ENVIRONMENTAL IMPACT STATEMENT

2050 Dunrobin Road, Kanata, Ontario
MP Project No.: CCO-21-1873

Prepared for:

Zbigniew Hauderowicz
Euroamber
165 Constance Lake Road
Kanata, Ontario
K2K 1X7

Prepared by:

McINTOSH PERRY
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, Ontario
K0A 1L0

McINTOSH PERRY

ENVIRONMENTAL IMPACT STATEMENT
2050 DUNROBIN ROAD, KANATA, ONTARIO

Prepared for:

Zbigniew Hauderowicz
Euroamber
165 Constance Lake Road
Kanata, Ontario
K2K 1X7

Prepared by:

McINTOSH PERRY

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, Ontario
K0A 1L0

Version 002
November 5, 2021

Written by: Erik Pohanka, B. Sc.
Biologist
McIntosh Perry Consulting Engineers Ltd.

Reviewed by: Christian Lyon
Project Manager (Environmental)
McIntosh Perry Consulting Engineers Ltd.

TABLE OF CONTENTS

Tables

Figures

Appendices

1.0 PROPERTY INFORMATION AND INTRODUCTION

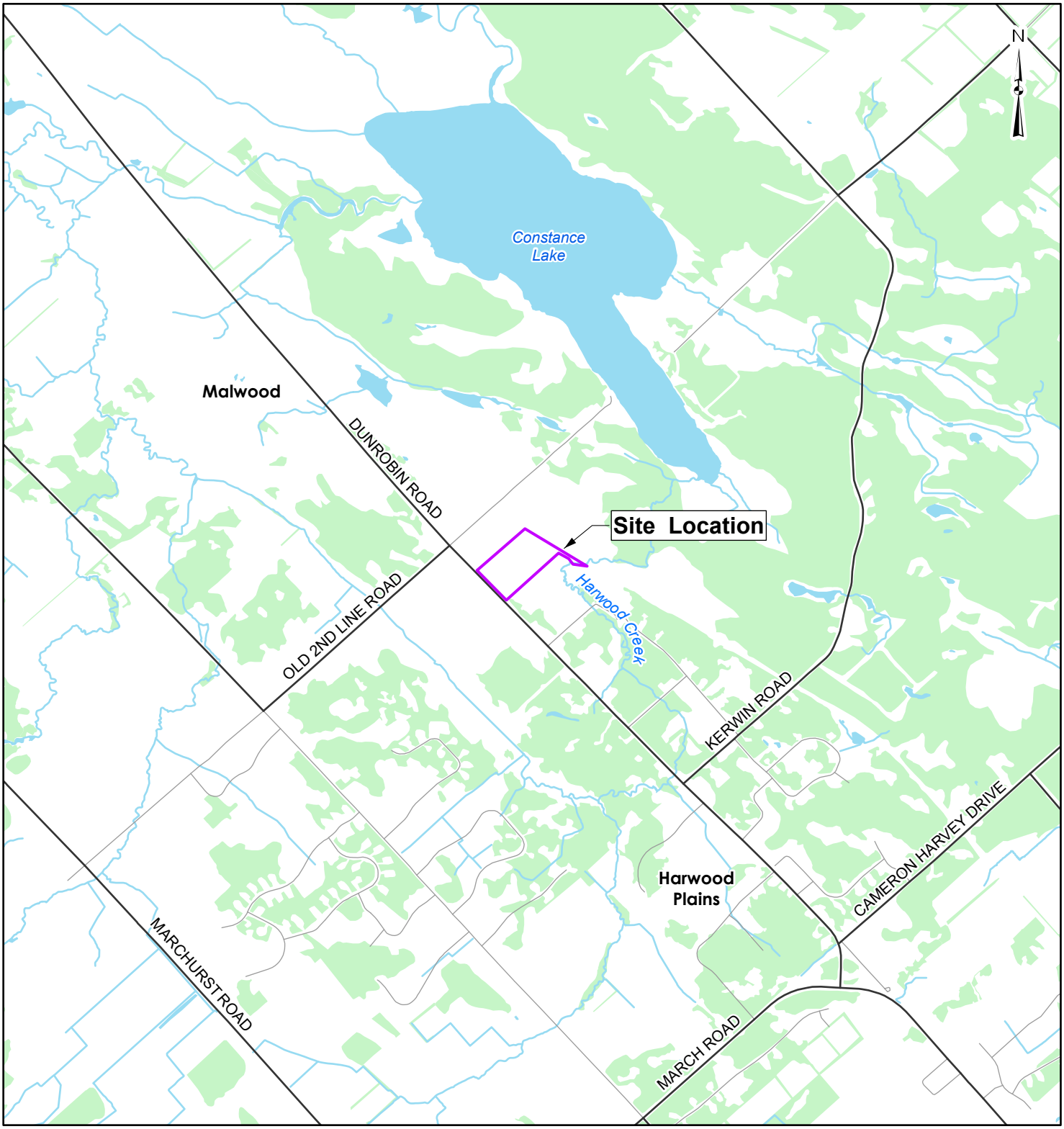
The subject property for this Environmental Impact Statement (EIS) is an 8.9-hectare (ha) parcel of land located at 2050 Dunrobin Road, Kanata (City of Ottawa), and is legally known as Part of Lot 20, Concession 4 in the Geographic Township of March. The subject property is located within the northwest end of the City of Ottawa, with approximately 230 metres (m) of frontage on the east side of Dunrobin Road, between Lillian Way to the south and Constance Lake Road to the north (Figure 1).

The subject property is designated as 'General Rural Area' under the City of Ottawa Official Plan (City of Ottawa, 2003).

The subject property is located within the jurisdiction of the Ministry of Northern Development, Mines, Natural Resources and Forestry's (NDMNRF) - Kemptville District and the Ministry of Environment, Conservation and Park's (MECP) – Ottawa Area.

The City of Ottawa required an EIS to be carried out for the subject property due to the presence of a fish-bearing watercourse (Harwood Creek), as well as regulation limits for the associated floodplain. The requirements of initiating the EIS and criteria for the EIS are outlined in the Environmental Impact Statement Guidelines (City of Ottawa, 2015). This EIS report assesses the potential impacts that development throughout the subject property may have upon the existing watercourse and fish habitat, woodlands, natural heritage features, including Significant Woodlands and wetlands, and species at risk (SAR) and their habitat. This EIS focuses on the entirety of the subject property proposed for future development. A Tree Conservation Report appended to this EIS has been prepared in accordance with the City of Ottawa's Tree Protection (By-law No. 2020-340) (2021). The report outlines the condition of all existing vegetation on site, any impacts of the proposed development on the vegetation, and the associated mitigation measures recommended to minimize impacts and preserve conserved trees (Appendix A).

McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) was retained by the development company Euroamber and the property representative, Zbigniew Hauderowicz, to carry out an EIS to assess the existing natural heritage features as required under the City of Ottawa Official Plan (City of Ottawa 2003) and the Provincial Policy Statement, 2020 (PPS). This EIS summarizes the findings of the surveys, outlines potential impacts as a result of the proposed development, and provides recommendations in order to mitigate anticipated impacts on natural heritage features. Statements within this EIS specific to the legal boundary 2050 Dunrobin Road will be referred to as the 'property' while reference to the 'study area' includes adjacent lands within 120 m of the property. The information contained in this report represents a survey undertaken in the summer of 2020 which is outlined in the Preliminary Environmental Impact Statement (McIntosh Perry, 2021), as well as several targeted surveys in the spring and summer of 2021.



1,000 500 0 1,000

Scale 1:30,000 Metres

LEGEND

- Study Area
- Local Road
- Major Road
- Watercourse
- Waterbody
- Wooded Area

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2020.

CLIENT: EUROAMBER

PROJECT: 2050 DUNROBIN ROAD ENVIRONMENTAL IMPACT STATEMENT

TITLE: SITE LOCATION

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO:CCO-21-1873	
Date	Dec., 08, 2020
GIS	EU
Checked By	JA

FIGURE: 1

C:\Users\e.ungun\McIntosh Perry\GIS - Documents\Projects\2021\CCO\CCO-21-1873 Euroamber - EIS - 2050 Dunrobin Rd\aprx\Key Map\CCO-21-1873-01-OptionD_KeyMap.aprx

2.0 METHODOLOGY

In order to satisfy survey requirements outlined under Section 4.7.8 in the City of Ottawa Official Plan (2003), field investigations were conducted in the study area by McIntosh Perry. Section 4.7.8 indicates that "An Environmental Impact Statement is required for development and site alteration proposed within and adjacent to natural heritage features designated as Rural Natural Features and adjacent to land designated as Urban Natural Feature, Significant Wetland, and Natural Environment Area. It is also required for development and site alteration within or adjacent to other elements of the natural heritage system…" The field investigations were carried out in the study area where development is proposed. The area surveyed, as well as adjacent lands (120 m) will be hereafter referred to in this report as the "study area." The field investigations were conducted to provide an inventory and assessment of the natural heritage features of the study area. The field investigations included the identification of the following features within the study area:

- Existing vegetation communities;
- Significant woody vegetation including a tree inventory;
- Areas of critical or significant habitat (i.e., Significant Valleylands, Significant Woodlands, Significant Wildlife Habitat, Provincially Significant Wetlands [PSWs], etc.);
- Soil types;
- Areas of groundwater recharge and discharge, drainage patterns, watercourses, wetland habitat, other areas of surface water;
- Watercourse morphology, habitat features, water quality parameters, specialized fish habitat, and migration barriers;
- SAR and their habitat, and
- Resident or migratory birds and other wildlife species.

2.1 Background Information

Background information on wildlife and plant species, and other significant natural heritage features known to occur within or adjacent to the study area was obtained from the following sources:

- Consultation with MECP – Ottawa District (Appendix B);
- Consultation with NDMNRF – Kemptville District (Appendix B);
- Consultation with Mississippi Valley Conservation Authority (MVCA) (Appendix B);
- The Natural Heritage Information Centre (NHIC) database accessed via the NDMNRF's Make a Map: Natural Heritage Areas; this search tool allows areas to be searched at up to 1 km^2 grid resolution and provides reports concerning rare species tracked by the NHIC. Information for each 1 km^2 square within the study area was reviewed for occurrences of rare species tracked by NHIC (NDMNRF, 2021a);
- The NDMNRF's Land Information Ontario (LIO) Metadata Management Tool; this tool contains information (e.g., location of PSW's, SAR element occurrences, etc.) as well as Aquatic Resource Area (ARA) licensed under the Open Government Licence for Ontario (NDMNRF, 2021b);
- Fish – ON-Line sport fish and stocking resource (NDMNRF, 2021c);
- Fisheries and Oceans Canada (DFO) Aquatic SAR Mapping (DFO, 2021);

- Data from the Ontario Breeding Bird Atlas Database (OBBA) was accessed from the data summaries page of the Atlas of the Breeding Birds of Ontario website. Information for each 10 km^2 grid square was reviewed for the study area (Bird Studies Canada et al., 2006);
- Ontario Reptile and Amphibian Atlas was accessed for the data summaries. Information for each 10 km^2 grid square was reviewed for the study area (Ontario Nature, 2020);
- Ontario Butterfly Atlas was accessed for data summaries. Information for each 10 km^2 grid square was reviewed for the study area (Toronto Entomologists' Association, 2020);
- Information from the 2018 Watershed report Card by Mississippi Valley Conservation Authority (MVCA) (2017), and
- Habitat in the study area was evaluated by use of aerial photography accessed through Google Earth aerials and StreetView mapping (Maxar Technologies, 2021).

2.2 Field Investigations

A preliminary field investigation was undertaken by E. Pohanka of McIntosh Perry on October 30, 2020 to determine general environmental concerns with development of the study area, as well as prescribe targeted surveys. This preliminary field investigation was conducted outside of appropriate timing windows to identify most species or natural features that may be present in the study area. The targeted surveys prescribed during appropriate timing windows were conducted in 2021. Field investigations conducted on the study area are outlined in Table 1.

Table 1: Summary of Field Investigation Activities

Date	Personnel Involved	Time on Property	Weather Conditions	Purpose of Visit
October 30, 2020	E. Pohanka	08:30 – 10:00	-1 °C, mostly sunny, calm	Existing environmental conditions survey (including identification of vegetation and wildlife species present and determining vegetation community boundaries) and species at risk habitat screening.
May 12, 2021	E. Pohanka and N. Hausz	08:30 – 12:30	8 °C, sunny, windy, cool	Flora/fauna inventory, tree inventory, targeted Gray Ratsnake (Pantherophis spiloides) surveys
May 20, 2021	E. Pohanka and N. Hausz	09:25 – 09:40	18 °C, sunny, calm, warm	Breeding bird survey, targeted Gray Ratsnake surveys, flora/fauna inventory
May 28, 2021	E. Pohanka and N. Hausz	12:00 – 12:20	13 °C, sunny, slight breeze	Targeted Gray Ratsnake surveys, flora/fauna inventory
June 4, 2021	E. Pohanka	08:00 – 09:00	20 °C, overcast, calm, humid	Breeding bird surveys, targeted Gray Ratsnake surveys, flora/fauna inventory
June 7, 2021	E. Pohanka and N. Hausz	07:10 – 08:30	24 °C, sunny, calm, humid	Breeding bird surveys, targeted Gray Ratsnake surveys, fisheries surveys, flora/fauna inventory
June 17, 2021	E. Pohanka	07:30 – 09:00	12 °C, sunny, breezy	Breeding bird surveys, targeted Gray Ratsnake surveys, flora/fauna inventory
June 23, 2021	E. Pohanka and N. Hausz	20:30 – 22:00	19 °C, clear, calm	Targeted Gray Ratsnake surveys, targeted acoustic bat surveys, flora/fauna inventory

Table 1: Summary of Field Investigation Activities				
Date	Personnel Involved	Time on Property	Weather Conditions	Purpose of Visit
June 28, 2021	E. Pohanka	07:35 – 07:55	23 °C, cloudy, calm, humid	Targeted Gray Ratsnake surveys, flora/fauna inventory
July 5, 2021	E. Pohanka	08:20 – 08:45	18 °C, sunny, slight breeze	Targeted Gray Ratsnake surveys, flora/fauna inventory
July 12, 2021	E. Pohanka and N. Hausz	19:25 – 19:50	28 °C, clear, calm, humid	Targeted Gray Ratsnake surveys, targeted acoustic bat surveys, flora/fauna inventory

The vegetation communities observed within the study area were characterized using the Ecological Land Classification (ELC) protocol (Lee et al., 1998), and delineated on an aerial photograph. During the field investigations, observations of wildlife species were made through sight, sound, and physical evidence.

The fisheries survey was conducted on Harwood Creek using a Haltech backpack electrofisher and dip net to determine fish communities and fish habitat within the study area. The survey was conducted in-stream for approximately 60 m (the extent of the watercourse within the subject property boundaries).

Wildlife species noted during the field investigations were identified by signs, visual observations, and vocalizations. For the purpose of this assessment, all wildlife observed within the study were recorded and considered to be residents or visitors of the area.

During the diurnal field investigation conducted on October 30, 2020, McIntosh Perry staff determined that there is potential habitat for bats within the wooded areas along the northwest and northeast boundaries of the study area. Therefore, nocturnal acoustic bat surveys were conducted during the active maternity period for bats (i.e., May 1 to July 31 of any year). These surveys began at dusk or within 15 minutes of dusk and continued for at least 30 minutes. The surveys were conducted during calm, warm evenings with little to no precipitation. An Echo Meter Touch 2 Pro for iOS (iPhone) was utilized to detect acoustic bat signatures and assist with the identification of bats within the study area. This device was attached to an iPhone 6 mobile phone using the Echo Meter Touch Bat Detector application (Version 2.8.4), created by Wildlife Acoustics Inc. (2021). The acoustic detector was utilized in several treed areas within the study area to detect bat signatures.

Photographs were taken during the field investigations depicting natural heritage features, flora and fauna, ELC communities, etc. observed within the study area. This photographic record can be found in Appendix C of this report (Photos 1 – 21).

3.0 DESCRIPTION OF THE SITE AND THE NATURAL ENVIRONMENT

3.1 Existing Land Use

At the time of the field investigations, the study area was undeveloped (Photos 1 - 21). The study area consists of vegetated areas and a watercourse in a range of successional stages.

Schedule A – Rural Policy Plan of the City of Ottawa Official Plan (2003), identifies the subject property in an area identified as 'General Rural Area.' The study area contains 'regulated areas' and '1:100-year floodplain' as identified in the MVCA Regulation Public Mapping Browser (MVCA, 2021) which are defined by the Provincial Policy Statement, 2020 (PPS) (Ministry of Municipal Affairs and House, 2020) as "..for river, stream and small inland lake systems, means the area, usually low lands adjoining a watercourse, which has been or may be subject to flooding hazards." Land uses adjacent to the study area include residential property to the northwest, decommissioned railway infrastructure and forested area to the northeast, commercial property to the southeast, and municipal road infrastructure (i.e., Dunrobin Road) and pasture to the southwest.

3.2 Natural Heritage System Components

The following background information was collected from various sources (refer to Section 2.0 of this report):

- LIO data from the NDMNRF identified the following natural features within 2 km of the study area:
  - The Shirley's Bay Area of Natural and Scientific Interest (ANSI) is present approximately 85 m east of the study area boundary;
  - A PSW named Constance Creek (swamp) is located approximately 750 m northeast of the study area;
  - An unevaluated wetland (swamp) is present approximately 130 m south of the study area;
- NHIC data from the NDMNRF identified the following natural features within 10 km of the study area:
  - The Constance Creek PSW is present within the general vicinity of the study area (within 10 km), and
  - The Shirley's Bay Natural Area is present within the general vicinity of the study area (within 10 km).

The City of Ottawa Official Plan (City of Ottawa, 2003) defines wetlands as "..lands that are seasonally or permanently covered by shallow water as well as lands where the water table is close to or at the surface. The four major categories of wetlands are swamps, marshes, bogs and fens". It also defines significant natural features and functions as "..ecologically important in terms of natural features and functions, representation or amount, and contributing to the quality and diversity of a defined natural area or system. In regard to wetlands identified as provincially significant or Areas of Natural and Scientific Interest, significance is established using evaluation procedures established by the province, as amended from time to time. In regard to other areas and features, significance is determined through application of criteria or assessment methods in the context of systematic studies such as those described in Section 2.4.3 (Watershed and Subwatershed Plans) and Section 3.2.2 (Natural Environment Areas), Section 3.2.3 (Urban Natural Features) and Section 3.2.4 (Rural Natural Features)". No natural heritage system feature identified within the background information is present in the study area; however, the Shirley's Bay ANSI is within 85 m of the eastern boundary of the study area. Harwood Creek is present within the study area drains into the Constance Creek PSW approximately 750 m northeast of the study area.

3.3 Landforms, Soils and Geology

The general topography of the study area was nearly level. According to the Ontario Geological Survey (2010), the soils identified in the study area are from the March formation, which consists of clay, silt, sand, gravel, and diamicton. The rock geology is composed of interbedded quartz sandstone, sandy dolostone, and dolostone (Ontario Geological Survey, 2010).

3.4 Surface Water, Groundwater, and Fish Habitat

During the 2020 field investigation, standing water was observed in a depression area along the recreational vehicle trails within the east end of the property. The standing water is part of the Harwood Creek floodplain, according to the MVCA Regulation Public Mapping Browser (MVCA, 2021). The floodplain area outlined by MVCA was confirmed during the May 12, 2021 field investigation where seasonally inundated areas were observed across the northeastern portion of the study area. These areas are not considered fish-bearing. Based on the Stormwater Management Report (Kollaard Associates, 2021), the floodplain within the study area is considered a backwater area that does not contribute to the storage capacity of Harwood Creek.

Groundwater was not observed during the 2020/2021 field investigations. Well records identified three (3) wells within the study area which ranged from depths of 6.7 m to 38.6 m (MECP, 2021). All the wells within the study area were domestic water supplies. A total of 47 wells are located within 500 m of the study area.

Background information indicated that a watercourse, Harwood Creek (a tributary of Constance Lake), is present in the northeast extension of the study area. Based on the Official Plan of the City of Ottawa (2003), geoOttawa (2021) interactive mapping, and MVCA Regulation Public Mapping Browser (MVCA, 2021), Harwood Creek and the associated floodplain within the property is within the regulation limit for non-evaluated and locally significant wetlands (Figure 2). The watercourse enters the easternmost part of the property and flows for approximately 60 m eastward through the study area. The watercourse continues flowing in a northeast direction, flowing under a decommissioned railway towards Constance Lake. Harwood Creek is classified as having a warm-water thermal regime containing the following fish species: Northern Pike (Esox Lucius) and Walleye (Sander vitreus) (NDMNRF, 2021c). Harwood Creek drains into Constance Lake which is known to contain the following fish species: Banded Killifish (Fundulus diaphanus), Black Crappie (Pomoxis nigromaculatus), Brown Bullhead (Ameiurus nebulosus), Central Mudminnow (Umbra limi), Channel Catfish (Ictalurus punctatus), Common Carp (Cyprinus carpio), Creek Chub (Semotilus atromaculatus), Golden Shiner (Notemigonus crysoleucas), Iowa Darter (Etheostoma exile), Largemouth Bass (Micropterus salmoides), Northern Pike, Pumpkinseed (Lepomis gibbosus), Rock Bass (Ambloplites rupestris), Smallmouth Bass (Micropterus dolomieu), Walleye, White Sucker (Catostomus commersonii), Yellow Bullhead (Ameiurus natalis), and Yellow Perch (Perca flavescens) (NDMNRF, 2021b and 2021c).

During the June 6, 2021 field investigation, a fisheries survey was conducted by McIntosh Perry staff on Harwood Creek within the study area. Harwood Creek is a permanent warm-water system within the study area consisting of a mix of runs and pools with some riffles. A wide pool is present at an access path within the study area. The pool is located directly upstream of a beaver dam/debris. Evidence of off-road vehicle access into the pool was observed (i.e., tire ruts crossing the pool). Runs with moderate depths (approximately 75 cm) are present upstream of the pool as well as another off-road vehicle crossing. The watercourse consists of shallow runs and riffles (approximately 8 cm to 30 cm) downstream of the beaver dam/debris. Substrate throughout the watercourse consists of a mix of silt and clay with some gravel in the riffles and runs. Some in-stream and overhanging woody

debris is present, as well as in-stream and overhanging vascular macrophytes (i.e., herbaceous plants). In-stream vegetation consists of submergent water milfoil (Myriophyllum spp.), floating pondweed species (Potamogeton spp.), and emergent grasses (Poaceae). Riparian vegetation along the watercourse within the study area consists of deciduous shrubs, small deciduous trees, and grass/forb herbaceous growth. This riparian vegetation is interrupted at the off-road vehicle crossings.

An electrofishing survey was conducted to determine fish species present within the study area. White Sucker adults (Photo 18) and young-of-year (YOY) were caught and/or observed within Harwood Creek in the study area during the June 6, 2021 field investigation. This species and its habitat are afforded protection under the Fisheries Act (1985). Specialized baitfish spawning habitat (including White Sucker) is present within the study area within the riffles and runs with gravel substrate; however, the beaver dam/debris is a potential barrier to fish migration within the watercourse.

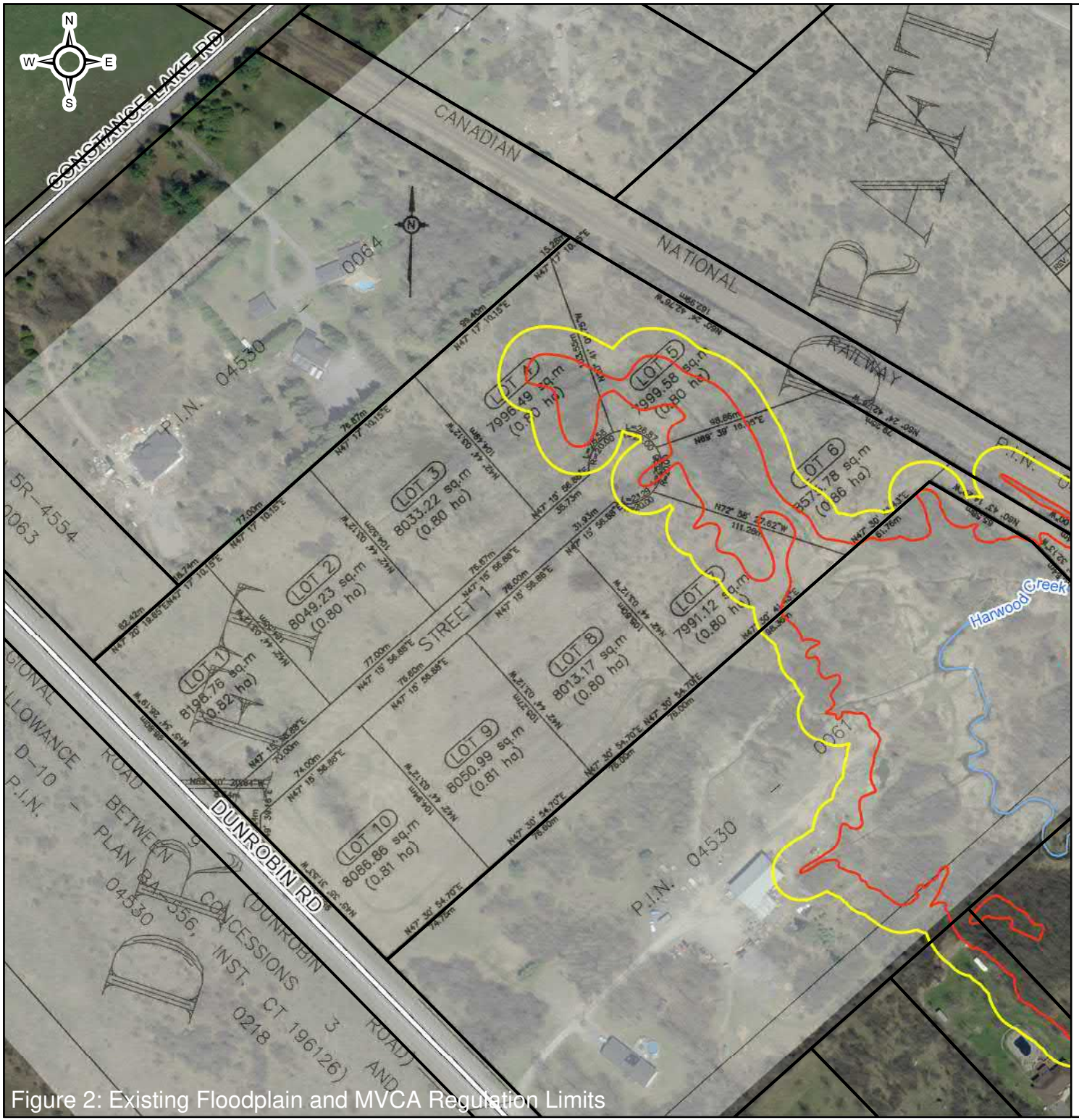


Figure 2: Existing Floodplain and MVCA Regulation Limits

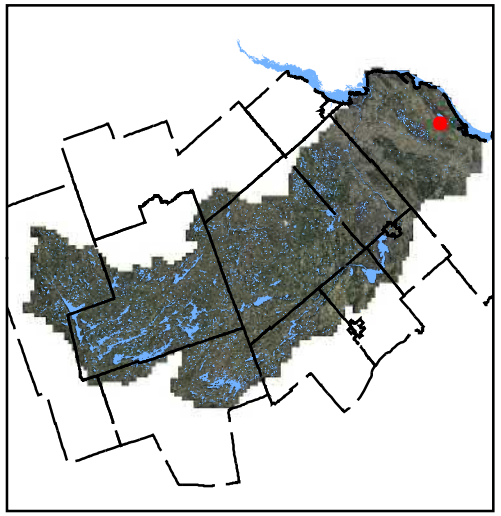
Mississippi Valley Conservation Authority

Ontario Regulation 153/06
2050 Dunrobin Road

Legend

- Property - Parcels
- MVCA Streams
- 1:100 yr Flood Plain
- MVCA Regulation Limit

1:3,000



Projection: UTM Zone18 - NAD 83 Datum

Date: 2020-11-02

3.5 Vegetation Cover

Vegetation surveys were completed during the 2020/2021 field investigations. Habitat observed during the field investigation included several vegetation communities. The following section outlines the existing vegetation communities identified within the study area. For a detailed map of vegetation communities present within the study area, refer to Figure 3. Photographs of the vegetation communities can be found in Appendix C. A complete listing of vegetation species observed within the study area during the field investigations is found in Appendix D. No Butternuts (Juglans cinerea) or other nationally, provincially, or regionally rare or SAR plant species were observed during the field investigation.

The adjacent land northwest of the study area consists of a forested community and rural residential properties. The adjacent land northeast of the study area consists of mainly forested and wetland areas, with rural residential properties further southeast. Constance Lake is located northeast of the property which is the direction in which Harwood Creek flows through the study area. The adjacent land to the southeast of the property consists of residential/commercial properties with treed areas. The adjacent land to the southwest of the property consists of flat, open pasture/fields with sparse trees and shrubs.

3.5.1 Vegetation Community 1: Dry – Fresh Non-Calcareous Bedrock Graminoid Meadow Ecosite (MEGR2)

Vegetation community 1 was classified through ELC as a Dry – Fresh Non-Calcareous Bedrock Graminoid Meadow Ecosite (MEGR2). This community makes up the southwest portion of the study area, bordering along Dunrobin Road and the west and south study area boundaries. This area is represented primarily by graminoid herbaceous ground cover such as smooth brome grass (Bromus inermis) and Timothy (Phleum pratense), as well as forb species such as common mullein (Verbascum Thapsus), common milkweed (Asclepias syriaca), cow vetch (Vicia cracca), field thistle (Cirsium discolor), goldenrod (Solidago spp.). This area shows evidence of disturbance, and transitions into the Buckthorn Deciduous Shrub Thicket towards the northwest end of the property. Open areas in the west end of the property contained exposed bedrock which included crevices and holes in the ground. Also found in this community, is a heavily disturbed treed area located on the southwest boundary of the study area where the remains of a demolished building and a driveway are located. Active clearing was observed during the 2021 field investigation in this ecosite.

3.5.2 Vegetation Community 2: Buckthorn Deciduous Shrub Thicket Type (THDM2-6)

Vegetation community 2 was classified through ELC as a Buckthorn Deciduous Shrub Thicket Type (THDM2-6). This community is the largest of the vegetation communities within the study area and extends from the northern boundary of the Dry – Fresh Calcareous Bedrock Forb Meadow to the northwest end of the study area. This community is represented primarily by glossy buckthorn (Frangula alnus) and common buckthorn (Rhamnus cathartica); however, other species such as hawthorn (Crataegus spp.), choke cherry (Prunus virginiana), Tartarian honeysuckle (Lonicera tatarica), nannyberry (Viburnum lentago), common juniper (Juniperus communis), white birch (Betula papyrifera), green ash (Fraxinus pennsylvanica) and common apple (Malus pumila) are also present. The ground cover has a similar species composition as the Dry – Fresh Calcareous Bedrock Forb Meadow. The north end of this vegetation community transitions into the Fresh – Moist Poplar Deciduous Woodland. The dominant species in this vegetation community indicate past disturbance as many of the woody species listed in this community are non-native and invasive in habit, particularly in disturbed areas.

