**REPORT**

# Natural Environment Level 1 and 2 Report

*Proposed Lafarge Brantford West Extension*

Submitted to:

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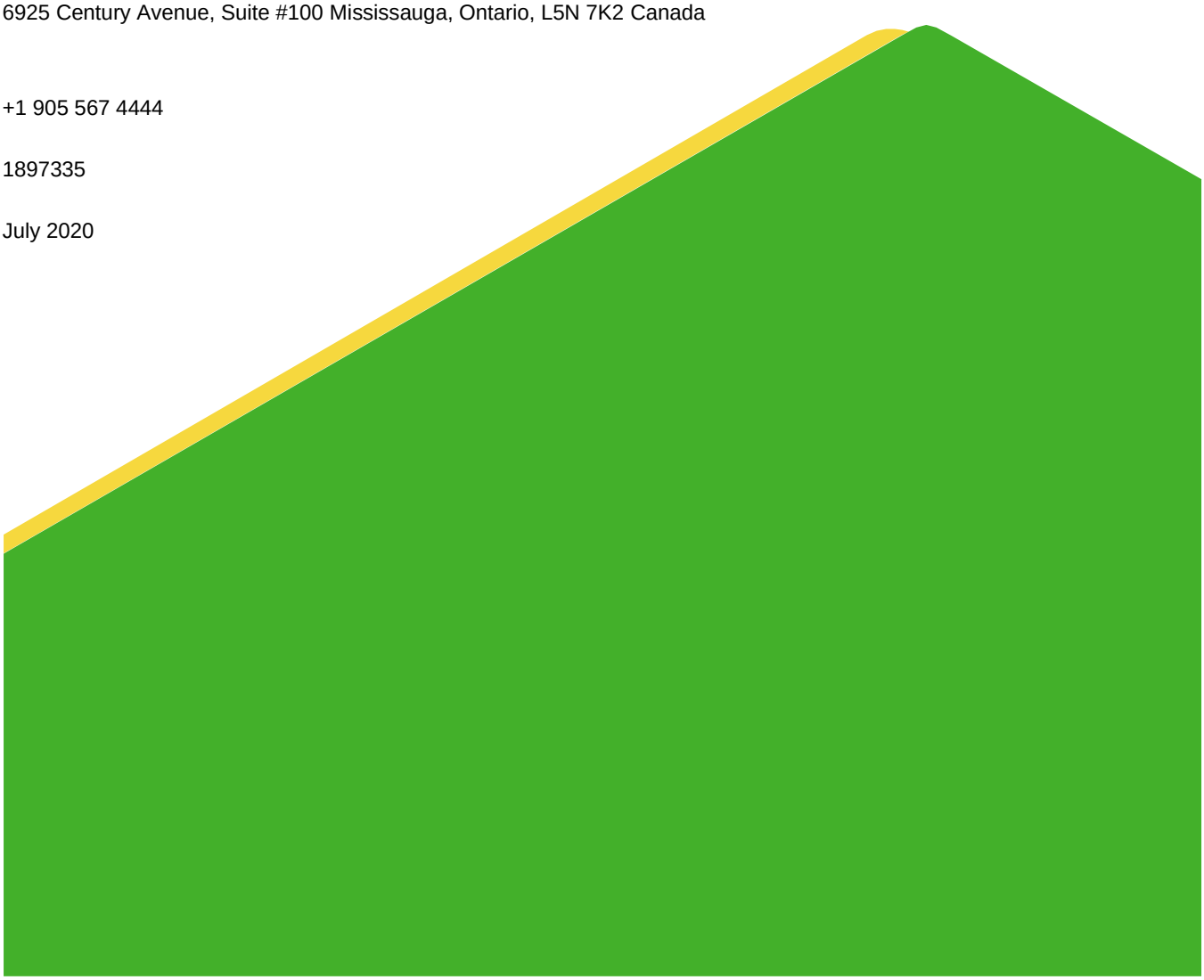

# Distribution List

PDF - Lafarge Canada Inc.

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# 1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been retained by Lafarge Canada Inc. (Lafarge) to complete natural environment technical studies to accompany the application for a new Category 1, Class “A” license (Pit Below Water) (the Project) under the *Aggregate Resources Act* (ARA) on Part Lot 12, Concession 5 (municipally known as 1044 Colborne Street West), Township of Brantford, Ontario (Figure 1). The Project is an expansion of the existing Lafarge Brantford Pit.

## 1.1 Purpose

This report specifically addresses the requirements of a Natural Environment Level 1 and Level 2 (NEL 1/2) Technical Report (Aggregate Resources of Ontario Provincial Standards, Section 2.2) that will accompany the applications for a Category 1, Class “A” Pit Below Water. This report also meets the requirements of an Environmental Impact Statement (EIS) as required by Section 2.3.4.2 of the County of Brant’s (the County) Official Plan (OP) for development of new mineral aggregate operations.

For the purpose of this report, the following definitions are used:

**Site** (Figure 2) - the total land area within the property owned by Lafarge that is proposed for licensing under the ARA. The Site is approximately 19.9 hectares (ha).

**Extraction Limit** (Figure 2) – The total area in which aggregate is proposed for extraction. The total area of the Extraction Limit is approximately 16.9 ha. The Extraction Limit will be set back 30 metres (m) along roads and adjacent to residential or commercial buildings, and 15 m along property boundaries, except for the eastern boundary adjacent to the existing Brantford Pit where zero metres is proposed to integrate the operations.

**Study Area** (Figure 2) - The Study Area for the NEL 1/2 assessment is defined in the Aggregate Resources of Ontario Provincial Standards, Sections 2.2.3 and 2.2.4 as the Site and surrounding 120 m. Because the predicted groundwater drawdown is not expected to extend beyond the Site boundaries (MTE 2020) and there are no sensitive natural features beyond 120 m that have potential to be influenced by the proposed extraction, the Study Area was not extended beyond 120 m.

The purpose of this report is to assess potential environmental impacts of the proposed aggregate extraction on the Site with respect to the following:

- The environmental features and functions in the Study Area
- The influence of extraction on the surrounding natural environment
- The rehabilitation potential of the Site after extraction

## 1.2 Site and Adjacent Lands

### 1.2.1 Site Description

The Site is located on the south side of Colborne Street West in a rural setting in the Township of Brantford. The Site is composed of a single agricultural lot. There are several buildings on the Site, including an occupied house, garden shed, larger storage shed, barn, and an old greenhouse structure. The majority of the Site consists of an agricultural field planted in corn that is bordered by a sparsely vegetated hedgerow. There is a small anthropogenic pond in the center of the agricultural field surrounded by a narrow band of thicket (Figure 2).

### 1.2.2 Adjacent Lands

The existing Lafarge Brantford Pit (Category 1 Class A – Below Water Licence No. 5515) is located to the east of the Site, while there are agricultural fields and rural residences to the north, west and south of the Site (Figure 2). The existing pit encompasses an area of 29.4 ha, with 25.6 ha approved for aggregate extraction. There are additional agricultural fields to the north and south of the Site, and a ginseng / produce field to the west (Figure 2).

## 2.0 ENVIRONMENTAL POLICY CONTEXT

The Site and Study Area are located in the Township of Brantford and the County of Brant. Documents reviewed to gain an understanding of the natural heritage features and regulations that are relevant to the proposed Site and Study Area included the following:

- The ARA (Ontario 1990) and the Provincial Standards of Ontario – Category 1 – Class A Pit/Quarry Above/Below Water (MNR 1997)
- The Provincial Policy Statement (MMAH 2020)
- The *Fisheries Act* (Canada 1985)
- The *Migratory Birds Convention Act* (Canada 1994)
- The *Species at Risk Act* (Canada 2002)
- The *Endangered Species Act* (Ontario 2007)
- The Growth Plan for the Greater Golden Horseshoe (MMAH 2017)
- The County of Brant Official Plan (2012)
- The Grand River Conservation Authority Reg. 150/06 Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario 2006)

An overview of the above noted legislation and policy documents are discussed in Sections 2.1 to 2.8.

## 2.1 Aggregate Resources Act

Applicants are required under the ARA Provincial Standards to prepare a Level 1 Natural Environment Technical Report and, where significant natural environment features occur on, or in proximity (i.e., within 120 m, or the estimated area of groundwater drawdown) to the proposed operation, a Level 2 Natural Environment Report is required. Significant natural heritage features are defined in the PPS (MMAH 2014) with guidance from supporting technical manuals prepared by the Ministry of Natural Resources (MNR 2000; MNR 2010; MNRF 2015). A Level 2 Natural Environment Technical Report, identifying the particular features and functions of the designated natural environment feature(s), the nature of the potential negative impacts of the extractive operation, the proposed mitigation of those effects and the nature and magnitude of any residual effects is also required to satisfy the ARA Provincial Standards (MNR 1997). As well, the proposed rehabilitation of the extraction area, and any prescriptions for that rehabilitation, are identified and discussed in the Level 1 and, if necessary, the Level 2 Natural Environment Technical Reports.

## 2.2 Provincial Policy Statement

The PPS was issued under Section 3 of *The Planning Act*. The natural heritage policies of the PPS (MMAH 2020) indicate that:

- 2.1.1 Natural features and areas shall be protected for the long-term.
- 2.1.2 The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.
- 2.1.3 Natural heritage systems shall be identified in Ecoregions 6E and 7E, recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas, and prime agricultural areas.
- 2.1.4 Development and site alteration shall not be permitted in:
    a) significant wetlands in Ecoregions 5E, 6E, and 7E
    b) significant coastal wetlands
- 2.1.5 Unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, development and site alteration shall not be permitted in:
    a) significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E, and 7E
    b) significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River)
    c) significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River)
    d) significant wildlife habitat
    e) significant areas of natural and scientific interest
    f) coastal wetlands in Ecoregions 5E, 6E, and 7E that are not subject to policy 2.1.4(b)
- 2.1.6 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.
- 2.1.7 Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.
- 2.1.8 Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.3, 2.1.4 and 2.1.5 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

## 2.3 Fisheries Act

The purpose of the *Fisheries Act* (Canada 1985) is to maintain healthy, sustainable and productive Canadian fisheries through the prevention of pollution and the protection of fish and their habitat. All projects undertaking work in or near-water must comply with the provisions of the *Fisheries Act*.

Measures to protect fish habitat include avoiding in-water work (i.e. below the high-water mark) and work on the banks or shoreline of watercourse/waterbody, as well maintaining riparian vegetation. Any project that is unable to avoid impacts to fish or fish habitat will require a project review (DFO 2019). If it is determined through the Fisheries and Oceans Canada (DFO) review process that the project will result in death of fish or the harmful alteration, disruption or destruction of fish habitat (HADD), an authorization under the *Fisheries Act* is required. This includes Projects that have the potential to obstruct fish passage or impacts flows.

Proponents of projects requiring a *Fisheries Act* Authorization are required to also submit a Habitat Offsetting Plan, which provides details of how the death of fish and/or HADD to fish habitat will be offset, as well as outlining associated costs and monitoring commitments. Proponents also have a duty to notify DFO of any unforeseen activities that cause harm to fish and outline the steps taken to address them.

## 2.4 Migratory Birds Convention Act

The *Migratory Birds Convention Act* (MBCA) (Canada 1994) prohibits the killing or capturing of migratory birds, as well as any damage, destruction, removal or disturbance of active nests. It also allows the Canadian government to pass and enforce regulations to protect various species of migratory birds, as well as their habitats. While Environment and Climate Change Canada (ECCC) can issue permits allowing the destruction of nests for scientific or agricultural purposes, or to prevent damage being caused by birds, it does not typically allow for permits in the case of industrial or construction activities.

## 2.5 Species at Risk

### 2.5.1 Species at Risk Act

At a federal level, SAR designations for species occurring in Canada are initially determined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). If approved by the federal Minister of the Environment and Climate Change, species are added to the federal List of Wildlife Species at Risk (Canada 2002). Species that are included on Schedule 1 as endangered or threatened are afforded protection of critical habitat on federal lands under the *Species at Risk Act* (SARA). On private or provincially-owned lands, only aquatic species listed as endangered, threatened or extirpated and migratory birds are protected under SARA, unless ordered by the Governor in Council.

### 2.5.2 Endangered Species Act

SAR designations for species in Ontario are initially determined by the Committee on the Status of Species at Risk in Ontario (COSSARO), and if approved by the provincial Minister of Environment, Conservation and Parks, species are added to the provincial *Endangered Species Act* (ESA) which came into effect June 30, 2008 (Ontario 2007). The legislation prohibits the killing or harming of species identified as endangered or threatened in the various schedules to the Act. The ESA also provides habitat protection to all species listed as threatened or endangered. As of June 30, 2008, the Species at Risk in Ontario (SARO) List is contained in Ontario Regulation (O. Reg.) 230/08.

Subsection 9(1) of the ESA prohibits the killing, harming or harassing of species identified as ‘endangered’ or ‘threatened’ in the various schedules to the Act. Subsection 10(1) (a) of the ESA states that “*No person shall damage or destroy the habitat of a species that is listed on the SARO list as an endangered or threatened species*”.

General habitat protection is provided, by the ESA, to all threatened and endangered species. Species-specific habitat protection is only afforded to those species for which a habitat regulation has been prepared and passed into law as a regulation of the ESA. The ESA has a permitting and registration process where alterations to the habitat of protected species may be considered.

## 2.6 Growth Plan for the Greater Golden Horseshoe

The Growth Plan for the Greater Golden Horseshoe was issued under *The Places to Grow Act* and came into effect on July 1, 2017 (MMAH 2017). The Growth Plan is intended, in coordination with other provincial plans, to establish a unique land use planning framework for the Greater Golder Horseshoe that supports the achievement of complete communities, a thriving economy, clean and healthy environment and social equity (MMAH 2017).

The Site and Study Area are located within the Prime Agricultural Area of the Growth Plan. Within these areas, applications for new aggregate operations must be accompanied by an agricultural impact assessment, and must plan to maintain or improve connectivity of the Agricultural System, where possible. Rehabilitation must also be in accordance with Section 2.5.4 of the PPS (MMAH 2014), which states that the site must be rehabilitated back to agricultural condition. Exceptions do apply where a site is outside of a specialty crop area and there is a substantial quantity of high quality resources below the water table and the depth of extraction prevents restoration to agricultural capability. Agricultural rehabilitation in the remaining areas must be maximized (MMAH 2014). The Site is not within a specialty crop area.

## 2.7 County of Brant

The Site is located in an Agriculture land use area according to Schedule A (Land Use Plan) of the County’s OP (Brant 2012), and is also within an area of potential aggregate resources according to Schedule E (Aggregate and Petroleum Resources). An OP amendment is required to re-designate the Site from agricultural use to mineral extraction. The entire Agriculture land use area defined on Schedule A is considered to be prime agricultural land. Where extraction is proposed below the water table on prime agricultural land, rehabilitation to agriculture shall be maximined for areas remaining above the water table following extraction (Brant 2012).

The Site is also located in a designated Groundwater Recharge Area according to Schedule C (Natural Heritage System Features and Development Constraints). Development proposed within a Groundwater Recharge Area must demonstrate there will be no negative impacts on groundwater quality or quantity to receive approvals (Brant 2012).

## 2.8 Grand River Conservation Authority

The Study Area is located within the jurisdiction of the Grand River Conservation Authority (GRCA). However, there are no areas regulated by Ontario Regulation 150/06 under the *Conservation Authorities Act* (Ontario 2011) on the Site or in the Study Area (GRCA 2019). Because this project is under the purview of the ARA, permits from the GRCA will not be required.

# 3.0 DESCRIPTION OF PROPOSED DEVELOPMENT

Access to the proposed expansion pit will be through the common boundary with the existing Brantford Pit.

Aggregate extraction will be completed in three phases beginning at the southern end of the Site and moving towards the north. Above and below-water extraction will be concurrent in each phase.

The total depth of extraction will correspond with the surface of the underlying sit till material and will reach a maximum depth of ±223 metres above mean sea level (mAMSL) on the Site.

No washing of aggregate will take place on the Site. In addition, there will be no dewatering or diversion of groundwater, and no water storage on the Site.

# 4.0 METHODS

## 4.1 Background Review

The investigation of existing conditions in the Study Area included a background information search and literature review to gather data about the local area and provide context for the evaluation of the natural features, including the following:

- Natural Heritage Information Centre (NHIC) database, maintained by the MNRF (NHIC 2018)
- Land Information Ontario (LIO) geospatial data (MNRF 2019a)
- Species at Risk Public Registry (ECCC 2019)
- Species at Risk in Ontario (SARO) List (MNRF 2019b)
- Breeding Bird Atlas of Ontario (OBBA) (Cadman et al. 2007)
- Atlas of the Mammals of Ontario (Dobbyn 1994)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2018)
- Bat Conservation International (BCI) range maps (BCI 2018)
- Ontario Butterfly Atlas (Jones et al. 2018)
- eBird species maps (eBird 2018)
- MNRF LIO Aquatic Resources Area Layer (MNRF 2018a)
- MNRF Fish On-Line (MNRF 2018b)
- County of Brant Official Plan (2012)
- GRCA Watershed Information: Grand River Information Network (GRCA 2019)
- Aerial imagery

To develop an understanding of the drainage patterns, ecological communities and potential natural heritage features that may be affected by the proposed aggregate development, MNRF LIO data were used to create base layer mapping for the Study Area. A geographic query of the NHIC database was conducted to identify element occurrences of any natural heritage features, including wetlands, ANSIs, life science sites, rare vegetation communities, rare species (i.e., species ranked S1-S3 by NHIC), species designated under the ESA or SARA, and other natural heritage features within 1 km of the Study Area.

## 4.2 SAR Screening

SAR considered for this report include those species listed in the ESA and SARA. An assessment was conducted to determine which SAR had potential habitat in the Study Area. A screening of all SAR which have the potential to be found in the vicinity of the Study Area was conducted first as a desktop exercise using the sources listed in Section 4.1. Species with ranges overlapping the Study Area, or recent occurrence records in the vicinity, were screened by comparing their habitat requirements to habitat conditions in the Study Area.

The potential for the species to occur was determined through a probability of occurrence. A ranking of low indicates no suitable habitat availability for that species in the Study Area and no specimens identified. Moderate probability indicates more potential for the species to occur, as suitable habitat appeared to be present in the Study Area, but no occurrence of the species has been recorded. Alternatively, a moderate probability could indicate an observation of a species, but there is no suitable habitat in the Study Area. High potential indicates a known species record in the Study Area (including during the field surveys or background data review) and good quality habitat is present.

Searches were conducted during all field surveys for suitable habitats and signs of all SAR identified through the desktop screening. If the potential for the species to occur in the Study Area was moderate or high, the screening was refined based on the results of the field surveys. Any habitat identified during the field surveys with potential to provide suitable conditions for additional SAR not already identified through the desktop screening was also assessed and recorded. All probability ratings were updated based on the results of the field surveys.

## 4.3 Field Surveys

The habitats and communities on the Site, and the Study Area where access allowed, were characterized through field surveys. The following sections outline the methods used for each of the field surveys on the Site. During all surveys, area searches were conducted and additional incidental wildlife, plant, and habitat observations were recorded. Searches were also conducted to document the presence or absence of suitable habitat, based on habitat preferences, for those species identified in the desktop SAR screening described above. The dates when all surveys were conducted are included in Table 1.

**Table 1: Summary of Field Surveys Conducted on the Proposed Lafarge Brantford West Extension Site in 2018**

| Date | Type of Survey |
|---|---|
| April 26, 2018 | Anuran Call Count (ACC) Survey #1, General Wildlife Survey |
| May 8, 2018 | ACC#2, General Wildlife Survey |
| May 25, 2018 | Breeding Bird Survey (BBS) #1, Bat Habitat Survey, General Wildlife Survey |
| June 19, 2018 | ACC#3, Bat Exit Survey, General Wildlife Survey |
| June 15, 2018 | BBS#2, Ecological Land Classification, Botanical Inventory, General Wildlife Survey |
| June 15-28, 2018 | Bat Acoustic Survey (Stationary Detector) |

### 4.3.1 Plant Community Surveys and Botanical Inventory

Plant communities on the Site and in the Study Area were first delineated at a desktop level using high-resolution aerial imagery, then ground-truthed in the field (where accessible) using the Ecological Land Classification (ELC) system for southern Ontario (Lee et al. 1998). These inventories were carried out by systematically traversing the Site and Study Area, where accessible, for a thorough survey of species and communities. Information on dominant plant species and plant community structure and composition was recorded in order to better define and refine the plant community polygons.

The botanical inventory included area searches in all naturally-occurring habitats on the Site. The searches were conducted by systematically walking through all habitats in a meandering fashion, generally paralleling the principal (long) axis of a natural area, where feasible, and examining the full width of the area. Lists of all plant species identified during all the field surveys were compiled.

### 4.3.2 Anuran Call Count Survey

Anuran (frog and toad) call count surveys were conducted at two stations on the Site (Figure 2). Surveys followed protocols from the Marsh Monitoring Program method for vocalizing frog surveys (BSC 2008). This method involves collection of call data from fixed stations over three survey periods during the spring and early summer (April to early July), with an interval of at least 15 days between surveys. Surveys began one half-hour after sunset and ended by midnight during evenings with appropriate weather conditions (i.e., little wind and a minimum air temperature of 5˚C, 10˚C, and 17˚C for each respective survey period).

Each station consisted of a semi-circle with a 100 m radius from the centre point (where the observer stands), and each survey was three minutes in duration. All frogs and toads seen or heard were noted on pre-printed datasheets. Frogs and toads heard or seen outside of the 100 m radius were also noted, including estimated distance (where possible).

### 4.3.3 Breeding Bird Survey

Breeding bird point count surveys for songbirds and other diurnal birds were conducted at three stations on the Site (Figure 2). Surveys followed protocols from the Canadian Breeding Bird Survey (Downes and Collins 2003), and the OBBA (Cadman et al. 2007). Point count stations were established in representative habitats on the Site and were spaced a minimum of 250 m apart. Surveys were conducted between 30 minutes before sunrise and 10:00 am to encompass the period of maximum bird song.

Each station consisted of a circle with a 100 m radius from the centre point (where the observer stands), and each point count was 10 minutes in duration, and was separated into survey windows of 0-3, 3-5, and 5-10 minutes. All birds seen or heard were noted on pre-printed datasheets and observations were made regarding sex, age and notable behaviour, when possible. Birds heard or seen outside of the 100 m radius were also noted using methods from the OBBA, including estimated distance (where possible).

### 4.3.4 Bat Survey

Field survey methods for bat surveys were based on the MNRF guidance document *Survey Protocol for Species at Risk Bats within Treed Habitats* (MNRF 2017). Bat surveys consisted of three components:

1) a habitat assessment to identify maternity roost potential on the Site

2) exit survey of features identified to have moderate or high potential to provide maternity roost habitat

3) an acoustic survey to confirm and characterize the bat community (i.e. species) on the Site

Specific methods for each survey type are described below.

#### 4.3.4.1 Habitat Assessment

An assessment of potential suitable maternity roost habitat was conducted of both natural communities (i.e., hedgerows and thicket) and anthropogenic features (i.e., buildings) on the Site. Natural communities were assessed based on high-level plant community classification, snag density estimates, and average tree diameter. Four anthropogenic structures on the Site were also assessed for potential to provide maternity roost habitat for SAR bats, including little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*) and eastern small-footed myotis (*Myotis leibii*). Buildings were assessed from the exterior and interior (where possible and safe to access) for suitable roosting features such as presence of chimneys, loose boards, condition of soffits, and potential entrance/egress points.

#### 4.3.4.2 Exit Survey

Following the habitat assessment, a one-night exit survey was conducted between one half hour before sunset and one hour after sunset (i.e., the time period when bats emerge from roosts). Two surveyors walked slowly around the buildings on Site watching for exiting bats, with a focus on the barn, which was assessed to have the highest potential to provide maternity roost habitat for SAR bats (based on the habitat assessment survey).

Each surveyor used a handheld Echo Meter Touch (EMT) detector in conjunction with the visual assessment of exiting bats. Using the real-time sonogram display, the surveyor distinguished between lower frequency bats, eastern red bat (*Lasiurus borealis*) and 40 kHz Myotis (i.e., potentially indicative of SAR bat species). The locations and time of detection of any 40 kHz Myotis bats was recorded along with behavioural observations (e.g., feeding approaches, flight direction). Once the survey was complete, the number of bats recorded by each surveyor were consolidated to determine the approximate number of bats that exited each building, if any.

#### 4.3.4.3 Acoustic Survey

Based on the results of the habitat assessment and the exit survey, a single passive full-spectrum bat detector was deployed between the barn and large storage shed on the Site (Figure 2). The detector was programmed to start recording one half hour before sunset and recorded for a total duration of one hour each night. The detector recorded for a total of 14 nights.

#### 4.3.4.4 Data Analysis and Assessment

Acoustic data from both the active monitoring and acoustic survey was filtered in Sonobat Data Wizard to remove noise files, and the high-grade noise scrubber setting was used. The data was analyzed and auto-classified using SonoBat 4.2.1 nnE. The Sonobat program is specifically intended for discrimination of bats to the species level wherever possible, and validation of the species-level classification was conducted by Golder's bat acoustic specialist. The results of the species classification were tallied on a per-night basis for each station for each species or species group. Once automated classification was complete, a subset of the files were reviewed (QA/QC'd) by an experienced and qualified bat acoustic specialist using the SonoVet tool. All recordings identified as high frequency calls were reviewed and a subset of the low frequency calls were also reviewed (see the percentage manually reviewed table for Qa/Qc percentages). For calls that were auto-classified to species by SonoBat but not reviewed, the SonoBat classification was accepted.

Bat passes cannot always be identified to species level. This can be due to either poor quality of the recording (i.e. high signal to noise ratio), or ambiguity of the call type. Some bat species have very similar calls and all bats have variability in their call repertoires. Some bat calls are quite diagnostic and can be confidently identified to species while other bat passes can only be identified to a Genus or to a group of species.

### 4.3.5 General Wildlife Survey

General wildlife surveys included track and sign surveys, area searches, and incidental observations, concurrent with other field surveys. The full range of habitats across the Site were searched, with special attention paid to edge habitats and other areas where mammals might be active. Areas of exposed substrate such as sand or mud were located and examined for any visible tracks. Any wildlife (including mammals, birds, butterflies, and dragonflies) seen and identified were recorded. When encountered, tracks and other signs (e.g., tracks, scats, hair, tree scrapes, etc.) were identified to a species, if possible, and recorded. Observations of wildlife species or signs during all field surveys were recorded.

Visual encounter surveys for reptiles and amphibians, as well as reptile and amphibian habitat (with a focus on SAR) were also conducted on the Site. All suitable habitats for reptiles and amphibians were searched (e.g., flipping logs and other types of cover objects, observations in piles of rocks) and all reptiles and amphibians observed were identified and recorded.

## 4.4 Analysis of Significance and Sensitivity and Impact Assessment

An assessment was conducted to determine if any significant environmental features or SAR exist, or have moderate or high potential to exist, on the Site in the Study Area and assess whether the development would negatively impact surrounding significant natural heritage features or SAR. Preventative, mitigative and remedial measures were considered in assessing the net effects of the proposed extraction operation on the surrounding ecosystem.

# 5.0 EXISTING CONDITIONS

## 5.1 Ecosystem Setting and Regional Context

The Study Area is located in Ecoregion 7E (Lake Erie-Lake Ontario), which covers approximately 2% of southern Ontario. Ecoregion 7E, also known as the Carolinian Forest zone, is underlain by limestone bedrock and is generally flat. Most substrates are calcareous mineral materials dominated by Gray Brown Luvisols and Gleysols. Approximately 78% of Ecoregion 7E is used for cropland or pasture, and another 7% is developed. Deciduous and mixed forest covers just over 12% of the ecoregion (Crins et al. 2009).

The Study Area is located in the Horseshoe Moraines physiographic region. The Horseshoe Moraines region has two distinct landforms consisting of kames (stony ridges) and sand and gravel terraces of valley floors. Dominant soils in this region include coarse, stony till (Chapman and Putnam 1984). Site topography is generally flat.

## 5.2 Hydrogeology

Measured groundwater elevations at the Site indicate that groundwater flow is to the northeast across the Site towards Airport Creek and ultimately the Grand River. An estimated maximum groundwater drawdown of 0.01 m was calculated and is expected to be indistinguishable from background climatic fluctuations in the water table. Extraction will also result in a flattening of the water table across the Site. The large amount of stored water in the

existing lake in the adjacent Lafarge Brantford pit is expected to have a buffering effect as extraction on the Site proceeds (MTE 2019).

## 5.3 Surface Water Resources

The Study Area is located in the Lower Middle Grand River watershed, and the Mount Pleasant Creek subwatershed (GRCA 2019). There is one surface water feature on the Site (a small pond in the center), and a second pond off-Site, in the western portion of the Study Area (Figure 2). Both ponds are anthropogenic and are likely used as irrigation ponds. The pond on the Site is interpreted to be the surface expression of the water table (MTE 2019). Both ponds appear to be isolated and have no connections to other surface water features off-Site.

## 5.4 Vegetation

### 5.4.1 Regional Setting

The Study Area is located in the Deciduous Forest Region and the Niagara subregion (Rowe 1972). This subregion is dominated by deciduous forest cover, with the most common association consisting of sugar maple (*Acer saccharum*) and American beech (*Fagus grandifolia*) together with basswood (*Tilia americana*), red maple (*Acer rubrum*), red oak (*Quercus rubra*), white oak (*Quercus alba*), and bur oak (*Quercus macrocarpa)*. Other common species include butternut, bitternut hickory (*Carya cordiformis*), rock elm (*Ulmus thomasii*), silver maple (*Acer saccharinum*) and blue-beech (*Carpinus caroliniana*).

This subregion also contains the main distribution of Carolinian species in Canada, including black walnut (*Juglans nigra*), sycamore (*Platanus occidentalis*), swamp white oak (*Quercus bicolor*) and shagbark hickory (*Carya ovata*), as well as scattered representations of tulip tree (*Liriodendron tulipifera*), black cherry (*Prunus serotina*), chinquapin oak (*Quercus muehlenbergii*), pin oak (*Quercus palustris*), blue ash (*Fraxinus quadrangulata*), cucumber tree (*Magnolia acuminata*), red mulberry, and sassafras (*Sassafras albidum*).

There is poor representation of coniferous species, which occur as scattered individuals, and may include eastern white pine (*Pinus strobus*) and eastern white cedar (*Thuja occidentalis*) (Rowe 1972).

### 5.4.2 Plant Communities

Based on the field surveys conducted on the Site and in the Study Area, three ELC community types were identified, in addition to anthropogenic communities and open water. The ELC and anthropogenic communities are shown on Figure 2 and are briefly described in Table 2.

**Table 2: Plant Communities within the Proposed Lafarge Brantford West Extension Study Area**

| ELC Community | Field Description | SRANK[a] |
|---|---|---|
| **Cultural** | | |
| CUT<br>Cultural Thicket | A thicket with scattered trees surrounding the pond in the center of the Site. The thicket is dominated by shrubs including staghorn sumac (*Rhus typhina*), sandbar willow (*Salix interior*), and slender willow (*Salix petiolaris*), in addition to red-osier dogwood (*Cornus sericea*), white mulberry (*Morus alba*), and red raspberry (*Rubus idaeus*). Scattered trees include eastern cottonwood (*Populus deltoides*), trembling aspen (*Populus tremuloides*) and Siberian elm (*Ulmus pumila*). Ground cover consists of disturbed meadow species typical of agricultural areas, including goldenrod (*Solidago* sp.), common milkweed (*Asclepias syriaca*), curly dock (*Rumex crispus*), daisy fleabane (*Erigeron* | n/a |

| ELC Community | Field Description | SRANK[a] |
|---|---|---|
| | *annuus*), yellow sweet-clover (*Melilotus officinalis*), orchard grass (*Dactylis glomerata*), smooth brome (*Bromus inermis*) and Kentucky blue grass (*Poa pratensis*). | |
| CUM<br>Cultural Meadow | An open meadow containing a small patch of coniferous trees off-Site, in the northeast corner of the Study Area. | n/a |
| Hedgerows | Hedgerows bordering the agricultural field on the Site. Hedgerows consist of a mixture of tree and shrub species, such as Norway maple (*Acer platanoides*), Manitoba maple (*Acer negundo*), white mulberry, black walnut (*Juglans nigra*), white spruce (*Picea glauca*), scots pine (*Pinus sylvestris*), bur oak (*Quercus macrocarpa*), black locust (*Robinia pseudoacacia*), lilac (*Syringa vulgaris*), red raspberry, multiflora rose (*Rosa multiflora*), Virginia creeper (*Parthenocissus quinquefolia*) and Tartarian honeysuckle (*Lonicera tatarica*). Groundcover species include typical disturbed edge species, such as dandelion (*Taraxacum officinale*), common ragweed (*Ambrosia artemisiifolia*), garlic mustard (*Alliaria petiolata*), mullein (*Verbascum thapsus*), common milkweed, bull thistle (*Cirsium vulgare*), alfalfa (*Medicago sativa*), chicory (*Cichorium intybus*) and lamb's quarters (*Chenopodium album*). | n/a |
| **Aquatic** | | |
| OAO<br>Open Aquatic | There are two ponds in the Study Area – one in the center of the Site and one off-Site, on the adjacent property in the western portion of the Study Area. | n/a |
| **Anthropogenic** | | |
| RES<br>Residential | Areas of rural residential buildings and maintained lots in the northern portion of the Site and Study Area. | n/a |
| OAGM<br>Open Agricultural | Areas of open agricultural crop fields on the Site and in the Study Area. The field on Site was planted in corn at the time of the field investigation. | n/a |
| COMC<br>Commercial | A commercial property off-Site, in the northeast corner of the Study Area. | n/a |
| EXT<br>Extraction | Areas of active aggregate extraction associated with the existing Lafarge Brantford pit, off-Site in the eastern portion of the Study Area. | n/a |

[a] An SRank is a provincial –level rank indicating the conservation status of a species or plant community and is assigned by the NHIC in Ontario (NHIC 2019). SRanks are not legal designations but are used to prioritize protection efforts in the Province. SRanks for plant communities in Ontario are defined in the Significant Wildlife Habitat Technical Guide (MNR 2000). Ranks 1-3 are considered extremely rare to uncommon in Ontario; Ranks 4 and 5 are considered to be common and widespread. n/a indicates a community that has not been ranked, which often applies to anthropogenic, culturally-influenced or high-level ELC communities (i.e., FOD).

### 5.4.3 Vascular Plants

A total of 61 vascular plant species were identified during the botanical, or other, surveys completed on the Site (Appendix A). Of these, 36% are native species, and 56% are exotic species. The remaining 8% (five plants) were unable to be identified to the species level due to plant condition, seasonal timing (i.e., not flowering), or origin (i.e., planted landscaped species). The high proportion of exotic species is typical of an agricultural environment where there is a high level of disturbance and limited natural habitat.

### *Significant and Sensitive Species*

All of the plant species identified through the botanical, or other, surveys are secure and common, widespread and abundant in Ontario and globally (S4 or S5; G5) or are unranked alien species (SNA; GNR). None of the plant species identified in the desktop SAR screening as having ranges which overlap the Study Area (Appendix B) were found during the botanical, or other, field surveys.

## 5.5 Wildlife

### 5.5.1 Amphibians

A total of three amphibian species were observed during anuran call count, or other, field surveys conducted on the Site (Appendix C). No amphibians were observed at the pond on Site, or the pond located off-Site in the western portion of the Study Area (Figure 2).

### *Significant and Sensitive Species*

All of the amphibian species observed during field surveys are secure and common in Ontario and globally (S5; G5) (Appendix C). None of the amphibian species identified in the desktop SAR screening as having ranges which overlap the Study Area (Appendix B) were found during the field surveys.

### 5.5.2 Breeding Birds

A total of 34 bird species were observed during breeding bird, or other field surveys, conducted on the Site (Appendix C). Barn swallow (*Hirundo rustica*), bank swallow (*Riparia riparia*), red-winged blackbird (*Agelaius phoeniceus*) and song sparrow (*Melospiza melodia*) were the most common bird species observed during the surveys. Barn swallow is common in agricultural settings, particularly where there are suitable barns for nesting, and bank swallow is common near aggregate pits where stockpiles provide nesting habitat. Red-winged blackbirds are common in wetlands, open fields and meadows, including crop fields, and song sparrow breeds in a range of forest, shrub and riparian habitats, often near water (Cornell 2015).

### *Significant and Sensitive Species*

All of the bird species observed during field surveys are secure and common in Ontario and globally (S4 or S5; G5) (Appendix C). Two of the bird species observed on the Site during field surveys are designated as threatened under the ESA: barn swallow (*Hirundo rustica*) and bank swallow (*Riparia riparia*).

Barn swallow breeds in areas that contain a suitable nesting structure, open areas for foraging, and a body of water. This species nests in human made structures including barns, buildings, sheds, bridges, and culverts. Preferred foraging habitat includes grassy fields, pastures, agricultural cropland, lake and river shorelines, cleared right-of-ways, and wetlands (COSEWIC 2011). Mud nests are fastened to vertical walls or built on a ledge underneath an overhang, and suitable nests from previous years are reused (Brown and Brown 1999). Eleven active barn swallow nests were observed inside the barn on Site and several barn swallows were observed entering and exiting the barn (Figure 2). No barn swallow nests were observed in the small or large sheds on the Site. Because barn swallow was confirmed to be nesting in the barn on Site and the barn is expected to be removed as part of the proposed extraction, barn swallow is carried forward to the impact assessment (Section 7.1).

Bank swallow breeds in a variety of natural and anthropogenic habitats (e.g. lake bluffs, stream banks, sand and gravel pits) located near open foraging sites such as waterbodies, fields, wetlands and riparian woods. Forested areas are generally avoided (Garrison 1999). Bank swallow was observed flying over the Site during breeding bird

surveys, but no suitable nesting habitat was identified on the Site. Although the active Brantford Pit adjacent to the Site may contain stockpiles suitable for nesting, there are no stockpiles within the Study Area. The agricultural fields and small ponds on the Site and in the Study Area may provide suitable foraging habitat for bank swallow. Although existing foraging habitat on the Site will be removed, birds may still forage over the open extraction area. In addition, there is abundant similar foraging habitat in the local area. Because there is no nesting habitat on the Site or in the Study Area, and the availability of suitable foraging habitat in the local landscape will not be altered, bank swallow is not expected to be impacted as a result of the proposed extraction. Further analysis is not warranted.

### 5.5.3 Bats

#### *5.5.3.1 Habitat Assessment*

There are limited trees on the Site which are primarily contained within the hedgerows along the eastern and western Site boundaries (Figure 2). No large diameter (i.e., greater than 30 cm in diameter at breast height [DBH]) trees or snags with cavities, peeling bark, or leaf clumps / squirrel nests that may provide roosting habitat for tree-roosting SAR bats were observed within the hedgerows. One suitable snag tree, a large dead pine tree with cavities, was observed next to the barn on Site. The snag tree was assessed to have moderate potential to provide maternity roost habitat for two SAR bats: little brown myotis or northern myotis.

A description of the four structures that were assessed for potential to provide maternity roost habitat and their habitat characteristics is provided in Table 3.

**Table 3: Assessment of Potential Anthropogenic Bat Maternity Roost Habitat on the Proposed Lafarge Brantford West Site**

| Structure | Habitat Description and Assessment | Potential to Provide Habitat |
|---|---|---|
| House | Assessed from exterior only. No observable access/egress points for bats, including around the roof, soffits, windows or siding. | Low |
| Small Shed | A small, wooden shed used for storage. Both interior and exterior assessed. Potential access/egress points and roosting sites observed. No evidence of bat use (e.g., guano, staining) observed. | Moderate |
| Barn | Both interior and exterior assessed. The barn has a concrete foundation and first storey and a timber hayloft in deteriorating condition. Several potential roosting sites were observed (e.g., rafters, loose boards, space behind doors), as well as access/egress points. No evidence of bat use (e.g., guano, staining) observed. | High |
| Large Shed | An aluminum-clad, single storey shed with timber frame used for storage. Several points of access/egress for bats observed. Some potential roosting sites observed inside the structure. No evidence of bat use (e.g., guano, staining) observed. | Moderate |

No other suitable roosting sites for eastern small-footed myotis, such as rock or rubble piles, rock crevices or boulders were observed on the Site.

Features assessed to have a moderate or high potential to provide maternity roost habitat were investigated further during the exit survey.

#### 5.5.3.2 Exit Survey

No bats were detected exiting the large snag tree, barn or either of the two sheds on the Site during the survey. A single bat was visually detected flying around the general barn area, and the handheld EMT detectors recorded a total of 13 bat passes. Two passes were classified as big brown bat (*Eptesicus fuscus*), two were classified as hoary bat (*Lasiurus cinereus*), and the remaining passes were indistinguishable between big brown bat and silver-haired bat (*Lasionycteris noctivagans*). No SAR bats were visually observed or detected by the EMT detectors during the exit survey.

#### 5.5.3.3 Acoustic Survey

In total, seven bat species were identified during the acoustic survey, including an unknown myotis species. The mean bat passes per night with standard deviation for all bat species at the stationary detectors is included in Table 4. The total and maximum number of passes of myotis species is provided in Table 5.

**Table 4: Mean (Standard Deviation) Bat Passes per Night at Acoustic Monitoring Stations from June 15-28, 2018[1]**

| Station | # of Nights Surveyed | Total Passes per Night (all bats) | Bat Species or Call Frequency Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | HiF total[2] | LoF total[2] | LoF Unknown Species[3] | HiF Unknown Species[4] | Hoary Bat | Silver-haired Bat | Big Brown Bat | Red Bat | Big Brown or Silver-haired Bat | Unknown Myotis | Little Brown Myotis | Small-footed Myotis |
| 1 | 14 | 96.79(128.23) | 1.64(2.73) | 95.14(126.32) | 13.07(18.05) | 0.79(1.63) | 6.86(3.7) | 2.14(2.03) | 57.21(90.74) | 0.07(0.27) | 15.86(21.87) | 0.57(1.02) | 0.07(0.27) | 0.14(0.53) |

[1] - Results presented in the format of X (Y), where X = mean number of bat passes per night and Y = standard deviation

[2] - HiF = High Frequency; LoF = Low Frequency

[3] - Recordings classified as bats with low frequency calls but could not be classified to the species level, typically including hoary bat, big brown bat and silver-haired bat

[4] - Recordings classified as bats with high frequency calls but could not be classified to the species level, typically including red bat, tricolored bat and all bats in the myotis genera

**Table 5: Total Passes and Maximum Passes within One Night for SAR Bats at Acoustic Monitoring Stations from June 15-28, 2018**

| Station | Bat Species or Call Frequency Type | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Unknown HiF[1] | Max Unknown HiF[1] | Total Myotis Species | Max Myotis Species | Total Little Brown Myotis | Max Little Brown Myotis | Total Eastern Small-footed Myotis | Max Eastern Small-footed Myotis |
| 1 | 11 | 6 | 8 | 3 | 1 | 1 | 2 | 2 |

[1] - HiF = High Frequency; LoF = Low Frequency

Overall, there was a high level of bat activity compared to other sites in southern Ontario, with an average of 96 passes per night. The most frequently recorded bat species were (in order) big brown bat, hoary bat and silver-haired bat. A low number of passes were identified as little brown myotis, eastern small-footed myotis or unknown Myotis species. A low number of unknown high-frequency bat species passes (potentially indicative of Myotis species) were also recorded.

The number of bat passages recorded by a detector may include multiple passes by the same bat individual and therefore are only indicative of presence/absence, rather than the number of bats that are potentially using the Site. The results of the acoustic survey, combined with the habitat assessment, indicate that there is a moderate potential for general bat maternity roost habitat in the barn on the Site. There are also two large ponds to the east of the Study Area (including the extraction pond on the existing Lafarge Brantford Pit) that likely function as a primary drinking source for bats in the local landscape. The presence of this nearby drinking source may also be a contributing factor to the high level of general bat activity recorded on the Site. General bat maternity roost habitat is discussed further in Section 6.7.

#### *5.5.3.4 Significant and Sensitive Species*

The majority of bat species observed during the field surveys are secure and common in Ontario (S4). Eastern small-footed myotis is considered imperiled to vulnerable (S2S3) in the province. Two bat species (big brown bat and eastern small-footed myotis) are considered apparently secure or secure globally (G4; G5), while the remaining species are considered vulnerable to apparently secure globally (G3G4) (Appendix C).

Two bat species observed during the acoustic surveys are designated endangered under the ESA: little brown myotis and eastern small-footed myotis. Little brown myotis will roost in both natural and man-made structures. Within forest communities, roosting colonies require a number of large dead trees, in specific stages of decay and that project above the canopy in relatively open areas. They may also form nursery colonies in buildings within 1 km of water (ECCC 2018). Little is known about the roosting habitats of eastern small-footed myotis, but it is believed to roost on the ground under rocks, in rock crevices, talus slopes and rock piles. It has also been recorded to occasionally inhabit buildings (Humphrey 2017).

Although these two SAR bat species were recorded on the Site, the recorded activity was very low over the 14-night survey period, with a total of two little brown myotis passes and one eastern small-footed myotis pass. Some of the eight passes identified as unknown myotis may also have been little brown myotis. This low rate of SAR detections suggests there is a low potential that little brown myotis or eastern small-footed myotis have maternity roosts on the Site, and these detections likely instead represent commuting or foraging bats (e.g., commuting to the nearby drinking source to the east, as discussed above). Because there is low potential for SAR bat maternity roost habitat on the Site, no impacts to little brown myotis or eastern small-footed myotis are expected as a result of the proposed extraction. Further analysis is not warranted.

### 5.5.4 Other Wildlife

Two mammal and one arthropod species were observed on the Site during field surveys (Appendix C): gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), and bluet damselfly sp.

#### *Significant and Sensitive Species*

Both mammal species are secure and common in Ontario and globally (S5; G5), and the arthropod was unable to be identified to species level (Appendix C). None of the other wildlife species identified in the desktop SAR screening as having ranges which overlap the Study Area (Appendix B) were found during the field surveys.

# 6.0 ASSESSMENT OF SIGNIFICANT NATURAL HERITAGE FEATURES

This section assesses the natural heritage features and functions (as outlined in Section 2.0) located within the Study Area. The following sources were used during the assessment of features:

- Natural Heritage Reference Manual (NHRM; MNR 2010)
- Significant Wildlife Habitat Technical Guide (SWHTG; MNR 2000)
- Significant Wildlife Habitat Mitigation Support Tool (SWHMiST; MNRF 2014)
- Significant Wildlife Habitat Criteria Schedule for Ecoregion 7E (MNRF 2015)

## 6.1 Habitat of Endangered or Threatened Species

General habitat protection is provided by the ESA to all threatened and endangered species. General habitat is defined as the area on which a species depends directly or indirectly to carry out life processes, including reproduction, rearing, hibernation, migration or feeding. Species-specific habitat protection is only afforded to those species for which a habitat regulation has been prepared and passed into law as a regulation of the ESA. A habitat regulation outlines specific habitat features and associated buffers that are protected, and also specifies the geographic area(s) of the province where the habitat regulation applies.

Four species designated threatened or endangered under the ESA were observed on the Site during field surveys: bank swallow, barn swallow, eastern small-footed myotis and little brown myotis. However, suitable habitat was only identified on the Site for barn swallow and this species is carried forward to the impact assessment (Section 7.0).

No other species designated threatened or endangered under the ESA were assessed to have a moderate or high potential to occur on the Site or in the Study Area based on the results of the field surveys and SAR screening (Appendix B).

## 6.2 Fish Habitat

Both ponds within the Study Area are isolated features intended for use as irrigation ponds. Neither pond contains fish, nor are they hydrologically connected to any fish-bearing waterbody (MNRF 2019a). Further analysis is not warranted.

## 6.3 Significant Wetlands

Significant wetlands are areas identified as provincially significant by the MNRF using evaluation procedures established by the Province, as amended from time to time (MMAH 2014). Wetlands are assessed based on a range of criteria, including biology, hydrology, societal value and special features (MNRF 2019c).

There are no PSWs, or other unevaluated wetlands, on the Site or in the Study Area based on mapping (MNRF 2019a) or identified through the field surveys. Further analysis is not warranted.

## 6.4 Significant Woodlands

Woodlands can vary in their level of significance at the local, regional and provincial levels. Significant woodlands are an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species

composition, or past management history (MMAH 2014). Where local municipalities have not defined or mapped significant woodlands, these features are to be identified using criteria established by the MNRF as included in the Natural Heritage Reference Manual (NHRM) for Policy 2.3 of the PPS (MNR 2010).

There are no woodlands on the Site or in the Study Area. Further analysis is not warranted.

## 6.5 Significant Valleylands

Significant valleylands should be defined and designated by the planning authority. General guidelines for determining significance of these features are presented in the Natural Heritage Reference Manual (NHRM) for Policy 2.3 of the PPS (MNR 2010). Recommended criteria for designating significant valleylands under the PPS include prominence as a distinctive landform, degree of naturalness, importance of its ecological functions, restoration potential, and historical and cultural values.

There are no significant valleylands on the Site or in the Study Area. Further analysis is not warranted.

## 6.6 Significant Areas of Natural and Scientific Interest

Significant ANSIs are areas identified as provincially significant by the MNRF using evaluation procedures established by the Province, as amended from time to time.

There are no ANSIs on the Site or in the Study Area. Further analysis is not warranted.

## 6.7 Significant Wildlife Habitat

Significant wildlife habitat (SWH) is one of the more complicated natural heritage features to identify and evaluate. The NHRM includes criteria and guidelines for designating SWH. There are two other documents, the Significant Wildlife Habitat Technical Guide (SWHTG) and the Significant Wildlife Habitat Mitigation Support Tool (SWHMiST) (MNR 2000 and MNRF 2014), that can be used to help decide what areas and features should be considered significant wildlife habitat. These documents were used as reference material for this study.

There are four general types of significant wildlife habitat: seasonal concentration areas, migration corridors, rare or specialized habitats, and species of conservation concern. The specific habitats considered in this report are evaluated based on the criteria outlined in the Ecoregion 7E Criterion Schedule (MNRF 2015). All types of SWH are discussed below in relation to the Site and the proposed extraction.

### 6.7.1 Seasonal Concentration Areas

Seasonal concentration areas are those areas where large numbers of a species congregate at one particular time of the year. Examples include deer yards, amphibian breeding habitat, bird nesting colonies, bat hibernacula, raptor roosts, and passerine migration concentrations. If a SAR, or if a large proportion of the population may be lost if significant portions of the habitat are altered, all examples of certain seasonal concentration areas may be designated.

The SWHTG (MNR 2000) and Ecoregion 7E Criterion Schedule (MNRF 2015) identifies the following 12 types of seasonal concentrations of animals that may be considered significant wildlife habitat:

- winter deer yards and congregation areas
- colonial bird nesting sites
- waterfowl stopover and staging areas

- shorebird migratory stopover areas
- landbird migratory stopover areas
- raptor winter feeding and roosting areas
- reptile hibernacula
- turtle wintering areas
- bat hibernacula
- bat maternity colonies
- bat migratory stopover areas
- migratory butterfly stopover areas

There are no large, non-agricultural open fields in the Study Area to provide terrestrial waterfowl stopover or staging areas. No shorebird migratory or aquatic waterfowl stopover areas were identified in the Study Area during field surveys. There are no large areas of forest with adjacent meadow habitat in the Study Area to support raptor wintering areas. No exposed bedrock or rock piles that extend below the frost line that would support bat or reptile hibernacula were identified in the Study Area during field surveys. No colonial bird nesting sites were identified in the Study Area during field surveys. There are no designated deer winter yards or winter congregation areas in the Study Area. Because the Study Area is further than 5 km from Lake Ontario, migratory butterfly stopover areas and landbird migratory stopover areas are not applicable. Because the Study Area is not within ecodistrict 7E-2, bat migratory stopover areas are not applicable.

Although the barn on Site (Figure 2) was assessed to have moderate potential to provide maternity roost habitat for bats (Section 5.6.3), buildings are not considered to be SWH according to the Ecoregion 7E Criterion Schedule (MNRF 2015). However, best management practices are recommended in Section 8.2 to minimize adverse impacts to individuals that may be roosting in the barn.

The pond on the Site and the pond off-Site in the western portion of the Study Area (Figure 2), were assessed to have low potential to provide aquatic or overwintering habitat for turtles. Both ponds have been dug for use as irrigation ponds and are isolated in the landscape. The shorelines of both ponds are steep and densely vegetated, providing minimal opportunity for basking. No other basking objects, such as logs or rocks, were observed in the pond on Site, and no turtles were observed during field surveys. Further analysis is not warranted.

### 6.7.2 Migration Corridors

The SWHTG (MNR 2000) defines animal movement corridors as elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another. This is generally in response to different seasonal habitat requirements. For example, trails used by deer to move to wintering areas or areas used by amphibians between breeding and summer habitat. To qualify as significant wildlife habitat, these corridors would be a critical link between habitats that are regularly used by wildlife.

There are no naturally vegetated corridors connecting the Site or Study Area to nearby natural features. Hedgerows on the Site are narrow and sparsely vegetated and do not provide suitable cover for wildlife, nor do they connect any natural features (Figure 2). Further analysis is not warranted.

### 6.7.3 Specialized Habitats

Specialized habitats are microhabitats that provide a critical resource to some groups of wildlife. Examples include salt licks for ungulates and groundwater seeps for wild turkeys.

The SWHTG (MNR 2000) and Ecoregion 7E Criterion Schedule (MNRF 2015) defines seven specialized habitats that may be considered SWH. They are:

- habitat for area-sensitive species
- amphibian breeding habitat (woodlands and wetlands)
- turtle nesting habitat
- specialized raptor nesting habitat
- waterfowl nesting areas
- bald eagle and osprey habitat
- seeps and springs

No seeps or springs were identified on the Site or in the Study Area during field surveys. No bald eagle or osprey individuals, and no nests, were observed during field surveys. No suitable wetland habitat was identified on the Site or in the Study Area to support waterfowl and no consideration of waterfowl nesting habitat is required.

No amphibians were observed at the pond on Site or the pond off-Site, in the western portion of the Study Area during field surveys (Figure 2), and neither pond is considered amphibian breeding SWH. Further analysis is not warranted.

As discussed in Section 6.7.1, both ponds were assessed to have low potential to provide aquatic habitat for turtles. In addition, no large areas of open, loose substrates such as sand or gravel were observed on the Site. Although there may be suitable nesting substrates on the adjacent Lafarge Brantford pit, licensed aggregate pits are not generally considered SWH. In addition, no turtles were observed during field surveys. Further analysis is not warranted.

### 6.7.4 Rare Habitat

This category includes vegetation communities that are considered rare in the province. Generally, communities assigned an SRANK of S1 to S3 (extremely rare to rare-uncommon) by the NHIC could qualify. It is assumed that these habitats are at risk and that they are also more likely to support rare species and other features that are considered significant.

No rare vegetation communities were identified on the Site or in the Study Area during the field surveys. Further analysis is not warranted.

### 6.7.5 Habitat for Species of Conservation Concern

Habitat for species of conservation concern (SOCC) includes habitat for three groups of species:

- Species that are rare, those whose populations are significantly declining, or have a high percentage of their global population in Ontario

- Species listed as special concern under the ESA
- Species listed as threatened or endangered under SARA

Rare species are considered at five levels: globally rare, nationally rare, provincially rare, regionally rare, and locally rare (i.e., in the municipality). This is also the order of priority that should be attached to the importance of maintaining species. Some species have been identified as being susceptible to certain practices, and their presence may result in an area being designated significant wildlife habitat. Examples include species vulnerable to forest fragmentation and species such as woodland raptors that may be vulnerable to forest management or human disturbance. The final group of species of conservation concern includes species that have a high proportion of their global population in Ontario. Although they may be common in Ontario, they are found in low numbers in other jurisdictions.

The SWHTG (MNR 2000) and Ecoregion 7E Criterion Schedule (MNRF 2015) defines five specialized habitats that may be considered SWH. They are:

- marsh bird breeding habitat
- open country bird breeding habitat
- shrub/early successional bird breeding habitat
- terrestrial crayfish
- special concern and rare wildlife species

No marsh, open country or shrub/early successional bird breeding habitat was identified on the Site or in the Study Area during field surveys. No habitat for terrestrial crayfish was identified on the Site or in the Study Area during field surveys.

Three special concern or rare species were assessed to have moderate potential to occur on the Site or in the Study Area based on the availability of suitable habitat (Appendix B): common nighthawk (*Chordeiles minor*), monarch (*Danaus plexippus*) and yellow-banded bumblebee (*Bombus terricola*).

Common nighthawk, designated special concern under the ESA and threatened under the SARA, is an aerial forager that requires areas with large open habitat, such as farmland, open woodlands, clearcuts, rock outcrops, alvars, wetlands, prairies, gravel pits and gravel rooftops in cities (Sandilands 2007). There is no suitable habitat on the Site to support nesting. Off-Site, in the northeast corner of the Study Area, the cultural meadow may provide suitable nesting habitat for this species. Because potential nesting habitat for common nighthawk is off-Site, it is not expected to be directly impacted by the proposed extraction. Implementation of best management practices (Section 8.2.1) will minimize potential indirect adverse impacts (e.g., dust) on the potential habitat.

Monarch, designated special concern under the ESA and SARA, is found throughout the northern and southern regions of the province. This butterfly is found wherever there are milkweed (*Asclepius* spp.) plants for its caterpillars and wildflowers that supply a nectar source for adults. It is often found on abandoned farmland, meadows, open wetlands, prairies and roadsides, but also in city gardens and parks (COSEWIC 2010). The edges of the agricultural fields and hedgerows on the Site, in addition to roadside ditches and berms off-Site within the Study Area, may provide suitable foraging habitat for this species. In addition, common milkweed was observed on the Site during field surveys and may support monarch reproduction. However, areas of suitable habitat on the Site are very small and isolated, and unlikely to support a large concentration of monarch

individuals. There is abundant similar habitat in the surrounding landscape, and loss of minimal habitat on Site is not expected to impact the regional population of monarch. Further analysis is not warranted.

Yellow-banded bumble bee, designated special concern under the ESA and not designated under SARA, is a forage and habitat generalist. Mixed woodlands are commonly used for nesting and overwintering, but it also occupies various open habitats including native grasslands, farmlands and urban areas. Nest sites are mostly abandoned rodent burrows (COSEWIC 2015). Hedgerows on the Site may provide suitable nesting and overwintering habitat for this species, as well as foraging habitat. No mammal burrows were observed on the Site during field surveys that may provide nesting sites. There is abundant similar habitat in the surrounding landscape, and loss of minimal habitat on Site is not expected to impact the regional population of yellow-banded bumble bee. Further analysis is not warranted.

# 7.0 IMPACT ANALYSIS

## 7.1 Threatened and Endangered Species

### *Barn Swallow*

Barn swallow was confirmed to be nesting in the barn on the Site. Because the barn will be removed as part of the proposed extraction, permitting under the ESA will be required to remove barn swallow habitat. This activity (i.e., removal of the barn structure) is subject to O. Reg. 242/08, s. 23.5 (barn swallow) under the ESA. This regulation allows removal or alteration of a structure that is nesting habitat for barn swallow with a number of conditions, including registering the activity with the Ministry of Environment, Conservation and Parks (MECP). Mitigation measures to address barn swallow nesting on the Site are discussed further in Section 8.2.

# 8.0 REHABILITATION / MITIGATION / MONITORING

## 8.1 Rehabilitation Concept

The post-extraction rehabilitation plan has been designed to fit into the overall regional context and complement the existing topography and terrestrial and aquatic features in the area. Because the proposed extraction is below-water, the overall final rehabilitation plan will consist of a lake surrounded by nearshore, riparian and upland habitats. The lake will be an extension of the lake created on the adjacent active Lafarge Brantford pit. Although the rehabilitation policies of the Growth Plan for the Greater Golder Horseshoe (MMAH 2017) and the County (Brant 2012) require rehabilitation to agricultural land be maximised in the upland areas, the proposed below-water extraction is excepted as there will be no suitable upland areas available. Proposed rehabilitation of the extraction area will proceed progressively through each phase (MHBC 2019).

The proposed final rehabilitation plan includes the creation of a ±12.2 ha lake (238 mAMSL), including shallow shoreline/littoral areas, and terrestrial habitats comprised of backfilled areas, overburden slopes, and terrestrial nodal plantings. Shallow shoreline widths and depths will be varied to promote maximum diversity within the habitat for wildlife.

All plantings (i.e., nodal plantings) included in the rehabilitation plan will be locally native, non-invasive species that create habitat in the short term and promote natural succession processes. Aquatic plants will include shrubs such as red-osier dogwood (*Cornus sericea*) and slender willow (*Salix petiolaris*), and herbaceous plants such as

water plantain (*Alisma plantago-aquatica*), lake sedge (*Carex lacustris*), swamp milkweed (*Asclepias incarnata*), softstem bulrush (*Schoenoplectus tabernaemontani*), and cattail (*Typha* spp.). Shallow shoreline/littoral areas will be created through construction of submerged benches up to 2 m deep. Shallow emergent marsh vegetation (i.e., herbaceous species listed above) will be planted in water ±0.15 m deep and extend ±5 m from the shore and be interspersed with cover structures (e.g. boulders and root wads) in the shallow shoreline wetland areas. Organic material and topsoil will be added to the shoreline areas to promote shoreline vegetation. Basking logs (i.e., large woody debris) and rubble/boulders will be placed along the shoreline to create wildlife habitat.

Side slopes will be rough graded to a 3:1 aspect to ensure stability. The slopes will be seeded with a mix of grasses and legumes consisting of native, non-invasive species. Terrestrial nodal plantings on the side slope and within the setback area will include a mixture of coniferous and deciduous tree species to promote species diversity and provide a variety of species to compensate for any substrate deficiencies. The species may include white pine, basswood, trembling aspen, and white birch, with a secondary focus on species such as choke cherry (*Prunus virginiana*), alternate-leaved dogwood (*Cornus alternifolia*), highbush cranberry (*Viburnum opulus*), nannyberry (*Viburnum lentago*) and serviceberry (*Amelanchier* spp.). It is recommended that ash (*Fraxinus* spp.) species in rehabilitation plantings be avoided due to the invasion of emerald ash borer.

## 8.2 Mitigation

### 8.2.1 General Best Management Practices

Standard Best Management Practices to mitigate damage to the adjacent natural features include the following:

- Clearly demarcate and maintain recommended setbacks on the site plan.
- To be in compliance with the MBCA, avoid removal of vegetation (excluding agricultural fields planted in annual row crop, such as corn) during the active season for breeding birds (April 15 – August 15).
- Remove the barn on the Site outside of the bat maternity roosting period (May 1 to July 31) to minimize adverse impacts on non-SAR roosting bats that may be roosting in the structure.
- Implement standard best management practices, including sediment and erosion controls, spill prevention, etc. during the construction phase of the Project.
- Implement standard best management practices to mitigate noise and dust on the Site during site preparation and operation phases of the Project.

### 8.2.2 Barn Swallow

Mitigation for barn swallow will include registering the Project with the MECP through the online Notice of Activity (NOA) process. As part of the registration, all the requirements outlined in O. Reg. 242/08, s. 23.5, must be met. In addition, the following measures must be implemented for removal of barn swallow habitat:

- Remove the barn outside of the barn swallow active season (May 1 – August 31). If the barn must be removed during the active season, steps must be taken to prevent barn swallow from entering the structure and building nests (e.g., install a tarp or netting) prior to the start of that active season (i.e., before May 1).
- Compensation structure(s) must be constructed and available prior to the next active season. If the barn is to be removed during the active season, the compensation structure(s) must be completed before the beginning of that active season (i.e., before May 1).

## 8.3 Monitoring

Monitoring as outlined in O. Reg. 242/08, s. 23.5 for barn swallow will be implemented for the proposed extraction.

# 9.0 SUMMARY AND RECOMMENDATIONS

The proposed extension of the existing Lafarge Brantford Pit has been assessed for potential ecological impacts under the ARA Provincial Standards, the Provincial Policy Statement, policies of the County of Brant, as well as other relevant legislation, including the ESA.

Based on these analyses, it is expected that there will be no negative impacts to the significant natural features and functions in the Study Area. In addition, an ecologically based rehabilitation plan and preventive mitigation measures that will enhance the natural heritage system have been developed. These conclusions are based on the following recommendations:

- Remove the barn on the Site outside of the bat maternity roosting period (May 1 to July 31) to minimize adverse impacts on non-SAR roosting bats that may be roosting in the structure.
- The Project will be registered with the MECP through the online Notice of Activity process for removal of barn swallow habitat and all the requirements outlined in O. Reg. 242/08, s. 23.5 will be implemented, including:
  - Remove the barn outside of the barn swallow active season (May 1 – August 15). If the barn must be removed during the active season, steps must be taken to prevent barn swallow from entering the structure and building nests (e.g., install a tarp or netting) prior to the start of that active season (i.e., before May 1).
  - Compensation structure(s) will be constructed and available prior to the next active season following removal of the barn.
  - Monitoring of compensation structures in accordance with O. Reg. 242/08, s. 23.5
- General best management practices will be implemented, including:
  - To be in compliance with the MBCA, avoid removal of vegetation (excluding agricultural fields planted in annual row crop, such as corn) during the active season for breeding birds (April 15 – August 15).
  - Implement standard best management practices, including sediment and erosion controls, spill prevention, etc. during the construction phase of the project.
- The Site will be rehabilitated in accordance with the requirements of the rehabilitation plan developed with ecological concepts from this report.

# 10.0 CLOSURE

We trust this report meets your current needs. If you have any further questions regarding this report, please contact the undersigned.

# Signature Page

**Golder Associates Ltd.**

Amber Sabourin, HBSc (Env)
*Ecologist*

Heather Melcher, MSc
*Principal, Senior Ecologist*

AVS/HM/mp



https://golderassociates.sharepoint.com/sites/1897335/deliverables/nel report/final/1897335-r-rev0-lafarge brantford west-nel 1&2-02jul2020.docx

# REFERENCES

Bat Conservation International (BCI). 2018. Range Maps. URL: http://batcon.org/index.php/all-about-bats/species-profiles.html. Accessed August 2018.

Bird Studies Canada (BSC). 2008. Marsh Monitoring Program for Surveying Amphibians.

Brant, County of. 2012. County of Brant Official Plan.

Brown, C.R. and M.B. Brown. 1999. Barn Swallow (*Hirundo rustica*). The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. URL: http://bna.birds.cornell.edu/bna/species/452

Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, editors. 2007. Atlas of the Breeding Birds of Ontario. Co-published by Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706 pp. ISBN 978-1-896059-15-0.

Canada, Government of (Canada). 1985. *Fisheries Act*. R.S.C., 1985, c. F-14.

Canada, Government of (Canada). 1994. *Migratory Birds Convention Act*. S.C. 1994, c. 22.

Canada, Government of (Canada). 2002. *Species at Risk Act*. S.C. 2002, c. 29.

Chapman, L.S. and D.F. Putnam. 1984. The Physiography of Southern Ontario. Ontario Geological Survey, Special Volume 2. Ontario Ministry of Natural Resources. Toronto.

COSEWIC. 2010. COSEWIC assessment and status report on the Monarch *Danaus plexippus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 43 pp.

COSEWIC. 2011. COSEWIC assessment and status report on the Barn Swallow *Hirundo rustica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 37 pp.

COSEWIC. 2015. COSEWIC assessment and status report on the Yellow-banded Bumble Bee *Bombus terricola* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 60 pp

Cornell University. 2015. All About Birds. The Cornell Lab of Ornithology. URL: https://www.allaboutbirds.org/. Accessed February 22, 2019.

Crins, W.J., P.A. Gray, P.W.C. Uhlig, and M.C. Wester. 2009. The Ecosystems of Ontario, Part I: Ecozones and Ecoregions. Ontario Ministry of Natural Resources, Inventory, Monitoring and Assessment Section, Science and Information Branch, Peterborough, Ontario.

Dobbyn, J.S. 1994. Atlas of the Mammals of Ontario. Federation of Ontario Naturalists, Toronto. 120 pp.

Downes, C.M. and B.T. Collins. 2003. Canadian Breeding Bird Survey, 1967-2000. National Wildlife Research Centre, Canadian Wildlife Service. Ottawa.

eBird. 2018. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. URL: http://www.ebird.org. Accessed August 2018.

Environment and Climate Change Canada (ECCC). 2018. Recovery Strategy for the Little Brown Myotis (*Myotis lucifugus*), the Northern Myotis (*Myotis septentrionalis*), and the Tri-colored Bat (*Perimyotis subflavus*) in Canada. Species at Risk Act Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. ix + 172 pp.

Environment and Climate Change Canada (ECCC). 2019. Species at Risk Public Registry. URL: http://www.registrelep-sararegistry.gc.ca/sar/index/default_e.cfm. Accessed January 2019.

Fisheries and Oceans Canada (DFO). 2019. Request a Review of Your Project Near Water. Available at: http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/request-review-demande-d-examen-001-eng.html. Updated: August 28, 2019.

Garrison, B.A. 1999. Bank Swallow (*Riparia riparia*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. URL: http://bna.birds.cornell.edu/bna/species/414

Grand River Conservation Authority (GRCA). 2019. Grand River Information Network (GRIN). URL: https://maps.grandriver.ca/web-gis/public/?theme=MYP&bbox=550458,4770656,556935,4776835. Accessed January 2019.

Humphrey, C. 2017. Recovery Strategy for the Eastern Small-footed Myotis (*Myotis leibii*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. vii + 76 pp.

Jones, C., R. Layberry, and A. Macnaughton. 2018. Ontario Butterfly Atlas Online. Toronto Entomologists' Association. URL: http://www.ontarioinsects.org/atlas_online.htm. Accessed August 2018.

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 Region, Science Development and Transfer Branch. SCSS Field Guide FG-02.

MTE Consultants Inc. (MTE). 2019. Draft Level 1 and 2 Hydrogeological Investigation. April 11, 2019.

Natural Heritage Information Centre (NHIC). 2018. Natural Areas, Species Lists and Element Occurrence Databases. Ontario Ministry of Natural Resources. Peterborough, ON. URL: https://www.ontario.ca/environment-and-energy/natural-heritage-information-centre. Accessed August 2018.

Ontario, Government of (Ontario). 1990. *Aggregate Resources Act*, R.S.O 1990, Chapter A.8.

Ontario, Government of (Ontario). 2006. O. Reg. 150/06: Grand River Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. URL: https://www.ontario.ca/laws/regulation/060150.

Ontario, Government of (Ontario). 2011. *Conservation Authorities Act*, R.S.O 1990, c. C. 27.

Ontario, Government of (Ontario). 2007. *Endangered Species Act*. S.O. 2007.

Ontario Ministry of Municipal Affairs and Housing (MMAH). 2020. Provincial Policy Statement. URL: https://www.ontario.ca/page/provincial-policy-statement-2020.

Ontario Ministry of Municipal Affairs and Housing (MMAH). 2017. Growth Plan for the Greater Golden Horseshoe. May 2017. URL: https://www.ontario.ca/document/place-grow-growth-plan-greater-golden-horseshoe

Ontario Ministry of Natural Resources (MNR). 1997. The Aggregate Resources of Ontario: Provincial Standards, Version 1.0. URL: http://www.ontario.ca/page/application-standards-proposed-pits-and-quarries.

Ontario Ministry of Natural Resources (MNR). 2000. Significant Wildlife Habitat Technical Guide (SWHTG). 151 pp.

Ontario Ministry of Natural Resources (MNR). 2010. Natural Heritage Reference Manual for Natural Heritage Polices of the Provincial Policy Statement, 2005 Second Edition.

Ontario Ministry of Natural Resources and Forestry (MNRF). 2014. Significant Wildlife Habitat Mitigation Support Tool. Version 2014.

Ontario Ministry of Natural Resources and Forestry (MNRF). 2015. Significant Wildlife Habitat 7E Criterion Schedule. 40 pp.

Ontario Ministry of Natural Resources and Forestry (MNRF). 2017. Survey Protocol for Species at Risk Bats with Treed Habitats Little Brown Myotis, Northern Myotis and Tri-Colored Bat. April 2017. Ontario Ministry of Natural Resources and Forestry, Guelph District.

Ontario Ministry of Natural Resources and Forestry (MNRF). 2018a. Land Information Ontario, Aquatic Resources Area Layer. Fisheries Section, Species Conservation Policy Branch. Accessed August 2018.

Ontario Ministry of Natural Resources and Forestry (MNRF). 2018b. Fish ON-Line. Powered by Land Information Ontario. Queen's Printer for Ontario. URL: https://www.gisapplication.lrc.gov.on.ca/FishONLine/Index.html?site=FishONLine&viewer=FishONLine&locale=en-US. Accessed August 2018.

Ontario Ministry of Natural Resources and Forestry (MNRF). 2019a. Land Information Ontario. URL: http://www.ontario.ca/environment-and-energy/land-information-ontario.

Ontario Ministry of Natural Resources and Forestry (MNRF). 2019b. Species at Risk in Ontario List. Queens Printer for Ontario. URL: http://www.ontario.ca/environment-and-energy/species-risk-ontario-list. Accessed January 2019.

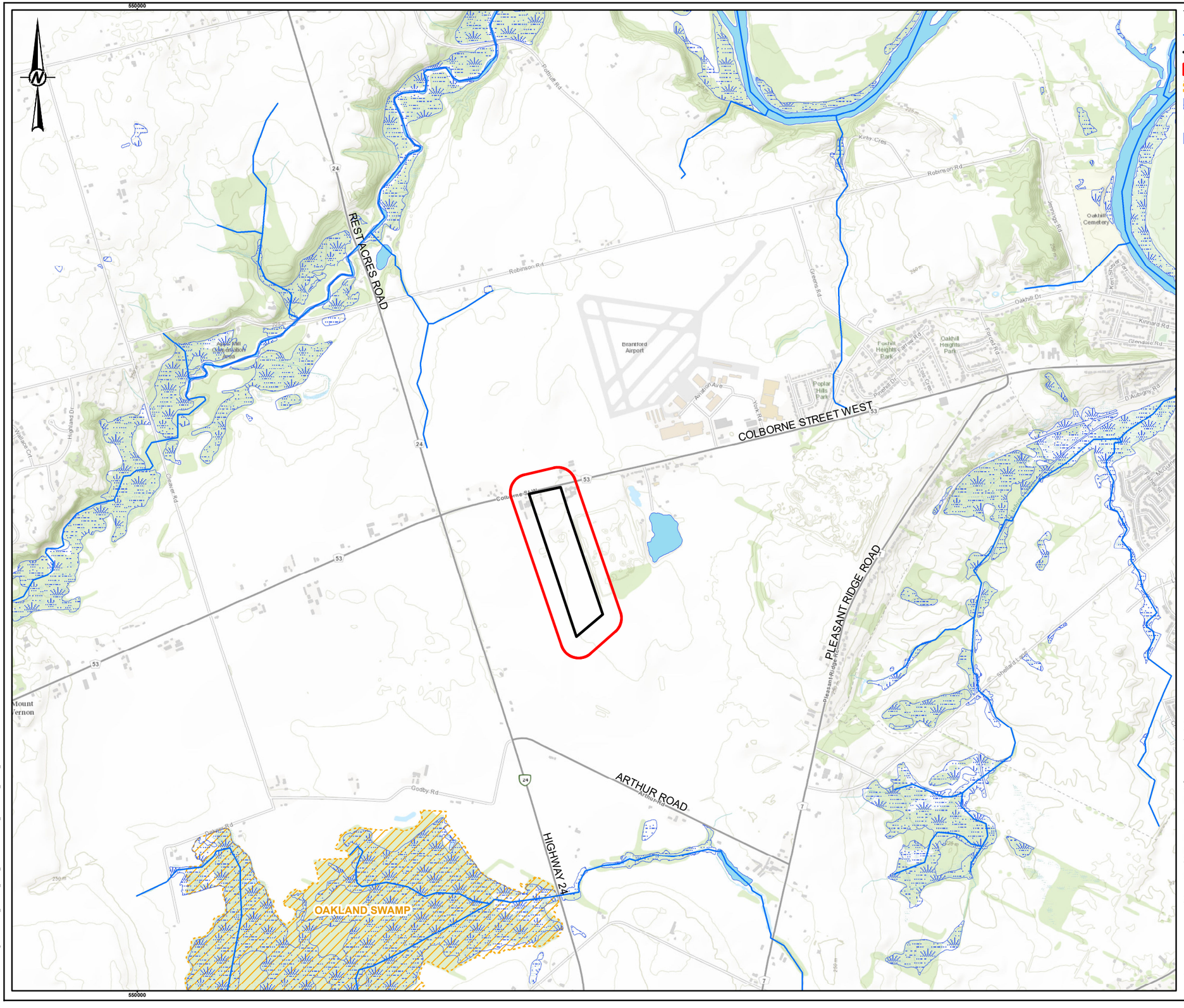
Ontario Ministry of Natural Resources and Forestry (MNRF). 2019c. