patchy forests with clearings as it forages in open areas and uses forested areas for roosting (1).	No	Known to occur in the general area	No further consideration required
Eastern Wood-Pewee	*Contopus virens*	SC	SC	S4B	The Eastern Wood-pewee is a species of 'flycatcher', a bird that eats flying insects. It grows to approximately 15 cm, has greyish-olive upper parts and pale bars on its wings. This species lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It prefers intermediate-age forest stands with little understory vegetation (1). It typically creates nests on tree branches 2-12 m in height (2).	Yes: on-site	Confirmed absent through targeted surveys	No further consideration required
Evening Grosbeak	*Coccothraustes vespertinus*	No Status	SC	S4B	The Evening Grosbeak is a large songbird with a thick greenish bill. It is a social bird that is often found in flocks, particularly during the winter months. Their preferred habitat is thick coniferous forest. During their breeding season, they are generally found in open, mature mixed forests dominated by Firs, White Spruce, or Trembling Aspen (1).	No	Known to occur in the general area	No further consideration required

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COMMON NAME	SCIENTIFIC NAME	Federal	Provincial		SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
		SARA	SARO	S-RANK				
Golden Winged Warbler	*Vermivora chrysoptera*	THR	SC	S4B	The Golden-winged Warbler is a small songbird with distinctive yellow wing patches and patches behind their eyes. It inhabits early successional habitat of old fields and favour areas where trees are spread out or forest edges to use for perching, singing, and searching for food. They seem to prefer regeneration zones with young shrub growth, surrounded by mature forest, locations that have recently been disturbed, such as field edges, hydro or utility right-of-ways, or logged areas for their breeding sites; often frequenting clusters of herbaceous plants and low bushes (1).	Yes: on-site	Confirmed absent through targeted surveys	No further consideration required
Grasshopper Sparrow	*Ammodramus savannarum*	SC	SC	S4B	The Grasshopper Sparrow is a small songbird with a streaked back, a white stripe down the center of its crown, a flattish head, and a conical beak. It inhabits open grasslands and prairies with well-drained soil, preferring areas that are sparsely vegetated. It will also nest in hayfields and pastures, as well as alvars and occasionally grain crops such as barley (1).	Yes: on-site and adjacent lands	Confirmed absent through targeted surveys	No further consideration required
Least Bittern	*Ixobrychus exilis*	THR	THR	S4B	The Least Bittern is a small member of the heron family, reaching around 30 cm in length. It has brown and beige plumage with chestnut patches on its wings (1). The species nests in marshes (> 5 - 10 ha) and swamps dominated by emergent vegetation, preferably cattails, interspersed with patches of woody vegetation and open water. They require dense vegetation and open water with stable levels within 10 m for nesting, and access to clear, open water for foraging (4).	Yes: on-site and adjacent lands	Confirmed absent through targeted surveys	No further consideration required
Loggerhead Shrike	*Lanius ludovicianus*	END	END	S2B	The Loggerhead Shrike is a small bird with a black, hooked bill, grey crown, and white throat and chest. This species has specific habitat requirements that are dependent on active livestock grazing, or grassland areas that have naturally short grass cover (i.e. alvar communities). They also require spiny, multi-branched shrubs, or barbed fencing, to catch prey. They prefer grassland habitats that have sporadic occurrences of low trees and shrubs; particularly hawthorn species, which are used as part of their feeding behaviour (1).	No	Known to occur in the general area	No further consideration required
Olive-sided Flycatcher	*Contopus cooperi*	THR	SC	S4B	The Olive-sided Flycatcher is a medium-sized songbird with olive colouring, often seen perching on top of tall trees waiting to catch their prey. It prefers open areas along natural mature forest edges, forest edges near natural openings such as rivers or swamps, human-made openings, or burned forest openings with numbers of dead trees. Breeding habitat usually consists of coniferous or mixed forests adjacent to rivers or wetlands, in Ontario often nesting in White and Black Spruce, Jack Pine, and Balsam Fir (1).	No	Known to occur in the general area	No further consideration required
Red-headed Woodpecker	*Melanerpes erythrocephalus*	THR	SC	S4B	The Red-headed Woodpecker is a mid-sized bird, at around 20 cm long, with a vivid red head, neck and breast as well a strong bill. The species can be found in open woodland and woodland edges, often near man-made landscapes such as parks, golf courses and cemeteries. These areas must contain a large number of dead trees for perching and nesting (1).	No	Known to occur in the general area	No further consideration required

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COMMON NAME	SCIENTIFIC NAME	Federal	Provincial		SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
		SARA	SARO	S-RANK				
Short-eared owl	*Asio flammeus*	SC	SC	S2N,S4B	The Short-eared Owl has a large round head with small tufts of feathers, long wings, a short tail, and cryptic colouring of brown streaks. This species is found in scattered pockets across the province where suitable open habitat, including grasslands, tundra, peat bogs and marsh, can be found in sufficient quantities. Adults build nests on the ground in grassy areas and occasionally agriultural fields (1). The main factor influencing their choice in habitat is believed to be an abundance of their food source, primarily rodents and other small mammals (2).	No	Known to occur in the general area	No further consideration required
Wood Thrush	*Hylocichla mustelina*	THR	SC	S4B	The Wood Thrush is a medium-sized songbird of around 20 cm with rusty brown coloured upper parts and white underparts with large dark spots. It breeds in deciduous and mixed forests with moderate understories, shade and abundant leaf litter where it forages for food, including larval and adult insects as well as plant material. They prefer moist stands of trees with well-developed undergrowth and tall trees for perches (1).	Yes: on-site	Confirmed absent through targeted surveys	No further consideration required
Fish								
American Eel	*Anguilla rostrata*	No Status	END	S1?	The American Eel is a long, slender bodied fish, with one long fin extending down the back and around the tail, and two small pectoral fins. It has thick lips, and a protruding lower jaw that extends out above the upper jaw. At the juvenile stage, they swim up the St. Lawrence River to reach Lake Ontario and connected tributaries where they will remain for 8 to 23 years before migrating back to their spawning grounds. In Ontario, the American eel prefers mud, sand or gravel substrates during the juvenile stage when they reside primarily in the benthic zone of waterbodies. More mature eels are able to thrive in most environments provided there is available cover during daylight hours, and the habitat is accessible (2).	No	Known to occur in the general area	No further consideration required
Lake Sturgeon	*Acipenser fulvescens*	No Status	END	S2	The Lake Sturgeon, a large freshwater fish, has an extended snout with four whisker-like organs hanging near the mouth and is dark to light brown or grey on its back and sides with a lighter belly. In Ontario, this fish is found in the rivers of the Hudson Bay Basin, the Great Lakes basin, and their connecting waterways. Lake Sturgeon's live almost exclusively in freshwater lakes and rivers with soft bottoms of mud, sand or gravel and are usually found at depths of 5 to 20 m. They spawn in relatively shallow, fast-flowing water or if available deeper water habitat as well (1).	No	Known to occur in the general area	No further consideration required
Herptiles								
Blanding's Turtle	*Emydoidea blandingii*	THR	THR	S3	Blanding's Turtles are identifiable by their bright yellow throat and chin and domed shell. They spend the majority of their life cycle in the aquatic environment, usually in large wetlands or shallow lakes with high densities of water plants (1). These turtles prefer shallow, nutrient rich water with organic sediment and dense vegetation. They use terrestrial sites for travel between habitat patches and to lay clutches of eggs, often going hundreds of meters from their nearest water body. Blanding's Turtles nest in dry coniferous and mixed forest habitats, as well as fields and roadsides (2). From late October until the end of April, they hibernate in the mud at the bottom of permanent water bodies (1).	Yes: on-site and adjacent lands	Known to occur in the general area	Potential habitat for endangered or threatened species on-site

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COMMON NAME	SCIENTIFIC NAME	Federal	Provincial		SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
		SARA	SARO	S-RANK				
Eastern Musk Turtle	*Sternotherus odoratus*	SC	SC	S3	The Eastern Musk Turtle is small with a narrow carapace, a dark brown body and two light stripes on each side of their head (5). It is a small freshwater turtle found primarily in slow moving water bodies with abundant emergent vegetation and mucky bottoms along the southern edge of the Canadian Shield within which they burrow into overwinter. Nesting sites vary, but must be close to the water and exposed to direct sunlight (1).	No	Known to occur in the general area	No further consideration required
Midland Painted Turtle	*Chrysemys picta marginata*	SC	-	S4	The Midland Painted Turtle has a olive to black carapace with red or dark orange markings on the marginal scutes, as well as red and yellow stripes on the head and neck. The species uses a variety of waterbodies including, ponds, marshes, lakes and slow-moving creeks with a soft bottom and an abundance of basking sites and aquatic vegetation. This species usually hibernates on the bottom of waterbodies (5).	Yes: on-site and adjacent lands	Confirmed habitat on-site through targeted surveys	Potential significant wildlife habitat on-site
Northern Map Turtle	*Graptemys geographica*	SC	SC	S3	The Northern Map Turtle is a medium sized turtle identified by its carapace's map contour-like patterning. It lives in larger lakes and rivers, requiring high water quality to support their primary prey species: molluscs. This species can often be seen in large groups basking together on rocks and logs. In the winter, the Northern Map Turtle can be found hibernating on the bottom of slow-moving rivers (1).	No	Potential habitat on adjacent lands through targeted surveys	No further consideration required
Snapping Turtle	*Chelydra serpentina*	SC	SC	S3	The Snapping Turtle, with its large serrated carapace, small plastron, and spiked tail, is Canada's largest freshwater turtle (5). It spends the majority of its life in water, preferring shallow water with soft mud and leaf litter, and will travel upland to gravel or sandy embankments, roadsides, along railway lines or beaches to lay their eggs (1).	Yes: on-site and adjacent lands	Potential habitat on adjacent lands through targeted surveys	Potential significant wildlife habitat on-site
Spotted Turtle	*Clemmys guttata*	END	END	S2	The Spotted Turtle is named after the distinct yellow spots on its carapace. The species is semi-aquatic and prefers ponds, marshes, bogs and even ditches with slow-moving, unpolluted water and an abundant supply of aquatic vegetation. This species usually hibernates in wetlands or seasonally wet areas with structures such as overhanging banks, hummocks, tree roots, or aquatic animal burrows (1).	No	Known to occur in the general area	No further consideration required
Wood Turtle	*Glyptemys insculpta*	THR	END	S2	The Wood Turtle has orange coloured front legs, neck and chin and a sculpted carapace with raised, pyramidal scutes (5). They prefer clear rivers and streams that have moderate current, and sandy or gravelly substrates. This species spends more time on land than other turtle species including in meadows, swamps and fields. Wooded areas are an essential habitat component, and the species uses aquatic habitats for hibernation and mating. Nesting occurs in areas with sandy soil and abundant light (1).	No	Known to occur in the general area	No further consideration required
Eastern Hog-nosed Snake	*Heterodon platirhinos*	THR	THR	S3	The Eastern Hog-nosed Snake can be a variety of colours and patterns so is most easily identified by its flattened, upturned nose. They prefer sandy well-drained habitats such as beaches and dry forests because they lay their eggs, hibernate and burrow in these areas. The main diet of this snake is toads and frogs, so they usually stay close to water including marshes and swamps, where they have an increased chance of finding their preferred prey (1).	No	Known to occur in the general area	No further consideration required

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COMMON NAME	SCIENTIFIC NAME	Federal	Provincial		SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
		SARA	SARO	S-RANK				
Eastern Milksnake	*Lampropeltis triangulum*	SC	NAR	S4	The Eastern Milksnake's colouration is grey or tan with reddish alternating blotches otlines in black along its back and sides (5). It has recently been delisted from being a species at risk in Ontario (1). This species tends to use open habitats such as rocky outcrops, fields and forest edges. The preferred prey of milksnakes are mice, small rodents, and ground nesting birds which are amply found in and surrounding agricultural outbuildings. The milksnake is secretive and is not likely to be encountered during the day or at night while hunting (5).	No	Known to occur in the general area	No further consideration required
Eastern Ribbonsnake	*Thamnophis sauritus*	SC	SC	S4	The Eastern Ribbonsnake is slender with three bright yellow stripes running down its back and sides and a white crescent in front of each eye. This snake is usually found close to water as they are strong swimmers, often fleeing predators by diving into shallow water. It prefers wetland habitats where its prey species, frogs and small fish, are abundant. Over winter, they congregate in underground burrows or rock crevices to hibernate (1).	Yes: on-site and adjacent lands	Known to occur in the general area	Potential significant wildlife habitat on-site
Common Five-lined Skink (Southern Shield Population)	*Plestiodon fasciatus*	SC	SC	S3	The Common Five-lined Skink is Ontario's only lizard species. Its Southern Shield population can be found underneath rocks on open bedrock in forests and like to bask on sunny rocks and logs. They hibernate in crevices among rocks or buried in the soil (1). They hibernate in groups under rocks and tree stumps or in rotting wood (5).	No	Known to occur in the general area	No further consideration required
Western Chorus Frog	*Pseudacris triseriata*	THR	-	S3	The Western Chorus Frog is small with a dark stripe running through its eye and a light stripe underneath (5). It is primarily a lowland terrestrial species that requires access to terrestrial and aquatic habitats in close proximity to one another. Relying on marshes and wooded wetlands adjacent to forested habitats, this species also requires isolated, predator free pools for breeding. Temporary pools, such as vernal pools in wooded areas, are preferred. This species hibernates terrestrially in a variety of environments, including leaf litter, wood debris, and vacant animal burrows (2).	Yes: on-site and adjacent lands	Confirmed absent through targeted surveys	No further consideration required
Invertebrates								
Monarch Butterfly	*Danaus plexippus*	SC	SC	S2N,S4B	The Monarch is an orange and black butterfly with small white spots and a wingspan of around 10 cm. It relies on milkweed plants as a food source for growing caterpillars, but the adult butterflies forage in diverse habitats for nectar from wildflowers (1).	Yes: on-site and adjacent lands	Known to occur in the general area	Potential significant wildlife habitat on-site
Mottled Duskywing	*Erynnis martialis*	No Status	END	S2	The mottled duskywing is a medium-sized butterfly in the skipper family with a wingspan of 25-42 mm. It is dark grey with yellow-brown spots on its hind wings that give the species its mottled appearance and its name. The wings of freshly emerged adults have a purplish iridescence that fades with age. The mottled duskywing tends to live in dry habitats with sparse vegetation. These include open barrens, sandy patches among woodlands, and alvars. In Ontario, the mottled duskywing will only deposit their eggs on two closely-related plants: New Jersey tea and prairie redroot (1).	No	Known to occur in the general area	No further consideration required
West Virginia White	*Pieris virginiensis*	No Status	SC	S3	The West Viginia White is a small, dingy white butterfly. This species is found in moist deciduous woods, and requires a supply of toothwort, a small, spring-blooming plant, which provides the only source of food for its larvae. The West Virginia White is found mostly in the central and southern parts of Ontario, but its range extends north to Manitoulin and St. Joseph islands (1).	No	Known to occur in the general area	No further consideration required

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COMMON NAME	SCIENTIFIC NAME	Federal	Provincial		SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
		SARA	SARO	S-RANK				
Yellow-banded Bumble Bee	*Bombus terricola*	SC	SC	S3S5	The Yellow-banded Bumble Bee is a medium-sized bumble bee with a distinct yellow and black abdominal band pattern found on its queens, males, and workers. This species is a forage and habitat generalist, able to use a variety of nectaring plants and environmental conditions. It can be found in mixed woodlands, particularly for nesting and overwintering, as well as a variety of open habitat such as native grasslands, farmlands and urban areas. The Yellow-banded Bumble Bee ranges from the Mixedwood Plains of southern Ontario to the Hudson Bay Lowlands in the north (1).	Yes: on-site and adjacent lands	Known to occur in the general area	Potential significant wildlife habitat on-site
Mammals								
Tri-colored Bat	*Perimyotis subflavus*	END	END	S3?	The Tri-colored Bat is small, with pale brown with orange-red forearms, muzzle, and ears. It is named for the black, yellow, and brown hairs on its back. It is considered rare in this region of Ontario which is at the northernmost limit of the natural range. These bats prefer to nest in foliage, tree cavities and woodpecker holes, but are occasionally found in buildings; though this is not their preferred habitat. Winter hibernation takes place in caves, mines and deep crevices. Tri-colored Bats prefer an open forest habitat type in proximity to water (6).	Yes: on-site	Known to occur in the general area	Potential habitat for endangered or threatened species on-site
Eastern Small-footed Myotis	*Myotis leibii*	No Status	END	S2S3	The Eastern Small-footed Myotis has fur with black roots and shiny brown tips as well as very small feet. In the spring and summer, the Eastern Small-footed Myotis 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. They change their roosting locations daily and hunt at night for insects. They hibernate in winter, often in caves and abandoned mines choosing colder and drier sites than other similar bats (1).	Yes: on-site	Known to occur in the general area	Potential habitat for endangered or threatened species on-site
Little Brown Myotis	*Myotis lucifugus*	END	END	S4	The Little Brown Myotis has glossy brown fur and a fleshy projection covering the entrance to its ears. This species roosts in trees and buildings, often selecting attics, abandoned buildings and barns for summer colonies where they can raise their young. Little Brown Bats hibernate from October/November to March/April, most often in caves or abandoned mines that are humid and remain above freezing (1).	Yes: on-site	Known to occur in the general area	Potential habitat for endangered or threatened species on-site
Northern Myotis	*Myotis septentrionalis*	END	END	S3	The Northern Myotis has dull yellow-brown fur with pale bellies and long, rounded ears. This species is found in boreal forests, roosting under loose bark and in the cavities of trees. These bats hibernate from October/November to March/April, most often in caves or abandoned mines (1).	No	Known to occur in the general area	No further consideration required
Algonquin Wolf	*Canis lycaon*	SC	THR	S4	Formerly called the Eastern Wolf, this canine was recently renamed the Algonquin Wolf. In the southern portion of the province, this species prefers deciduous and mixed forest landscapes while their northern range include mixed and coniferous forests. It is most prevalent in areas with abundant prey species which include Beaver, White-tailed Deer and Moose. Dens sites are usually found in coniferous forests with easily excavated soil types like sand and close to a permanent water source (1).	No	Known to occur in the general area	No further consideration required
Trees, plants, fungi and lichens								

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COMMON NAME	SCIENTIFIC NAME	Federal	Provincial		SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
		SARA	SARO	S-RANK				
American Ginseng	*Panax quinquefolius*	END	END	S2	American Ginseng is a perennial plant which grows up to 60 centimetres in height. The leaves typically have five leaflets arranged in a whorl at the end of the leaf stem. The root looks like a gnarly parsnip. The flowers are an inconspicuous green-white in colour, but the berries are bright red and arranged in a cluster. In Ontario, the American Ginseng typically grows in rich, moist, and mature deciduous woods dominated by Sugar Maple, White Ash, and American Basswood. It typically grows in deep, nutrient rich soil over limestone or marble bedrock (1).	No	Known to occur in the general area	No further consideration required
Butternut	*Juglans cinerea*	END	END	S2?	The Butternut is a medium sized tree reaching 30 m in height. It has large compound leaves with 11 to 17 leaflets. The fruit is oval, fuzzy and sticky. In Ontario, the Butternut prefers moist, well-drained soil, often along streams, or occasionally well-drained gravel sites. It grows alone or in small groups in deciduous forests (1).	Yes: on-site and adjacent lands	Confirmed absent through targeted surveys	No further consideration required
Pale-bellied Frost Lichen	*Physconia subpallida*	END	END	S3	The Pale-bellied Frost Lichen resembles a light dusting of frost on a dark tree trunk. This species is found throughout eastern North America, growing in wooded areas rich in hardwood species, such as White Ash, Hop Hornbeam (Ironwood), Black Walnut, and American Elm. It is also common to find this species growing on fenceposts or boulders within or near these wooded areas. In Ontario, this species has been found in the following counties: Frontenac, Haliburton, Hastings, Peterborough, Lanark and Renfrew (1).	No	Known to occur in the general area	No further consideration required

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Appendix F
Curriculum Vitae

ANDREA HICKS, M.Sc. *Project Manager / Senior Biologist*

Andrea Hicks holds a Master of Science degree from Trent University in Watershed Ecosystems and a Bachelor of Science in Environmental Science from McGill University. She has 13 years of experience in the aquatic sciences and watershed management field, working with consulting, non-profit organizations, research institutes, and Conservation Authorities. Her focus has been within rural and agricultural landscapes, including lakes, rivers, and streams, wetlands, and woodlands. Ms. Hicks has managed over 120 biological and species at risk (SAR) projects within terrestrial, wetland, and aquatic ecosystems and has coordinated over 100 stream and wetland restoration projects for private landowners and municipalities. She has also completed in-stream habitat inventories, channel morphology, water quality, and lake monitoring (bathymetry, fish, invertebrates, aquatic plants). Under the Clean Water Act, 2006, Ms. Hicks is a certified Risk Management Official and is an expert at Source Protection Plan policy and implementation. At Cambium, Ms. Hicks is responsible for ecological assessments, environmental impact studies, natural heritage evaluations, SAR assessments, and Source Water Protection projects.

SUMMARY OF PROFESSIONAL EXPERIENCE

2014 - Present — Project Manager, Project Coordinator (2014-2016). Cambium Inc.
Peterborough, Ontario, Canada.

Ms. Hicks manages and conducts Cambium's ecological inventories and assessments, natural heritage evaluations, species at risk assessments, and aquatic biomonitoring programs. Ms. Hicks is responsible for project management in the form of Client contact and communication, initial budget set-up, regular budget analysis, project scheduling, invoicing, and evaluation of the status of project deliverables. Ms. Hicks' duties include proposal and report writing including data compilation, determination of significance, permitting and regulatory requirements, and senior review of final reports. Ms. Hicks also manages Source Water Protection projects for multiple Ontario municipalities including fulfilling risk management requirements, development reviews, and education/outreach initiatives.

2013 - 2014 — Source Protection Program Coordinator. Lower Trent Conservation Authority
Wooler, Ontario, Canada.

Managed the Drinking Water Source Protection Program for the Trent Conservation Coalition, the largest region in the province that encompasses five Conservation Authorities. The program is responsible for delivering the requirements of the Clean Water Act, 2006. Ms. Hicks was responsible for administering the 27-member Source Protection Committee, coordinating the regional work plan and budget, and working with Ministry of the Environment, Source Protection Authorities, and municipalities on program delivery.

2010 - 2014 — Conservation and Stewardship Consultant. Self Employed.
Peterborough, Ontario, Canada.

Provided on-site and administrative services to conservation organizations and committees. Projects included administration of on-line mapping resources for the Oak Ridges Moraine Foundation, guidance on naturalized shorelines and aquatic habitats for the Environment Council for Clear, Stoney, and White Lakes, and co-authoring a report on invasive species threats to Lake Simcoe for the Institute for Watershed Science, Trent University.

2009 - 2013 — Program Coordinator. Community Stream Steward Program, Ontario Federation of Anglers and Hunters.
Peterborough, Ontario, Canada.

Managed all aspects of a conservation-based, non-profit environmental program focused on supporting, advising, and training private landowners and community groups to undertake stream stewardship efforts. Implemented 50-65 stream and wetland conservation projects annually (over 120 total), from initial site visits, design, budgeting, volunteer coordination, and on-the-ground work. Projects included riparian plantings, bank stabilization, and agricultural projects.

2009 Crew Leader – Mill Creek Restoration Project. Grand River Conservation Authority. Cambridge, Ontario, Canada

Coordinated the construction of in-stream restoration techniques along reaches of Mill Creek to improve cold water fish habitat; included log jam removal, installing deflectors, in-filling, shoreline re-seeding and replanting. Worked to ensure community involvement through collaboration with organizations and landowners. Trained and supervised a field crew of four youths, aged 17.

2008-2009 Coordinator – Aquatic Plant Study. Kawartha Lake Stewards Association.
Buckhorn, Ontario, Canada.

Coordinated a research study that investigated the direct and indirect effects of small-scale aquatic plant removal in the littoral zone of lakes, Kawartha Region, Ontario.

2005-2006 Fisheries Technician. Canadian Rivers Institute - University of New Brunswick.
Saint John, New Brunswick, Canada.

Conducted field and laboratory work for a fish toxicology research laboratory: fish sampling via electrofishing, minnow traps, beach seining, and gill netting; littoral and profundal invertebrate collection and identification; fish dissection.

EDUCATION & TRAINING

Education

2008 Master of Science: Watershed Ecosystems Graduate Program. Trent University
Peterborough, Ontario, Canada.

2004 Bachelor of Science: Environmental Science. McGill University
Montreal, Quebec, Canada.

Training

2017 Project Management Basics, Online Training Course, ECO Canada

2016 Risk Management Official/Inspector Training and Certification: MOE

Property Entry Training: MOE

2015 Backpack Electrofishing Certification – Class 2 (Crew Leader): Cambium Inc.

2014 Ecological Land Classification Training and Certification, Southern Ontario: OMNR
Ontario Wetland Evaluation System Training and Certification: OMNR
Reptile and Amphibian Field Survey Training Course: OMNR and Ontario Nature
WHMIS, Cambium Inc., Peterborough, Ontario, Canada

2012 Canadian Firearms Safety Course, Firearms Possession and Acquisition License: Ontario Federation of Anglers and Hunters, Royal Canadian Mounted Police

2011 Water Resources and Wetland Restoration Training: OMNR
Ontario Benthic Biomonitoring Network Certification: MOE
Ontario Hunter Education Course: Ontario Federation of Anglers and Hunters

2010 Royal Ontario Museum Fish Identification Training: Royal Ontario Museum
Ontario Stream Assessment Protocol Training and Certification: OMNR

2008 Ontario Pleasure Craft Operators Card

ASSOCIATIONS & COMMITTEES

- Canadian Society of Environmental Biologists, Member: 2017-2019
- Fleming/Trent Ecological Restoration Program Advisory Committee, Member: 2013-2018
- Environment Council for Clear, Ston(e)y and White Lakes, Adviser: 2012-2018
- Kawarthas, Naturally Connected, Environmental Stewardship Committee, Member: 2015-2017
- Harper Park Stewardship Committee, Member: 2013-2015
- Ecology Park Steering Committee, Peterborough Green-Up: 2010-2012

PUBLICATIONS

Hicks, Andrea L. and Paul C. Frost. 2011. Shifts in aquatic macrophyte abundance and community composition in cottage developed lakes of the Canadian Shield. Aquatic Botany, 94 (1): 9-16.

Eric Sager and Andrea Hicks. 2010. Aquatic and terrestrial species in the Lake Simcoe watershed: presence, distribution, and vulnerability to future invasions. Lake Simcoe Climate Change Vulnerability Assessment.

Aquatic Plants Guide: Aquatic plants in the Kawartha Lakes – their growth, importance, and management. 2009. A publication by the Kawartha Lake Stewards Association. Lakefield, Ontario.

LANGUAGES

English; French (Intermediate)

SELECTED PROJECT EXPERIENCE

ENVIRONMENTAL IMPACT STUDY FOR CLOSED WASTE DISPOSAL SITE – TOWN OF HUNTSVILLE

Completed vegetation inventory, community classification, and wildlife surveys to evaluate the sensitivity of vegetation and habitat directly adjacent to a closed waste disposal site. Field work included confirming wetland boundaries, verification of provincially significant wetland types and extent, breeding bird surveys (both early morning and night time surveys for species at risk birds), bat maternity roost habitat surveys, and turtle basking surveys. The results of the study were used to evaluate the suitability of remediation options for the site in order to balance the needs of mitigating impacts with protecting adjacent natural ecosystems.

BIOLOGICAL REPORT PEER REVIEW – ENGAGE ENGINEERING

Conducted thorough review of Site Evaluation Reports and Environmental Impact Studies submitted to the Township of Dysart et al. in support of development applications under the Planning Act. Reports were reviewed with respect to County of Haliburton Official Plan, Municipality of Dysart et al. Official Plan, Provincial Policy Statement, 2014, Endangered Species Act, 2007, Fisheries Act, 1985, and Migratory Birds Convention Act, 1994. Provided comments with respect to completeness of reports, adherence to provincial field sampling protocols, natural heritage policy conformity, due diligence for species at risk regulatory compliance, and sufficiency of recommended avoidance/mitigation/compensation measures. Engaged in collaborative discussions with authors of the reports to reach agreement on suitable measures to be used to ensure the proposed development provided necessary protection and enhancement of the natural environment.

ONTARIO MUNICIPAL BOARD HEARING NATURAL HERITAGE EXPERT – G & L GROUP

Cambium provided expert testimony at an Ontario Municipal Board (OMB) hearing in 2017 with respect to a proposed expansion of a commercial operation within a Hamlet on the Oak Ridges Moraine. Three (3) Cambium staff were qualified as expert witnesses in the fields of natural heritage, hydrogeology, and noise and dust, respectively. Ms. Hicks was qualified as the natural heritage expert. In preparation for the hearing, Ms. Hicks conducted a review of the Natural Heritage Evaluation completed by a former employee of Cambium, conducted a site investigation to observe current conditions and natural heritage features, reviewed historical reports to determine site alteration timelines at the Site, and updated the recommendations of the Natural Heritage Evaluation with additional measures to address the Site Plan requirements of the Site. During the OMB hearing, Ms. Hicks was sworn in as an expert witness, provided a summary of the Natural Heritage Evaluation, confirmed that her expert opinion agreed with the findings of the evaluation, and addressed questions regarding historical alterations to the natural heritage features of the Site during cross-examination. The OMB ruled in favor of the proposed expansion in its decision rendered February 4, 2019.

ENVIRONMENTAL IMPACT STUDY – LOVESICK LAKE RESORT EXPANSION

Managed all aspects of a comprehensive Environmental Impact Study for a proposed resort expansion that required Official Plan and Zoning By-Law Amendments. Background review and agency consultation was completed to scope the policy and site-specific biological field investigations for the Site. The field components included confirming the boundaries of a evaluated wetland, documenting vegetation communities, completing a vascular plant list, conducting breeding bird surveys, conducting whip-poor-will surveys, and identifying butternut trees. The study confirmed the presence of several protected natural heritage features including evaluated wetland, significant woodland, significant wildlife habitat for deer wintering and wood thrush (special concern bird), and protected individuals and habitat for butternut trees (endangered). The study provided avoidance measures in the form of development setback, mitigation measures to reduce impacts through site planning and operations, and compensation measures to enhance the natural features.

BASELINE NATURAL HERITAGE STUDY – PRIVATE PROPERTY, TOWNSHIP OF ADDINGTON HIGHLANDS

Managed the financial and ecological components of a baseline study for a 300-acre private property in the Township of Addington Highlands, including Client communication, invoicing, coordinating field work, and conducing ecological field visits. The baseline study included vegetation, wildlife, surface water, groundwater, and dust fall monitoring. The field investigations included over 300 hours of on-the-ground time for a team of biologists, hydrogeologists, and environmental professionals. For the ecological baseline, desk-top imagery interpretation provided vegetation communities which were field verified through a vascular plant inventory and wildlife habitat areas were delineated based on species-specific requirements. Species at risk surveys for bat maternity roost habitat and whip-poor-will nesting were completed following provincial protocols. Aquatic habitat characterization was completed through benthic invertebrate and fish community sampling, with support from flow and water level loggers. A comprehensive report detailing the findings of the investigation and delineating sensitive natural heritage features was delivered to the Client for use in site development planning.

TYLER JAMIESON, M.Sc. *Ecological/Biological Technologist*

SUMMARY OF PROFESSIONAL EXPERIENCE

2016 - Present Ecological/Biological Technologist. Cambium Inc.
Peterborough, Ontario, Canada

Performed vegetation community and wildlife habitat assessments, and assisted in the preparation of Environmental Impact Studies and Compliance Monitoring Reports. Completed species at risk habitat investigations and assessments. Collected surface and ground water samples for the purpose of monitoring impacts to water quality from waste disposal sites. Prepared annual monitoring reports, and literary reviews for a variety of projects. Performed a variety of tasks to assist with the completion of Source Water Protection projects. Tasks included field investigations, community outreach activities, utilizing GIS software (ArcGIS) to aggregate client data, and developing and managing a client database.

2013 - 2015 Teaching Assistant. Trent University
Peterborough, Ontario, Canada

Assisted professors with the teaching responsibilities. Helped coordinate field trips, and seminars for up to forty undergraduate students. Responsible for marking assignments, and handling student inquiries. Subjects included wetland ecology and restoration ecology.

2013 - 2013 Researcher. Trent University
Peterborough, Ontario, Canada

Gained employment through the Bank of Montreal Green Leaders Undergraduate Research Award Program. Planned and coordinated research during the summer of 2013. Gained experience working in a lab, using UV-visible absorption and excitation-emission matrix fluorescence spectroscopies. Performed complex data analysis, and gained experience using statistics software. Produced a manuscript that was submitted and accepted for publication in a peer-reviewed scientific journal.

2011 - 2012 Field Technician. Alderville Black Oak Savanna and Tallgrass Prairie
Alderville, Ontario, Canada

Responsible for site maintenance, planting, invasive species removal, trail maintenance at a black oak savanna and tallgrass prairie site in a First Nations community. Designed a monitoring program to assess the results of restoration activities at the site. Assisted in the development of restoration plans, projects, and research. Worked with volunteers, and attended numerous public outreach events. Gained familiarity with native tallgrass ecosystems and a range of other habitats throughout Northumberland County.

EDUCATION & TRAINING

Education

2017 Masters of Environmental and Life Sciences (M.Sc.). Trent University
Peterborough, Ontario, Canada

2013 Bachelor of Science (Honours) in Ecological Restoration. Trent University
Peterborough, Ontario, Canada

2011	Ecological Restoration Diploma. Fleming College Lindsay, Ontario, Canada

Training

Emergency First Aid – CPR Level A

Ontario Wetland Evaluation System Certification

Ontario Benthos Biomonitoring Network Participant Certification

Workshop: Revegetation of Drastically Disturbed Sites, with David Polster

Workshop: Indigenous Land Use-and-occupancy Mapping, with Terry Tobias

PUBLICATIONS

Jamieson T, Watmoug SA, Eimers MC, 2018. Increase in woody debris nutrient pools in streams channels following selection harvesting in a northern hardwood forest. *Forest Ecology and Management* 409: 8-18.

Jamieson T, Sager E, Guéguen C, 2014. Characterization of biochar-derived dissolved organic matter using UV-visible absorption and excitation-emission matrix fluorescence spectroscopies. *Chemosphere* 103: 197-204.

PRESENTATIONS

Canadian Land Reclamation Association Annual Conference, 2013: Characterization of biochar-derived dissolved organic matter using UV-visible absorption and excitation-emission matrix fluorescence spectroscopies (Poster).

Haliburton Forest and Wildlife Reserve's Research Day Conference, 2013: Leachate characterization and metal binding affinities of three types of biochar.

SELECTED EXPERIENCE

BASELINE NATURAL HERITAGE STUDY, UNION GLORY GOLD LIMITED – ADDINGTON, ON

Characterized vegetation communities, completed benthic invertebrate surveys, wetland delineations, and Species at Risk screenings as part of a baseline ecological study for a potential gold mining operation in Addington, Ontario.

AQUATIC BIOMONITORING STUDY, PASTWAY PLANING LIMITED – COMBERMERE, ON

Planned and completed a benthic invertebrate study to assess potential ecological impacts to surface waters surrounding a pressure treated wood manufacturing plant.

LINDSAY OPS WETLAND STUDY, CITY OF KAWARTHA LAKES – LINDSAY, ON

Completed vegetation surveys, sediment sampling, benthic invertebrate sampling, and fisheries assessments to assess potential impacts from a wastewater treatment plant.

NASSAU GUARD GATE REPLACEMENT – PETERBOROUGH, ONTARIO, CANADA

Responsible for the ecological monitoring component of Cambium's Environmental Monitoring Program during the construction of the gate replacement. Responsible for conduction bird nest sweeps, fish salvages, tree inventories, surface water sampling, tree protection plan development, wildlife exclusion planning, and environmental monitoring plan development. This work was completed for Parks Canada in association with R.W. Tomlinson Construction Ltd.

WASTE DISPOSAL SITE ENVIRONMENTAL MONITORING – VARIOUS LOCATIONS, ONTARIO

Cambium is responsible for solid waste disposal site environmental monitoring, compliance, annual reporting, permitting, and approvals for over forty-eight (48) sites for numerous small to medium-sized municipal and private clients in central, eastern, and northern Ontario.

As a Field Technician, Mr. Jamieson's responsibilities included coordination with client and laboratories, collection of groundwater samples, surface water samples, data pertaining to surface water discharge volumes at sites for the purpose of monitoring impacts to water quality from waste disposal sites.

ENVIRONMENTAL IMPACT STUDY

Mr. Jamieson has completed numerous field monitoring and assessment programs for diverse habitats in support of environmental impact studies and natural heritage evaluations. Tyler has completed studies in sensitive development areas with complex planning issues and is familiar with the application of relevant legislation and policies in Ontario as they relate to development in the vicinity of natural heritage features. The scope of field work for these projects have included wetland assessments, fish habitat assessments, bird nest sweeps, and whip-poor-will, turtle and breeding bird surveys, to name just a few.

MYLES LATTER, Hons. B.A., Dipl., Can-CISEC *Project Coordinator*

SKILLS OVERVIEW

Mr. Latter holds a Bachelor of Arts degree in Biology from Trent University as well as a Diploma in Ecosystem Management from Sir Sandford Fleming College. Mr. Latter is also accredited with the Canadian Certified Inspector of Sediment and Erosion Control designation. Mr. Latter has extensive experience with the Port Hope Area Initiative working on the Small Scale Sites/Property Radiological Surveys and at the Long Term Waste Management Facility including RVSOP projects over the past four years. In addition to working in Port Hope, Mr. Latter has completed Phase I and II Environmental Site Assessments and has provided environmental monitoring on numerous large-scale construction sites such as the Trent-Severn Waterway infrastructure rehabilitation projects. Mr. Latter is adept at soil and water sampling and laboratory submission protocols, obtains a valid NRCan Level 1 X-Ray Fluorescence Operator Certificate, current CNL Group 3 and 4 training, and contains thorough knowledge of provincial environmental regulations.

SUMMARY OF PROFESSIONAL EXPERIENCE

2018 - Present

Project Coordinator. Cambium Inc.

Peterborough, Ontario, Canada

Mr. Latter coordinates and conducts environmental monitoring programs associated with large-scale construction projects. A majority of these projects include the Trent-Severn Waterway and Rideau Canal dam and bridge rehabilitation projects. He is responsible for developing Environmental Management Plans, Site Specific Turbidity Relationship Analysis Reports, and construction monitoring programs such as high risk, or in-water water quality monitoring. Mr. Latter has also been involved and provides support to the Port Hope Area Initiative's (PHAI) Long Term Waste Management Facility (LTWMF) Environmental Monitoring and the Remediation Verification Standard Operating Procedure (RVSOP) program. Mr. Latter is responsible for proposal submissions, project management, scheduling, invoicing, report writing and review, data compilation, interpretation, and evaluation of project deliverables.

2017 - 2018

Technologist. Cambium Inc.

Peterborough, Ontario, Canada

Mr. Latter performed a variety of tasks including field sampling activities such as groundwater, surface water, air, dust, soil and sediment sampling, noise audits, erosion and sediment control inspections and biological surveys. Mr. Latter was responsible for completing RVSOP at the PHAI LTWMF as well as providing environmental and ecological monitoring. Environmental and ecological monitoring includes air, dust, and noise monitoring, erosion and sediment control inspections, bird nest sweeps, and wildlife removal services.

2016 - 2017

Laboratory Coordinator/Field Technician. Arcadis Canada

Port Hope, Ontario, Canada

Mr. Latter conducted radiation surveys in residential and commercial areas including exterior, interior and subsurface surveys as part of the Small Scale Sites/Property Radiological Surveys program. He also supervised drilling crews to collect soil core samples for further laboratory analysis. Mr. Latter managed a soil laboratory with dedicated staff, analyzed all soil samples taken in the field, including XRF analysis, and was responsible for coordinating the shipment and procurement of soil samples to third party laboratories.

EDUCATION

2016	Advanced Diploma, Ecosystem Management Technology. Fleming College Lindsay, Ontario, Canada
2015	Certificate, Environmental Field Skills. Fleming College Lindsay, Ontario, Canada
2013	Honours Bachelor of Arts, Biology & Philosophy. Trent University Peterborough, Ontario, Canada

CERTIFICATES & TRAINING

2019	Ontario Ministry Transportation RAQS Certified Environmental Inspection During Construction Canadian Certified Inspector of Sediment and Erosion Control Working at Heights Certification Asbestos Awareness Training
2018	Class 2 Backpack Electrofishing Crew Leader Certification Standard First Aid Level C, CPR/AED Group 3 & 4 Radiation Protection Training - RadSafe
2017	NRCan Level 1 X-Ray Fluorescence Operator Certificate WHMIS 1988 & 2015 Supervisor Health and Safety Awareness in 5 Steps Pleasure Craft Operators Card
2016	Ontario Benthos Biomonitoring Certificate
2015	Ontario Hunter Education Program Canadian Firearms Safety Course

SELECTED EXPERIENCE

PORT HOPE AREA INITIATIVE

PORT HOPE AREA INITIATIVE LONG TERM WASTE MANAGEMENT FACILITY – REMEDIATION VERIFICATION STANDARD OPERATING PROCEDURE

Cambium was retained to provide environmental services to the contractor for the construction of the LTWMF. Mr. Latter was responsible for completing the RVSOP sampling requirements, including soil grab-samples and XRF analysis, to determine sample selection for laboratory analysis to ensure compliance with the PHAI Cleanup Criteria.

PORT HOPE AREA INITIATIVE LONG TERM WASTE MANAGEMENT FACILITY – ENVIRONMENTAL SERVICES

Cambium was retained to create and ensure adherence to an Environmental Management Plan, Dust Management Plan, and Erosion and Sediment Control Plan (ESCP) for the project site. Mr. Latter assisted in the creation of the ESCP and completed monitoring tasks such as continuous dust monitoring, erosion and sediment control inspections, noise monitoring of equipment, and wildlife sweeps and removals.

PORT HOPE AREA INITIATIVE – SMALL SCALE SITES/PROPERTY RADIOLOGICAL SURVEYS

Mr. Latter was involved in all aspects of the radiological surveys as part of the Small Scale Sites/Property Radiological Surveys. This included interior and exterior surveys, subsurface investigation, and radon monitoring. Mr. Latter was the laboratory coordinator, responsible for overseeing the soil analysis, sample selection, XRF analysis, sample storage, and data compilation of all soil cores collected.

CONTAMINATED SITE REMEDIATION

REMEDIATION OF GROUNDWATER IMPACTED WITH CHLORINATED SOLVENTS

Located at a former electronics manufacturing facility, the project involved groundwater remediation with identified volatile organic compounds (VOCs) impacts migrating to a down gradient waterbody. The remediation program involves a groundwater pump and treat system to intercept impacted groundwater. Mr. Latter has performed routine maintenance on this system, including monthly system sampling and quarterly groundwater sampling.

PHASE I AND II ESA AND RECORD OF SITE CONDITION

Cambium was retained to complete a Phase I and II ESA in accordance with O. Reg. 153/04 to assess a property for potential environmental concerns resulting from previous land use. Mr. Latter was responsible for supervising drill staff to drill and install monitoring wells, collecting groundwater samples, and compiling data received from laboratory results.

ENVIRONMENTAL CONSTRUCTION MONITORING

PETERBOROUGH EARTH DAMS REHABILITATION

Create, employ and follow the Environmental Monitoring Plan including sampling and monitoring for weekly inspections and high-risk events such as dewatering, cofferdam installation, or concrete pours in and/or near the water. This work was completed for Parks Canada in association with Coco Paving Group. The environmental components of the project include conducting turbidity and pH monitoring, electrofishing and fish removal, erosion and sediment control inspections, tree surveys and inventories, bird nest sweeps and surface water sampling.

SITES G & I REHABILITATION

Create, employ and follow the Environmental Monitoring Plan including sampling and monitoring for weekly inspections and high-risk events such as dewatering or tremie concrete pours in or near the water. This work was completed for Parks Canada in association with Louis W. Bray Construction Ltd. The environmental components of the project include creating a contaminated sediment sampling protocol, conducting turbidity and pH monitoring, electrofishing and fish removal, erosion and sediment control inspections, tree surveys and inventories, bird nest sweeps and surface water.

NASSAU GUARD GATE REPLACEMENT

Create and employ an Environmental Monitoring Plan including sampling and monitoring for weekly inspections and high-risk events such as dewatering or tremie concrete pours in or near the water. Create and assess a Site Specific Turbidity Relationship Analysis Report to further understand turbidity and settling times at this specific site. This work was completed for Parks Canada in association with R.W. Tomlinson Construction Ltd. The environmental components of the project include conducting turbidity and pH monitoring, electrofishing and fish removal, erosion and sediment control inspections, tree surveys and inventories, bird nest sweeps and surface water sampling.

ERNIE SILHANEK, Dipl. F&W Tech *Sr. Ecologist /Sr. Project Coordinator*

Mr. Silhanek is a terrestrial and wetland biologist with over 35 years' experience and expertise in ecosystems, resources management, Species at Risk (SAR), regulations and legislative knowledge, and provincial policies related to the environmental field. He is a certified wetland evaluator under the Ontario Wetland Evaluation System for Southern Ontario (OWES) and has extensive experience in conducting vegetation inventories using the Southern Ontario Ecological Land Classification (ELC) system and Forest Ecosystem Classification (FEC) system. Mr. Silhanek has extensive experience conducting biological inventories and has been a professional avian biologist for over 10 years. His identification skills include flora and fauna of Ontario: vegetation, lichens, fungi, birds, mammals, herptiles, fish, and terrestrial and aquatic invertebrates. He specializes in wildlife habitat enhancement techniques, native ecosystem restoration, and trail design and maintenance.

SUMMARY OF PROFESSIONAL EXPERIENCE

2018 - Present	Senior Ecologist/Sr. Project Coordinator. Cambium Inc. Peterborough, Ontario, Canada *Responsible for the coordination and implementation of projects related to environmental assessments, natural heritage assessments, environmental impact studies, and species at risk assessments. This also includes the responsibilities of project coordination in the form of initial budget set-up, regular budget analysis, project scheduling, invoicing, and evaluation of the status of project deliverables. His duties also include proposal and report writing including data compilation, interpretation and review of final reports.*
2012 - 2018	Terrestrial and Wetland Biologist. Niblett Environmental Associates Inc. Lindsay, Ontario, Canada *Responsible for conducting biological inventories, SAR assessments, and providing guidance/advice to clientele on wildlife habitat enhancement, restoration and rehabilitation techniques using Best Management Practices, maintaining natural, rare and critical habitats that comply with By-laws and regulatory policies. His duties also included report writing including data analysis and compilation.*
2000 - 2012	Professor & Technologist. Sir Sandford Fleming College Lindsay, Ontario, Canada *Responsible for development and implementation of curriculum relating to terrestrial and wetland ecosystems and other foundational courses. This included all administration and budgetary planning, as well as coordination of field camps/trips, lectures and labs.*
1996- 2012	Owner & Operator. Nature Trails Unlimited Bobcaygeon, Ontario, Canada *Responsible for all operations and management of the business including providing land stewardship and ecological planning services, silvicultural advice, environmental education and specialized in trail design and construction for a variety of clients and sectors.*
1989-1995	Conservation & Land Management Coordinator & Assistant Field Superintendent. Kawartha Region Conservation Authority. Lindsay, Ontario, Canada

Responsible for coordination of land stewardship programming, field development, operations and maintenance of conservation areas and/or Authority managed lands as well as the enforcement of regulations of the Conservation Authority Act.

1981-1986 Hatchery Technician & Hatchery Manager. Aberfoyle Fisheries
Aberfoyle, Ontario, Canada
Responsible for the maintenance, production and overall supervision of the aquaculture operations.

1997-1987 Resource Technician. Ministry of Natural Resources (Maple District Office)
Maple, Ontario, Canada
Responsible for the evaluation of wetlands, photo interpretation, field investigations, landowner consultations and report production.

EDUCATION & TRAINING

2019	Butternut Health Assessor Certification – Ministry of Environment, Conservation and Parks
2019	Wilderness & Remote First Aid & CPR/AED Level C Certification – Canadian Red Cross
2018	Supervisor Responsibility & Due Diligence Certificate, Workplace Safety and Prevention Services
	Accessibility for Ontarians with Disabilities Act (AODA) including Ontario Human Rights Code as it relates to people with disabilities.
	B.O.A.T 2018 WHMIS 2015 – GHS - current
2015	Standard First Aid/CPR;
2011	Received Certification: Invasive Species Awareness workshop (OFAH)
2008	Received EP designation (Environmental Professional) Ecological Land Classification (ELC) Certification – current
2006	Geographical Positioning Systems (GPS) Certification - current
2003	Natural Resource Stewards Volunteer Recognition Award, MNR
1998	Ontario Heritage Foundation's Heritage Community Recognition Program Award for Kawartha Settlers Village volunteer work.
1994	Wetlands Evaluation Certification for Southern and Northern Ontario
1993	Provincial Offences Officer Designation (Section 28 & 29 of Conservation Authority Act)
	Cutter/Skidder Certification Course. Ministry of Labour
1980	Fish and Wildlife Technician. Sir Sandford Fleming College Lindsay, Ontario, Canada

SELECTED PROJECT EXPERIENCE

ENVIRONMENTAL IMPACT STUDIES/NATURAL HERITAGE STUDIES

Mr. Silhanek has excellent skills and practical experience conducting biological inventories including identification of flora and fauna of Ontario (specializing in Lichens), SAR, fungi, birds, mammals, herptiles, fish, terrestrial and aquatic invertebrates, wildlife habitat enhancement techniques and restoration. He has conducted over 200 environmental reports consisting of SAR screening reports, Environmental Impact Studies, Natural Heritage Evaluations and Natural Environment Level 1 & 2 Technical Reports (relating to aggregate sector) and completed over 250 biophysical inventories. All biological inventories followed the policies and procedures of the Southern Ontario Ecological Land Classification system (ELC) and Forest Ecosystem Classification system (FEC). He has provided guidance/advice to clientele on wildlife habitat enhancement, restoration and rehabilitation techniques using Best Management Practices, maintaining natural, rare and critical habitats and invasive species management in order to comply with federal, provincial and municipal laws, by-laws and policies. Some of his recent projects include:

- *Golden Pond Retirement Residence; Scoped EIS; Brighton, Ontario, Oct. 2018*
- *British Empire Fuels; EIS; Bobcaygeon, Ontario; Oct. 2018*

SPECIES AT RISK

Mr. Silhanek has completed SAR screening reports and has a solid understanding of the biology of the listed species and applied protocols that currently exist in determining the presence of SAR species and their habitat. SAR assessments are completed in accordance with standardized Ministry of Natural Resources and Forestry (MNRF) survey protocols in compliance with the Species at Risk Act (SARA) and Endangered Species Act (ESA). He has generated and presented data on the various online forms related to SAR including Information Gathering Form (IGF), Avoidance Alternative Form (AAF) and the Overall Benefits Form (C-PAF) as per OMNRF guidelines. Recent projects include:

- *IDA Subdivision, Bobolink Development and Monitoring Plan, Ongoing*
- *City of Toronto, Species at Risk Assessment – West Humber Trail Sewer Re-lining, Nov. 2018*

WETLAND & FISHERIES

As a certified wetland evaluator under the OWES, Mr. Silhanek extensive experience in conducting vegetation inventories using the Southern Ontario Ecological Land Classification (ELC) system and Forest Ecosystem Classification (FEC) system. He has evaluated and delineated wetland boundaries, conducted field investigations and photo interpretation as well as conducted consultations with clients and generated reports of findings.

Mr. Silhanek also has experience with implementing aquaculture operations, parasitological and behavioural studies. He has been responsible for the maintenance, production and overall supervision of an aquaculture operation, including fisheries management principles and fish husbandry. Recent projects include:

- *Sevenpifer, Natural Heritage Assessment/Wetland Delineation; Oct. 2018.*
- *Donald; Scoped EIS/Wetland Delineation; Nov. 2018*

INSTITUTION PROGRAM DELIVERY

As a former College Professor, Mr. Silhanek has exceptional knowledge of applicable pieces of legislation, including but not limited to the following Acts and Regulations: Fish and Wildlife Conservation, Fisheries, Migratory Birds Convention, Ontario Species at Risk, Endangered Species, Lakes and Rivers Improvement, Crown Forest Sustainability, Conservation Authorities and Environmental Protection. He has taught a variety of courses relating to Trees and Shrubs of Ontario, Ecological Land Classification (ELC), Forest Ecosystem Classification (FEC), Terrestrial Ecosystems and other foundational courses.

MATTHEW WHEELER, *Project Manager / Senior Ecologist*

B.A. Geography, Post Graduate Certificate Ecosystem Restoration

Mr. Wheeler has 15 years of experience delivering environmental services including project management, Environmental Assessments (EA), permits/approvals/authorizations, environmental impact statements (EIS), biological inventories, species at risk (SAR) assessments, wildlife surveys, pit and quarry rehabilitation, and mine reclamation. He has extensive experience completing the Class EA process for Provincial Transportation Facilities and for railway corridors. He has worked with private, municipal, and federal clients in a variety of sectors. He has authored four (4) Best Management Practice (BMP) guides for Industry. He has obtained permits/approvals/authorizations for species at risk (SAR), and applied innovative approaches to SAR conservation. Matthew is familiar with leading client relations, public consultation programs, and agency collaboration. He seeks to provide "buildable and biddable" solutions that allow clients to engage in activities that comply with municipal, provincial and federal legislation.

SUMMARY OF PROFESSIONAL EXPERIENCE

2020 - Present — Senior Ecologist / Project Manager. Cambium Inc.

Kingston, Ontario, Canada

Mr. Wheeler coordinates and conducts terrestrial biomonitoring programs, Ecological Land Classification, Ontario Wetland Evaluation System habitat delineation, species at risk surveys, and environmental impacts studies. He is responsible for project management, client relations, regulatory compliance, technical reporting and agency consultation.

2011 - 2020 — Senior Ecologist /Practice Area Lead. McIntosh Perry Consulting Engineers

Kingston, Ontario, Canada

Mr. Wheeler provided natural heritage services throughout Ontario for private, municipal, provincial and federal clients. He has participated in and led natural heritage evaluations, applied biological research, species at risk assessments, terrestrial and aquatic ecosystem classification, Class Environmental Assessments, ecological restoration, planting plans, mine reclamation design, environmental impact statements, road ecology design and monitoring, public consultation, permits/approvals, tender assembly, contract administration, and construction monitoring. Mr. Wheeler's is responsible for delivering project management services including proposal writing, field and office scheduling of staff, sub-consultant management, client relations, budget tracking, invoicing, schedule adherence, and quality control of technical deliverables and public consultation materials. He led the development of best management practice documents for industry. His work using conservation dogs to detect nests of species at risk turtles along roadways secured McIntosh Perry a Creative Solutions Award from the Consulting Engineers of Ontario. Assisted in the procurement and management of environmental retainers for provincial agencies.

2008 - 2010 — Restoration Technologist. The Ontario Aggregate Resources Corporation

Kingston, Ontario, Canada

Collaborated with landowners, agencies, contractors, and colleagues to rehabilitate over 60 aggregate properties (pits/quarries) across Ontario. Designed, installed, and monitored ecological restoration projects at former aggregate sites to establish functional habitat for common, rare and species at risk plants and wildlife. Engaged Universities to conduct applied research and progress aggregate rehabilitation techniques using native plants and animals.

PROFESSIONAL ASSOCIATIONS

- Field Botanists of Ontario

EDUCATION & TRAINING

- Valid Ontario Driver's Licence (GM)
- 2018 (Renewal) Class 2 Backpack Electrofishing Certification
- 2014 Project Management Training PSMJ
- 2013-2014 Sedge and Grass Identification Workshops, New York Flora Association
- 2013 Grass Identification Workshop, Royal Botanical Gardens
- 2012 Ontario Wetland Evaluation System Evaluator
- 2011 MTO/DFO/OMNR Fisheries Protocol Training Session
- 2011 Wetland Plant Taxonomy and Identification, University of Guelph
- 2010 Ecological Land Classification System
- 2009 Certified Ontario Seed Collector, Forest Gene Conservation Association/MNR
- 2008 Natural Heritage Data Sensitivity Training, Ministry of Natural Resources
- 2007 Fungi Cultivation and Mycorestoration with Paul Stamets
- 2006 Soil Bioengineering with Woody Plants with Dave Polster

PUBLICATIONS

Beneficial Practices for Compliance with the Migratory Birds Convention Act and Regulations. Transportation Association of Canada (2019) Pages 1-172

Operational Guidance for Migratory Birds and Vegetation Management for Existing Transportation Facilities and Infrastructure , Transportation Association of Canada (2019) Pages 1-48

Operational Guidance for Migratory Bird Nests under Bridges and in Culverts, Transportation Association of Canada (2019) Pages 1-44

Using Detection Dogs to Monitor Aquatic Ecosystem Health and Protect Aquatic Resources. (2018) Palgrave MacMillian Publishing. Pages 303-317

Conservation Dogs to Detect Blandings Turtle Nest prior to Road Rehabilitation Activities. Transportation Research Board (2017). Pages 1-10

Best Management Practices for Vegetation Management for Conservation of Species at Risk and their Habitat. Ministry of Natural Resources (2015). Pages 1-127.

Molecular Identification and Culture of Fungi Native to Heavy Metal Contaminated Kam Kotia Mine Site (2016) Proceedings of the Canadian Land Reclamation Association Annual Conference.

SELECTED EXPERIENCE

GENERAL PROJECT MANAGEMENT

Mr. Wheeler has more than a decade of experience providing project management services for a wide range of projects including mining, aggregates, private development, linear infrastructure, municipal assets, federal properties, and indigenous communities. He has completed project management training from PSMJ to streamline project delivery, track financial performance, achieve regulatory conformance and most importantly, ensure client satisfaction. By delivering over 150 projects for private, municipal, provincial and federal clients, Mr. Wheeler has gained project management experience to improve client satisfaction and generate high-value outcomes. He has provided services to municipalities, Parks Canada, Ministry of Transportation of Ontario (MTO), Ministry of Northern

Mines and Development (MNDM), Metrolinx, Ministry of Natural Resources and Forestry, private developers, private landowners, construction firms, engineering and architectural firms, and academic institutions. He seeks to deliver cost-effective solutions to complex real-world challenges, achieve compliance with regulatory standards and legislation, provide exceptional client relations, maintain schedules through the project lifecycle, and ensure work is completed on time and on budget.

ROADS AND RAILWAYS– VARIOUS LOCATIONS ONTARIO

Mr. Wheeler has over a decade of experience servicing provincial clients in Ontario in support of road and rail networks. Through the delivery of over 125 projects, he has led the *Class Environmental Assessment* process, the Transit Project Assessment Process (TPAP), field studies, data management, public consultation, technical reporting, permits/approvals/exemptions, sub-consultant management, contract document assembly, stakeholder engagement, construction monitoring, post-construction monitoring, and client relations. Mr. Wheeler has designed and led field studies for aquatic and terrestrial ecosystems. He is familiar with ensuring proposed activities are carried out in compliance with the *Endangered Species Act, Species at Risk Act, Fisheries Act, Migratory Birds Convention Act*, *Fish and Wildlife Conservation Act*, Environmental Standards and Practices, and other legislative instruments. He has extensive experience with bridge and culvert work, paving operations, utilities, creation of new infrastructure, tree removals, vegetation management, and drainage improvements/maintenance. He has developed, installed and monitored native plantings to benefit pollinators along a rail corridor in the Greater Toronto Area. He has developed comprehensive large scale compensation plans across multiple jurisdictions to offset impacts created by infrastructure improvements while ensuring no loss of natural capital (i.e. the intrinsic and economic valuation of natural assets including soil, water, biodiversity, etc.) through compensation via applied ecological restoration.

SPECIES AT RISK INVENTORY, ASSESSMENT, MITIGATION AND AUTHORIZATIONS/PERMITS

Mr. Wheeler has 13 of experience working with Species at Risk (SAR) vascular plants, insects, mammals, fishes, birds and reptiles. Work settings include landfills, municipal roadways, provincial highways, Canadian Forces Base, National Capital Commission lands, active construction sites, private lands, Provincial and Federal Parks, solar farms, wind farms, licenced aggregate extraction sites, an airport and railway corridors. Mr. Wheeler has led the acquisition of permits/approvals/exemptions under the *Endangered Species Act* (provincial) and *Species at Risk Act* (federal). He is comfortable leading field surveys and walking clients through complex regulatory processes. He develop a best management practice guide for industry to conserve SAR and their habitat during vegetation management activities for the *Ministry of Natural Resources and Forestry*.

He has delivered post-construction monitoring for permits and authorizations to ensure conditions of legislative exemptions were followed by proponents. He has obtained Wildlife Scientific Collector's Authorization to capture, handle, transport and move SAR wildlife out of active construction areas. Matthew coordinated and participated in targeted species at risk surveys for Bobolink, Eastern Meadowlark, Barn Swallow, Kirtland's Warbler, Henslow's Sparrow, Whip-poor-will, Least Bittern, Common Nighthawk, Eastern Wood Pewee, Golden Winged Warbler, Chimney Swift, Cerulean Warbler, Map Turtle, Blanding's Turtle, Wood Turtle, Spotted Turtle, Eastern Musk Turtle, Snapping Turtle, Massasauga (rattlesnake), Eastern Hog-nosed Snake, Gray Ratsnake, Eastern Foxsnake, Eastern Ribbonsnake, Dwarf Hackberry, Dense Blazing Star, Kentucky Coffee-tree, Hill's Thistle, Green Dragon, Juniper Sedge, Butternut, Red Mulberry, Blue Ash, Rusty-patched Bumble Bee, Monarch, Red-side Dace, Pugnose Shiner, Grass Pickerel, Algonquin Wolf, Northern Myotis, Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis, Tri-coloured Bat, and other species.

He has led targeted Species at Risk surveys at more than 25 locations to ensure highway improvement activities are compliant with the *Endangered Species Act*. He has acquired authorizations and permits to safely capture and relocate turtle populations. He has designed over 5,000 metres of permanent turtle exclusion fencing at various locations in Ontario to reduce turtle road mortality. Collaborating with multiple levels of government he secured provincial funding ($60,000) under the SAR Stewardship Fund to assist a municipality install permanent turtle exclusion fencing, construct nesting habitat for turtles and inform the public of conservation actions.