3.5.3 Vegetation Community 3: Fresh – Moist Poplar Deciduous Woodland Type (WODM5-1)

Vegetation community 3 was classified through ELC as a Fresh – Moist Poplar Deciduous Woodland Type (WODM5-1). This community is the smallest vegetation community in the study area and is found along the northeast and northwest boundaries of the study area as a narrow tree line consisting of poplar trees parallel to the decommissioned railway corridor and a residential property. This area is represented primarily by balsam poplar (Populus balsamifera), trembling aspen (Populus tremuloides), and Carolina poplar (Populus × canadensis) with interspersed glossy buckthorn and hawthorn. Harwood Creek is located within this community at the northeastern extension of the study area. The riparian vegetation along Harwood Creek within the study area is indicative of this vegetation community.

3.5.4 Significant Woodlands

The PPS defines Significant Woodlands as "..treed areas that provide environmental and economic benefits such as erosion prevention, water retention, provision of habitat, recreation and the sustainable harvest of woodland products. Woodlands include treed areas, woodlots or forested areas and vary in their level of significance". The City of Ottawa Significant Woodlands: Guidelines for Identification, Evaluation, and Impact Assessment (2016) refers to the Ministry of Natural Resources' (MNR) Natural Heritage Reference Manual (MNR, 2010), to define Significant Woodlands using certain criteria and sub-criteria. The City of Ottawa Official Plan (City of Ottawa, 2003) did not identify any Significant Woodlands within or adjacent to the study area. The Tree Conservation Report (Appendix A) provides information on tree species composition, sizes, health, etc. found in the study area and the potential impacts to trees based on the proposed project works.

3.5.5 Invasive and Noxious Plant Species

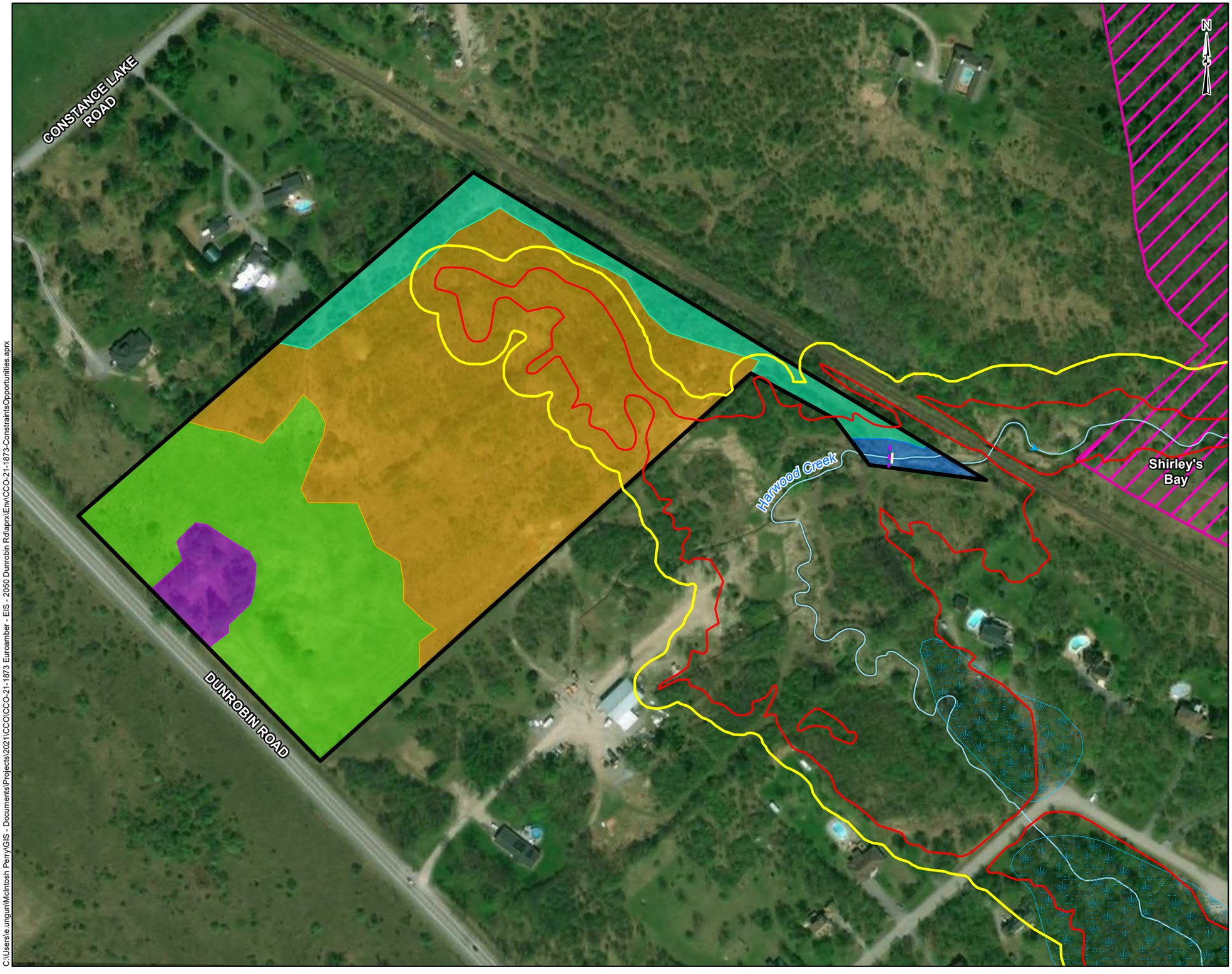
The following plant species listed as 'Restricted' under the Invasive Species Act, 2015, were observed within the study area during the 2020/2021 field investigations:

- dog-strangling vine (Vincetoxicum rossicum).

The following plant species listed as 'Noxious Weeds' under the Weed Control Act, 1990, were observed within the study area during the 2020/2021 field investigations:

- common buckthorn (Rhamnus cathartica);
- common ragweed (Ambrosia artemisiifolia);
- dog-strangling vine (Vincetoxicum rossicum);
- leafy spurge (Euphorbia esula);
- smooth bedstraw (Galium mollugo);
- western poison-ivy (Toxicodendron rydbergii), and
- wild parsnip (Pastinaca sativa).

The common buckthorn is a dominant shrub species in the eastern half of the study area, creating a thicket community. The rest of the 'Restricted' and 'Noxious Weed' species are either considered widespread or do not exist in large numbers within the study area (i.e., no stands of the species, but rather sporadic occurrences of individuals within the larger study area).



LEGEND

- Study Area
- Off-road Vehicle In-stream Crossing
- Potential Seasonal Fish Migration Barrier
- MVCA Regulation Limit
- Flood Plain
- Watercourse
- Buckthorn Deciduous Shrub Thicket Type (THDM2-6)
- Disturbed/Treed Area
- Dry-Fresh Non-Calcareous Bedrock Graminoid Meadow (MEGR2)
- Fresh-Moist Poplar Deciduous Woodland Type (WODM5-1)
- Watercourse Corridor
- Unevaluated Wetland
- Shirley's Bay ANSI

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2021.

80 40 0 80

Scale 1:2,500 Meters

CLIENT: EUROAMBER

PROJECT: 2050 DUNROBIN ROAD ENVIRONMENTAL IMPACT STATEMENT

TITLE: NATURAL HERITAGE FEATURES

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO:CCO-21-1873	FIGURE: 3
Date	Nov., 05, 2021
GIS	EU
Checked By	JA

C:\Users\e.ungun\McIntosh Perry\GIS - Documents\Projects\2021\CCO\CCO-21-1873 Euroamber - EIS - 2050 Dunrobin Rd\aprx\Erw\CCO-21-1873-ConstraintsOpportunities.aprx

3.6 Habitat for Species at Risk

Background information obtained from the sources listed in Section 2.0 of this report, indicated that SAR and their habitat were potentially present within the study area. The MECP provided the following information on SAR regarding the study area (Appendix B):

- The following SAR are known to occur within the vicinity of the study area:
  - American Ginseng (Panax quinquefolius);
  - Bald Eagle (Haliaeetus leucocephalus);
  - Bank Swallow (Riparia riparia);
  - Least Bittern (Ixobrychus exilis);
  - Peregrine Falcon (Falco peregrinus);
- There is potential for the following SAR to be present within the study area:
  - Butternut;
  - Eastern Small-footed Myotis (Myotis leibii);
  - Little Brown Myotis (Myotis lucifugus);
  - Northern Myotis (Myotis septentrionalis);
  - Tri-colored Bat (Perimyotis subflavus);
- Blanding's Turtles (Emydoidea blandingii) have been recorded just over 200 m from the study area.

SAR habitat in the study area is outlined in Table 2 based on background information sources, habitat availability, and the results of targeted surveys for SAR in 2021. The status of each species under the provincial Endangered Species Act, 2007 (ESA) and federal Species at Risk Act, 2002 (SARA) are also listed in Table 2. Additional protection afforded to species under the provincial Fish and Wildlife Conservation Act, 1994 (FWCA) and federal Migratory Birds Convention Act, 1997 (MBCA) are noted as well.

Table 2: Species at Risk Potentially Present within the Study Area								
Species Name	Scientific Name	Provincial Status under the ESA	Provincial Habitat Protection	Federal Status under the SARA	Federal Protection of Individual and Residence outside of Federal lands	Source	Other Applicable Legislation	Potential/ Unconfirmed or Confirmed Habitat Present in the Study Area and Adjacent Lands
Plants								
American Ginseng	Panax quinquefolius	Endangered	Yes	Endangered	Yes	MECP	N/A	No
Butternut	Juglans cinerea	Endangered	Yes	Endangered	Yes	MECP, General range	N/A	Yes; however, no individuals were observed.
Insects								
Monarch	Danaus plexippus	Special Concern	No	Special Concern	No	OBA, General Range	FWCA	Confirmed
Amphibians								
Western Chorus Frog	Pseudacris triseriata	No Status	No	Threatened	Yes	ORAA, General Range	N/A	No
Turtles								
Blanding's Turtle	Emydoidea blandingii	Threatened	Yes	Threatened	Yes	LIO, NHIC, ORAA	FWCA	Confirmed Category 2 and 3 Habitats
Common Snapping Turtle	Chelydra serpentina	Special Concern	No	Special Concern	No	NHIC, ORAA	FWCA	Confirmed (migratory only)
Eastern Musk Turtle	Sternotherus odoratus	Special Concern	No	Special concern	No	General range	FWCA	No
Midland Painted Turtle	Chrysemys picta marginate	No Status	No	Special Concern	No	ORAA, General Range	FWCA	No
Northern Map Turtle	Graptemys geographica	Special Concern	No	Special Concern	No	ORAA, General Range	FWCA	No

Table 2: Species at Risk Potentially Present within the Study Area								
Species Name	Scientific Name	Provincial Status under the ESA	Provincial Habitat Protection	Federal Status under the SARA	Federal Protection of Individual and Residence outside of Federal lands	Source	Other Applicable Legislation	Potential/ Unconfirmed or Confirmed Habitat Present in the Study Area and Adjacent Lands
Snakes and Lizards								
Eastern Milksnake	Lampropeltis triangulum triangulum	No Status	No	Special Concern	No	General range	FWCA	No
Eastern Ribbonsnake	Thamnophis sauritus sauritus	Special Concern	No	Special Concern	No	General range	N/A	No
Birds								
Bald Eagle	Haliaeetus leucocephalus	Special Concern	No	No Status	No	MECP, OBBA, General Range	FWCA	No
Bank Swallow	Riparia riparia	Threatened	Yes	Threatened	No	MECP, General Range	MBCA	No
Barn Swallow	Hirundo rustica	Threatened	Yes	Threatened	No	OBBA, General Range	MBCA	No
Black Tern	Chlidonias niger	Special Concern	No	Not at Risk	No	General Range	MBCA	No
Bobolink	Dolichonyx oryzivorus	Threatened	Yes	Threatened	No	OBBA, General Range	MBCA	Adjacent habitat only
Canada Warbler	Cardellina canadensis	Special Concern	No	Threatened	No	General Range	MBCA	No
Cerulean Warbler	Setophaga cerulea	Threatened	Yes	Endangered	Yes	OBBA	MBCA	No
Chimney Swift	Chaetura pelagica	Threatened	Yes	Threatened	No	General Range	MBCA	No
Common Nighthawk	Chordeiles minor	Special Concern	No	Threatened	No	OBBA, General Range	MBCA	No

Table 2: Species at Risk Potentially Present within the Study Area								
Species Name	Scientific Name	Provincial Status under the ESA	Provincial Habitat Protection	Federal Status under the SARA	Federal Protection of Individual and Residence outside of Federal lands	Source	Other Applicable Legislation	Potential/ Unconfirmed or Confirmed Habitat Present in the Study Area and Adjacent Lands
Eastern Meadowlark	Sturnella magna	Threatened	Yes	Threatened	No	OBBA, General Range	MBCA	Adjacent habitat only
Eastern Whip-poor-will	Antrostomus vociferus	Threatened	Yes	Threatened	Yes	OBBA	MBCA	No
Eastern Wood-Pewee	Contopus virens	Special Concern	No	Special Concern	No	OBBA, General Range	MBCA	No
Evening Grosbeak	Hesperiphona vespertina	Special Concern	No	Special Concern	No	OBBA	MBCA	No
Golden Eagle	Aquila chrysaetos	Endangered	Yes	Not at Risk	No	General Range	FWCA	No
Golden-winged Warbler	Vermivora chrysoptera	Special Concern	No	Threatened	Yes	OBBA	MBCA	No
Grasshopper Sparrow	Ammodramus savannarum	Special Concern	No	Special Concern	No	General Range	MBCA	Adjacent habitat only
Least Bittern	Ixobrychus exilis	Threatened	Yes	Threatened	Yes	MECP	MBCA	No
Loggerhead Shrike	Lanius ludovicianus	Endangered	Yes	No Status	No	General Range	MBCA	Adjacent habitat only
Olive-sided Flycatcher	Contopus cooperi	Special Concern	No	Threatened	No	General Range	MBCA	No
Peregrine falcon	Falco peregrinus anatum/tundrius	Special Concern	No	Special Concern	No	MECP, OBBA, General Range	FWCA	No
Red-headed Woodpecker	Melanerpes erythrocephalus	Special Concern	No	Endangered	Yes	General Range	MBCA	No
Rusty Blackbird	Euphagus carolinus	Special Concern	No	Special Concern	No	General Range	MBCA	No

Table 2: Species at Risk Potentially Present within the Study Area								
Species Name	Scientific Name	Provincial Status under the ESA	Provincial Habitat Protection	Federal Status under the SARA	Federal Protection of Individual and Residence outside of Federal lands	Source	Other Applicable Legislation	Potential/ Unconfirmed or Confirmed Habitat Present in the Study Area and Adjacent Lands
Short-eared Owl	Asio flammeus	Special Concern	No	Special Concern	No	General Range	FWCA	Adjacent habitat only
Wood Thrush	Hylocichla mustelina	Special Concern	No	Threatened	No	OBBA, General Range	MBCA	No
Mammals								
Eastern Small-footed Myotis	Myotis leibii	Endangered	Yes	No Status	No	MECP, General Range	FWCA	No
Little Brown Myotis	Myotis lucifugus	Endangered	Yes	Endangered	No	MECP, General Range	FWCA	No
Northern Myotis	Myotis septentrionalis	Endangered	Yes	Endangered	No	MECP, General Range	FWCA	No
Tri-colored Bat	Perimyotis subflavus	Endangered	Yes	Endangered	No	MECP, General Range	FWCA	No

Of the SAR identified by background information as potentially present within the vicinity of the study area, habitat observed during the field investigation within the study area does not appear to be suitable for the life processes of the following SAR: American Ginseng, Western Chorus Frog, Eastern Musk Turtle, Midland Painted Turtle, Northern Map Turtle, Eastern Milksnake, Eastern Ribbonsnake, Bald Eagle, Bank Swallow, Barn Swallow, Black Tern, Canada Warbler, Cerulean Warbler, Chimney Swift, Common Nighthawk, Eastern Whip-poor-will, Eastern Wood-Pewee, Evening Grosbeak, Golden Eagle, Golden-winged Warbler, Least Bittern, Olive-sided Flycatcher, Peregrine Falcon, Red-headed Woodpecker, Rusty Blackbird, Wood Thrush, Eastern Small-footed Myotis, Little Myotis, Northern Myotis, and Tri-colored Bat. These species will not be discussed further in this report.

Suitable habitat for the following species was deemed to be present within the study area or adjacent to the study area, based on the background information and results of the 2021 targeted surveys: Butternut, Monarch, Blanding's Turtle, Common Snapping Turtle, Bobolink, Eastern Meadowlark, Grasshopper Sparrow, Loggerhead Shrike, and Short-eared Owl.

3.6.1 Plants

Butternut is designated as 'Endangered' under the ESA and the SARA. Habitat for this species and individuals of this species are afforded protection. Habitat is available within the study area due to the wide range of habitat preferences for Butternuts where adequate sunlight is available. Butternuts are shade intolerant and prefer open areas; however, they often become crowded out by other tree species. No Butternuts were observed within the study area or within 50 m of the study area during the 2021 field investigations.

3.6.2 Insects

Monarchs were observed during multiple field investigations in 2021 within the study area. These were observed within the open meadow habitat in the west end of the study area. Adult Monarchs forage on a variety of wildflowers including milkweed (Asclepias spp.) on which they rely for several life processes. Common milkweed was identified within the study area in the Dry – Fresh Non-Calcareous Bedrock Graminoid Meadow Ecosite (MEGR2). This species is designated as 'Special Concern' under ESA and SARA and does not receive habitat protection.

3.6.3 Turtles

Migratory habitat for Blanding's Turtle and Common Snapping Turtle is available through Harwood Creek within the study area. Potential suitable habitat for these species is also available outside the study area in surrounding unevaluated wetlands. The Blanding's Turtle is designated as 'Threatened' under the ESA and SARA and receives habitat protection. The Common Snapping Turtle is designated as 'Special Concern' under the ESA and SARA and does not receive habitat protection. LIO data indicates that the study area is within a 1 km by 1 km grid square in which Blanding's Turtles have been recorded. Through correspondence with MECP, Blanding's Turtle occurrences were identified to be present within 200 m of the property. Based on the General Habitat Description for the Blanding's Turtle (Emydoidea blandingii) by the MNR (2013a), Category 2 habitat for Blanding's Turtle is available in any connected wetland and waterbody complex extending up to 2 km from the Blanding's Turtle occurrences as well as 30 m around these suitable wetlands/waterbodies. Category 3 Blanding's Turtle habitat is any area from 30 m to 250 m around Category 2 habitat. These habitats are present within the study area (Figure 4). These habitats

are also suitable for Common Snapping Turtles. However, the habitat within the property only provides the function of migration to more suitable habitat outside of the study area for these species. No nesting habitat for these species was observed within the property and it is not likely that these species are present in significant numbers within the study area due to the limited stream habitat types available. No individuals of these species were observed during the field investigation.

3.6.4 Snakes and Lizards

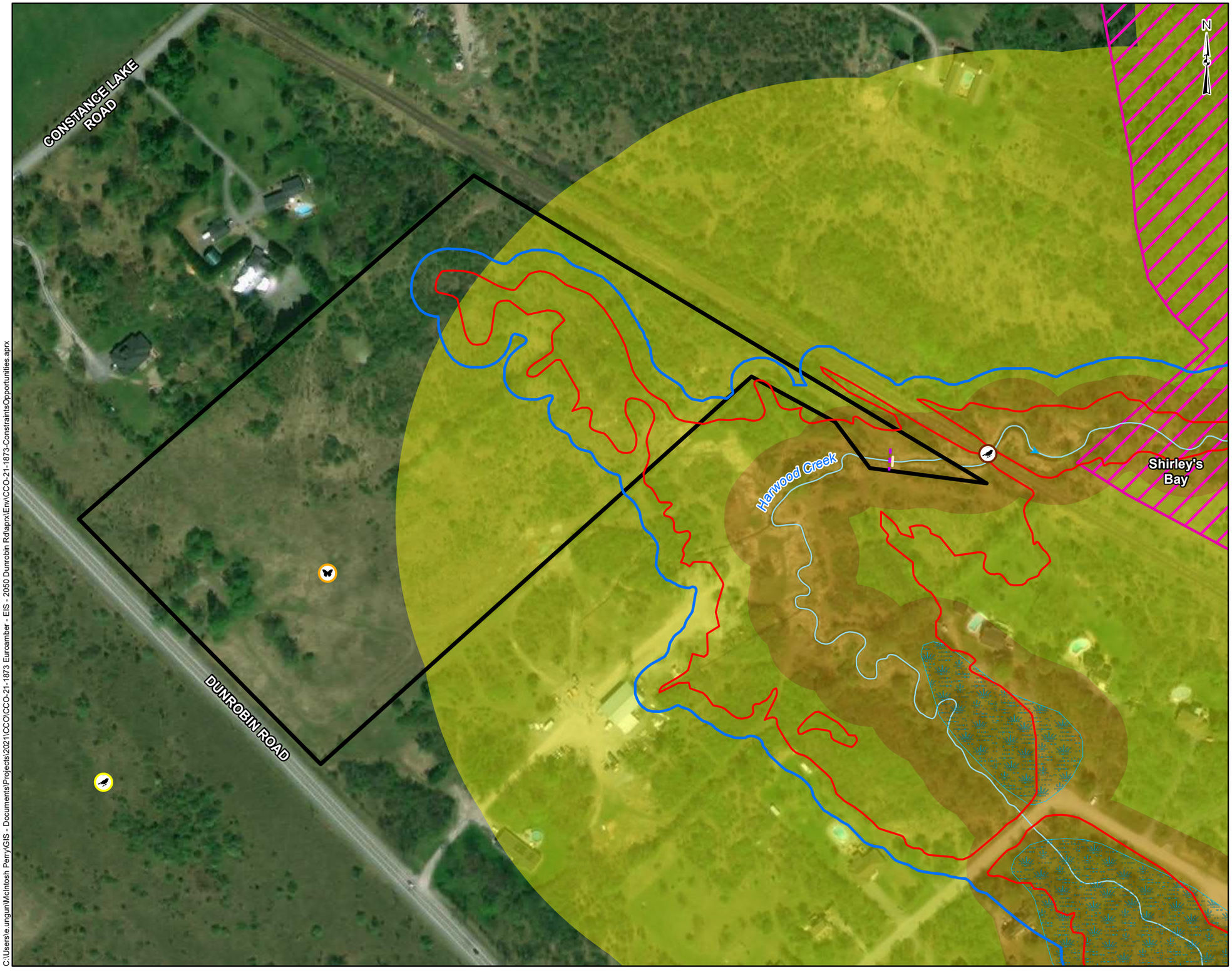
During the preliminary field investigation on October 30, 2020, potential SAR snake habitat was identified in the west end of the study area. This area consists of the open Dry – Fresh Non-Calcareous Bedrock Graminoid Meadow Ecosite (MEGR2) containing exposed bedrock and crevices into the ground which may provide potential habitat for Eastern Milksnakes, including areas for foraging and hibernacula. This species is a habitat generalist and may be found in a variety of habitats. The Eastern Milksnake is designated as 'Special Concern' under SARA and does not receive habitat protection. However, individuals of this species are protected under the FWCA (1997). Targeted surveys for SAR snakes were conducted following parameters outlined in the Ministry of Natural Resources and Forestry's (MNRF) the Survey Protocol for Ontario's Species at Risk Snakes (MNRF, 2016a). The surveys were conducted within potential snake habitat identified in the west portion of the study area during the preliminary field investigation. No SAR snakes or evidence of SAR snakes were observed during the 2021 targeted surveys. It was determined that the study area is not suitable for SAR snakes.

3.6.5 Birds

During the preliminary field investigation on October 30, 2020, potential SAR grassland bird habitat was identified in the west end of the study area. This area consists of the open Dry – Fresh Non-Calcareous Bedrock Graminoid Meadow Ecosite (MEGR2) containing open grass and forb areas which may provide potential breeding habitat for Bobolink, Eastern Meadowlark, and Grasshopper Sparrow. During the May 20, 2021 field investigation, an Eastern Meadowlark was heard from the pasture on the west side of Dunrobin Road (adjacent to the study area). No Eastern Meadowlarks or other SAR grassland bird species were observed or heard within the study area during the targeted breeding bird surveys conducted during the field investigations in 2021. This species is designated as 'Threatened' under the ESA and SARA and receives habitat protection. Potential habitat for SAR grassland birds (i.e., Bobolink, Eastern Meadowlark, and Grasshopper Sparrow), as well as SAR birds that utilize pastures and open thickets such as Loggerhead Shrike and Short-eared Owl, is present adjacent to the study area in the pasture on the west side of Dunrobin Road. No habitat for SAR birds is present within the study area.

3.6.6 Mammals

During the preliminary field investigation on October 30, 2020, potential SAR bat habitat was identified in the tree lines along the northwest and northeast boundaries of the study area. During the June 21 and July 12, 2021 field investigations, targeted nocturnal surveys for bats were conducted using an acoustic bat monitor during the active season for bats. No bats were recorded or observed during the field investigations. It was determined that there is no SAR bat habitat available within the study area.



LEGEND

- Study Area
- Eastern Meadowlark (Heard on May 20, 2021)
- Eastern Phoebe Nest
- Monarch
- Off-road Vehicle In-stream Crossing
- Beaver Dam/Debris
- MVCA Regulation Limit
- Flood Plain
- Watercourse
- Category 2 Blanding's Turtle Habitat
- Category 3 Blanding's Turtle Habitat
- Unevaluated Wetland
- Shirley's Bay ANSI

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2021.

80 40 0 80

Scale 1:2,500 Meters

CLIENT: EUROAMBER

PROJECT: 2050 DUNROBIN ROAD ENVIRONMENTAL IMPACT STATEMENT

TITLE: CONSTRAINTS AND OPPORTUNITIES

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO:CCO-21-1874		FIGURE: 4
Date	Nov., 05, 2021	
GIS	EU	
Checked By	JA	

C:\Users\e.ungun\McIntosh Perry\GIS - Documents\Projects\2021\CCO\CCO-21-1873 Euroamber - EIS - 2050 Dunrobin Rd\aprx\Env\CCO-21-1873-ConstraintsOpportunities.aprx

3.8 Wildlife & Significant Wildlife Habitat

The study area is located in the Pembroke Ecodistrict (6E-16) of the Lake Simcoe-Rideau (6E) Ecoregion within the Mixedwood Plains Ecozone (Ecological Stratification Working Group, 1996). Characteristic wildlife present within this Ecoregion includes: American Bullfrog (Lithobates catesbeianus), Eastern Newt (Notophthalmus viridescens), Northern Leopard Frog (Lithobates pipiens), Spring Peeper (Pseudacris crucifer), Common Snapping Turtle, Eastern Gartersnake (Thamnophis sirtalis sirtalis), Northern Watersnake (Nerodia sipedon sipedon), groundhog (Marmota monax), raccoon (Procyon lotor), striped skunk (Mephitis mephitis), and white-tailed deer (Odocoileus virginianus). Representative bird species include the Great Blue Heron (Ardea herodias), Hairy Woodpecker (Leuconotopicus villosus), Rose-breasted Grosbeak (Pheucticus ludovicianus), Scarlet Tanager (Piranga olivacea), Wilson's Snipe (Gallinago delicata), Wood Duck (Aix sponsa), and Wood Thrush (Crins et al., 2009).

The following section outlines the existing wildlife habitat within the study area. Table 3 lists the species observed, heard, and/or recorded during the 2020/2021 field investigation.

Table 3: Wildlife Species Observed Within and Adjacent to the Study Area

Common Name	Scientific Name	Resident/ Visitor	Evidence	Applicable Legislative Protection
Fish				
White Sucker	Catostomus commersonii	Resident	Visual observation	Fisheries Act
Insects				
Eastern Pondhawk	Erythemis simplicicollis	Resident	Visual observation	N/A
Halloween Pennant	Celithemis eponina	Resident	Visual observation	N/A
Monarch	Danaus plexippus	Visitor	Visual observation	FWCA
Widow Skimmer	Libellula luctuosa	Resident	Visual observation	N/A
Amphibians				
Northern Leopard Frog	Lithobates pipiens	Resident	Visual observation	N/A
Snakes and Lizards				
Northern Red-bellied Snake	Storeria occipitomaculata occipitomaculata	Resident	Visual observation	N/A
Birds				
Alder Flycatcher	Empidonax alnorum	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
American Bittern	Botaurus	Visitor	Visual observation	MBCA

Table 3: Wildlife Species Observed Within and Adjacent to the Study Area				
Common Name	Scientific Name	Resident/ Visitor	Evidence	Applicable Legislative Protection
	lentiginosus			
American Crow	Corvus brachyrhynchos	Resident	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	N/A
American Goldfinch	Spinus tristis	Resident	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
American Redstart	Setophaga ruticilla	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
American Robin	Turdus migratorius	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
American Tree Sparrow	Spizelloides arborea	Visitor	Visual observation	MBCA
Belted Kingfisher	Megaceryle alcyon	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	FWCA
Black-and-white Warbler	Mniotilta varia	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Black-capped Chickadee	Poecile atricapillus	Resident	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Blue Jay	Cyanocitta cristata	Resident	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	FWCA
Brown Thrasher	Toxostoma rufum	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Canada Goose	Branta canadensis	Visitor	Visual observation (flyover)	MBCA
Cedar Waxwing	Bombycilla cedrorum	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Chestnut-sided Warbler	Setophaga pensylvanica	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA

Table 3: Wildlife Species Observed Within and Adjacent to the Study Area				
Common Name	Scientific Name	Resident/ Visitor	Evidence	Applicable Legislative Protection
Chipping Sparrow	Spizella passerina	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Common Grackle	Quiscalus quiscula	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	N/A
Common Raven	Corvus corax	Resident	Singing male (flyover)	FWCA
Common Yellowthroat	Geothlypis trichas	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Eastern Kingbird	Tyrannus tyrannus	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Eastern Meadowlark	Sturnella magna	Visitor	Singing male, within appropriate breeding habitat, during appropriate breeding season	ESA, SARA, MBCA
Eastern Phoebe	Sayornis phoebe	Visitor	Nesting observed directly adjacent to the study area.	MBCA
European Starling	Sturnus vulgaris	Resident	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	N/A
Field Sparrow	Spizella pusilla	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Gray Catbird	Dumatella carolinensis	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Great Crested Flycatcher	Myiarchus crinitus	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Hairy Woodpecker	Leuconotopicus villosus	Resident	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
House Wren	Troglodytes aedon	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA

Table 3: Wildlife Species Observed Within and Adjacent to the Study Area				
Common Name	Scientific Name	Resident/ Visitor	Evidence	Applicable Legislative Protection
Killdeer	Charadrius vociferus	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Mourning Dove	Zenaida macroura	Resident	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Northern Cardinal	Cardinalis cardinalis	Resident	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Northern Flicker	Colaptes auratus	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Red-eyed Vireo	Vireo olivaceus	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Red-winged Blackbird	Agelaius phoeniceus	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	N/A
Savannah Sparrow	Passerculus sandwichensis	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Song Sparrow	Melospiza melodia	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Tree Swallow	Tachycineta bicolor	Visitor	Visual observation (flyover)	MBCA
Turkey Vulture	Cathartes aura	Visitor	Visual observation (flyover)	FWCA
Veery	Catharus fuscescens	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Vesper Sparrow	Pooecetes gramineus	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Warbling Vireo	Vireo gilvus	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
White-breasted Nuthatch	Sitta carolinensis	Resident	Visual observation; Singing male,	MBCA

Table 3: Wildlife Species Observed Within and Adjacent to the Study Area				
Common Name	Scientific Name	Resident/ Visitor	Evidence	Applicable Legislative Protection
			within appropriate breeding habitat, during appropriate breeding season	
White-throated Sparrow	Zonotrichia albicollis	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Yellow Warbler	Setophaga petechia	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Yellow-rumped Warbler	Setophaga coronata	Visitor	Visual observation; Singing male, within appropriate breeding habitat, during appropriate breeding season	MBCA
Mammals				
American red squirrel	Tamiasciurus hudsonicus	Resident	Visual observation; calling	FWCA
North American beaver	Castor canadensis	Resident	Chewed branches observed, small beaver dam in the watercourse	FWCA
snowshoe hare	Lepus americanus	Resident	Visual observation	FWCA
white-tailed deer	Odocoileus virginianus	Resident	Tracks observed	FWCA

For those observations of male birds singing, within appropriate breeding habitat, during the appropriate breeding season, this quality of breeding evidence represents "possible breeder," under the Ontario Breeding Bird Atlas' Breeding Evidence Codes (Bird Studies Canada, 2020). The bird species listed in Table 3 with applicable legislative protection from the MBCA are afforded protection to individuals, their nests, eggs, and fledglings. This same protection is afforded to bird species with applicable legislative protection from the FWCA. Bird species observed flying over the study area are not considered to be resident breeders within the study area.

An active Eastern Phoebe nest was observed within the decommissioned railway culvert directly adjacent to the eastern extent of the study area (Photo 19).

The study area was examined under the Significant Wildlife Habitat Technical Guide (MNR, 2000) and its supporting document Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF, 2015) to determine if significant wildlife habitat is present within the existing study area. Table 4 outlines the various significant wildlife habitat (SWH) categories and rationale on their designation within the study area.

Table 4: Significant Wildlife Habitat within the Study Area		
Specialized Wildlife Habitat Category	Candidate Significant Wildlife Habitat (Y/N)	Confirmed Significant Wildlife Habitat (Y/N)
Waterfowl Stopover and Staging Areas (Terrestrial)	No	No
Waterfowl Stopover and Staging Areas (Aquatic)	No	No
Shorebird Migratory Stopover Area	No	No
Raptor Wintering Area	No	No
Bat Hibernacula	No	No
Bat Maternity Colonies	No	No
Turtle Wintering Area	No	No
Reptile Hibernaculum	No	No
Colonially-Nesting Bird Breeding Habitat (Bank and Cliff)	No	No
Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs)	No	No
Colonially-Nesting Bird Breeding Habitat (Ground)	No	No
Migratory Butterfly Stopover Areas	No	No
Landbird Migratory Stopover Areas	No	No
Deer Yarding Areas	No	No
Deer Winter Congregation Areas	No	No
Cliffs and Talus Slopes	No	No
Sand Barren	No	No
Alvar	No	No
Old Growth Forest	No	No
Savannah	No	No
Tallgrass Prairie	No	No
Other Rare Vegetation Communities	No	No
Waterfowl Nesting Area	No	No
Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat	No	No
Woodland Raptor Nesting Habitat	No	No
Turtle Nesting Area	No	No
Seeps and Springs	No	No
Amphibian Breeding Habitat (Woodland)	No	No
Amphibian Breeding Habitat (Wetlands)	No	No

Table 4: Significant Wildlife Habitat within the Study Area		
Specialized Wildlife Habitat Category	Candidate Significant Wildlife Habitat (Y/N)	Confirmed Significant Wildlife Habitat (Y/N)
Woodland Area-Sensitive Bird Breeding Habitat	No	No
Marsh Bird Breeding Habitat	No	No
Open Country Bird Breeding Habitat	No	No
Shrub/Early Successional Bird Breeding Habitat	No	No
Terrestrial Crayfish	No	No
Special Concern and Rare Wildlife Species	No	No
Amphibian Movement Corridors	No	No
Deer Movement Corridors	No	No

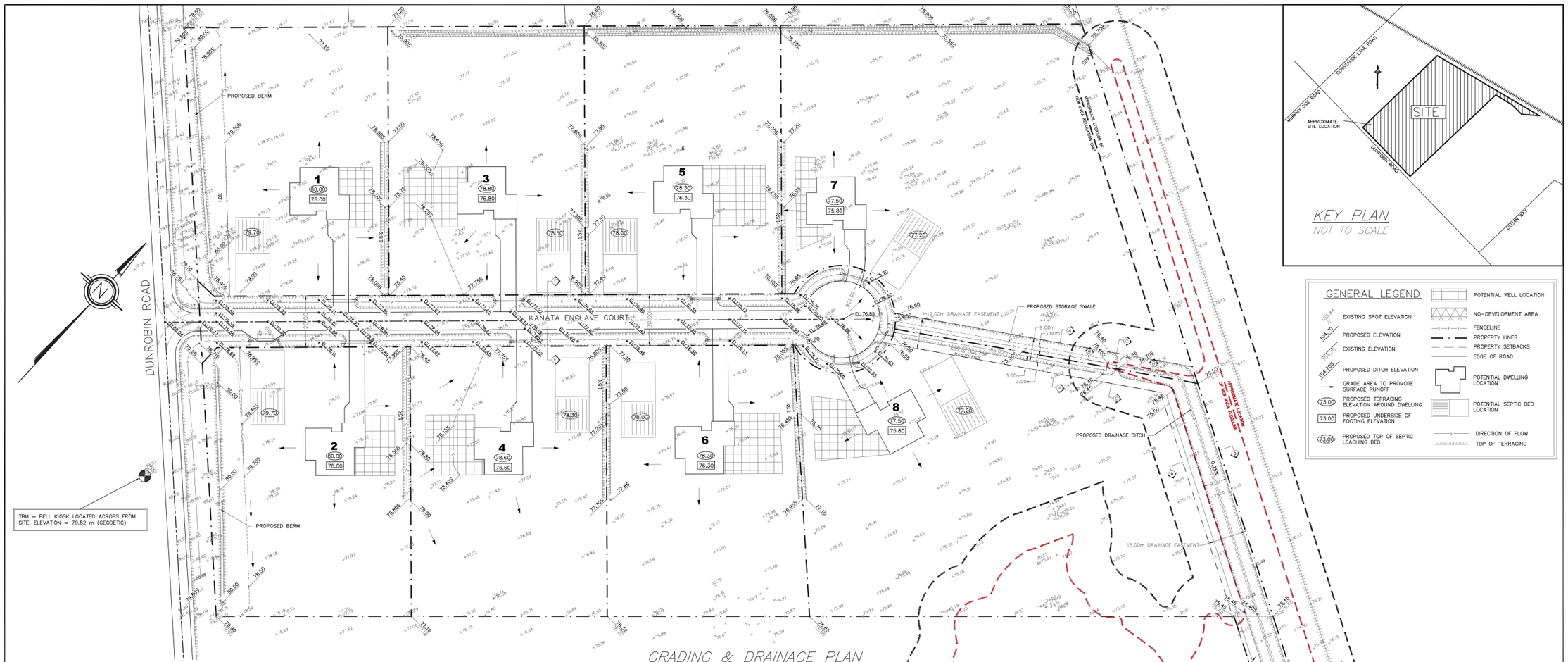
Based on the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF, 2015), no Candidate or Confirmed SWH was determined to be present within the study area. The study area primarily consisted of historically disturbed areas with non-native regenerative growth.

4.0 DESCRIPTION OF THE PROPOSED PROJECT

As per the PPS, development is defined as "…the creation of a new lot, a change in land use, or the construction of buildings and structures requiring approval under the Planning Act…". The proposed development within the study area involves the following:

- Clearing of approximately 8.91 ha of the study area to convert into eight (8) residential properties (lots). The eight (8) proposed lots range from 0.8 ha to 1.94 ha in area with varying frontage along the boundaries of the study area. Two of the proposed lots (7 and 8) will have frontage along the east side of Dunrobin Road;
- Construction of single-family dwellings on each lot with associated septic beds and wells;
- Widening of the east side of Dunrobin Road by 0.3 m where the study area has frontage;
- Construction of a new municipal road for access to the proposed lots. This will extend eastward from Dunrobin Road with four lots on the north and south sides of the new municipal road. The road will also include ditch lines along the margins that will drain into the proposed drain in the eastern end of the study area;
- Construction of a drainage ditch from the eastern end of the proposed municipal road to convey runoff and stormwater along the northeastern boundary of the study area, through the eastern extension of the study area, and into Harwood Creek. The drainage ditch will have shallow 4:1 slopes and a 250 mm perforated subdrain underground which will outlet into Harwood Creek. Rip Rap will be installed at the outlet of the drainage ditch into Harwood Creek, matching the grade of the existing watercourse bank. The rip rap will be placed on the bank as well as in-stream. The drainage ditch will also include an entrance crossing with a 0.3 m corrugated steel pipe (CSP) culvert at an existing entrance to the decommissioned railway corridor approximately 90 m west of Harwood Creek. A nine (9) m wide storage swale will be constructed parallel with the drainage ditch with varying shallow slopes and buried perforated subdrains surrounded by clear stone to attenuate water to the drainage ditch. A berm will be constructed between the swale and the drainage ditch;
- The majority of proposed Lots 7 and 8 are to be filled. This includes the extent of regulated floodplain areas within the study area. These areas consist of approximately 3.95 ha of the study area. A clay berm will be constructed where the existing surface water enters the study area and causes seasonal flooding, and
- Installation of post-and-wire fences around the entire study area boundaries.

Refer to Figure 5 for an outline of the proposed development. The proposed development must be assessed for potential impacts to natural heritage features found in and adjacent to the study area.

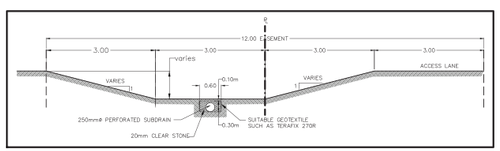


GRADING & DRAINAGE PLAN
SCALE = 1:750

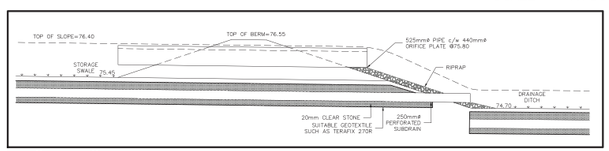
KEY PLAN
NOT TO SCALE

GENERAL LEGEND

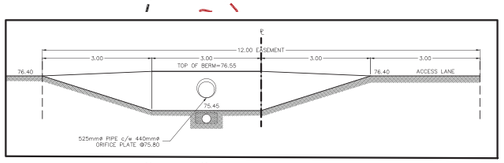
- EXISTING SPOT ELEVATION
- PROPOSED ELEVATION
- EXISTING ELEVATION
- PROPOSED DITCH ELEVATION
- GRADE AREA TO PROMOTE SURFACE RUNOFF
- PROPOSED TERRACING ELEVATION AROUND DWELLING
- PROPOSED UNDERSIDE OF FOOTING ELEVATION
- PROPOSED TOP OF SEPTIC LEACHING BED
- POTENTIAL WELL LOCATION
- NO-DEVELOPMENT AREA
- FENCELINE
- PROPERTY LINES
- PROPERTY SETBACKS
- EDGE OF ROAD
- POTENTIAL DWELLING LOCATION
- POTENTIAL SEPTIC BED LOCATION
- DIRECTION OF FLOW
- TOP OF TERRACING



"A–A" PROPOSED STORAGE SWALE SECTION
NOT TO SCALE



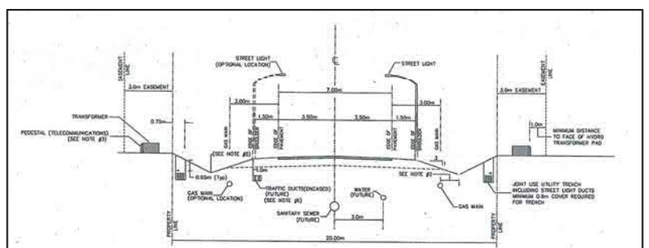
"B–B" PROPOSED DRAINAGE DITCH PROFILE
NOT TO SCALE



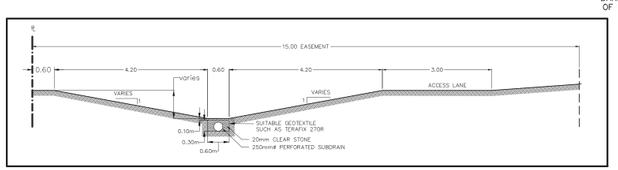
"C–C" ORIFICE DETAIL
NOT TO SCALE

GRADING & DRAINAGE NOTES

1. Finished grade to slope away from proposed and existing buildings at a minimum of 2% grade for the first 5.0 metres from building. Grade elevations are as indicated.
2. All roadside ditches, swales and exposed drainage channels to be treated with 75mm of topsoil and seeded/mulched or hydroseeded as soon as possible. (Unless noted otherwise)
3. All materials and construction methods to be in accordance with the City of Ottawa.
4. All disturbed areas to be reinstated to the satisfaction of the engineer and the City of Ottawa.
5. The owner (and/or Contractor) agrees to prepare and implement an erosion and sediment control plan at least equal to the stated minimum requirements and to the satisfaction of the City of Ottawa and the Mississippi Conservation, appropriate to the site conditions, prior to undertaking any site alterations (filling, grading, removal of vegetaiton, etc…) and during all phases of site preparation and construction in accordance with the current Best Management Practices for Erosion and Sediment Control such as but not limited to installing a light duty silt fence barrier as shown of Kollaard Associates Inc. dwg. No. 070415-3 (Erosion & Sediment Control Plan).
6. Match existing elevations at all exterior property lines. Ensure positive drainage whether indicated or not.
7. All lots to be graded to allow positive drainage away from tile beds and dwellings consistent with the drainage patterns outlined on this plan. All isolated low areas are to be eliminated.
8. Undersides of footing and terrace elevations have been set for grading drainage purposes only. Builders should consult the geotechnical report for the subdivision prior to construction. Builders should obtain a subgrade inspection report from qualified engineer prior to concrete placement.
9. Driveway entrance culverts to will consist of non-perforated 12.00 METRE – 600mm Ø Corrugated Steel Pipel.
10. Roadway subgrade shall be inspected by a licensed Geotechnical engineer prior to the placement of granulars.
11. All drainage easements, road side ditches, and property line swales with slopes one percent (1%) or less require a subdrain (see typical detail).
12. Subdrain cover material to consist of a sand/peat mixture capable of supporting vegetative growth.



"F–F" PROPOSED ROAD SECTION
NOT TO SCALE



"D–D" PROPOSED DRAINAGE DITCH SECTION
NOT TO SCALE

NOTE:
1. All dimensions are in metres.
2. All elevations are in metres and are based on a geodetic benchmark. TBM = Bell kiosk located sout/westh side of Dunrobin Road, across from proposed lot #2 , elevation = 79.82 m (geodetic)
3. This drawing does not represent a legal survey.
4. Finished grade to slope away from proposed building at a minimum of 2%. Grade elevations are as indicated.
5. All dimensions to be verified on site by contractor prior to construction.
6. All materials and construction methods to be in accordance with City of Ottawa Standards and Ontario Provincial Standards and Specifications.
7. All disturbed areas to be reinstated to the satisfaction of the engineer and the City of Ottawa.
8. The owner (and/or Contractor) agrees to prepare and implement an erosion and sediment control plan at least equal to the stated minimum requirements and to the satisfaction of the City of Ottawa, appropriate to the site conditions, prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and during all phases of site preparation and construction in accordance with the current Best Management Practices for Erosion and Sediment Control.
9. Any changes made to this plan must be verified and approved by Kollaard Associates Inc.

No.	REVISION	DATE	BY
0	ISSUED FOR SUBDIVISION APPROVAL	SEP. 23/2021	SD/ML

Kollaard Associates Engineers
BOX 189
210 PRESCOTT STREET
KEMPTVILLE, ONTARIO
K0G 1J0
FACSIMILE (613) 258-0475
(613) 860-0923

LICENSED PROFESSIONAL ENGINEER
SEPT. 23, 2021
S.E. deWit
100079612
PROVINCE OF ONTARIO

DESIGN	KL/SD/BK
CHECKED	SD
DRAWN	PV/RR/ML
CHECKED	SD
APPROVED	SD

SCALE
1:750
0 10 30
5 20

PROJECT LOCATION	2050 DUNROBIN ROAD, CITY OF OTTAWA, ONTARIO
CLIENT NAME	ZBIGNIEW HAUDEROWICZ
PROJECT NAME	PROPOSED RESIDENTIAL SUBDIVISION
DRAWING	GRADING & DRAINAGE PLAN
PROJECT No.	200977
DRAWING No.	200977-GRD
DATE	MARCH 09, 2021
SHEET SET	

Figure 5: Site Plan

5.0 IMPACT ASSESSMENT & RECOMMENDATIONS

The following sections outline and assess any potential impacts that are expected as a result of the proposed development. Recommendations for mitigation measures to avoid these impacts are outlined in Section 6.0 of this report.

5.1 Natural Heritage System Components

Although the study area and proposed development are located within 85 m of the Shirley's Bay ANSI (east of the study area), no Natural Heritage Systems are present directly within the study area. A decommissioned railway corridor is situated between the study area and the Shirley's Bay ANSI which is anticipated to act as a buffer between the study area and the ANSI. No work is proposed within Natural Heritage Systems. It is not anticipated that the proposed development will negatively impact the Shirley's Bay ANSI or other Natural Heritage Systems.

The proposed development is located > 120 m of any wetlands including the unevaluated wetland to the south of the study area (located 130 m from the study area). No wetlands were identified within or adjacent to the study area during the field investigations. The proposed development is not anticipated to cause negative impacts to wetland systems.

5.2 Landforms, Soils, and Geology

The property contains minimal landform types according to the *City of Ottawa Official Plan* (2003). Regulation Limits for Harwood Creek's floodplain that contributes to non-evaluated and locally significant wetlands are located within the northeast end of the study area. Impacts to this feature will be further discussed in **Section 5.3**. No other significant landforms or geology were noted within or adjacent to the study area.

5.3 Surface Water, Groundwater, and Fish Habitat

The property contains floodplain areas that are regulated by MVCA. According to Kollard Associates (2021), these areas are considered backwater areas of Harwood Creek which do not contribute to the storage capacity of Harwood Creek. As part of the development, the floodplain will be reconfigured to the proposed drainage ditch and the existing depression along the decommissioned rail corridor. The drainage ditch will include a storage swale to capture storm water which will attenuate through clear stone and perforated subdrains. The water will be captured within the swale prior to entry (via subdrains) into Harwood Creek by the construction of a berm between the swale and drainage ditch. The drainage ditch will consist of constructed depression lined with rip rap where water will outlet from the perforated subdrains. The drainage ditch will extend from the eastern end of the proposed cul-de-sac along the existing off-road vehicle trail. The drainage ditch will outlet at the off-road vehicle crossing on the north bank of Harwood Creek. The outlet will be lined with rip rap to stabilize the existing eroded bank. The existing trail does not contribute to the backwater area of the floodplain and consists of a disturbed off-road vehicle trail. Based on the proposed development and the analysis by Kollaard Associates (2021), there will be no risk of flood during various storm events, including the 100-year storm events provided there are no extraneous circumstances such as damming of the creek downstream. Assuming approval from MVCA, the construction of a drainage ditch with storage swales and berms is not anticipated to negatively impact the backwater floodplain of Harwood Creek.

Fish habitat in Harwood Creek consists of specialized baitfish spawning (including White Sucker) throughout the watercourse in the study area. The off-road vehicle access has caused eroded banks directly upstream of a beaver dam/debris. This area is where the proposed outlet for the drainage ditch will be installed. Rip rap will be installed on the north bank for stabilization and the off-road vehicle crossing will no longer be present. The rip rap, although not suitable for spawning for most species present in Harwood Creek, will improve bank stability (leading to better water quality) and may provide interstitial spaces (cover) for small species of fish. This is anticipated to create a positive impact on fish habitat in the study area.

Storm water calculations provided by Kollaard Associates (2021) indicated that the post-development release rate from the entire catchment area will be less than the pre-development runoff rate for the design storm events. In conjunction with the attenuation designs (i.e., swale, berm, perforated subdrains), the drainage ditch is anticipated to improve the water quality of runoff during storm events which enter Harwood Creek. This is anticipated to create a positive impact on fish habitat in the study area.

5.4 Vegetation Cover

The majority of the vegetation present in the property consists of non-native regenerative growth from previous disturbance (see Figure 3). The majority of the study area consists of Buckthorn Deciduous Shrub Thicket Type (THDM2-6), dominated by common buckthorn which is a non-native/invasive plant designated as a 'Noxious Weed' under the Weed Control Act (2015). The wooded poplar area along the northern boundary of the property also indicates historical clearing as poplars are considered pioneer species (typically one of the first tree species to colonize a recently cleared area). The vegetation communities in the property indicate characteristics of a historically disturbed area with abundant clearing and evidence of frequent recreational vehicle activity. No significant woodlands or other vegetation communities were identified within or adjacent to the study area. Therefore, it is not anticipated that the clearing of the property will have negative impacts on any significant vegetation or vegetation communities.

5.5 Habitat for Species at Risk

5.5.1 Plants

Suitable habitat is available for Butternut within the proposed development. However, no Butternuts were identified within the study area or within 50 m of the study area. No impacts to this species are anticipated to occur as part of the development. However, if a Butternut is observed prior to construction (i.e., sprouts from the time of the submission of this report and the beginning of proposed development works), it will require a Butternut Health Assessment (BHA) to determine whether the Butternut(s) are retainable for the recovery of the species.

5.5.2 Insects

Monarchs were observed within the study area in the open meadow where common milkweed and other wildflowers are present. Due to their status as 'Special Concern' under the ESA and SARA, Monarchs are not afforded habitat protection. The development of this area is anticipated to remove Monarch habitat from the study area. However, as part of the site plan, the drainage ditch will be entirely seeded with native, locally appropriate plants which will include wildflower species which Monarchs can utilize for various life processes. Therefore, the

proposed development is anticipated to only have a temporary impact on Monarchs. Mitigation measures and recommendations for reinstating some of the habitat removed as part of the proposed development are discussed in Section 6.0.

5.5.3 Turtles

Migratory habitat for Blanding's Turtles is available through the study area following Harwood Creek. Category 2 and 3 Blanding's Turtle habitats are present within the eastern half of the study area, spanning approximately 4.11 ha of the study area. These areas may also contain other SAR turtles (i.e., Common Snapping Turtle). Overwintering habitat for Blanding's Turtle is not present within the watercourse associated with the study area. No nesting habitat is present within the study area. Suitable habitat for these life processes of this species is available outside of the study area. An elemental occurrence of Blanding's Turtle was identified within 2 km of the study area (within 200 m according to MECP). It is unlikely that the Blanding's Turtle exists in high densities within the study area due to limited habitat available and function the habitat provides (migratory corridor only). Common Snapping Turtles may be present in the watercourse habitat within the study area for similar purposes (migratory corridor). Consultation with the Ottawa District of MECP must be initiated due to the confirmed presence of Category 2 and 3 Blanding's Turtle Habitat within the study area. An Information Gathering Form (IGF) will be concurrently submitted to MECP for review of the project.

The construction of the new residential road and cul-de-sac is not likely to impact Blanding's Turtles as it is not a through road and traffic is not anticipated to be in high volume (eight residential properties). Vehicles are not crossing over Harwood Creek and the construction of the new road is not within any habitat that serves important functions for turtles, despite being located in Category 3 Blanding's Turtle habitat. The speed limit on the new road will be low (i.e., 20 km/h maximum). The new road is not anticipated to cause negative impacts to Blanding's Turtles or other SAR turtles (i.e., road mortalities).

The project will include construction of the drainage ditch with rip rap installed at the outlet (on the watercourse bank and in-stream). Any excavation or heavy equipment use in the watercourse within the study area, conducted between June 1 and September 15, has the potential to harm travelling Blanding's Turtles and other SAR turtles that utilize the watercourse. As such, mitigation measures should be employed to protect SAR and their habitat during construction and to maintain compliance with the ESA. The drainage ditch will have a storage swale and berm which will attenuate storm water before it drains into Harwood Creek. If the entirety of this drainage ditch is seeded with a suitable seed mix (e.g., natural retention basin mix), this will offset temporary impacts to the functions of the migratory turtle habitat. Seeding the drainage ditch with native, locally appropriate plants is anticipated to provide improved seasonal foraging areas for Blanding's Turtles. Although approximately 0.23 ha of Category 2 habitat will be impacted due to the construction of the drainage ditch, the improved water quality through attenuation, bank stabilization, and appropriate seeding of the entire drainage ditch is anticipated to offset these temporary impacts. Overall, the impacts to Blanding's Turtle habitat and other SAR turtle habitat are anticipated to be temporary and enhancements to turtle habitat is anticipated through the design of the drainage ditch. Assuming approval from MECP, the proposed works are not anticipated to cause negative impacts to SAR turtles.

5.5.4 Birds

Potential breeding habitat for Bobolink, Eastern Meadowlark, and Grasshopper Sparrow (as well as other potential general habitat for Loggerhead Shrike and Short-eared Owl) is present directly adjacent to the study area on the west side of Dunrobin Road. Habitat specifically for Eastern Meadowlarks within this area was confirmed through the 2021 field investigations. No work is proposed to occur within SAR grassland bird habitat as part of the project scope. Disturbance to adjacent habitat (i.e., the study area) during breeding may occur; however, traffic and anthropogenic disturbances are common throughout the study area and it is likely that the Eastern Meadowlarks nesting within adjacent pastures are acclimatized. It is not anticipated that the proposed project works will negatively impact SAR grassland birds.

5.6 Wildlife & Significant Wildlife Habitat

5.6.1 Migratory and Non-migratory Birds

A total of 32 species of migratory birds and five (5) non-migratory birds were observed to be possible breeders within the study area during the 2020/2021 field investigations (Table 3). As detailed information on the bird species (migratory birds, provincially protected birds, and birds not afforded protection) is available for the study area based on the findings of the 2020/2021 field investigations, a nesting window reflective of the species known to occur within the study area has been recommended for this location. The Birds Canada Nesting Calendar Query Tool (Hussel and Lepage, 2015) was used to determine the most appropriate nesting period based on the individual bird species known to utilize the study area for the purposes of nesting (Figure 6). The nesting calendar query tool utilizes a very large data set collected over decades by the Canadian Wildlife Service, Birds Canada, and other agencies to calculate the dates when individual species are most likely to be actively nesting within a given geographic area. The core nesting period for birds within the study area is approximately April 15 to September 15 (i.e., the period when most birds are anticipated to be actively nesting). It is important to note that several species (i.e., American Tree Sparrow etc.) were not included in the nesting query as they do not nest within or directly adjacent to the study area (i.e., breeds in arctic tundra and migrates through the study area, etc.) or they are not anticipated to be encountered (i.e., specific habitat wetland is required for the American Bittern) during vegetation removals based on observations made during the 2020/2021 field investigations. Provided that the appropriate mitigation measures are implemented during construction, such as timing of vegetation clearing outside of the core nesting period (see Section 6.0), it is not anticipated that the proposed works will negatively impact migratory birds or other wildlife species as there.

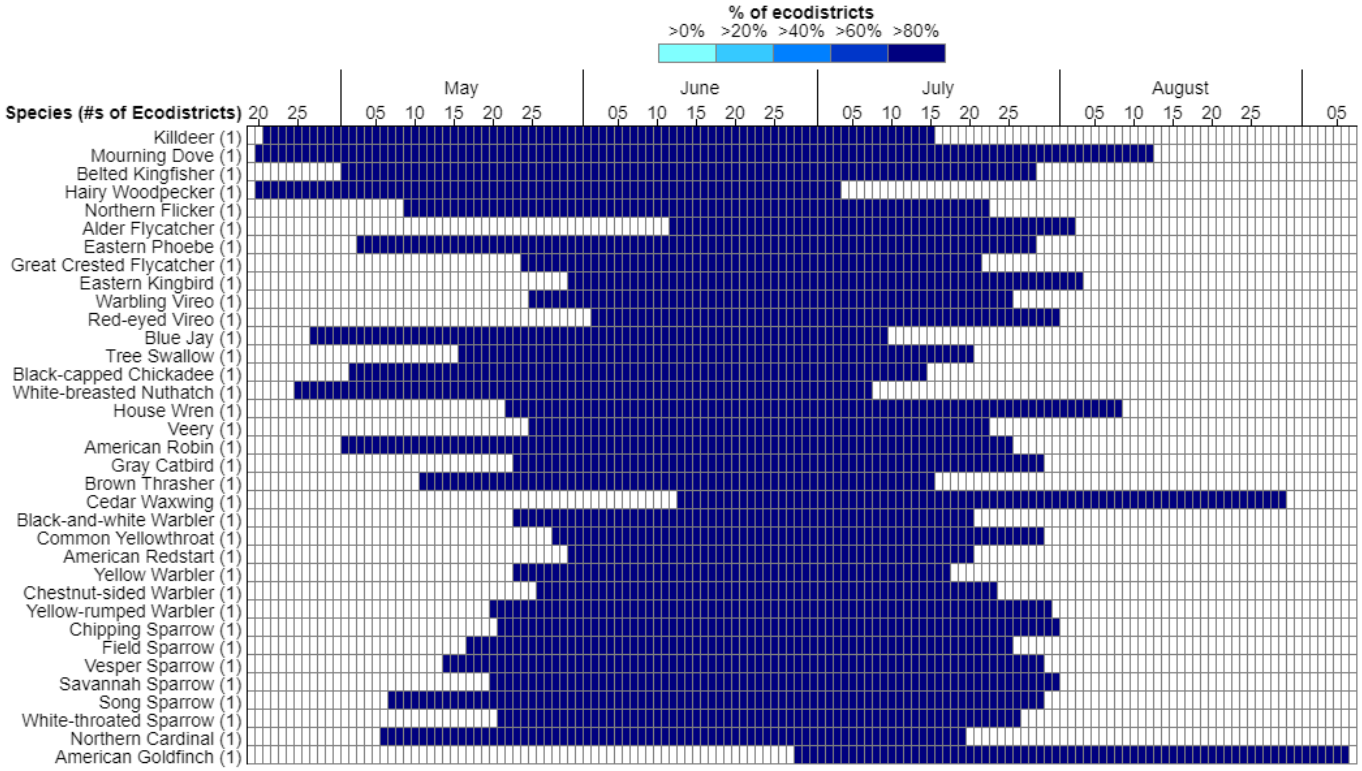


Figure 6: Bird Nesting Period by Species for the Study Area (Hussell and Lepage, 2015) Based on Species Known to Nest within the Study area

5.6.2 Significant Wildlife Habitat

No Significant Wildlife Habitat was determined to be present in or adjacent to the study area. No negative impacts to Significant Wildlife Habitat are anticipated to occur due to the proposed development.

5.7 Wildland Fire Risk Assessment

According to Section 3.1.8 of the PPS, 2014, "Development shall generally be directed to areas outside of lands that are unsafe for development due to the presence of hazardous forest types for wildland fire. Development may, however, be permitted in lands with hazardous forest types for wildland fire where the risk is mitigated in accordance with wildland fire assessment and mitigation standards."

Wildland fire assessment is necessary to determine the presence or absence of forest types associated with the risk of high to extreme wildland fire. Recommended mitigation techniques are designed to disrupt that principle of combustion by eliminating one or more of the three necessary elements of fire (heat, oxygen and fuel). They do so by minimizing the opportunity for ignition of new fires from embers; reducing the potential for direct flame contact from approaching wildland fires; and reducing the effects of radiant heat from an approaching wildland fire by reducing the opportunity for crown fire potential (MNRF, 2016b).

The woody species composition (refer to Section 3.5), condition (i.e., deciduous tree line and thicket, etc.), and health (i.e., low occurrence of insect or diseased trees), within the study area, characterizes the woodland within

the study area as not a hazardous forest type. Therefore, further risk assessment and mitigation measures are not required.

5.8 Identifying Cumulative Impacts

Based on the proposed development, there will be a net loss of trees within the study area. These trees are not deemed as high value or form significant vegetation communities, wildlife habitat, or other significant natural heritage features. It is recommended that the current site plan include compensation tree planting in order to partially mitigate cumulative impacts at a local site level through the loss of native tree species (Appendix A).

Net loss to Category 2 and 3 Blanding's Turtle habitats is also anticipated as part of the proposed development. The mitigation measures proposed in this report will serve to protect individual turtles; however, approximately 4.11 ha of their habitat will be removed as part of the proposed development. These areas do not serve as functional habitat for Blanding's Turtles or other SAR turtles as Harwood Creek is considered only migratory habitat. As such, the 0.23 ha for Category 2 habitat that is being temporarily impacted by the construction of the drainage ditch will be enhanced to provide suitable seasonal foraging habitat for Blanding's Turtles. MECP consultation is required to discuss further mitigation measures and enhancements in order to reduce the impact on SAR turtles or compensate for the loss of their habitat.

The floodplain within the study area will be permanently altered. However, as discussed in Section 5.3, the alteration is not anticipated to have negative impacts on the natural drainage or fish habitat within or outside the study area. It is not anticipated that cumulative negative impacts on a wider landscape context will occur as part of the development if the mitigation measures are followed.

6.0 RECOMMENDATIONS

In order to minimize or eliminate environmental impacts and to help achieve ecological and environmental improvements from the proposed construction and development, the following mitigation measures are recommended. These recommendations are general due to the lack of proposed site alteration as part of the lot severances. The recommendations are not comprehensive and are to be modified and expanded upon based on the impact assessment of any future development of the lot severances.

6.1 Surface Water, Groundwater, and Fish Habitat

Due to alterations within a fish-bearing watercourse as well as alterations within 30 m of Harwood Creek, the following mitigation measures are proposed to reduce impacts to fish and fish habitat.

- MVCA must be consulted to determine the most up-to-date floodplain mapping within the study area. Once this has been determined, MVCA will require permitting under Ontario Regulation (O. Reg.) 153/06 Mississippi Valley Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses to alter floodplain, shoreline, and substate associated with Harwood Creek which are within 'Regulation Limits';
- All lands cleared as part of future developments should be revegetated as soon as practicable to stabilize disturbed soils and prevent the mobilization of sediment-laden surface runoff into the Harwood Creek;
- An erosion and sediment control (ESC) plan should be developed and all applicable measures to mitigate erosion and sediment transport to Harwood Creek, should be implemented and maintained until disturbed soils are stabilized by successful revegetation or other permanent means of soil stabilization;
- All stockpiles of erodible construction materials and excess or surplus materials within 30 m of a waterbody shall be protected from erosion;
- Erosion and sediment control measures shall be inspected for effectiveness regularly throughout construction and deficiencies corrected;
- Based on the proposed development (i.e., installation of a drain and altering a watercourse) and current DFO policy, a DFO Request for Review must be submitted prior to the proposed;
- Minimize the duration of in-water work. To reduce impacts to fish in Harwood Creek, any in-water work must be conducted from July 1 to March 14, as per the MNR Work In-Water Timing Guidelines for Southcentral Region (2001). When possible, schedule work to avoid wet and rainy periods that may increase the risk of erosion and sedimentation. All in-water work shall be conducted in the dry to avoid introducing suspended sediment into the watercourse;
- Work below the high-water mark will be conducted under isolated conditions (i.e., isolated from the watercourse through the use of cofferdams, etc.) to prevent the mobilization of sediment within the watercourse. Work activities within the isolated area will follow the removal of fish from the isolated area by a qualified professional and fish will be released downstream of the work area;
- Plan access points to minimize the amount of riparian vegetation lost or disturbed;
- Develop a spill response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance. All spills of deleterious substances (as defined by the Fisheries Act) must be reported to the Ontario Spill's Action Center (https://www.ontario.ca/page/report-pollution-and-spills)

AND DFO (FisheriesProtection@dfo-mpo.gc.ca) if the spill results in the Harmful Alteration, Disruption or Destruction (HADD) fish habitat or death of fish An emergency spill kit shall be kept on-site at all times;

- In-water and near-water work shall be monitored daily to ensure mitigation measures (e.g., sediment and erosion control measures, work area isolation measures) are properly implemented, functioning as intended, and maintained as required during the work period, and
- Should a dam and pump system be employed to maintain flow around the work area, fish screens will be installed on all pump intakes as described in the DFO Freshwater Code of Practice: End-of-Pipe Fish Protection (2020).

6.2 Vegetation Cover

To mitigate the cumulative and long-term impacts to the study area and adjacent areas, the following principles should be implemented during the proposed development.

- Natural areas to be retained are to be isolated by sturdy construction fencing or similar barriers at least 1 m in height during any future construction in order to ensure their retention;
- To prevent the introduction and spread of invasive plant species into the site, equipment utilized during any future construction should be inspected and cleaned in accordance with the Clean Equipment Protocol for Industry (Appendix E);
- It is recommended that the Draft Invasive Common (European) Buckthorn (Rhamnus cathartica): Best Management Practices in Ontario (Anderson, 2012), included in Appendix F, are utilized when clearing the Buckthorn Deciduous Shrub Thicket Type (THDM2-6) area;
- Replace vegetative cover with topsoil and seed. It is recommended that a permanent seed mix comprised of primarily native species be utilized for all re-vegetation activities within the study area, watercourses, and riparian areas. This may include but is not necessarily limited to:
    - The Northern Ontario Mix offers similar qualities for re-establishment within a roadside environment (and reduced long-term maintenance). This mix contains mostly native species, with some non-native legumes included to help with the establishment of the planting This mix should be utilized in all areas that are not part of the drainage ditch;
    - Alternatively, a seed mix such as the OSC Rural Ontario Roadside Native Seed Mixture 8145 (https://www.oscseeds.com/product/rural-ontario-roadside-native-mixture-8145/) may also be utilized, as this seed mix contains a variety of native plant species able to establish and grow within a roadside environment;
    - A natural retention basin seed mix should be utilized when seeding the drainage ditch and the associated swales and berms. This will provide appropriate retention and attenuation of surface waters prior to draining into Harwood Creek;
- If there is insufficient time in the growing season for the seed to sprout, the site shall be stabilized with temporary erosion and sediment control measures and seeded in the following spring. It is important to note that many of the seed mixes outlined above are best established through fall seeding to allow normal dormancy and then germination the following spring as these species are adapted to the Ontario environment;

- It is recommended that cover be utilized for areas where seeding is required, given the sensitivities associated with the study area. Recommended covers include:
    - Straw mulch (where conditions permit);
    - Bonded Fiber Matrix or Fiber Reinforced Matrix (where conditions permit);
    - Erosion control blankets made of natural fiber (i.e., with no nylon or synthetic netting/materials etc.);
- Herbicides will not be used unless to control noxious and/or invasive plants such as common buckthorn;
- It is recommended that only locally appropriate native species be used for landscaping within the subject property. This would contribute to re-establishing native plants within the wider landscape and potentially have a positive impact for biodiversity (i.e., using native species for pollinators such as Monarchs and bees). Disturbed areas should be replanted with locally grown native species. The use of non-native plant material should be discouraged. Locally appropriate, native species of trees can include, but are not limited to:
    - Large trees: black cherry (Prunus serotina), bur oak (Quercus macrocarpa), eastern white pine (Pinus strobus), red maple (Acer rubrum), paper birch (Betula papyrifera), red oak (Quercus rubra), sugar maple, tamarack (Larix laricina), white elm, and white spruce, and
    - Small trees (smaller specimens that are considered shrubs, but are also considered trees when larger): alternate-leaved dogwood (Cornus alternifolia), American mountain-ash (Sorbus americana), Bebb willow (Salix bebbiana), Canada plum (Prunus nigra), downy hawthorn (Crataegus mollis), and downy serviceberry (Amelanchier arborea).

6.3 Habitat for Species at Risk

Due to the presence of Category 2 and 3 Blanding's Turtle habitats within the study area, the following mitigation measures are recommended.

- The MECP must be consulted prior to the proposed development for consultation on Category 2 and 3 Blanding's Turtle habitats. Upon the direction of the City of Ottawa, the proposed development does require an Information Gathering Form (IGF) to be submitted and reviewed by MECP for altering the habitat of a 'Threatened' species under the ESA. The IGF will be submitted to gather background information related to the Blanding's Turtle habitats within the proposed development. The MECP will provide information and guidance regarding SAR and their habitat including specific protocols to follow to gather existing conditions suitable for SAR, confirmation of SAR presence, and legislative requirements for alterations of SAR habitat. Permitting, exemptions, and approvals may be required for altering Blanding's Turtle habitat after MECP has reviewed the IGF;
- Timing of Road Construction Work: In-water work within Category 2 Blanding's Turtle Habitat is anticipated. No in-water work shall be conducted within watercourse habitat during the active turtle period from May 1 to September 15 of any year, unless the area has been cleared of turtles by a qualified biologist;
- Exclusion Measures to Prevent Turtle Nesting in the Work Area: Temporary turtle exclusion barriers should be installed by May 1, prior to the turtle nesting season, at the work locations where soils are stockpiled. This will reduce the likelihood of drainage ditch and road installation work harming or killing turtle eggs, by preventing turtles from accessing and nesting within the work zone. Temporary turtle

exclusion measures should be maintained until July 15 (i.e., the end of the period when turtle lay their eggs):

- All stockpiled topsoil, sand and gravel must be completely encircled with silt fence or completely covered with geotextile to prevent turtles from accessing and nesting in the materials between May 1 and July 15 of any year;
- "Heavy-duty" silt fence, particularly those with reinforced nylon netting, should not be used during construction, as they have the potential to trap and kill large-bodied snakes (MNR, 2013b);
- All temporary turtle exclusions measures must be removed after the work has been completed;

- The seed mixes suggested in Section 6.2 for seeding disturbed areas should include a variety of native wildflowers, including milkweed, to promote suitable habitat for the life processes of Monarchs, and
- If any SAR are observed during construction, all work within the work area should cease and the local MECP management biologist should be contacted (Ottawa District Office: 613-521-3450).

6.4 Wildlife and Significant Wildlife Habitat

To mitigate the cumulative and long-term impacts to the study area and adjacent areas, the following mitigation measures for wildlife should be implemented during the proposed development.

- In accordance with the MBCA, any required removal of vegetation should be completed prior to or after the bird nesting period of April 15 to September 15 of any given year to ensure migratory birds or their nests are not adversely impacted. In the event that vegetation removal will be required prior to September 15, but later than April 15, a visual inspection of the areas to be cleared should be conducted by a qualified avian specialist before disturbance to ensure that no birds are using the area for the purposes of nesting. Note: The Canadian Wildlife Service does not support relying on inspections for migratory bird nests in such habitats due to the difficulty of locating all nests and risk to birds; therefore, it is always a better option to clear vegetation outside of the breeding bird period. If migratory bird breeding and/or nesting activity is encountered at any time of year within the study area, an appropriate setback distance should be maintained from the nest/nesting birds. Works should not continue in the location of the nest until after it has been determined by an avian specialist that the young have fledged and vacated the nest and work areas. This is recommended in order to prevent negative impacts to migratory birds and other bird species, their nests, and eggs, which are protected under the MBCA or the FWCA.

7.0 CONCLUSION

This EIS supports the proposed development of a residential subdivision at 2050 Dunrobin Road, Kanata (City of Ottawa), legally known as Part of Lot 20, Concession 4 in the Geographic Township of March given the mitigation measures recommended in this report are followed. Following the recommended mitigation measures in the report, creation of the lots will not result in negative impacts to floodplain, aquatic habitat, and terrestrial habitat within or adjacent to the study area including quality and quantity of water as per Section 2.2.1 and habitat for endangered species and threatened species as per Section 2.1.7 of the PPS.

The development of the study area requires consultation with regulatory agencies including, but are not limited to the following:

- Mississippi Valley Conservation Authority which will determine if permitting is required based on-site alterations within regulation limits and existing floodplains. MVCA will provide input on development proposals with regards to watershed policies, flood plains and natural hazards, and the natural environment. The conditions of any permit or approval issued by MVCA must be followed;
- Due to the presence of specialized warm-water baitfish habitat within the study area, the DFO will need to review the site plan for development. A Request for Review will be submitted to the DFO following the guidance documents on preparing the form;
- Any in-water work within the study area must be conducted during appropriate timing windows for fish approved by the Kemptville District of the NDMNRF. The timing windows will be implemented to avoid harm to fish and fish habitat, and
- An IGF will be submitted to the MECP to gather background information related specifically to due to the existing Category 2 and 3 habitats for Blanding's Turtles. The MECP will provide information and guidance regarding SAR and their habitat including specific protocols to follow to gather existing conditions suitable for SAR, confirmation of SAR presence, and legislative requirements for alterations of SAR habitat.

8.0 LIMITATIONS

The investigations undertaken by McIntosh Perry with respect to this report and any conclusions or recommendations made in this report reflect McIntosh Perry's judgment based on the site conditions observed at the time of the site inspection(s) on the date(s) set out in this report and on information available at the time of the preparation of this report.

This report has been prepared for specific application to this site, and it is based, in part, upon visual observation of the site and terrestrial investigation at various locations during a specific time interval, as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, or portions of the site which were unavailable for direct investigation.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary.

If you have any questions, comments, or concerns, please do not hesitate to contact the undersigned at McIntosh Perry at 613-903-6137.

Sincerely,
McIntosh Perry Consulting Engineers Ltd.

Erik Pohanka

_____

Erik Pohanka, B. Sc.
Biologist

9.0 REFERENCES

Anderson, H. 2021. Draft Invasive Common (European) Buckthorn (Rhamnus cathartica): Best Management Practices in Ontario. Peterborough: Ontario Invasive Plant Council. 35 p.

Bird Studies Canada, Environment Canada's Canadian Wildlife Service, Ontario Nature, Ontario Field Ornithologists, and Ontario Ministry of Natural Resources. 2020. Breeding Evidence Codes. Ontario Breeding Bird Atlas (OBBA) Website. https://www.bsc-eoc.org/dataentry/codes.jsp?page=breeding. Accessed 18 August 2021.

Bird Studies Canada, Environment Canada's Canadian Wildlife Service, Ontario Nature, Ontario Field Ornithologists, and Ontario Ministry of Natural Resources (OBBA). 2006. Atlas Data Summary. Ontario Breeding Bird Atlas (OBBA) Website. 31 January 2008. http://www.birdsontario.org/atlas/index.jsp. Accessed 18 August 2021.

City of Ottawa. May 2003. Official Plan. City of Ottawa.

City of Ottawa. 2012. Environmental Impact Statements Guidelines. City of Ottawa: Policy Development and Urban Design Branch. 93 p.

City of Ottawa. 2016. Significant Woodlands: Guidelines for Identification, Evaluation, and Impact Assessment. City of Ottawa. 65 p.

City of Ottawa. 2021. geoOttawa- Interactive Mapping Tool. City of Ottawa. Accessed 18 August 2021.

Crins, W.J., P.A. Gray, P.W.C. Uhlig, and M.C. Wester. 2009. The Ecosystems of Ontario, Part 1: Ecozones and Ecoregions. Inventory, Monitoring and Assessment Section. Science and Information Branch. Ontario Ministry of Natural Resources. Ontario, Canada: Queen's Printer for Ontario. 87p.

Ecological Stratification Working Group. 1996. A National Ecological Framework for Canada. Agriculture and Agri-Food Canada, Research Branch, Centre for Land and Biological Resources Research, and Environment Canada. State of the Environment Directorate; Ecozone Analysis Branch, Ottawa/Hull.

Endangered Species Act. 2007. S.O. 2007, c. 6. Current version 21 July 2020.

Fish and Wildlife Conservation Act. 1997. S.O. 1997, c. 41. Current version 10 December 2019.

Fisheries Act. 1985. R.S.C., 1985, c. F-14. Current version 26 July 2021.

Fisheries and Oceans Canada. (DFO). 2020. Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater. Fisheries and Oceans Canada. https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html. Accessed 18 August 2021.

Fisheries and Oceans Canada (DFO). 2021. Aquatic Species at Risk Map. Fisheries and Oceans Canada. https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html. Accessed 18 August 2021.

Hussell, J. and D. Lepage. 2015. Bird Nesting Calendar Query Tool. Project NestWatch. Bird Studies Canada. http://www.birdscanada.org/volunteer/pnw/rnest/warning.jsp?lang=en. Accessed 18 August 2021.

Kollaard Associates. 2021. Stormwater Management Report: Proposed Residential Subdivision, 2050 Dunrobin Road, City of Ottawa. Kollaard Associates. 119 p.

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, South Central Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.

Maxar Technologies. 2021. Google Earth Image. Google Earth Pro. http://www.earth.google.com. Accessed 18 August 2021.

McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry). 2021. Preliminary Environmental Impact Statement: 2050 Dunrobin Road, Kanata, Ontario. McIntosh Perry Consulting Engineers Ltd. 95 p.

Migratory Birds Convention Act. 1994. S.C. 1994, c. 22. Current version 25 August 2020.

Ministry of Natural Resources and Forestry (MNR). 2000. Significant Wildlife Habitat Technical Guide. Toronto: Queen's Printer of Ontario. 151 p.

Ministry of Natural Resources (MNR). 2001. Work-In-Water Timing Guidelines for Southcentral Region, Ministry of Natural Resources (DRAFT). Ministry of Natural Resources and Forestry. Excel document.

Ministry of Natural Resources (MNR). 2010. Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Edition. Toronto: Queen's Printer of Ontario, 248 p.

Ministry of Natural Resources (MNR). 2013a. General Habitat Description for the Blanding's Turtle (Emydoidea blandingii). Toronto: Queen's Printer of Ontario. 7 p.

Ministry of Natural Resources (MNR). 2013b. Reptile and Amphibian Exclusion Fencing: Best Practices, Version 1.0. Species at Risk Branch Technical Note. Ontario Ministry of Natural Resources and Forestry. Peterborough, Ontario. 11p.

Ministry of Natural Resources and Forestry (MNRF). 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E. Toronto: Queen's Printer of Ontario. 39 p.

Ministry of Natural Resources and Forestry (MNRF). 2016a. Survey Protocol for Ontario's Species at Risk Snakes. Toronto: Queen's Printer of Ontario. 26 p.

Ministry of Natural Resources and Forestry (MNRF). 2016b. Wildland Fire Risk Assessment and Mitigation: A Guidebook in Support of the Provincial Policy Statement, 2014 – Draft. Ministry of Natural Resources and Forestry. 78 p.

Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF). 2021a. Make A Map: Natural Heritage Areas. Ministry of Natural Resources and Forestry. http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US. Queen's Printer for Ontario. Accessed 18 August 2021.

Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF). 2021b. Land Information Ontario metadata tool. https://www.ontario.ca/page/land-information-ontario. Queen's Printer of Ontario. Accessed 18 August 2021.

Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF). 2021c. Fish ON-Line. Queen's Printer of Ontario. https://www.gisapplication.lrc.gov.on.ca/FishONLine/Index.html?site=FishONLine&viewer=FishONLine&locale=en-US. Accessed 18 August 2021.

Mississippi Valley Conservation Authority (MVCA). 2017. 2018 Watershed Report Card. Mississippi Valley Conservation Authority. http://mvc.on.ca/wp-content/uploads/2013/07/MVCA-Watershed-Report-Card-Full-FINAL-2018.pdf. Accessed 18 August 2021.

Mississippi Valley Conservation Authority (MVCA). 2021. MVCA Regulation Public Mapping Browser. Mississippi Valley Conservation Authority. http://camaps.maps.arcgis.com/apps/webappviewer/index.html?id=70831905961e470988262c7a703a56af. Accessed 16 August 2021.

Ontario Geological Survey. 2010. Surficial geology of Southern Ontario. Ontario Geological Survey. http://www.geologyontario.mndm.gov.on.ca/mndmaccess/mndm_dir.asp?type=pub&id=MRD128-REV. Accessed 18 August 2021.

Ontario Nature. 2020. Ontario Reptile and Amphibian Atlas: A citizen science project to map the distribution of Ontario's reptiles and amphibians. Ontario Nature. http://www.ontarionature.org/atlas. Accessed 18 August 2021.

Ministry of Municipal Affairs and Housing. 2020. Provincial Policy Statement. Queen's Printer of Ontario. 50 p.

Species at Risk Act. 2002. S.C. 2002, c. 29. Current version 25 August 2020.

Toronto Entomologists' Association. 2020. Ontario Butterfly Atlas. Toronto Entomologists' Association. https://www.ontarioinsects.org/atlas/. Accessed 18 August 2021.

Tree Protection. 2021. By-law No. 2020-340. City of Ottawa.

Wildlife Acoustics Inc. 2021. Echo Meter Touch Bat Detector. Version 2.8.4. Mobile device application. Downloaded July 2021.

APPENDIX A: TREE CONSERVATION REPORT

TREE CONSERVATION REPORT

2050 Dunrobin Road, Kanata, Ontario
MP Project No.: CCO-21-1873

Prepared for:

Zbigniew Hauderowicz
Euroamber
165 Constance Lake Road
Kanata, Ontario
K2K 1X7

Prepared by:

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R. 3
Carp, Ontario
K0A 1L0

TREE CONSERVATION REPORT

2050 Dunrobin Road, Kanata, Ontario

Prepared for:

Zbigniew Hauderowicz
Euroamber
165 Constance Lake Road
Kanata, Ontario
K2K 1X7

Prepared by:

McINTOSH PERRY

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R. 3
Carp, Ontario
K0A 1L0

November 5, 2021

Written by: Erik Pohanka, B. Sc.
Biologist
McIntosh Perry Consulting Engineers Ltd.

Reviewed by: Christian Lyon
Project Manager (Environmental)
McIntosh Perry Consulting Engineers Ltd.

TABLE OF CONTENTS

Figures

Tables

Appendices

1.0 INTRODUCTION

McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) has been retained by the development company Euroamber and the property representative, Zbigniew Hauderowicz, to complete a Tree Conservation Report in support of development in the subject property. The subject property is located at 2050 Dunrobin Road, Kanata (City of Ottawa), and is legally known as Part of Lot 20, Concession 4 in the Geographic Township of March. The subject property is an 8.9-hectare (ha) parcel of land with approximately 230 metres (m) of frontage on the east side of Dunrobin Road, between Lillian Way to the south and Constance Lake Road to the north.

This Tree Conservation Report has been prepared in accordance with the City of Ottawa's Tree Protection (By-law No. 2020-340). The report outlines the condition of all existing vegetation on-site, any impacts of the proposed development on the vegetation, and the associated mitigation measures recommended to minimize impacts and preserve conserved trees.

A tree inventory of the subject property was conducted on May 12, 2021, by McIntosh Perry staff (E. Pohanka, Terrestrial Biologist) to review trees within the study area (where access permitted), including documenting conditions of the vegetation growing in the subject property.

The objectives of the Tree Conservation Report include the following:

- To describe the existing trees that are ≥10 cm diameter at breast height (DBH) growing on-site, including species composition, size (DBH), age, and condition and health of the trees;
- To identify vegetation that will be retained and the rationale to support this decision;
- To assess the impact of the development on the conserved portions of vegetation;
- To describe mitigation measures that will be used to promote the long-term survival of retained trees, and any other measures as required based on the site conditions;
- To describe protection measures being implemented on-site, and
- To provide a planting and/or compensation overview of the impacted tree(s).

2.0 EXISTING VEGETATION

A tree inventory and assessment was conducted by McIntosh Perry staff, (E. Pohanka) on May 12, 2021. The tree inventory and assessment included all trees located within the subject property, as well as trees off-site on adjacent lots which have critical root zones overlapping or potentially overlapping with the subject property. Photos of the tree investigation areas can be found in Appendix A.

The subject property is undeveloped in its entirety, consisting of vegetated areas in a range of successional stages and a watercourse. The subject property contains several natural vegetation communities with a range of shrubs and trees.

The inventory data included tree species identification, a general health condition assessment, and data on tree DBH measurements. All specimens with a DBH of 10 cm or greater were included in the inventory. DBH measurements were taken at approximately 1.4 m above the ground surface at the base of each tree.

The tree health assessment was graded on a scale including Dead, Poor, Fair and Good based on characteristics such as trunk integrity, canopy structure and canopy vigour. Outlined below are the detailed guidelines utilized for the classification/condition rating:

Good: (Healthy)
No major branch mortality: the crown is reasonably normal with less than 25% branch or twig mortality; little to no evidence of decay.

Fair: (Light – Moderate Decline)
Branch mortality, twig dieback in 26-50% of the crown: broken branches or crown missing based on presence of old snags is 50% or less; decay evident.

Poor: (Severe Decline)
Branch mortality, 50% or more of the crown dead: broken branches or crown area missing based on presence of old snags in more than 50%; decay resulting in potential hazard.

Dead:
Tree is dead, standing and is considered a potential hazard to public health and safety.

3.0 TREE RESOURCE DESCRIPTION

The subject property consists mostly of young, regenerative growth that is indicative of a previously disturbed area. Table 1 outlines the inventoried trees that are within the subject property (access was limited to the subject property and the adjacent decommissioned railway corridor to the northeast). The tree inventory included 89 trees within the subject property. The majority of the trees are native deciduous trees, with some non-native deciduous trees (Figure 1).

Table 1: Tree Resource Composition

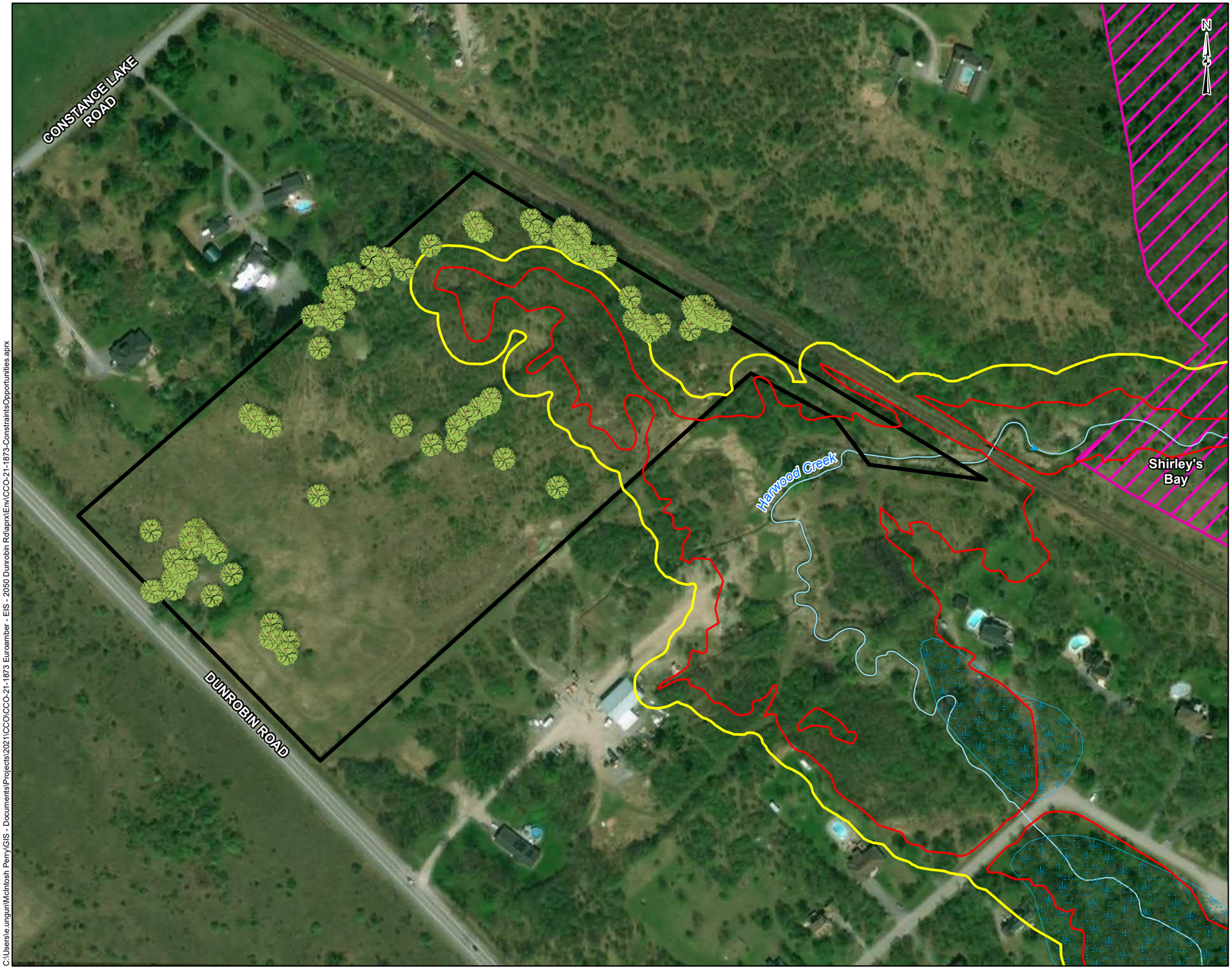
Tree No.[1]	Common Name	Scientific Name	Status	DBH (cm)	Ownership	Condition	Action
1	sugar maple	Acer saccharum	Native	48	On-site	Good	Remove
2	sugar maple	Acer saccharum	Native	30	On-site	Good	Remove
3	bur oak	Quercus macrocarpa	Native	25	On-site	Good	Remove
4	sugar maple	Acer saccharum	Native	24	On-site	Good	Remove
5	sugar maple	Acer saccharum	Native	26	On-site	Good	Remove
6	silver maple	Acer saccharinum	Native	51	On-site	Good	Remove
7	silver maple	Acer saccharinum	Native	51	On-site	Good	Remove
8	eastern red-cedar	Juniperus virginiana	Native	27	On-site	Good	Remove
9	eastern red-cedar	Juniperus virginiana	Native	31	On-site	Good	Remove
10	Manitoba maple	Acer negundo	Non-native	28	On-site	Good	Remove
11	Manitoba maple	Acer negundo	Non-native	19	On-site	Good	Remove
12	Manitoba maple	Acer negundo	Non-native	18	On-site	Good	Remove
13	trembling aspen	Populus tremuloides	Native	18	On-site	Good	Remove
14	Manitoba maple	Acer negundo	Non-native	17	On-site	Good	Remove
15	Manitoba maple	Acer negundo	Non-native	16	On-site	Good	Remove
16	ironwood	Ostrya virginiana	Native	32	On-site	Good	Remove
17	sugar maple	Acer saccharum	Native	33	On-site	Good	Remove
18	white spruce	Picea glauca	Native	48	On-site	Good	Remove
19	basswood	Tilia americana	Native	38	On-site	Good	Remove
20	white elm	Ulmus americana	Native	40	On-site	Good	Remove
21	basswood	Tilia americana	Native	31	On-site	Good	Remove
22	basswood	Tilia americana	Native	29	On-site	Poor	Remove
23	basswood	Tilia americana	Native	56	On-site	Good	Remove
24	white elm	Ulmus americana	Native	24	On-site	Dead	Remove
25	black cherry	Prunus serotina	Native	14	On-site	Good	Remove
26	Manitoba maple	Acer negundo	Non-native	41	On-site	Good	Remove
27	white ash	Fraxinus americana	Native	38	On-site	Poor	Remove

Table 1: Tree Resource Composition							
Tree No.[1]	Common Name	Scientific Name	Status	DBH (cm)	Ownership	Condition	Action
28	common apple	Malus sylvestris	Non-native	56	On-site	Good	Remove
29	common apple	Malus sylvestris	Non-native	52	On-site	Good	Remove
30	common apple	Malus sylvestris	Non-native	39	On-site	Good	Remove
31	common apple	Malus sylvestris	Non-native	34	On-site	Good	Remove
32	white ash	Fraxinus americana	Native	31	On-site	Poor	Remove
34	white elm	Ulmus americana	Native	12	On-site	Good	Remove
35	white ash	Fraxinus americana	Native	13	On-site	Good	Remove
37	white ash	Fraxinus americana	Native	17	On-site	Good	Remove
38	trembling aspen	Populus tremuloides	Native	15	On-site	Good	Remove
39	trembling aspen	Populus tremuloides	Native	14	On-site	Good	Remove
40	trembling aspen	Populus tremuloides	Native	19	On-site	Good	Remove
41	trembling aspen	Populus tremuloides	Native	21	On-site	Good	Remove
42	trembling aspen	Populus tremuloides	Native	29	On-site	Good	Remove
43	white elm	Ulmus americana	Native	14	On-site	Good	Remove
44	hybrid white willow	Salix alba x fragilis	Non-native	20	On-site	Good	Remove
45	white ash	Fraxinus americana	Native	17	On-site	Good	Remove
46	white ash	Fraxinus americana	Native	16	On-site	Good	Remove
47	black cherry	Prunus serotina	Native	21	On-site	Good	Remove
48	white ash	Fraxinus americana	Native	18	On-site	Good	Remove
49	common apple	Malus sylvestris	Non-native	14	On-site	Good	Remove
50	white elm	Ulmus americana	Native	18	On-site	Good	Remove
51	trembling aspen	Populus tremuloides	Native	17	On-site	Dead	Remove
52	trembling aspen	Populus tremuloides	Native	17	On-site	Good	Remove
53	trembling aspen	Populus tremuloides	Native	21	On-site	Good	Remove
54	choke cherry	Prunus virginiana	Native	14	On-site	Good	Remove
55	trembling aspen	Populus tremuloides	Native	15	On-site	Good	Remove
56	trembling aspen	Populus tremuloides	Native	23	On-site	Good	Remove
57	black cherry	Prunus serotina	Native	16	On-site	Good	Remove
58	black cherry	Prunus serotina	Native	15	On-site	Good	Remove
59	trembling aspen	Populus tremuloides	Native	21	On-site	Good	Remove
60	trembling aspen	Populus tremuloides	Native	17	On-site	Good	Remove
61	trembling aspen	Populus tremuloides	Native	23	On-site	Good	Remove
62	trembling aspen	Populus tremuloides	Native	18	On-site	Good	Remove
63	trembling aspen	Populus tremuloides	Native	18	On-site	Good	Remove

Table 1: Tree Resource Composition							
Tree No.[1]	Common Name	Scientific Name	Status	DBH (cm)	Ownership	Condition	Action
64	white elm	Ulmus americana	Native	15	On-site	Good	Remove
65	black cherry	Prunus serotina	Native	17	On-site	Good	Remove
66	black cherry	Prunus serotina	Native	13	On-site	Good	Remove
67	black cherry	Prunus serotina	Native	16	On-site	Good	Remove
68	black cherry	Prunus serotina	Native	19	On-site	Good	Remove
69	black cherry	Prunus serotina	Native	23	On-site	Good	Remove
70	common apple	Malus sylvestris	Non-native	22	On-site	Good	Remove
71	white elm	Ulmus americana	Native	25	On-site	Good	Remove
72	white ash	Fraxinus americana	Native	16	On-site	Good	Remove
73	common apple	Malus sylvestris	Non-native	14	On-site	Good	Remove
74	common apple	Malus sylvestris	Non-native	18	On-site	Good	Remove
75	common apple	Malus sylvestris	Non-native	19	On-site	Good	Remove
76	white elm	Ulmus americana	Native	34	On-site	Good	Remove
77	basswood	Tilia americana	Native	17	On-site	Good	Remove
78	common apple	Malus sylvestris	Non-native	18	On-site	Good	Remove
79	common apple	Malus sylvestris	Non-native	16	On-site	Good	Remove
80	Manitoba maple	Acer negundo	Non-native	18	On-site	Good	Remove
81	white ash	Fraxinus americana	Native	18	On-site	Good	Remove
82	white elm	Ulmus americana	Native	20	On-site	Good	Remove
84	common apple	Malus sylvestris	Non-native	17	On-site	Good	Remove
85	common apple	Malus sylvestris	Non-native	11	On-site	Good	Remove
86	white elm	Ulmus americana	Native	21	On-site	Good	Remove
87	common apple	Malus sylvestris	Non-native	13	On-site	Good	Remove
88	white elm	Ulmus americana	Native	20	On-site	Good	Remove
89	black cherry	Prunus serotina	Native	18	On-site	Good	Remove

[1]refer to Figure 1 for an overview of tree locations

The health status of the majority of the inventoried trees was Good (81). Very few were Poor (3) or Dead (2). Approximately 75% of the trees were native. The trees were composed of common native and non-native trees typical of regenerative areas (i.e., pioneer species and non-native/invasive species that colonize recently disturbed areas). Sizes varied on location. Larger trees were present along the northwest and northeast boundaries of the study area where historical clearing may not have been as intense as the rest of the study area.



LEGEND

- Study Area
- Existing Tree Location
- MVCA Regulation Limit
- Flood Plain
- Watercourse
- Unevaluated Wetland
- Shirley's Bay ANSI

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2021.

80 40 0 80

Scale 1:2,500 Meters

CLIENT: EUROAMBER

PROJECT: 2050 DUNROBIN ROAD ENVIRONMENTAL IMPACT STATEMENT

TITLE: EXISTING TREE COVER

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO: CCO-21-1873		FIGURE:
Date	Nov., 05, 2021	1
GIS	EU	
Checked By	EP	

C:\Users\e.ungun\McIntosh Perry\GIS - Documents\Projects\2021\CCO\CCO-21-1873 Euroamber - EIS - 2050 Dunrobin Rd\aprx\Env\CCO-21-1873-ConstraintsOpportunities.aprx

4.0 PROPOSED DEVELOPMENT AND CONSERVED VEGETATION

The proposed development within the subject property involves the following:

- Clearing of approximately 8.91 ha of the study area to convert into eight (8) residential properties (lots). The eight (8) proposed lots range from 0.8 ha to 1.94 ha in area with varying frontage along the boundaries of the study area. Two of the proposed lots (7 and 8) will have frontage along the east side of Dunrobin Road;
- Construction of single-family dwellings on each lot with associated septic beds and wells;
- Widening of the east side of Dunrobin Road by 0.3 m where the study area has frontage;
- Construction of a new municipal road for access to the proposed lots. This will extend eastward from Dunrobin Road with four lots on the north and south sides of the new municipal road. The road will also include ditch lines along the margins that will drain into the proposed drain in the eastern end of the study area;
- Construction of a drainage ditch from the eastern end of the proposed municipal road to convey runoff and stormwater along the northeastern boundary of the study area, through the eastern extension of the study area, and into Harwood Creek. The drainage ditch will have shallow 4:1 slopes and a 250 mm perforated subdrain underground which will outlet into Harwood Creek. Rip Rap will be installed at the outlet of the drainage ditch into Harwood Creek, matching the grade of the existing watercourse bank. The rip rap will be placed on the bank as well as in-stream. The drainage ditch will also include an entrance crossing with a 0.3 m corrugated steel pipe (CSP) culvert at an existing entrance to the decommissioned railway corridor approximately 90 m west of Harwood Creek. A 9 m wide storage swale will be constructed parallel with the drainage ditch with varying shallow slopes and buried perforated subdrains surrounded by clear stone to attenuate water to the drainage ditch. A berm will be constructed between the swale and the drainage ditch;
- The majority of proposed Lots 7 and 8 are to be filled. This includes the extent of regulated floodplain areas within the study area. These areas consist of approximately 3.95 ha of the study area. A clay berm will be constructed where the existing surface water enters the study area and causes seasonal flooding, and
- Installation of post-and-wire fences around the entire study area boundaries.

The proposed development includes clearing of all vegetation within the subject property. All inventoried trees will be removed as part of this clearing.

5.0 TREE PROTECTION MEASURES

Tree protection measures described in this section are provided not only to ensure tree survival during the construction period but also to ensure that trees will continue to grow and remain healthy. The tree protection strategy is to create a safe environment during the construction period while also preserving the trees and ensuring that they do not become a hazard in the long-term. Trees can be damaged in a number of ways during construction. It is recommended that the contractor take every precaution necessary to prevent damage to the trees to be retained/conserved.

5.1 Temporary Tree Protection Fencing

The most common injury to a tree is to the crown or trunk. These injuries are visible and permanent and in some cases can be fatal to the tree. The roots are susceptible to physical injury resulting from cutting of the roots, soil compaction and/or smothering of the roots.

To ensure the protection of the root system of trees to be retained, temporary tree protection fencing should be erected at the critical root zone of trees located inside or adjacent to the construction area. Temporary fencing is proposed surrounding the perimeter of the subject property and will sufficiently protect the retained trees that are adjacent to the subject property.

5.2 Tree Pruning

Prior to construction, any trees that have branches in the way of the proposed development should be pruned by a Certified Arborist. Pruning should not occur until after the leaves have come out in the spring. At this time, dead wood and hazardous limbs should also be removed; however, pruning of live branches should be avoided unless necessary.

Similarly, any roots that are partially exposed, due to earthworks, should be pruned by hand if possible, following standard arboricultural practices. Roots that are exposed due to earthworks should be covered with native topsoil immediately to ensure that the roots do not dry out or have further damage occur to them. Root pruning should be completed by a Certified Arborist.

5.3 Tree Monitoring

Trees located adjacent to construction works will experience a change in their immediate environment. As a result, tree health should be monitored. Trees that have died or have been damaged beyond repair by the Contractor within two (2) years of construction shall be removed and replaced by the Contractor at their own expense according to City of Ottawa compensation requirements, or as directed by City staff.

5.4 Wildlife Protection

Clearing and vegetation removal is prohibited during the nesting period of most migratory birds, under the Migratory Birds Convention Act, 1994 (MBCA). This period extends from April 15 to September 15 of any year. Should tree removal during the bird nesting season be unavoidable, the Contractor is required to conduct a nesting

survey by a registered professional avian biologist to identify and ensure that there are no nesting birds within the site that may be negatively impacted. Clearance surveys during this period are valid for a period of 48 hours following the completion of the nest search. Note: The Canadian Wildlife Service does not support relying on inspections for migratory bird nests in such habitats due to the difficulty of locating all nests and risk to birds; therefore, it is always a better option to clear vegetation outside of the breeding bird period.

6.0 RECOMMENDATIONS

All 89 trees inventoried are proposed for removal. The subject property is zoned as 'General Rural Area' under the City of Ottawa Official Plan (City of Ottawa, 2003). As such, no compensation plantings or cash-in-lieu is proposed or required as per the City of Ottawa's Tree By-law (2020-340), based on the following provisions:

Part IV - Trees on private property greater than one hectare in area

Section 39 to 41 - Scope

Section 39

The provisions of this Part shall apply to trees with a DBH of 10 cm or greater, on privately-owned property that is within the urban area of the City, or within the lands identified in Schedules "G" to "O" inclusive annexed hereto as additional lands, and that is:

(1) greater than one hectare in area; or

(2) equal to or less than one (1) hectare in area and subject to one of the following applications:

a site plan control application pursuant to Section 41 of the Planning Act;

a plan of subdivision application pursuant to Section 51 of the Planning Act; or

a plan of condominium application pursuant to Section 51 of the Planning Act.

Although no compensation plantings or cash-in-lieu is required for the tree removals in the subject area, the following measures are recommended:

- Natural areas to be retained are to be isolated by sturdy construction fencing or similar barriers at least 1 m in height during any future construction in order to ensure their retention;
- Replace vegetative cover with topsoil and seed. It is recommended that a permanent seed mix comprised of primarily native species be utilized for all re-vegetation activities within the study area, watercourses, and riparian areas. This may include but is not necessarily limited to:
    - The Northern Ontario Mix offers similar qualities for re-establishment within a roadside environment (and reduced long-term maintenance). This mix contains mostly native species, with some non-native legumes included to help with the establishment of the planting;
    - Alternatively, a seed mix such as the OSC Rural Ontario Roadside Native Seed Mixture 8145 (https://www.oscseeds.com/product/rural-ontario-roadside-native-mixture-8145/) may also be utilized, as this seed mix contains a variety of native plant species able to establish and grow within a roadside environment;
- If there is insufficient time in the growing season for the seed to sprout, the site shall be stabilized with temporary erosion and sediment control measures and seeded in the following spring. It is important to

note that many of the seed mixes outlined above are best established through fall seeding to allow normal dormancy and then germination the following spring as these species are adapted to the Ontario environment, and

- It is recommended that only locally appropriate native species be used for landscaping within the subject property. This would contribute to re-establishing native plants within the wider landscape and potentially have a positive impact on biodiversity (i.e., using native species for pollinators such as Monarchs and bees). Disturbed areas should be replanted with locally grown native species. The use of non-native plant material should be discouraged. Locally appropriate, native species of trees can include, but are not limited to: black cherry (Prunus serotina), bur oak (Quercus macrocarpa), eastern white pine (Pinus strobus), red maple (Acer rubrum), paper birch (Betula papyrifera), red oak (Quercus rubra), sugar maple, tamarack (Larix laricina), white elm, and white spruce.

7.0 LIMITING TERMS AND CONDITIONS

The assessment of the trees presented within this report have been made using a visual examination of the above-ground parts of each tree for structural defects, external indications of decay, evidence of insect presence, and discoloured foliage. None of the trees examined were dissected, cored, probed, or climbed, and detailed root crown examinations involving excavation were not undertaken.

Notwithstanding the recommendations and conclusions made in this report, it must be realized that trees are living organisms and their health and vigour are constantly changing. They are not immune to changes in site conditions or seasonal variations in the weather.

While reasonable efforts have been made to ensure the trees recommended for retention are healthy, no guarantees are offered or implied, that these trees or any part of them will remain standing. It is both professionally and practically impossible to predict with absolute certainty the behaviours of a single tree or group of trees in all circumstances. Every effort has been made to ensure that this assessment is reasonably accurate; however, trees should be re-assessed periodically.

Appendix A: Study Area Photographs

Photo 1: View of the disturbed area on the west side of the subject property which still contains some trees. May 12, 2021.

Photo 2: View of a treed area in the east end of the study area with a shrub understory. May 12, 2021.

Photo 3: View of the tree line along the northwest boundary of the subject property. May 12, 2021.

Photo 4: View of treed area near the centre of the subject property within a shrub thicket. May 12, 2021.

APPENDIX B: REGULATORY AGENCY CORRESPONDENCE

Erik Pohanka

From: Hann, Carolyn (MECP) <Carolyn.Hann@ontario.ca>
Sent: November 19, 2020 4:04 PM
To: Erik Pohanka
Subject: 2020-11-19_2050 Dunrobin Road EIS Information Request

Hi Erik,

Hope you are well.

I have looked at the information request that you have provided and in addition to the species at risk that you have noted I have the additional following occurrence information for you to consider:

- Bank Swallow
- Least Bittern
- Bald Eagle
- American Ginseng
- Peregrine Falcon

There is also potential for:

- Species at Risk Bats (Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis and Tricolored Bat)
- Butternut

You noted in your request records of Blanding's Turtle within a 10 km grid. I will note that there are multiple occurrences of Blanding's Turtle in the direct area with the closest being just over 200 m from the noted location.

Please note it remains the clients responsibility to:

- Carry out preliminary screening for their project,
- Obtain the best available information for all applicable information sources,
- Conduct necessary field studies or inventories to identify and confirm the presence of absence of species at risk or their habitat,
- Consider any potential impacts to species at risk that a proposed activity might cause, and
- Comply with the Endangered Species Act (ESA).

Additionally, while this data represents MECP's best current available information, it is important to note that a lack of information for a site does not mean that species at risk or their habitat are not present. There are many areas where the Government of Ontario does not currently have information, especially in more remote parts of the province. On-site assessments can better verify site conditions, identify and confirm presence of species at risk and/or their habitats. It is the responsibility of the proponent to ensure that species at risk are not killed, harmed, or harassed, and that their habitat is not damaged or destroyed through the activities carried out on the site.

The MECP Species at Risk Branch is responsible for species at risk and the Endangered Species Act if you are looking for confirmation or additional information on other natural heritage information (ex. wetlands, fisheries information, etc.) within the area of the proposed location you will need to contact the appropriate agency.

If you would like to discuss further please feel free to reach out directly.

Best,

Carolyn Hann
Management Biologist | Permissions and Compliance Section | Ontario Ministry of Environment, Conservation and Parks | 10-1 Campus Drive, Kemptville, Ontario, K0G 1J0 | PH: 613.355.7312 | Email: carolyn.hann@ontario.ca

---

From: Erik Pohanka <e.pohanka@mcintoshperry.com>
Sent: November-04-20 5:19 PM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Cc: Christian Lyon <C.Lyon@McIntoshPerry.com>; Jessica Abernethy <j.abernethy@mcintoshperry.com>
Subject: 2050 Dunrobin Road EIS Information Request

To whom it may concern;

Please see the attached Information Request Letter regarding the 2050 Dunrobin Road Environmental Impact Study project located in the City of Ottawa.

Please feel free to contact me if you have any questions or concerns.

Thank you,

Erik Pohanka, B.Sc.
Junior Biologist
115 Walgreen Road, R.R. 3, Carp, ON, K0A 1L0
T. 613.903.6137 | **C.** 613.203.5470
e.pohanka@mcintoshperry.com | www.mcintoshperry.com
McINTOSH PERRY

Erik Pohanka

From: Matt Craig <mcraig@mvc.on.ca>
Sent: November 10, 2020 9:29 AM
To: Erik Pohanka
Subject: RE: 2050 Dunrobin Road EIS Information Request
Attachments: 2050 Dunrobin Concept Plan Oct 21, 2020 O Reg Map.pdf

What number are you at?

From: Erik Pohanka <e.pohanka@mcintoshperry.com>
Sent: November 10, 2020 9:22 AM
To: Matt Craig <mcraig@mvc.on.ca>
Cc: Christian Lyon <C.Lyon@McIntoshPerry.com>; Jessica Abernethy <j.abernethy@mcintoshperry.com>
Subject: RE: 2050 Dunrobin Road EIS Information Request

Hi Matt;

Thanks for the update! I'll be free all day to discuss if you'd like to give me a call.

Thank you,

From: Matt Craig <mcraig@mvc.on.ca>
Sent: November 10, 2020 7:51 AM
To: Erik Pohanka <e.pohanka@mcintoshperry.com>
Cc: Christian Lyon <C.Lyon@McIntoshPerry.com>; Jessica Abernethy <j.abernethy@mcintoshperry.com>
Subject: Re: 2050 Dunrobin Road EIS Information Request

Hi Erik

There is a pre-consultation meeting today in regard to this property. Since the original review we have approved new floodplain mapping on Harwood Creek which includes some of the parcels on this proposed subdivision.
I provided the mapping to the city for distribution for the meeting today.

I will be discussing some of the concerns we have today at the meeting in regard to development on these impacted lots.
I am free later in the day after 3 o'clock to discuss if you want to connect then.

Regards

Matt Craig

Sent using a mobile device.

> On Nov 9, 2020, at 3:18 PM, Erik Pohanka <e.pohanka@mcintoshperry.com> wrote:
>
> Hi Matt;
>
> I received a response from Kelly about an Environmental Impact Study McIntosh Perry is conducting on proposed development of the 2050 Dunrobin Road property in the City of Ottawa (thank you for your response Kelly!). We wanted to discuss the regulation lines that are present within the study area (I have attached a kmz file of the study area boundaries). We just want to clarify if the

regulation limits based on some observations we made during a recent field investigation on the property. Please let us know if you have time to discuss the property and what kind of regulations/limits/permitting may be required.

Thank you,

From: Kelly Stiles <kstiles@mvc.on.ca>
Sent: November 6, 2020 1:13 PM
To: Erik Pohanka <e.pohanka@mcintoshperry.com>
Cc: Christian Lyon <C.Lyon@McIntoshPerry.com>; Jessica Abernethy <j.abernethy@mcintoshperry.com>
Subject: RE: 2050 Dunrobin Road EIS Information Request

Good afternoon Erik. Thanks for reaching out to me with your inquiry. I don't have anything else to add to your wildlife species lists.

The floodplain and regulation limit for Harwood Creek is currently under review. To see what the current lines are please refer to our online regulations map found here: http://camaps.maps.arcgis.com/apps/webappviewer/index.html?id=70831905961e470988262c7a703a56af
If you would like to discuss the regulations lines further please contact Matt Craig at mcraig@mvc.on.ca

Have a nice day,

Kelly Stiles | Aquatic Biologist | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, Ontario K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 234| f. 613 253 0122 | kstiles@mvc.on.ca

<image001.png>

From: Erik Pohanka <e.pohanka@mcintoshperry.com>
Sent: Wednesday, November 4, 2020 5:13 PM
To: Kelly Stiles <kstiles@mvc.on.ca>
Cc: Christian Lyon <C.Lyon@McIntoshPerry.com>; Jessica Abernethy <j.abernethy@mcintoshperry.com>
Subject: 2050 Dunrobin Road EIS Information Request

Good afternoon Kelly;

McIntosh Perry Consulting Engineers Ltd (McIntosh Perry) would like to request information from the Mississippi Valley Conservation Authority (MVCA) for a proposed development at 2050 Dunrobin Road, Kanata within the City of Ottawa. The property is part of Lot 20, Concession 4 in the Geographic Township of March. The proponent has retained the services of McIntosh Perry to undertake an Environmental Impact Statement as per the requirements of the *City of Ottawa Official Plan* and the *Provincial Policy Statement* (PPS). Please see the attached kmz file for the location of the study area.

The purpose of this information request is to identify any of the following related to the study area:

- Floodplain issues;
- Regulation limits, and

- Watercourse information.

McIntosh Perry has conducted a preliminary review of publicly available environmental background information for the study area regarding the watercourse present in the study area using various resources such as the Land Information of Ontario database, MVCA mapping tool, Aquatic Resource Area data, etc.. Publicly available information has been summarized into the attached Background Information Table.

McIntosh Perry is requesting confirmation of the attached natural heritage features and any further site-specific environmental information from MVCA regarding the proposed development.

We look forward to the MVCA's response and appreciate any assistance you can provide with this project. Feel free to contact the undersigned if you require any additional information.

Thank you,

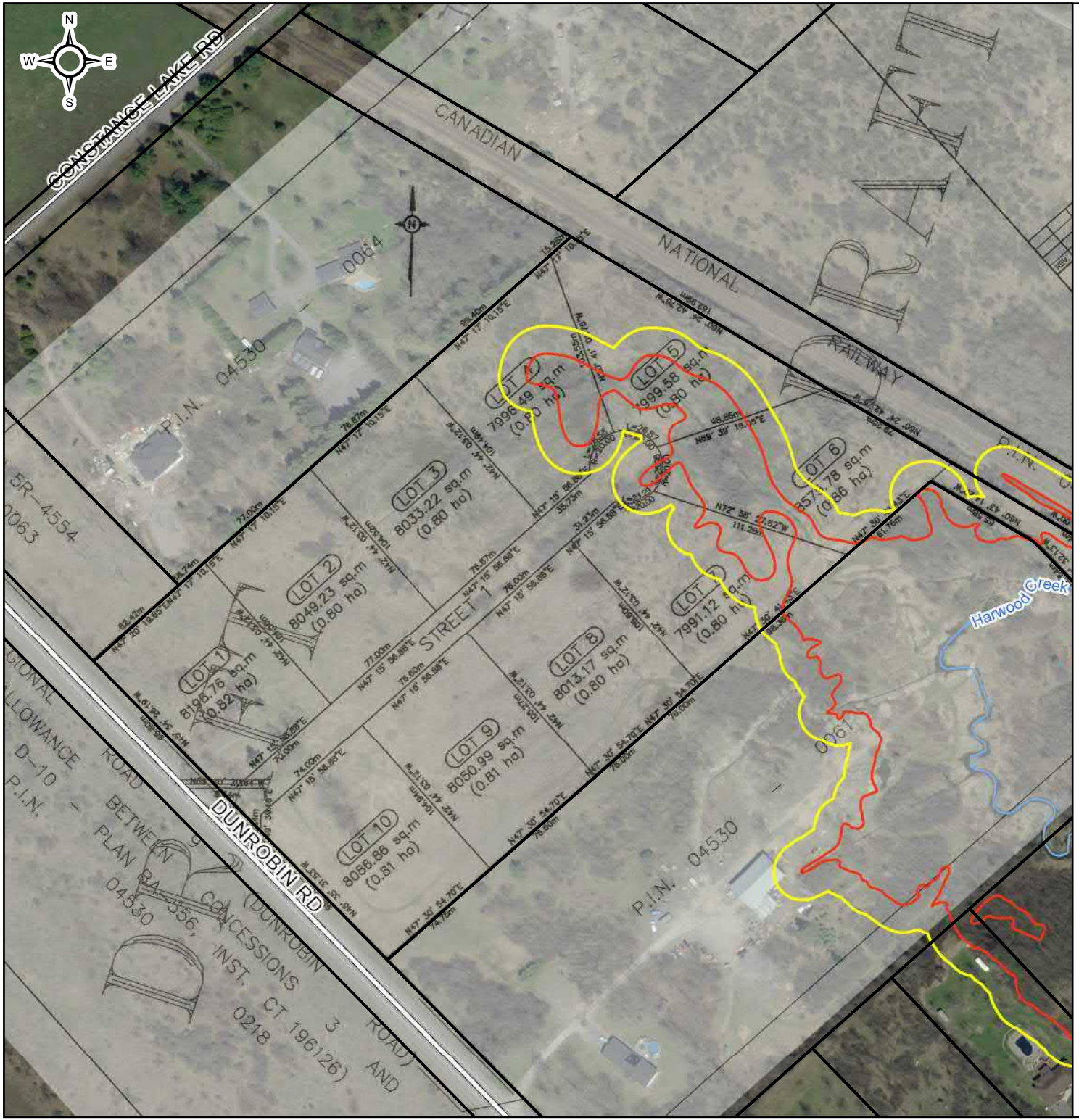
Erik Pohanka, B.Sc.
Junior Biologist
115 Walgreen Road, R.R. 3, Carp, ON, K0A 1L0
T. 613.903.6137 | **C.** 613.203.5470
e.pohanka@mcintoshperry.com | www.mcintoshperry.com

<image002.png>

<image003.png> <image004.png> <image005.png>

<image007.png>

<Study Area Boundaries.kmz>



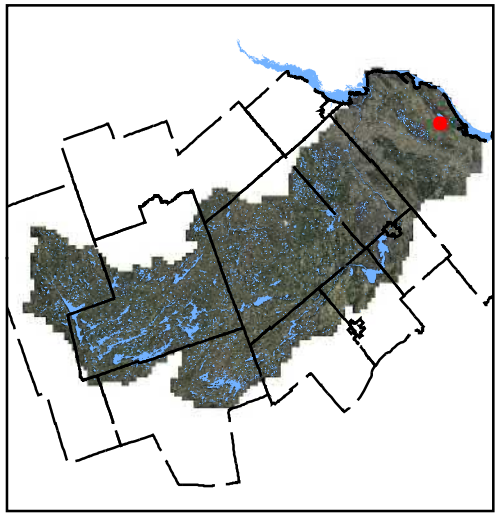
Mississippi Valley Conservation Authority

Ontario Regulation 153/06
2050 Dunrobin Road

Legend

- Property - Parcels
- MVCA Streams
- 1:100 yr Flood Plain
- MVCA Regulation Limit

1:3,000



Projection: UTM Zone18 - NAD 83 Datum

Date: 2020-11-02

APPENDIX C: STUDY AREA PHOTOGRAPHS

Photo 1: Disturbed treed area in the west end of the study area adjacent to Dunrobin Road. 12 May 2021.

Photo 2: Dry – Fresh Non-Calcareous Bedrock Graminoid Meadow Ecosite (MEGR2) present in the west portion of the study area. 12 May 2021.

Photo 3: Potential SAR snake hibernacula habitat identified within the Dry – Fresh Non-Calcareous Bedrock Graminoid Meadow Ecosite (MEGR2) in the west end of the study area during the preliminary EIS. During the 2021 field investigations, it was determined that this area does not provide SAR snake habitat. 28 May 2021.

Photo 4: Red-bellied Snake (Storeria occipitomaculata occipitomaculata) observed within the potential SAR snake habitat. This species is not a SAR and does not indicate limiting habitat. 12 July 2021.

Photo 5: Field Sparrow (Spizella pusilla) observed in the transition area between the Dry – Fresh Non-Calcareous Bedrock Graminoid Meadow Ecosite (MEGR2) and Buckthorn Deciduous Shrub Thicket Type (THDM2-6). 12 May 2021.

Photo 6: Buckthorn Deciduous Shrub Thicket Type (THDM2-6) present in the majority of the study area. 12 May 2021.

Photo 7: Fresh – Moist Poplar Deciduous Woodland Type (WODM5-1) present along the northeast boundary (left) and northwest boundary of the study area. 17 June 2021.

Photo 8: Chestnut-sided Warbler (Setophaga pensylvanica) observed in the Fresh – Moist Poplar Deciduous Woodland Type (WODM5-1) within the study area. 17 June 2021.

Photo 9: A flooded trail in the east end of the study area during early spring conditions. This area is part of the identified floodplain under MVCA regulation limits. 12 May 2021.

Photo 10: A flooded area in the west end of the study area during early spring conditions. This area is the western extent of the identified floodplain within the study area under MVCA regulation limits. 12 May 2021.

Photo 11: Northern Leopard Frog (Lithobates pipiens) observed within the study area. 12 May 2021.

Photo 12: Harwood Creek flowing through the eastern extent of the study area. An off-road vehicle crossing is present within the watercourse located within the study area, creating a pool. 12 May 2021.

Photo 13: A beaver dam/debris within Harwood Creek directly downstream of one of the off-road vehicle crossings (right), which creates a potentially permanent barrier to fish migration. 12 May 2021.

Photo 14: Harwood Creek looking upstream (west) from the off-road vehicle crossing within the study area. Another off-road vehicle crossing is present upstream at the boundary of the study area (background). 12 May 2021.

Photo 15: Harwood Creek looking downstream (east) from the beaver dam. The majority of the watercourse within the study area is downstream of the beaver dam. 12 May 2021.

Photo 16: Upstream view (west) of Harwood Creek from downstream of the beaver dam/debris within the study area. 07 June 2021.

Photo 17: Upstream view (west) of Harwood Creek from upstream of the beaver dam/debris within the study area. 07 June 2021.

Photo 18: White Sucker (Catostomus commersonii) caught in Harwood Creek within the study area. The watercourse within the study area provides specialized baitfish spawning habitat. 07 June 2021.

Photo 19: An active Eastern Phoebe (Phoebe sayornis) nest with eggs observed within the decommissioned railway culvert directly adjacent to the eastern extent of the study area. 17 June 2021.

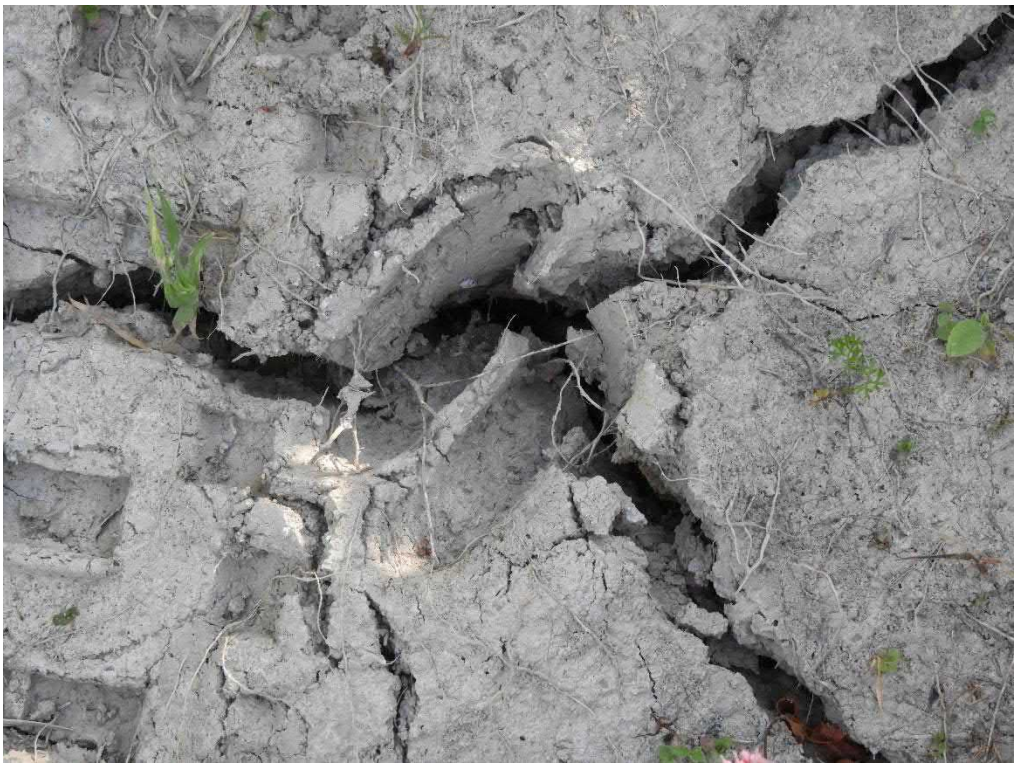


Photo 20: White-tailed deer (Odocoileus virginianus) tracks observed within the study area. 17 June 2021.

Photo 21: Snowshoe hare observed in the decommissioned railway corridor directly adjacent along the northeast boundary of the study area. 17 June 2021.

APPENDIX D: VEGETATION INVENTORY

Vegetation Species Observed within the Study Area			
Common Name	Scientific Name	Common Name	Scientific Name
Woody Species			
balsam poplar	Populus balsamifera	red maple	Acer rubrum
basswood	Tilia americana	red oak	Quercus rubra
black cherry	Prunus serotina	red-osier dogwood	Cornus sericea
bur oak	Quercus macrocarpa	riverbank grape	Vitis riparia
Carolina poplar	Populus x canadensis	Scot's pine	Pinus sylvestris
choke cherry	Prunus virginiana	shrub willow	Salix spp.
common apple	Malus sylvestris	Siberian elm	Ulmus pumila
common buckthorn	Rhamnus cathartica	stoloniferous serviceberry	Amelanchier stolonifera
common juniper	Juniperus communis	sugar maple	Acer saccharum
common lilac	Syringa vulgaris	Tatarian honeysuckle	Lonicera tatarica
downy arrowwood	Viburnum rafinesqueanum	thicket creeper	Parthenocissus inserta
eastern red-cedar	Juniperus virginiana	trembling aspen	Populus tremuloides
eastern white pine	Pinus strobus	Virginia creeper	Parthenocissus quinquefolia
European larch	Larix decidua	virgin's bower	Clematis virginiana
glossy buckthorn	Frangula alnus	western poison-ivy	Toxicodendron rydbergii
green ash	Fraxinus pennsylvanica	white ash	Fraxinus americana
hawthorn	Crataegus spp.	white elm	Ulmus americana
hybrid white willow	Salix alba x fragilis	white spruce	Picea glauca
ironwood	Ostrya virginiana	wild prickly gooseberry	Ribes cynosbati
Manitoba maple	Acer negundo	wild red currant	Ribes triste
nannyberry	Viburnum lentago	wild red raspberry	Rubus strigosus
narrow-leaved meadowsweet	Spiraea alba	yellow birch	Betula alleghaniensis
northern bush honeysuckle	Diervilla lonicera		
Herbaceous Species			
asparagus	Asparagus officinalis	northern maidenhair fern	Adiantum pedatum
bird's-foot trefoil	Lotus corniculatus	ox-eye daisy	Leucanthemum vulgare
black-bindweed	Fallopia convulvulus	hedge bindweed	Calystegia sepium
broad-leaved cattail	Typha latifolia	hooked buttercup	Ranunculus recurvatus

Vegetation Species Observed within the Study Area			
Common Name	Scientific Name	Common Name	Scientific Name
Canada anemone	Anemone canadensis	hop-clover	Triflorum aureum
Canada mayflower	Maianthemum canadense	king-devil	Pilosella caespitosa
common dandelion	Taraxacum officinale	lady's bedstraw	Galium verum
common gromwell	Lithospermum officinale	leafy spurge	Euphorbia virgata
common milkweed	Asclepias syriaca	meadow goat's-beard	Tragopogon pratensis
common mullein	Verbascum Thapsus	motherwort	Leonurus cardiaca
common ragweed	Ambrosia artemisiifolia	New England aster	Symphyotrichum novae-angliae
common St. John's-wort	Hypericum perforatum	orange day-lily	Hemerocallis fulva
common valerian	Valeriana officinalis	ox-eye daisy	Leucanthemum vulgare
common yarrow	Achillea millefolium	panicled aster	Symphyotrichum lanceolatum
cow vetch	Vicia cracca	Queen Anne's lace	Daucus carota
curled dock	Rumex crispus	smooth bedstraw	Galium mollugo
common water-plantain	Alisma plantago-aquatica	smooth brome	Bromus inermis
dame's-rocket	Hesperis matronalis	spikerush	Eleocharis spp.
dark green bulrush	Scirpus atrovirens	spreading dogbane	Apocynum androsaemifolium
dog-strangling vine	Vincetoxicum rossicum	sulphur cinquefoil	Potentilla recta
English plantain	Plantago lanceolata	tall buttercup	Ranunculus acris
field bindweed	Convolvulus arvensis	Timothy	Phleum pratense
field thistle	Cirsium discolor	violet	Viola spp.
fragrant bedstraw	Galium triflorum	viper's bugloss	Echium vulgare
garlic mustard	Alliaria petiolate	Virginia waterleaf	Hydrophyllum virginianum
goldenrod	Solidago spp.	white sweet-clover	Melilotus alba
ground-ivy	Glechoma hederacea	wild basil	Clinopodium vulgare
heal-all	Prunella vulgaris	wild parsnip	Pastinaca sativa
marsh horsetail	Equisetum palustre	woodland strawberry	Fragaria vesca
milfoil	Myriophyllum spp.	yellow avens	Geum aleppicum

APPENDIX E: CLEAN EQUIPMENT PROTOCOL FOR INDUSTRY

Clean Equipment Protocol for Industry

Inspecting and cleaning equipment for the purposes of invasive species prevention

Invasive Species Centre

Catalyst for research and response

Ontario

Peterborough County Stewardship

Ontario Invasive Plant Council

Publication Information

Halloran, Joe, Anderson, Hayley and Tassie, Danielle. 2013. Clean Equipment Protocol for Industry. Peterborough Stewardship Council and Ontario Invasive Plant Council. Peterborough, ON.

Printed April 2013
Peterborough, Ontario

ISBN: (to be confirmed)

This document was prepared for the Canada-Ontario Invasive Species Centre and the Ontario Ministry of Natural Resources by the Peterborough Stewardship Council and the Ontario Invasive Plant Council.

Inquiries regarding this document can be directed to the Ontario Invasive Plant Council
PO Box 2800, 4601 Guthrie Drive
Peterborough, ON
K9J 8L5

Phone: (705) 748-6324
Email: info@ontarioinvasiveplants.ca

For more information on invasive plants in Ontario, visit www.ontario.ca/invasivespecies, www.ontarioinvasiveplants.ca, www.invadingspecies.com or www.invasivespeciescentre.ca

Table Of Contents

Introduction

Why Invasive Plants are a Problem

Invasive alien species are "a growing environmental and economic threat to Ontario. Alien species are plants, animals and microorganisms that have been accidentally or deliberately introduced into areas beyond their normal range. Invasive species are defined as harmful alien species whose introduction or spread threatens the environment, the economy, or society, including human health (Government of Canada 2004)." (Ontario Invasive Species Strategic Plan, 2012). The great majority of plant invasions occur in habitats that have been disturbed either naturally or by humans (Rejma´nek 1989; Hobbs and Huenneke 1992; Hobbs 2000).

The ecological effects of invasive species are often irreversible and, once established, they are extremely difficult and costly to control or eradicate. According to Pimental et al. (1999), invasive species in the U.S. cause economic and environmental damages totalling over $138 billion per year, with agricultural weed control and crop losses totalling approximately $34 billion per year. Exact figures for the total economic and environmental damages are not available for Canada. In Ontario however, the costs of dealing with just one invasive species is astonishing; Zebra Mussels cost Ontario power producers who draw water from the lake $6.4 million per year in increased control/operating costs and about $1 million per year in research costs (Colautti et al. 2006).

Invasive species can spread to new areas when contaminated mud, gravel, water, soil and plant material are unknowingly moved by equipment used on different sites. This method of spread is called an unintentional introduction, and is one of the four major pathways for invasive species introduction into a new area of Ontario (Ontario Invasive Species Strategic Plan, 2012).

Buckthorn removal, Lynde Shores Conservation Area.
Photo by: Central Lake Ontario Conservation Authority

Invasive plant seed and propagules (plant material, i.e. rhizomes) have the ability to travel sight unseen in mud attached to or lodged in various parts and spaces between parts of vehicles, machinery and other mechanical equipment. A recent study at Montana State University found that most seeds (99% on paved roads and 96% on unpaved roads) stayed attached to the vehicle after traveling 160 miles (257 km) under dry conditions.

Invasive plant species are commonly transported on or in vehicles and construction equipment when they are moved to new locations. Those vehicles include four-wheel drives, excavators, tractors, loaders, water trucks and all-terrain vehicles. Failure to properly clean vehicles and machinery of soils, mud, and contaminated water that may contain invasive species seed and propagules can result in permanent, irreversible environmental impacts. These impacts can mean substantial cost to the landowner, land manager and/or the user. Businesses may also face liability issues for activities and operations that result in the introduction of invasive species.

Some of the invasive species in Ontario which have been known to spread through equipment transfer include:

- **Common Buckthorn** *(Rhamnus cathartica)*
- **Dog-strangling Vine** *(Cynanchum rossicum)*
- **Garlic Mustard** *(Alliaria petiolata)*
- **Giant Hogweed** *(Heracleum mantegazzianum)*
- **Glossy Buckthorn** *(Frangula alnus)*
- **Japanese Knotweed** *(Polygonum cuspidatum)*
- **Miscanthus or Chinese Silver Grass** *(Miscanthus sinensis)*
- **Phragmites or Common Reed** *(Phragmites australis subsp. australis)*
- **Reed Canary Grass** *(Phalaris arundinacea)*
- **Wild Parsnip** *(Pastinaca sativa)*
- **Wild Chervil** *(Anthriscus sylvestri)*

Dog-strangling vine
(Cynachum rossicum)
Photo by: Hayley Anderson

Garlic Mustard
(Alliaria petiolata)
Photo by: Ken Towle

Phragmites
(Phragmites australis subsp. Australis)
Photo by: Michael Irvine

These plants impact biodiversity by out-competing native species for space, sunlight, and nutrients. They can also have impacts on road and driver safety by physically blocking intersection sightlines, and in the case of Phragmites and Miscanthus, may fuel intense grass fires if ignited, which can damage utility stations and hydro lines.

The harmful effects of invasive species include:

- Physical and structural damage to infrastructure
- Human health hazards (i.e. Giant Hogweed and Wild Parsnip exposure)
- Delays and increased cost in construction activities
- Environmental damage (i.e. erosion)
- Aesthetic degradation
- Loss of biodiversity
- Reduced property values
- Loss of productivity in woodlots and agriculture

Why Cleaning Vehicles and Equipment is Important

Passenger and recreational vehicles as well as heavy machinery are major vectors for spreading terrestrial invasive species into new areas.

It is much more costly to control invasive species after their establishment and spread than it is to prevent their spread. The spread of invasive species through unintentional introduction can be minimized significantly by the diligent cleaning of vehicles and equipment when leaving one site and moving to the next. In the case of large properties, cleaning before moving to a new site is recommended, even if it is within the same property.

This guide has been developed for the construction, agriculture, forestry and other land management industries, to provide equipment operators and practitioners with tools and techniques to identify and prevent the unintentional introduction of invasive species. It establishes a standard for cleaning vehicles and equipment and provides a guide where current codes of practice, industry standards or other environmental management plans are not already in place.

Passenger and recreational vehicles include:

- 2WD and 4WD cars
- 2WD and 4WD trucks
- All Terrain Vehicles (ATV's)
- Motorbikes
- Snowmobiles

Heavy machinery includes:

- Trucks
- Tractors
- Mowers
- Slashers
- Trailers
- Backhoes
- Graders
- Dozers
- Excavators
- Skidders
- Loaders
- Water Tankers and Trucks

Dog-strangling Vine plants attached to ATV.
Photo by: Francine Macdonald

Plant material attached to bobcat.
Photo by: TH9 Outdoor Services

Impacts of Invasive Species on Industry

Construction

In the UK, Japanese Knotweed (*Polygonum cuspidatum* or *Fallopia japonica*) is classified as a hazardous material. When construction occurs in established Japanese Knotweed stands workers sift the soil to remove root fragments and institute treatment plans to ensure that the Knotweed does not re-sprout, as it can damage housing foundations by growing through concrete and asphalt. The contractors must also thoroughly clean their equipment, and dispose of the contaminated soil at biohazard waste sites. While we do not have these requirements in Ontario, Japanese Knotweed is present here.

Invasive plant species can also increase site preparation and weed control costs, and reduce property values. For example, in Vermont the presence of the aquatic invasive plant Eurasian Watermilfoil (*Myriophyllum spicatum*) depressed shoreline residence property value by as much as 16.4% (Zhang and Boyle, 2010).

Forestry/Agriculture

Invasive plant species which become established in forests will out-compete native species and prevent forest re-generation after logging or natural disturbance. Dog-strangling Vine (*Cynanchum rossicum*) is of particular concern in conifer plantations. This species thrives in the filtered light and open soils of mature plantations, and suppresses seedling establishment of native hardwoods. If its invasion continues, very few juvenile trees will survive to fill the shrinking canopy of over-mature pines. Reforestation sites are also susceptible; the thick mats of vegetation and aggressive competition from Dog-strangling Vine decrease available planting space and increase costs as more mature vegetation needs to be planted in order to ensure the new vegetation can outcompete the invasive plant. As a result, expensive control programs are often required.

Land Management (Trail Use/Maintenance)

Recreational trail use and the maintenance of trails can facilitate the transport of invasive plant material and seeds, and create open and disturbed sites that are prime locations for the establishment of invasive species. Studies have proven that trails act as corridors which assist in the spread of invasive plant species. Humans, their pets, and vehicles such as ATV's can be vectors of invasion along trails because seeds and plant pieces can be carried on equipment and clothing. In addition, frequent trampling along trails alters soil properties, limits the growth of some native species, and creates conditions that may favour the growth of non-native species (Kuss et al. 1985; Marion et al. 1985; Yorks et al. 1997).

Roadsides/Utilities

Invasive species can increase the cost of roadside and utility maintenance by requiring additional maintenance and control efforts. The presence of invasive species can also provide a safety hazard. In the case of Phragmites and Miscanthus (invasive grass species), along with interrupting sight lines, the dead stalks which remain standing each autumn also provide combustible material. Fires in these stands burn intensely, and can damage utilities and hydro lines. Phragmites along roadsides is generally assumed to be spread through the transport and burial of rhizome fragments through ditching, ploughing, and other human activities that transport rhizomes on machinery. Studies have shown that vehicles and road-fill operations can transport invasive plant seeds into uninfested areas, and road construction and maintenance operations provide optimal disturbed sites for seed germination and seedling establishment (Schmidt 1989; Lonsdale & Lane 1994; Greenberg et al. 1997; Trombulak & Frissell 2000).

Steps to Prevent the Unintentional Introduction of Invasive Species from Equipment

Inspection and cleaning of all machinery and equipment should be performed in accordance with the procedures, checklists and diagrams provided in this protocol.

When visiting more than one site, always schedule work in the sites that are the least disturbed and free of known invasive species first, and visit sites with known invasive species infestations last. This will greatly reduce the risk of transferring plants to new locations.

When to Inspect

Inspection should be done before:

- Moving vehicles out of a local area of operation
- Moving machinery between properties or sites within the same property where invasive species may be present in one area, and not in another
- Using machinery along roadsides, in ditches, and along watercourses
- Vehicles using unformed dirt roads, trails or off road conditions
- Using machinery to transport soil and quarry materials
- Visiting remote areas where access by vehicles is limited

Inspection should be done after:

- Operating in areas known to have terrestrial invasive plants or are in high risk areas (i.e. recently disturbed areas near known invaded areas)
- Transporting material (i.e. soil) that is known to contain, or has the potential to contain, invasive species
- Operating in an area or transporting material that you are uncertain contain invasive species
- In the event of rain. If mud contains seeds, they can travel indefinitely until it rains or the road surface is wet, allowing for long distance transport. This may result in transporting seeds to areas where those species did not previously exist

How to Inspect

- Inspect the vehicle thoroughly inside and out for where dirt, plant material and seeds may be lodged or adhering to interior and exterior surfaces.
- Remove any guards, covers or plates that are easy to remove.
- Attention should be paid to the underside of the vehicle, radiators, spare tires, foot wells and bumper bars.

If clods of dirt, seed or other plant material are found, removal should take place immediately, using the techniques outlined below.

When to Clean

Vehicles and heavy equipment that stay on formed and sealed roads have a low risk of spreading invasive species. Cleaning is only required when inspection identifies visible dirt clods and plant material or when moving from one area to another.

Depending on the invasive species present, vehicles may need to be cleaned even when deep snow is present. Phragmites, for example, can still be spread, even in packed snow because the seed heads are usually above the surface of the snow. Other plants, such as Dog-strangling vine, will be contained beneath deep snow.

**Regular inspection of vehicles and machinery will identify if any soil or plant material has been collected on or in vehicles and machinery.*

Where to Clean

Clean the vehicle/equipment in an area where contamination and seed spread is not possible (or limited). The site should be:

- Ideally, mud free, gravel covered or a hard surface. If this option is not available, choose a well maintained (i.e. regularly mowed) grassy area.
- Gently sloping to assist in draining water and material away from the vehicle or equipment. Care should be taken to ensure that localized erosion will not be created, and that water runs back into the area where contamination occurred.
- At least 30m away from any watercourse, water body and natural vegetation.
- Large enough to allow for adequate movement of larger vehicles and equipment.

**Safely locate the vehicle and equipment away from any hazards. If mechanized, ensure engine is off and the vehicle or equipment is immobilized.*

How to Clean Inside

Clean the interior of the vehicle by sweeping, vacuuming or using a compressed air device. Particular attention should be paid to the floor, foot wells, pedals, seats and under the seats.

How to Clean Outside

Knock off all large clods of dirt. Use a pry bar or other device if necessary.

Identify areas that may require cleaning with compressed air rather than water such as radiators and grills. Clean these areas first prior to using water.

Clean the vehicle with a high pressure hose in combination with a stiff brush and/or pry bar to further assist the removal of dirt clods.

Start cleaning from the top of the vehicle and work down to the bottom.

Emphasis should be placed on the undersides, wheels, wheel arches, guards, chassis, engine bays, radiator, grills and other attachments.

When the cleaning is finished avoid driving through the waste water when removing the vehicle or equipment from the cleaning site.

For equipment such as water trucks that may be exposed to aquatic invasive species, trucks should be disinfected with bleach solution before conducting work in a new area. For further information please refer to the Invading Species Awareness Program's Technical Guidelines listed under Contacts and Resources.

Hosing down a vehicle in Queensland Australia
Photo by: TH9 Outdoor Services

Final Inspection Checklist

Conduct a final inspection to ensure the following general clean standard has been achieved:

- No clods of dirt should be visible after wash down.
- Radiators, grills and the interiors of vehicles should be free of accumulations of seed, soil, mud and plant material parts including seeds, roots, flowers, fruit and or stems.

Diagrams have been provided to assist in quickly identifying key areas to inspect and clean on a variety of vehicles associated with the targeted industries. These can be used in combination with vehicle checklists to ensure all areas of the vehicles have been inspected and cleaned.

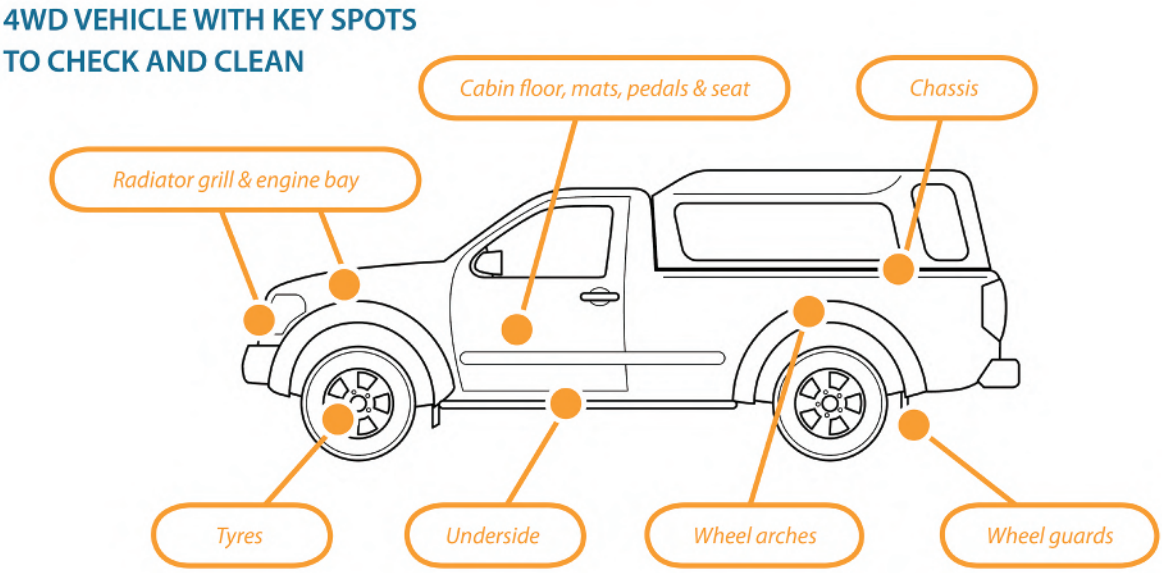
Equipment Required

- A pump and high pressure hose OR High pressure water unit
- Minimum water pressure for vehicle cleaning should be at least 90 pounds per square inch. Water can be supplied as high volume/low pressure or low volume/high pressure (NOAA Fisheries Service).
- Air compressor and blower OR Vacuum
- Shovel
- Pry bar
- Stiff brush or broom

Cleaning station at construction site.
Photo by: Mark Heaton, OMNR

Inspection and Cleaning Diagrams and Checklists

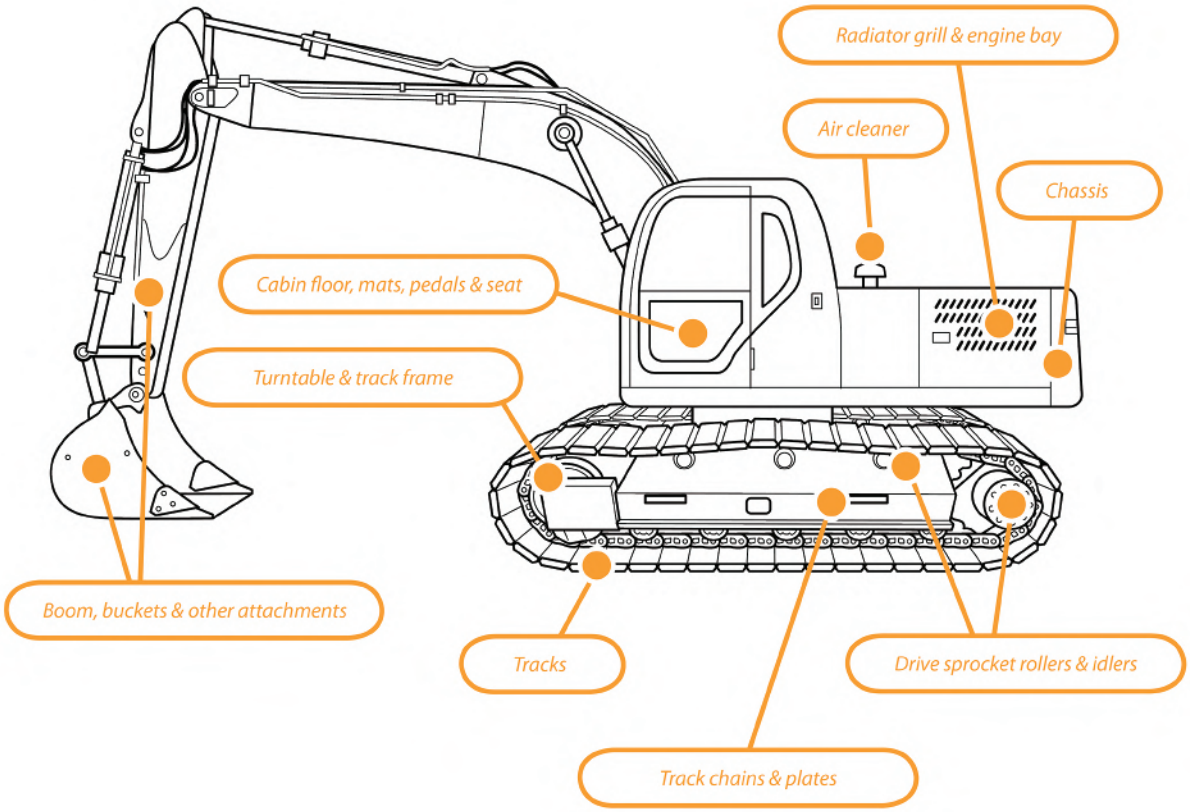
2WD and 4WD Vehicles



		✓
Cabin	Floor, mats, pedals, seats	
Engine	Radiators, engine bay, grill	
Body	Underside, chassis, crevices, ledges, bumper bars	
Wheels	All wheels (including spare), wheel arches, guards	
Tray	Floor, canopy (if included)	

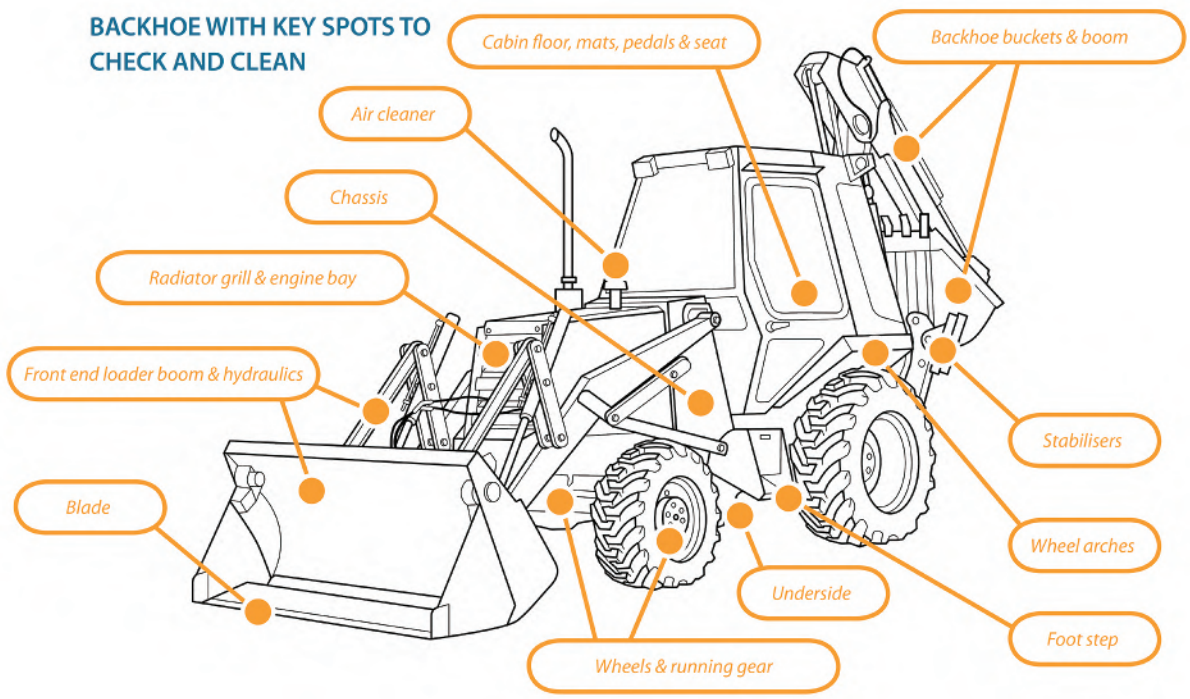
Excavator

EXCAVATOR WITH KEY SPOTS TO CHECK AND CLEAN



		✓
Cabin	Floor, mats, pedals, seats	
Engine	Radiators, engine bay, grill, air cleaner	
Tracks	Tracks, track frame, drive sprocket rollers, idlers	
Body Plates	Plates of cabin	
Body	Ledges, channels	
Bucket		
Booms		
Turret Pivot		

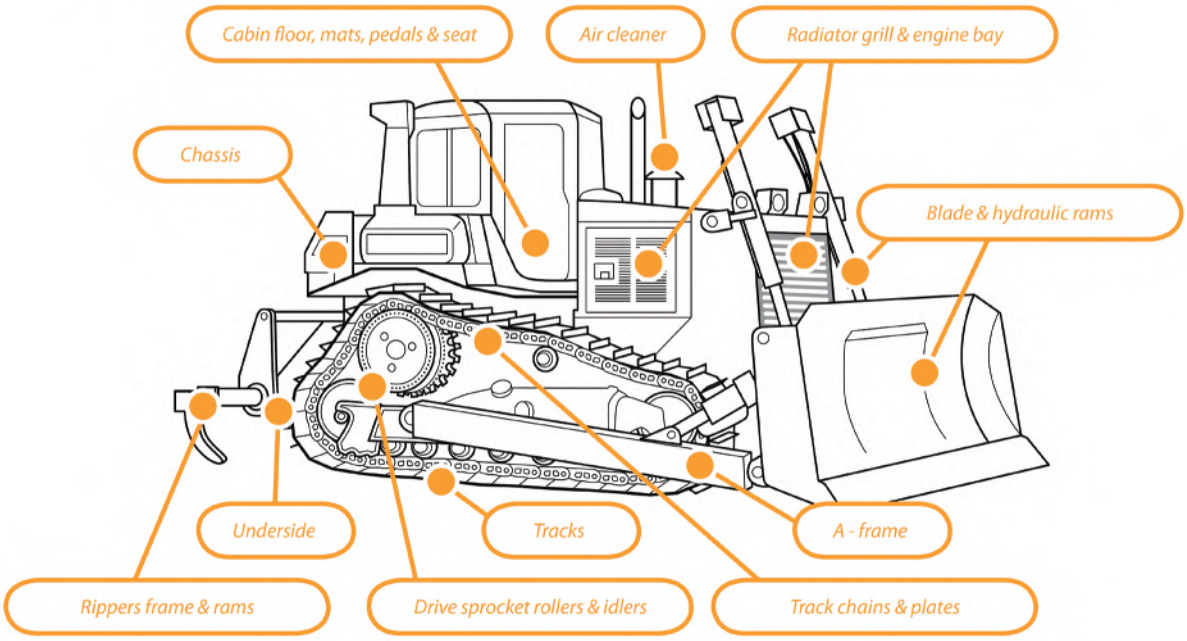
Backhoe



		✓
Cabin	Floor, mats, pedals, seats, foot step	
Engine	Radiators, engine bay, grill, air cleaner	
Wheels	All wheels (including spare), wheel arches, guards	
Front end loader	Blade, hydraulics, booms	
Backhoe	Buckets, boom, hydraulics, stabilizers	

Bulldozer

BULLDOZER WITH KEY SPOTS TO CHECK AND CLEAN



		✓
Cabin	Floor, mats, pedals, seats	
Engine	Radiators, engine bay, grill, air cleaner	
Tracks	Tracks, track frame, drive sprocket rollers, idlers	
Body Plates	Belly plates and rear plates	
Body	Ledges, channels	
Blade	Pivot points, hydraulic rams, a-frame	
Ripper	Ripper frame, ripper points	

Contacts and Resources

Ontario Invasive Species Strategic Plan 2012. Government of Ontario. Online, accessed May 8, 2012.
http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@biodiversity/documents/document/stdprod_097634.pdf

Invasive Species Management for Infrastructure Managers and the Construction Industry 2008. Wade, M. Booy, O. and White, V. Online, accessed April 27, 2012
http://www.ciria.org/service/Web_Site/AM/ContentManagerNet/ContentDisplay.aspx?Section=Web_Site&ContentID=9001

T.I.P.S (Targeted Invasive Plant Solutions) Highway Operations. British Columbia Invasive Species Council. Online, accessed May 8, 2012
http://www.bcinvasiveplants.com/iscbc/publications/TIPS/Highways_Operations_TIPS.pdf

Invading Species Awareness Program Workshop Manual: Aquatic Invasive Species: An Introduction to Identification, Collection and Reporting of Aquatic Invasive Species in Ontario Waters (includes information on decontaminating equipment).
http://www.invadingspecies.com/download/publications/manuals/WorkshopManual.pdf

Reporting Invasive Species

To report invasive species, or view maps of existing records, visit the Invading Species Awareness Program website www.invadingspecies.com/report/ or www.eddmaps.org/Ontario.

Or call the OFAH/MNR Invading Species Awareness Program Hotline at **1-800-563-7711**

Acknowledgements

We gratefully acknowledge NRM South (Tasmania, Australia) for allowing the use of their artwork and text from their "Keeping it Clean – A Tasmanian Field Hygiene Manual to Prevent the Spread of Freshwater Pests and Pathogens".

We also sincerely thank the Clean Equipment Protocol Working Group and the Ontario Invasive Plant Council Committees and Board of Directors for their ongoing support and valuable input into this document, and the Canada-Ontario Invasive Species Centre and Ontario Ministry of Natural Resources for the support in creating this protocol.

Clean Equipment Protocol Working Group:

Diana Shermet, Central Lake Ontario Conservation Authority; Paula Berketo, Ontario Ministry of Transportation; Travis Cameron, Ontario Ministry of Natural Resources; Jennifer Hoare, Ontario Parks; Michael Irvine, Ontario Ministry of Natural Resources; Alison Kirkpatrick, OFAH/MNR Invading Species Awareness Program; Erika Weisz, Ontario Ministry of Natural Resources; Amanda Chad, Ontario Power Generation; Nancy Vidler, Lambton Shores Phragmites Community Group; Nigel Buffone, Du Pont Canada Company; Ewa Bednarczuk, Lower Trent Conservation Authority

We also gratefully acknowledge the input and direction from Francine MacDonald, James Rockwood, Anne-Marie Roussy, Stephen Smith, Caroline Mach, Patricia Lowe, John Bowen, Karen Hartley, and the Southern Ontario Community Forest Managers group.

More Information:

Ontario Invasive Plant Council: www.ontarioinvasiveplants.ca

Appendix A: Identification of Invasive Plants found in Ontario

- **Common Buckthorn** (*Rhamnus cathartica*) and **Glossy Buckthorn** (*Frangula alnus*)
- **Dog-strangling Vine** (*Cynanchum rossicum*)
- **Garlic Mustard** (*Alliaria petiolata*)
- **Japanese Knotweed** (*Polygonum cuspidatum*)
- **Phragmites or Common Reed** (*Phragmites australis subsp. australis*)
- **Giant Hogweed** (*Heracleum mantegazzianum*)

common & glossy buckthorn

(Rhamnus cathartica & R. frangula)

Plant type: Shrub/small tree

Arrangement: Common buckthorn are sub-opposite (almost opposite). Glossy buckthorn are alternate.

Leaf: The common buckthorn leaf is egg shaped, edge of the leaf is "pebbled" (small rounded teeth). Veins converging toward leaf top. The glossy buckthorn leaf is more slender (tear drop shaped) and smooth margined.

Bark: Smooth, young bark with prominent raised patches or lenticels; rough texture and peeling bark when mature.

Seed/Flowers: Flowers are green-yellowish, small and inconspicuous. Green berries becoming purplish/black in late summer, berry > 1 cm in diameter.

Buds/Twigs: Common buckthorn has thorn-like tip on many twigs. Glossy buckthorn buds have no bud scales and lack thorny tips to twigs.

Habitat: Various - forest, thickets, meadows, dry to moist soils.

Similar native species: Native dogwoods, which lack the thorny "tip". Native dogwoods are truly opposite in arrangement of twigs; only alternate leaved (pagoda) dogwood has alternate branching.

dog-strangling vine
(Cynanchum rossicum & C. nigrum)

Plant type: Herb, twining vine

Arrangement: Opposite

Leaf: Lance shaped, smooth margin (edge)

Bark: n/a

Seed/Flowers: Bean shaped seed pod with seeds attached to downy 'umbrellas'. Flowers - pink (C. rossicum) or purple (C. nigrum) with five petals.

Buds/Twigs: n/a

Habitat: Dry to moist soils; more dominant in meadows and woodland edges.

Similar native species: Swamp milkweed (Asclepias incarnata spp.), is an upright plant, typically found in wetland habitats.

garlic mustard
(Alliaria petiolata)

Plant type: Herb

Arrangement: Alternate

Leaf: Saw tooth like edge, elongated heart shape. Garlic/onion smell when crushed. Leaves are kidney shaped with prominent veins.

Bark: n/a

Seed/Flowers: Cluster of small white flowers with four petals. Small black < 1 mm rounded seed found in elongated 'tube-like' seed pods (similar to a bean pod).

Buds/Twigs: n/a

Habitat: Various – dry to moist soils, in all habitat types, less often in meadows.

Similar native species: n/a

japanese knotweed
(Polygonum cuspidatum)

Plant type: Herb, 2 - 4 m in height.

Arrangement: Alternate

Leaf: Tear drop shaped, sharp pointed, dark green, flattened at base.

Bark: n/a

Seed/Flowers: Flowering stalk of many small greenish-white flowers.

Buds/Twigs: Large plant with a 'bamboo-like' stem. Stem light green maturing to tan colour.

Habitat: Moist to wet soils found in wetlands, water-courses and roadside ditches.

Similar native species: None.

common reed
(Phragmites australis)

Plant type: Grass

Arrangement: Alternate

Leaf: Broad leaf > 1 cm wide.

Bark: n/a

Seed/Flowers: Dense cascading 'broom-like' flower head. 'Cottony' in appearance when mature.

Buds/Twigs: Stems rough and ridged, ligule a densely hairy band. Mature plants > 3 m tall.

Habitat: Moist to wet soils. Found in wetlands, water- courses and road side ditches.

Similar native species: Species of mannagrass (Glyceria sp) including tall northern, eastern and rattlesnake grass. A native common reed exists but has a smooth stem and the ligule is not hairy. It is also quite rare.

giant hogweed
(Heracleum mantegazzianum)

Plant type: Herb. Mature plants can be over 3m tall.

Arrangement: Alternate

Leaf: Lobed leaf 1-2 m wide, lobes sharp-pointed.

Bark: n/a

Seed/Flowers: Small, white flowers in a large umbrella-shaped cluster, .75 m wide.

Buds/Twigs: Hairy stem with purple spots.

Habitat: Fresh to wet soils in forests, swamps, meadows, marshes.

Similar native species: Cow parsnip *(Heracleum maximum)* – has smaller flowers, no purple spots on stems.Angelica (Angelica atropurpurea) has a rounded-topped flower cluster and leaves divided into many leaflets.

Do not touch this plant because it is poisonous. If you do, wash your skin immediately in cool soapy water and do not expose the area to sunlight.

Seek professional advice before removing.

Identification of Invasive Plants found in Ontario Photos by:

Credit Valley Conservation, Greg Bales, Ken Towle, Patrick Hodge,
Ontario Federation of Anglers and Hunters, Francine Macdonald, Matt Smith

Ontario
Invasive Plant Council

APPENDIX F: DRAFT INVASIVE COMMON (EUROPEAN) BUCKTHORN (RHAMNUS CATHARTICA): BEST MANAGEMENT PRACTICES IN ONTARIO

Invasive Common (European) Buckthorn

(Rhamnus cathartica)

Best Management Practices in Ontario

ontario.ca/invasivespecies

Invasive Species Centre

Ontario Invasive Plant Council

Ontario

Foreword

These Best Management Practices (BMPs) are designed to provide guidance for managing invasive Common Buckthorn (*Rhamnus cathartica*) in Ontario. Funding and leadership in the development of this document was provided by the Canada/Ontario Invasive Species Centre. They were developed by the Ontario Invasive Plant Council (OIPC), its partners and the Ontario Ministry of Natural Resources (OMNR). These guidelines were created to complement the invasive plant control initiatives of organizations and individuals concerned with the protection of biodiversity, agricultural lands, crops and natural lands.

These BMPs are based on the most effective and environmentally safe control practices known from research and experience. They reflect current provincial and federal legislation regarding pesticide usage, habitat disturbance and species at risk protection. These BMPs are subject to change as legislation is updated or new research findings emerge. They are not intended to provide legal advice, and interested parties are advised to refer to the applicable legislation to address specific circumstances. Check the website of the Ontario Invasive Plant Council (www.ontarioinvasiveplants.ca) or Ontario Ministry of Natural Resources (www.ontario.ca/invasivespecies) for updates.

Anderson, Hayley. 2012. Invasive Common (European) Buckthorn (*Rhamnus cathartica*): Best Management Practices in Ontario. Ontario Invasive Plant Council, Peterborough, ON.

Printed April 2012
Peterborough, Ontario

ISBN: (to be confirmed)

This document was prepared for the Canada/Ontario Invasive Species Centre and the Ontario Ministry of Natural Resources by the Ontario Invasive Plant Council.

Support for the production and publication of this document has been provided by the:
Canada/Ontario Invasive Species Centre
Ontario Ministry of Natural Resources

Inquiries regarding this document can be directed to the
Ontario Invasive Plant Council
c/o Ontario Federation of Anglers and Hunters
PO Box 2800, 4601 Guthrie Drive
Peterborough, ON
K9J 8L5
Phone: (705) 748-6324 | Email: info@ontarioinvasiveplants.ca

For more information on invasive plants in Ontario, visit www.ontario.ca/invasivespecies, www.ontarioinvasiveplants.ca, www.invadingspecies.com or www.invasivespeciescentre.ca

Cover photo courtesy of Central Lake Ontario Conservation Authority.

Table of Contents

Common Buckthorn.
Photo courtesy of Hayley Anderson.

Common Buckthorn.
Photo courtesy of Central Lake Ontario Conservation Authority.

Introduction

Common Buckthorn is native to Europe and is also known as European Buckthorn. In Canada, it is found from Nova Scotia to Saskatchewan. It was likely introduced around the 1880s, becoming widespread in the early 1900s. This species was often used in hedgerows and windbreaks, and was widely planted across the country. Common Buckthorn is of concern to the agricultural community because it can host oat crown rust and soybean aphid, both of which reduce crop yields.

Common Buckthorn is shade and drought tolerant. It is now found throughout southern Ontario and grows in a wide range of habitats, spreading rapidly along roadsides, fence lines, woodland edges, and in pastures and abandoned fields. Buckthorn fruit has a laxative effect on wildlife which helps to widely distribute the seeds.

Common Buckthorn invasions can harm the economy and the environment. It out-competes native plants, reduces biodiversity, degrades the quality of wildlife habitat, and impacts a wide range of industries. Common Buckthorn is listed as a noxious weed in Ontario's Weed Control Act.

Description

Description of Common Buckthorn

Common Buckthorn is closely related to two other buckthorn species, Glossy Buckthorn *(Frangula alnus)* a non-native invasive species also present within Ontario, and Alderleaf Buckthorn *(Rhamnus alnifolia)*, a species that is native and widespread in southern Ontario. For the purpose of this document, the focus will be on Common Buckthorn *(Rhamnus cathartica)* with Glossy Buckthorn information included where necessary.

Height:

Common Buckthorn is a woody plant that ranges in size from a shrub to small tree; reaching heights of 6 - 7 m. Old and large tree specimens can have trunks up to 25 cm in diameter.

Common Buckthorn often grows as a mid-size (height) tree.

Photo courtesy of Patrick Hodge.

Stems:

The stems of Common Buckthorn are very dark grey to black with prominent small lenticels (lines), similar to birch. The bark is smooth and shiny with a metallic sheen when young, and rough textured when mature. When the bark is scratched or removed, the under layers are yellow-green and the cambium layer (directly under the bark) is orange.

Lenticels on the bark of a young Common Buckthorn.

Photo courtesy of Matt Smith.

The cambium layer (directly under the bark) of Common Buckthorn is orange.

Photo courtesy of Chris Evans.

Buds/Twigs:

On many twigs there are small thorn-like tips, which are generally located at the end of the twig. The buds are pointed and hug the stem.

Common Buckthorn has a thorn-like tip.

Photo courtesy of Matt Smith.

The buds of Common Buckthorn are pointed and hug the stem.

Photo courtesy of Central Lake Ontario Conservation Authority.

Leaves:

Leaves are opposite to sub-opposite, and occasionally alternate. They have sharp tips, and are pointed, curved or folded. The margins are somewhat finely toothed with rounded tips on the teeth. There are 3-5 strongly curved prominent veins per side which arch towards the tip of the leaf.

Common Buckthorn leaves have prominent, curved veins.

Photo courtesy of Central Lake Ontario Conservation Authority.

Common Buckthorn leaves are opposite to sub-opposite.

Photo courtesy of Ontario Federation of Anglers and Hunters.

Opposite to sub-opposite leaves.

Photo courtesy of Paul Wray, Iowa State University.

Flowers:

Common Buckthorn has inconspicuous four-petal flowers that are greenish-yellow, 6 mm across, and appear in early June on short threadlike stalks.

Common Buckthorn has greenish-yellow inconspicuous flowers.

Photo courtesy of Leslie J. Mehrhoff, University of Connecticut.

Flowers are borne on short stalks.

Photo courtesy of Scott Sampson.

Fruit:

In late July and August, black fruits are produced on the female trees, and are found in dense clusters in the leaf axils (where the leaf attaches to the stem). Each fruit contains 3-4 seeds and has deep narrow grooves on the back. The fruits remain on the plant well into the winter.

Immature Common Buckthorn fruit.

Photo courtesy of Central Lake Ontario Conservation Authority.

Common Buckthorn has black fruits in dense clusters.

Photo courtesy of Freyja Forsyth.

Description of Common Buckthorn and its look-a-likes

The table below lists the main features of Common Buckthorn in comparison to its invasive relative, Glossy Buckthorn *(Frangula alnus)* and the native Alderleaf Buckthorn *(Rhamnus alnifolia)*. For details of other species often mistaken for Common Buckthorn, see Appendix 1.

	Common (European) Buckthorn (invasive) *R. cathartica*	**Glossy Buckthorn (invasive)** *R. frangula*	**Alderleaf Buckthorn (native)** *R. alnifolia*
Leaves	• opposite to sub-opposite, occasionally alternate • sharp, pointed, curved or folded • somewhat finely rounded teeth • 3-5 strongly curved veins per side. Very obvious/strong on the underside, arch towards the tip of the leaf • petiole (stalk attaching leaf to stem) is grooved	• alternate • smooth wavy edges • shiny, oval, widest above the middle • not toothed • 5-10 fairly straight veins per side, very obvious/strong on the underside • petiole ¼ to ½ inch long	• alternate • tip of blade flat, tip of leaf acute point, smaller leaves more rounded • toothed edges • can be up to 10 cm long, 5 cm wide • mainly straight, conspicuous veins • deep green, paler grey-green below • petiole grooved
Flowers	• greenish yellow • 6 mm across • on short threadlike stalks • in dense clusters • appear in early June • 4 stamens, 4 petals, 4 sepals	• greenish white to greenish-yellow • 6 mm • solitary or in groups of 2-8 • 5 stamens, 5 petals, 5 sepals	• greenish yellow • 3 mm diameter • on short stalks, solitary at base of leaf stem • very inconspicuous • 5 stamens, 5 petals 5 sepals

Description of Common Buckthorn and its look-a-likes (continued...)

	Common (European) Buckthorn (invasive) *R. cathartica*	**Glossy Buckthorn (invasive)** *R. frangula*	**Alderleaf Buckthorn (native)** *R. alnifolia*
Fruit	• black when mature, green when immature • dense clusters, in leaf axils • 3-4 seeds, with deep narrow groove on back	• Red-brown turning black • solitary or in clusters in leaf axils • tend to have fruit in varying stages of ripeness • 2-3 seeds	• purplish-black • in small clusters • slightly longer than wide • 1-3 seeds, flat on back, scarcely grooved
Bud	• scaly, almost black • lies close to twig • some dwarf shoots end in a thorn • opposite, sometimes alternate	• no scales • no thorn	• dark smooth scales • up to 7 mm long • terminal bud absent • no thorn
Bark	• greyish brown • prominent small lenticels • smooth and shiny when young, rough textured when mature • under layers are yellow-green and heartwood is orange	• greyish brown • prominent small lenticels • under layers are yellow-green	• grey • branches purplish-red to grey • finely ridged
Branchlets or twigs	• terminal spine • no hairs	• no terminal spine • greying • minutely hairy	• no spines • grey-brown • minutely hairy
Form	• shrub or tree	• shrub or tree	• small low shrub
Size	• 6-7 m and 25 cm diameter	• 6-7 m and 25 cm diameter	• usually less than 1 m in height

Biology and Life Cycle

Common Buckthorn is a shade-tolerant plant that forms dense thickets. It is one of the first trees to leaf in early spring, getting a head start on growing when other shrubs and trees are leafless. It also retains its green leaves well into the fall (November in some areas) when nearly all other accompanying species are leafless or have changed colour. Its dense thickets suppress shade-intolerant species – the end result being a Common Buckthorn monoculture.

Common Buckthorn in the fall, still green while other species have changed colour.

Photo courtesy of Wasyl Bakowsky.

Common Buckthorn is dioecious, meaning individual trees have either male flowers or female flowers, but not both. Only female trees produce seed. Common Buckthorn will flower prolifically in the early spring, often unnoticed because of the small flower size. It sets seed rapidly and in great quantity from late July to August and berries persist into the winter. Fallen seeds can produce a seedling in as little as 28 days. Seeds may also be dropped in the water and carried downstream.

Common Buckthorn berries.

Photo courtesy of Greg Bales.

Common Buckthorn berries are often one of the only berries that last into the winter. The seeds are spread after being eaten by birds and mammals. They move through the animal's digestive system quickly, and the animal then excretes the seeds away from the parent shrub, further enabling its widespread invasion. These seeds can remain in the soil for up to 5 years resulting in a need for long term management.

Common Buckthorn seedling.

Photo courtesy of Matt Smith.

Common Buckthorn is commonly found along forest edges
Photo courtesy of Cody Hough.

Habitat

Common Buckthorn is native to Europe and north-western parts of Asia where it can be found in the understory of oak, oak-beech and ash woods, fens, open areas, disturbed sites and along forest edges. It was introduced in Ontario as an ornamental and windbreak plant in the 1800s after a period of deforestation in the province caused by settlement and development. Common Buckthorn has also been used for erosion control and stream bank stabilization.

Common Buckthorn is found in both dry and moist habitats and in almost any type of soil but has a preference for neutral to alkaline pH. It does well in sunny or partly shaded areas but can be limited by deep shade. The other two buckthorn species are found on more moist grounds, with the native Alderleaf Buckthorn tolerating wetlands, sphagnum bogs and cedar swamps. Glossy Buckthorn can also be found in these same more moist/wet areas with lower pH soils.

Common Buckthorn is found both west and east of the Canadian Shield in southern Ontario but is rare north of the shield. In some buckthorn control sites, Glossy Buckthorn is becoming more of a problem as Common Buckthorn is removed, especially in Ottawa-area wetlands where it is considered to be one of the most aggressive alien species. Some land managers have noted that Glossy Buckthorn can often be found growing alongside Common Buckthorn, and it is not restricted to moist areas.

Impacts

Impacts to Biodiversity

Common Buckthorn can harm biodiversity in a number of ways, affecting soil quality, plant communities, and wildlife.

It can change the nitrogen composition of soil making it harder for other species to survive. These changes can have long-lasting effects even after Common Buckthorn has been removed. For example, native species such as Chokecherry and Pincherry with fruits that are beneficial to wildlife (i.e. not laxative like Common Buckthorn) may not survive even in the right conditions, due to soil changes.

Common Buckthorn seems to have a direct impact on understory plant communities and vegetation types, though no formal studies have been completed. There may be several reasons for lower numbers of native plant species in an area with Common Buckthorn, such as preferential deer browse and alterations in the soil composition and leaf layer caused by non-native earthworm populations. Common Buckthorn may also encourage non-native earthworm establishment, which would facilitate the destruction of leaf layers.

Sites invaded by Common Buckthorn often show a lower species richness count, and a higher concentration of weedy and exotic species, including invasive honeysuckle species (*Lonicera* spp).

Common Buckthorn has been shown to negatively affect some native songbird populations. Robins (*Turdus migratorius*) nesting in buckthorn are more susceptible to predators because of the low branch heights and lack of protective thorns (like those found on hawthorns and native rose species).

The berries are eaten by thrushes (Turdidae), waxwings (Bombycilla), White-throated Sparrows *(Zonotrichia albicollis)*, European Starlings *(Sturnus vulgaris)*, jays (Corvidae) and small mammals. The laxative properties of the seeds ensure they are spread widely and rapidly. Seedlings will begin to sprout under perch trees, and along fence lines and woodland edges. The seeds are also long-lived five years and will rapidly colonize a site if space becomes available. Under conditions of full sun, favourable soil conditions (especially disturbed soils) and no competition, Common Buckthorn can mature and produce seed in a few years.

Site invaded by Common Buckthorn and exotic honeysuckle. Buckthorn on left, honeysuckle on right.
Photo courtesy of Paul Evans.

Impacts to Forestry

Land managers of wooded or open areas in southern Ontario are likely familiar with Common Buckthorn due to its aggressive spread by seed and prolific growth. Common Buckthorn forms dense, even-aged stands that can tolerate shade and suppress other vegetation because of its long growing season. The growth of hundreds of buckthorn seedlings across the forest floor prevents other species, including native plants, from growing and surviving. Its greatest impact can be in somewhat disturbed sites, especially if in full sun. Once established on the edge of a forest, plants will spread into the interior.

In southern Ontario, Common Buckthorn is found along forest edges and as a dominant part of the forest understory. It aggressively invades hardwood (deciduous) and softwood (coniferous) forests and can harm the surrounding soil similarly to aggressive allelopathic[1] invaders, such as Garlic Mustard *(Alliaria petiolata)*. In North America, Common Buckthorn develops its leaves weeks before native species and loses them weeks after, effectively outcompeting native species for sunlight. These traits make it particularly harmful to hardwood forests and make it hard for land managers to promote healthy forest growth and succession.

Common Buckthorn invading a pine plantation.
Photo courtesy of Greg Bales.

Impacts to Agriculture

Common Buckthorn is host to the Soybean Aphid *(Aphis glycines)*, and the fungus that causes Oat Crown Rust *(Puccinia coronata* spp. *avenae)*. As a result it is listed as a provincially noxious weed in Ontario's *Weed Control Act*. Common Buckthorn and Ontario's native Alderleaf Buckthorn can act as overwintering hosts for the Soybean Aphid, which can harm the production of soybean and vegetable crops. The Soybean Aphid may have also has facilitated an increase in populations of the exotic Multi-coloured Asian Lady Beetle *(Harmonia axyridis)* (preys upon the Soybean Aphid), leading to the decline of several native lady beetle species.

1 Allelopathy is the release of chemicals from the root of a plant in to the soil to discourage other plants from growing nearby

Impacts on Recreation

Common Buckthorn can inhibit recreational activities in areas where it has become established. Its dense stands can make it difficult to walk along established trails. Common Buckthorn also harms the aesthetic value of natural areas by reducing the abundance and variety of native species such as wildflowers.

Common Buckthorn in a natural area.

Photo courtesy of Central Lake Ontario Conservation Authority.

Regulatory tools

Provincial - Weed Control Act

Common Buckthorn is listed as a provincially noxious weed in the Weed Control Act. The act was created to reduce the impact of noxious weeds and weed seeds on agricultural or horticulture land. Landowners whose property contains noxious weeds and weed seeds that negatively affect agricultural lands are responsible for weed control and associated costs.

Best Management Practices

Controlling Common Buckthorn before it becomes well established will reduce its impacts on biodiversity, the economy and society.

Once Common Buckthorn has been confirmed at a location, a control plan should be developed based on population size, accessibility, potential for spread and the risk of environmental, economic or social impacts. Early action can significantly reduce the cost of control.

With large infestations and limited time and resources, control work can seem daunting. It is important to develop a feasible, long-term strategy with the following considerations:

1) Try to remove the most prolific seed producers first – identify the fruit-bearing trees in late autumn, both the male (non-fruit bearing) and female Common Buckthorn will retain green leaves after other trees have gone dormant.

2) Concentrate on high-priority areas such as the most productive or sensitive part of a woodlot or a favourite natural area.

3) Consider dedicating a certain time each year to control efforts, and make it a joint effort with neighbouring landowners/land managers.

4) Plan to replant native tree and shrub species once the Common Buckthorn population is eradicated or under control. If dealing with a large infestation, it is best to remove the buckthorn and re-plant in phases to avoid opening the canopy to other invasive species. Re-planting with native species will help jump-start natural succession and increase biodiversity in the area.

Common Buckthorn seeds can remain viable in the soil for up to five years. Follow-up monitoring is essential to remove future seedlings. A number of natural resource considerations, such as species at risk and habitat disruption, should be assessed before creating a control plan.

Natural Resource Considerations

You are responsible for ensuring that your project follows all relevant laws, including the Endangered Species Act (ESA).

Prior to implementing control actions, a site assessment for species or habitat protected under the ESA is required. Your local MNR office can provide existing knowledge of protected species and or their habitat at or near your site, as well as provide existing species at risk survey protocols. Details on additional sources to consult for this information are available in the ESA Submission Standards for Activity Review.

If protected species or habitats are present, an assessment of the potential effects of the control project is required. Consult with your local MNR district office as early in your control plans as possible for advice on alternatives that may avoid or minimize adverse effects, and to determine if your control activities require authorization under the ESA.

Control Measures

Mechanical control

Pulling:

When the soil is moist, small plants up to 1 m (3ft) in height can be pulled. As Common Buckthorn grows, it puts down a deep root system very quickly (dependent on soil conditions) and sends out lateral roots that can be as long as 2 - 3 m which will also need to be removed. Larger plants can be dug out, or pulled out using a weed wrench tool. Re-sprouting can occur unless all the roots are removed or other measures like fire or chemical control are used. Re-sprouting can worsen the problem dramatically (i.e. population can quintuple in five years) if appropriate measures are not taken. However, some land managers have reported success using only pulling as a control method.

If pulling takes place in the fall, care should be taken to remove and contain branches with berries prior to pulling. Because of the thorns, it is recommended that volunteers or staff wear personal protective equipment, such as gloves and safety glasses when performing mechanical control of Common Buckthorn. As with any control method, follow up monitoring/ maintenance is crucial. Pulling is extremely difficult in clay soils. It works best in fresh-moist loamy sites or when the soil is moist or wet.

To limit disturbance and reduce impact on surrounding vegetation, it is recommended that pulling take place from mid-October to mid-November.

Benefits of pulling in the fall/winter season (before the ground freezes) include the following:

- Common Buckthorn leaves stay green longer and remain on the stem longer than our native trees and shrubs. This makes identification easier and reduces the potential of pulling look-a-like species; especially if you are using volunteers to help with the control.
- Most of the ground vegetation has gone dormant at this time, reducing the disturbance to surrounding plants that may arise while pulling shrubs and walking through the site.

Removal using a weed wrench tool can be effective for stems up to 5cm in diameter. For larger trees (greater than 5cm in diameter) some organizations have reported success using a tractor to pull plants, however this leaves a large hole which will need to be re-planted. If not re-planting immediately, an annual cover crop can be used until planting takes place.

Removal using a weed wrench tool.

Photo courtesy of Matt Smith.

Cutting/Girdling:

Cutting or girdling (a cut groove down to the heartwood all the way around the stem) are also feasible control options. However, herbicide must be applied to fresh stumps or girdled areas to prevent re-sprouting. Immediate application of herbicide to a fresh cut allows for better absorption and may reduce the need for repeat applications. A precise application of herbicide from a small hand-pump bottle can be done at any time of the year, although late spring/early summer is the most effective time. See "chemical control" section for additional information on the use of pesticides, including herbicides. The site must be monitored for the next few seasons to ensure control of seedlings or re-sprouts.

Girdling can weaken larger Common Buckthorn shrubs that can't be pulled by hand or by mechanical means. This makes the shrub easier to remove mechanically the following year. Cutting the shrub down to a stump will cause sprouting and make stump removal very difficult. Sprouting will still occur with girdling but won't be as vigorous as with cutting. Over time (1-2 years, girdling may need to be repeated after the first year) the canopy will begin to die, the roots will die back and the shrub will become easier to pull out. When girdling, the band should be at least 3" wide to prevent wound closure and the recovery of the shrub.

A cut buckthorn stump will re-sprout unless treated.
Photo courtesy of Chris Hargreaves.

Mowing:

Mowing will reduce stem numbers and vigour, and will eventually kill off most seedlings. It needs to be carried out in early and late summer for at least 2 – 3 consecutive years and is recommended for stems that are less than 2 years old. Mowing will also prevent growth of native vegetation so should only be used in areas with dense buckthorn seedlings where restoration will occur.

Grazing:

Livestock usually find buckthorn seedlings succulent and tasty, and will successfully control new regeneration in pastured areas once fence-line shrubs have been removed. Because livestock can also graze or trample nearby native vegetation grazing is not recommended for high quality natural areas.

Fire:

Fire can be an effective tool where feasible (e.g. where there are natural fire barriers around a plant community that is almost entirely Common Buckthorn). Regular prescribed fire or the use of a propane torch will control seedlings and shrubs of this species in fire-adapted upland and wetland sites (e.g. fens, sedge meadows, marshes). Some control will be evident after the first burn. For complete control in established stands, burning yearly or every other year may be required for 5 to 6 years or more.

The success of using prescribed burning to control Common Buckthorn depends on the intensity of the fire. Generally, Common Buckthorn shrubs over 5cm in diameter may require additional control, such as pulling or chemicals. To use fire as a control option you must contact the municipality for a burn permit. Remember to always follow safe burning practices.

Flooding:

In wetlands where the water table has been artificially lowered, restoration of water levels will often kill Common Buckthorn. Care should be taken not to damage sensitive plant communities by raising water levels higher than occurred historically. Regulating water levels may require permits or approvals from both federal (Fisheries and Oceans Canada) and provincial governments (Ministry of Natural Resources and Ministry of Environment). Before undertaking work contact these agencies for more information.

Disposal:

Common Buckthorn branches can be piled and burned on site (check with your municipality for a burn permit). Pile branches before they dry, as dry buckthorn thorns harden and can inflict painful and long-lasting wounds. If you are going to dispose of buckthorn in green waste (compost) or by chipping, ensure that you have removed all fruit or are only doing so with the male trees. Common Buckthorn has been noted to take more time than most other species to break down in to compost. Fruits should be removed and placed in the trash. Disposal at municipal compost waste facilities is an option if they have the ability to heat the seeds to a high enough temperature, check with your municipality for disposal options.

Chemical Control

The Ontario Pesticides Act and Ontario Regulation 63/09 provides natural resources, forestry and agricultural exceptions which may enable chemical control of invasive plants on your property. Other exceptions under the Act include golf courses, and for the promotion of public health and safety.

Natural Resources Exception

A 'natural resources' exception exists for the use of prohibited pesticides to manage, protect, establish or restore a natural resource. This exception allows the use of prohibited herbicides for control of invasive plants on your property provided your project meets specific conditions and you obtain the necessary approvals.

If your project meets the natural resources criteria specified in section 33 of Ontario Regulation 63/09 and includes the use of pesticides in accordance with Integrated Pest Management principles outlined in the BMP guide you will need to contact the Ontario Ministry of Natural Resources (www.ontario.ca) to obtain a written letter of opinion from the MNR Regional or Branch Director.

Forestry Exception

If Common Buckthorn is within a forest*, chemical control may fall under the exception for forest management, and a letter of opinion may not be required. Class 9 pesticides can be used under the forestry* exception to protect trees from pests and to control competing vegetation.

*O. Reg. 63/09 defines "forestry" and "forest" as:

"Forestry means activities relating to any of the following: harvesting, renewing, maintaining or establishing a forest, protecting forest resources derived from a forest, and accessing a forest for these purposes."

"Forest means a treed area of land that is one hectare in size or larger and is not used for producing an agricultural crop as part of an agricultural operation."

Refer also to the Ministry of Environment's factsheet titled "Pesticides Act and Ontario Regulation 63/09 Private Land and Woodlot Owners April 2011" http://www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/stdprod_085367.pdf

Agriculture Exception

There is an exception for the use of Class 9 pesticides for uses related to agriculture by a farmer. This exception may apply to the control of Common Buckthorn in agricultural fields or near farm operations.

A farmer is an individual who owns or operates an agricultural operation.

An agricultural operation is an agricultural, aquacultural or horticultural operation and includes:

- Growing, producing or raising farm animals
- Production of crops, including greenhouse crops, maple syrup, mushrooms, nursery stock, tobacco, trees and turf grass, and any additional agricultural crops
- Activities that are part of an agricultural operation such as maintenance of a shelterbelt for the purposes of the agricultural operation

- The production of wood from a farm woodlot, if at least one of the activities described earlier is carried out on the property where the farm woodlot is located.

Refer also to the Ministry of the Environment's factsheet titled "Pesticides Act and Ontario Regulation 63/09 Agriculture May 2011" http://www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/stdprod_080128.pdf

Herbicide Application

Herbicides must be applied in accordance with all label directions and only for the control of specified pests. For an up-to-date list of herbicides labelled for Common Buckthorn control, visit the Pest Management Regulatory Agency's web site at www.pmra-arla.gc.ca. The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)'s Publication 75, Guide to Weed Control is an excellent reference for all aspects of weed control, and includes a section on invasive plant management. It is regularly updated and includes herbicides currently registered for specific weeds, including Common Buckthorn. To determine if a federally registered herbicide is also classified for use in Ontario, visit http://app.ene.gov.on.ca/pepsis/.

Anyone using a pesticide is responsible for complying with all federal and provincial legislation. Most non-domestic (i.e. commercial, restricted etc.) herbicides can only be applied by licensed exterminators. For more information, refer to the Ontario Pesticides Act and Ontario Regulation 63/09 (available on http://www.elaws.gov.on.ca), or contact the Ontario Ministry of the Environment (http://www.ene.gov.on.ca/environment).

Biological Control

Since 2001, research has been on-going to identify potential bio-control agents using a predator, disease or other natural control to fight Common buckthorn. Over the past 10 years, nine species have been studied and discarded because they may have impacts on other non-target species (lack of host-specificity). Testing for Common Buckthorn is ongoing using two psyllids (sap-sucking lice) and a seed-feeding midge that have shown host-specificity in early trials. Research in to the relationship between soil organisms and pathogens and Common Buckthorn will also be conducted in the future.

Removing a cut stump
Photo courtesy of Iola Price.

Preventing the Spread

Everyone can help prevent the spread of Common Buckthorn by following these tips:

☑ Report it.

If you think you see Common Buckthorn, take a picture, record the location and contact the Invading Species Hotline to report it. For more information and guidance contact the Invading Species Hotline at **1-800-563-7711** or visit www.invadingspecies.com or www.ontarioinvasiveplants.ca. Because it is included in the Weed Control Act you can also contact county and regional weed inspectors regarding Common Buckthorn infestations.

☑ Watch for it.

Monitor hedges, property boundaries, fence lines and trails. Early detection of invasive plants can increase the success of control and removal efforts.

☑ Stay on trails.

Avoid traveling off-trail and in areas known to have Common Buckthorn or other invasive species.

☑ Stop the spread.

Inspect, clean and remove mud, seeds and plant parts from clothing, pets (and horses), vehicles (including bicycles), and equipment such as mowers and tools. Clean vehicles and equipment in an area where plant seeds or parts aren't likely to spread (e.g., wash vehicles in a driveway or at a car wash) before travelling to a new area.

☑ Keep it natural.

Try to avoid disturbing soil and never remove native plants from natural areas. This leaves the soil bare and vulnerable to invasive species.

☑ Use native species.

Try to use local native species in your garden. Never use Common Buckthorn in your garden or hedgerows. Encourage your local garden centre to sell non-invasive or native plants.

Help track the Spread of Common Buckthorn

Common Buckthorn is assumed to be widespread in Ontario, however the extent of populations is not well known. You can help track the spread of this invasive species by using one of these tools:

1) The Invasives Tracking System is an on-line reporting tool that allows users to view existing sightings of Common Buckthorn and other invasive species in Ontario and document their sighting reports utilizing satellite imagery. The website (www.invasivestrackingsystem.ca) is free to use for both the public and professionals.

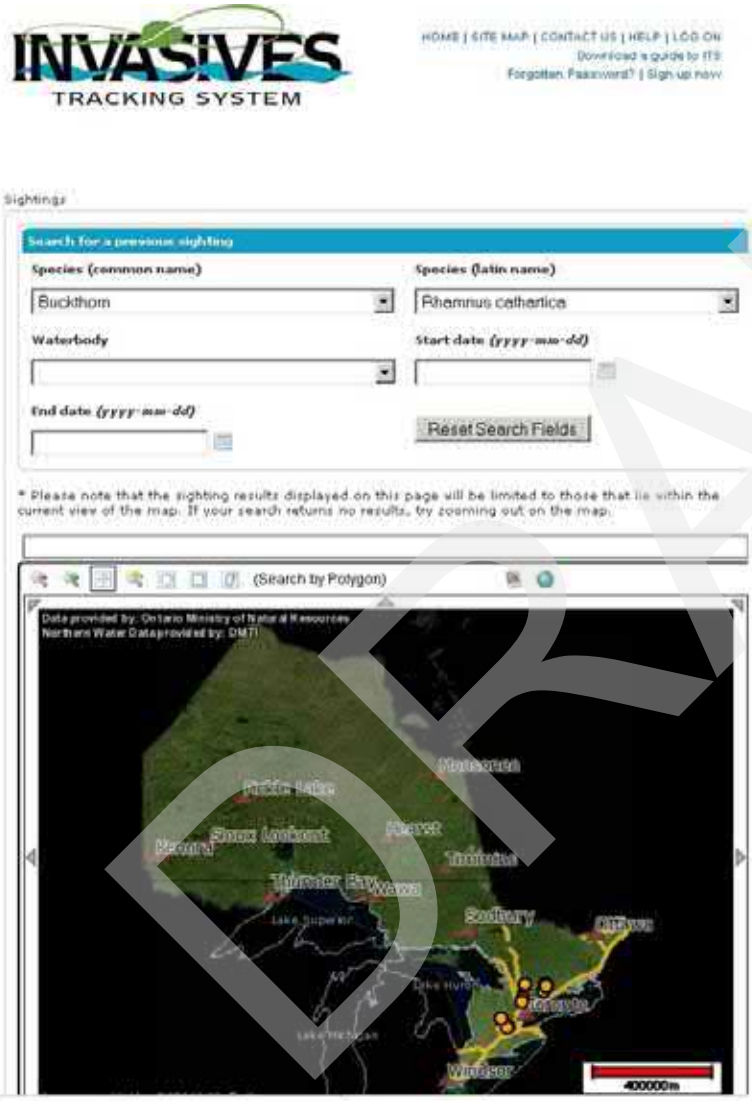


Photo courtesy of OFAH.

2) The toll-free Invading Species Hotline (**1-800-563-7711**) and website (www.invadingspecies.com) can be used to report sightings verbally or on-line.

If you think you have Common Buckthorn on your property or see it in your community, please report it. You will be asked to send in the sighting location along with photos of the leaf, stem and, flowers or berries (if present) for identification.

Literature and Other Resources

The Ministry of Natural Resources, the Ontario Invasive Plant Council and their partners have produced outreach materials which can be shared with the public and provide information on the identification, control and management of Common Buckthorn. These materials (including this BMP document) can be found on-line at www.ontario.ca/invasivespecies, www.invadingspecies.com and www.ontarioinvasiveplants.ca or by contacting the Invading Species Hotline at **1-800-563-7711**.

Additional materials and resources can be found at:

Fact Sheet on the Ontario Pesticides Act and Ontario Regulation 63/09 for Private Land and Woodlot Owners
http://www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/stdprod_085367.pdf

Credit Valley Conservation Authority
www.creditvalleyca.ca/invasives

Canadian Botanical Conservation Network
http://archive.rbg.ca/cbcn/en/projects/invasives/invade1.html

References/Additional Resources

Archibold O. W, Brooks D, and Delanoy L. 1997. An investigation of the invasive shrub European buckthorn, *Rhamnus cathartica L.*, near Saskatoon, Saskatchewan. Canadian Field-Naturalist 111 (4): 617–621.

Campbell C.S, Hyland F, and Campbell M.L.F. 1975. Winter key to woody plants of Maine. University of Maine Press, Orono, Maine

Converse C. 1998. Element Stewardship Abstract for *Rhamnus cathartica, Rhamnus frangula* (syn. *Frangula alnus*). The Nature Conservancy, Arlington.

Gardiner M, Michel A. P, Landis D. A, O'Neal M. E, and Lusch D. 2010. Common Buckthorn *(Rhamnus cathartica)* as a keystone invader in Agricultural Landscapes. Ohio State University. Available at: http://www.reeis.usda.gov/web/crisprojectpages/220700.html

English Alex. Manuscript, McGill University. Glossy Buckthorn. Available at: http://canadianbiodiversity.mcgill.ca/english/index.htm

Farrar John Laird. 1995. Trees in Canada. Fitzhenry and Whiteside Ltd and Canadian Forest Service. 502 pp

Gassmann A, Jovic J, Haefliger N and Tosevski I. 2011. Annual Report 2010: Biological Control of Common Buckthorn, *Rhamnus cathartica*. CABI-Europe (Reference VM01730).

Gassmann A , Tosevski I, and Skinner L. 2008. Use of native range surveys to determine the potential host range of arthropod herbivores for biological control of two related weed species, *Rhamnus cathartica* and *Frangula alnus*. Biological Control 45: 11-20

Heneghan L, Fatemi F, Umek L, Grady K, Fagen K, and Workman M. 2006. The invasive shrub European buckthorn (*Rhamnus cathartica* L.) alters soil properties in Midwestern US woodlands. Applied Soil Ecology 32(1):142–148.

Huebner C. 2007. Invasive Plants Field and Reference Guide: An Ecological Perspective of Plant Invaders of Forests and Woodlands. USDA Forest Service.

Jacquart E. 2009 Where Do I Start?! Prioritizing Invasive Plant Control. Paper presented at OIPC AGM 26 October 2009.

Knight, K.S., Kurylo, J.S., Endress A.G., Stewart J.R., and Reich P.B. 2007. Ecology and ecosystem impacts of common buckthorn (*Rhamnus cathartica*): A review. Biological Invasions 9:925-937.

Kurylo, J.S., Knight K.S., Stewart J.R., and Endress, A.G. 2007. Rhamnus cathartica: Native and naturalized distribution and habitat preferences. Journal of the Torrey Botanical Society 134(3): 420-430.

Mccay T.S, Mccay D, and Czajka J.L. 2008. Deposition of exotic bird-dispersed seeds into three habitats of a fragmented landscape in the northeastern United States. Plant Ecology 203: 59-67

Ontario Federation of Angler and Hunters (OFAH). 2011. Invading Species Awareness Program; Common Buckthorn (*Rhamnus cathartica*) and Glossy Buckthorn (*Frangula alnus*). Available at: http://www.invadingspecies.com/Invaders.cfm?A=Page&PID=35 Accessed February 29, 2012

Pridham D and Anderson H (ed). 2009. Landowners Guide to Controlling Invasive Woodland Plants. Ontario Federation of Anglers and Hunters (available at www.invadingspecies.com and www.ontarioinvasiveplants.ca)

Schmidt K.A, and Whelan C.J. 1999. Effects of exotic Lonicera and Rhamnus on songbird nest predation. Conservation Biology 13(6): 1502–1506.

Seltzner S. and Eddy T.L. 2003. Allelopathy in *Rhamnus cathartica*, European buckthorn. The Michigan Botanist 42:51-61

Soper J. and Heimburger M. 1994. Shrubs of Ontario. The Royal Ontario Museum, Toronto.

USDA. 2007. Pest Management – Invasive Plant Control - Buckthorn (Common and Glossy. Field Office Technical Guide. Available at: http://efotg.sc.egov.usda.gov/references/public/MN/797Buckthorn.pdf

Voegtlin D, O'Neil R, Graves W, Lagos D. 2005. Potential Winter Hosts of Soybean Aphid. Annals of the Entomological Society Am. 98(5): 690-693.

Wyckoff P. 2005 The European buckthorn (*Rhamnus cathartica*) invasion in west central Minnesota. In: Skinner LC (ed) Proceedings: symposium on the biology, ecology and management of garlic mustard (*Alliaria petiolata*) and European buckthorn (*Rhamnus cathartica*), St Paul, May 2005. USDA Forest Service Publication, St Paul, pp 49-52

Acknowledgements

Common Buckthorn BMP sub-committee

Hayley Anderson, Ontario Invasive Plant Council

Lindsay Burtenshaw, Royal Botanical Gardens

Rachel Gagnon, Ontario Invasive Plant Council

Sean James, Fern Ridge Landscaping

Dan Kraus, Nature Conservancy of Canada

Francine MacDonald, Ontario Ministry of Natural Resources

Iola Price, Ottawa Invasive Plant Group/Rockcliffe Park Residents Association

Diana Shermet, Central Lake Ontario Conservation Authority

Melanie Sifton, Humber Arboretum

Fraser Smith, OFAH/MNR Invading Species Awareness Program

Owen Williams, Ontario Invasive Plant Council

Additional Review/Information provided by

Andrea Bake, LEAF

Ewa Bednarczuk, Lower Trent Conservation

John Bowen, Hydro One

Mike Cowbrough, Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)

Albert Dugal, (retired) National Museum of Nature

Freyja Forsyth, Credit Valley Conservation

Ken Goldsmith, Bruce County

Michael Irvine, Ontario Ministry of Natural Resources

Sean James, Fern Ridge Landscaping

Scott Olan, Ontario Ministry of the Environment

Stephen Smith, Urban Forest Associates

John D. Smith

Ken Towle, Ganaraska Region Conservation Authority

Brenda van Ryswyk, Conservation Halton

Cara Webster, City of Toronto Urban Forestry Department

Editing services provided by Sarah Higginson

Design by Adam Connor, www.AdamConnor.ca

Appendix 1 – Additional Species which may be confused with Buckthorn

	Choke Cherry (native) *Prunus virginiana*	**Pin Cherry (native)** *Prunus pensylvanica*	**Sandcherry (native)** *Prunus pumila*
Leaves	• alternate • widest above the middle • longer than wide • slightly hairy beneath • may have tufts of hair at vein axils • toothed/serrated edges and teeth not incurved • petiole with 1-3 glands at base of blade	• alternate • 2x longer than wide • long pointed tip • margins (edges) have fine inward-curved teeth • upper surface shiny green, under surface slightly paler and smooth • petiole usually has a small gland at the base of leaf	• opposite or alternate • can be long and narrow, often crowded at end of branch • sharply toothed but usually missing teeth along bottom 1/3 of leaf • blunt, bright olive green above, paler below, • prominent veins curving forward • When broken, held together by veins
Flowers	• thick, white cylindrical clusters on one stalk • appear before the leaves open • 5 petals • 10-25 flowers grouped at end of stem	• tiny, white in flat-topped clusters of 2-4 flowers on pedicels (stem that attaches flower) • 5 petals • appear when leaves half open	• white, in clusters of 2-6 • 5 petals
Fruit	• red to purple • one seed • many fruit clustered on one stalk • ripen in August to September	• red, pea-sized • one seed • 1 fruit per stalk on longer stalks but in clusters of stalks • ripen late July to early September	• purple to blackish • astringent • singly or in small clusters, like Choke Cherry

Appendix 1 – Additional Species which may be confused with Buckthorn (continued)

	Choke Cherry (native) *Prunus virginiana*	**Pin Cherry (native)** *Prunus pensylvanica*	**Sandcherry (native)** *Prunus pumila*
Bud	• 3-4 mm long • sharp pointed scales • dark brown with pale edges	• 1-2 mm long • rounded • terminal and several lateral buds clustered at end of twig	• less than 4 mm long • blunt to slightly sharp • uniformly reddish-brown • clustered toward tip of twig
Branchlets or twigs	• can have thorns • twig has disagreeable odour when broken	• can have thorns	• new twigs are bright red, slender, smooth
Form	• Shrub or tree-like	• Single-stemmed tree	• Prostrate shrub (branches lay along the ground)
Size	• 10-30 ft • trunk can be 3-4 inches in diameter	• 12-20 ft • trunk 4-15 inches in diameter	• 1-5 ft but usually 2 ft high

*Glossy Buckthorn also looks very similar to Chokecherry

Appendix 1 – Additional Species which may be confused with Buckthorn (continued)

	Serviceberry (native) *Amelanchier* spp.	**Dogwood (mostly native)** *Cornus* spp.	**Nannyberry (native)** *Viburnum lentago*
Leaves	• alternate • oval to almost round • veins tend to be straight and parallel • about 10 per side • small teeth on edges • often toothless toward the stalk	• opposite or alternate • often crowded at end of branch • not toothed • can be long and narrow • prominent veins curving forward • Alternate-leafed Dogwood has pointed tip • When broken, held together by veins	• opposite • finely toothed • 5-10 cm long • tip slender and sharp • deep green above, paler below • tiny dark brown spots beneath petioles grooved with winglike margins that are an extension of the leaf
Flowers	• white, conspicuous • 5 petals appear before or with leaves	• small, white, • in compact terminal clusters • often appear before leaves • some are surrounded by floral bracts that resemble petals	• sweet-scented white flowers • in sessile (no stalk) clusters • up to 5-10 cm across
Fruit	• 5-10 hard seeds • red to dark blue or purple • ripen late July-early August	• one seed - sometimes 2 • berries are white, blue, red	• open cluster of blue-black nearly round to ellipsoid berries

Appendix 1 – Additional Species which may be confused with Buckthorn (continued)

	Serviceberry (native) *Amelanchier* spp.	**Dogwood (mostly native)** *Cornus* spp.	**Nannyberry (native)** *Viburnum lentago*
Bark	• smooth, grey • marked by slightly twisted network of darker vertical lines • when older, bark is rough and scaly	• thin, reddish or grey	• greyish brown with small irregular scales • mature bark rough and scaly
Bud	• narrow, ovoid • 8-12 mm long • pressed tightly against twig • red, purple or red and green	• terminal (at end of stem) • often a large, globular and swollen flower bud • slender leaf buds	• terminal • elongated and pointed • flower bud twice as long with bulbous base
Branchlets or twigs	• slender stems • unarmed • may be somewhat hairy when young	• round-leafed dogwood streaked with purple • other species ranging from light brown to bright red to dark purple	• slender, smooth • light brown • unpleasant odour when bruised
Form	• Shrub or small tree	• Shrub or tree-like	• Shrub or tree-like

Appendix 2

Are the leaves: scalloped or wavy-edged (lobed)? split into three sections (like clover)? many smaller leaflets on one stem (like sumac)? Do the leaves have: sharp and irregular or jagged teeth along edges? irregular wavy edges? curving edges all the way around (undulate)?	**YES →** It's NOT Common Buckthorn		
NO ↓			
Do the leaves have yellow dots (glands) on both sides? Does the leaf underside have round brown scales?	**YES →** It's NOT Common Buckthorn (might be Bayberry or Buffaloberry)		
NO ↓			
Are the leaves opposite or sub opposite (Are they across or almost exactly across from each other along the stem)?	**YES →** Are there small thorns at the end of the twigs? Are there greenish yellow flowers?	**YES →** It's probably **COMMON BUCKTHORN**	
NO ↓	**NO** ↓		
↓	Are the edges (margins) of the leaf toothed?	**YES →** Is the tip of the leaf long and pointy? Does it have sharply toothed edges with a fringe of short hairs? Does it have yellow or orange/red flowers?	**YES →** It's NOT Common Buckthorn (might be Bush Honeysuckle)
↓	**NO** ↓	**NO** ↓	

Alder Leaved Buckthorn

Common Buckthorn

Glossy Buckthorn

Notes:

To use this chart, you will need to have a sample or photos of the leaf and branch. It will also be helpful to have a sample or photo of the flowers. This means keeping an eye on the plant during the Spring to note when it is in flower and collecting your sample or taking a photo.

Appendix 2 (continued)

↓	↓	Is the tip of the leaf shorter (not long tapering)? Are some of the edges toothed?	**YES →** Are the flowers greenish-yellow and hard to see, in clusters where lower leaves attach to twigs?	**YES →** It's probably **COMMON BUCKTHORN**
↓	**NO** ↓	**NO** ←	**NO** ↓	
	↓		Are the flowers white, conspicuous and in clusters at the end of twigs?	**YES →** It's NOT Common Buckthorn (might be Nannyberry)
↓	Are the flowers in bunches (clusters) of many flowers?	**YES →** Are the flowers white? On shrubs?	**YES →** It's NOT Common Buckthorn (might be Dogwood)	
↓	**NO** ↓	**NO** ↓		
↓	↓	Are the flowers yellow or reddish? On vines or shrubs?	**YES →** It's NOT Common Buckthorn (might be a variety of Honeysuckle. Some Honeysuckle is an invasive species.)	
↓	Are the flowers found in pairs on the axils of the leaves (where the leaves join the stem)?	**YES →** It's NOT Common Buckthorn (might be Honeysuckle. Some Honeysuckle is an invasive species.)		
NO ↓				
Are the leaves alternate (staggered along the stem, not across from each other)?	**YES →** Is it a plant with long thorns or some spine-tipped shoots?	**YES →** Does it have long thorns and sharply toothed leaf edges?	**YES →** It's NOT Common Buckthorn (might be Long-spur Hawthorn)	
	NO ↓	**NO** ↓		
		Does it have spine-tipped shoots and do the leaf edges have blunt teeth with tiny dots (glands) on the tips of them?	**YES →** It's NOT Common Buckthorn (might be Canada Plum)	

Appendix 2 (continued)

NO
↓

Are the edges of the leaf smooth? (Not toothed)

YES →
Is the petiole (small stem attaching leaf to twig) less than 3mm, in winter are the buds hairy and dark brown, do pale yellow flowers bloom in early Spring before the leaves?

YES →
It's NOT Common Buckthorn (might be Leatherwood)

NO
↓

NO
↓

↓

Is the petiole (leaf stem) more than 3mm? Are the tiny scales covering the buds not hairy or are there no scales on the buds? Do yellowish flowers bloom later in the spring?

YES →
Are the leaf stems (petioles) thin and purplish, with bud scales in the winter, and flowers appearing in late May? Does it have purplish to crimson fruit?

YES →
It's NOT Common Buckthorn (might be a type of Holly)

↓

NO
↓
Are leaf stems thin and greenish, no scales on the winter buds, flowers from June onwards and purplish-black fruit?

YES →
It's probably **GLOSSY BUCKTHORN**, an invasive species similar to Common Buckthorn.

Are the plant's buds covered by a single hood-shaped scale? Are the flowers catkins (shaped like tiny tubes)?

YES →
It's NOT Common Buckthorn (probably a type of Willow)

NO
↓

Do the buds have 2 or more scales or no scales and are the flowers not in catkins?

YES →
Are the small branches ridged or angled? (Grooves in the branchlets)

YES →

YES →
Are flowers scattered along the branch attached where the leaves join the stem? Are the fruits red or orange?

YES →
It's NOT Common Buckthorn (probably Winterberry)

NO
↓

NO
↓

↓

Are the flowers in a long bunch at the end of branches and is the fruit a long-lasting capsule?

YES →
It's NOT Common Buckthorn (probably a type of Spirea)

Appendix 2 (continued)

Do the edges of the leaf have a few teeth and are the leaf stems (petioles) purplish in colour?

YES →
It's NOT Common Buckthorn (might be a type of Holly)

NO
↓

Do the leaf edges have many teeth?

YES →
Do the leaves have stems (stalks) that have one or more dots (glands) near the base of the leaf?

YES →
Are the leaves long and narrow with a lance shape? Are the leaf edges finely and irregularly toothed? Are the teeth rounded with dots (glands) on the tips? Are the flowers in clusters of 2 to 6 at ends of branches? Does the bark have large and noticeable horizontal lines (lenticels)?

YES →
It's NOT Common Buckthorn (probably Pin Cherry)

NO
↓

NO
↓

↓

Are the leaves oval or elliptic shaped? Are the leaf edges finely toothed with sharp pointed teeth? Are the flowers in long clusters of 10-25 at the ends of branches? Are there small narrow lines on the bark?

YES →
It's NOT Common Buckthorn (probably Chokecherry)

Is the leaf's midrib (main central vein) on the top of the leaf with a row of dark hair-like glands? Do the leaf's edges have gland (dot) tipped teeth?

YES →
It's NOT Common Buckthorn (probably Chokeberry)

NO
↓

Are the leaf edges finely or coarsely toothed and are the flowers white, conspicuous and bigger than 3mm across?

YES →
It's NOT Common Buckthorn (probably Serviceberry)

NO
↓

Are the edges of the leaf rounded with blunt teeth? Are the flowers small and greenish/ yellow and about 3mm across?

YES →
It's probably **ALDERLEAF BUCKTHORN.** This is a native species and is NOT invasive.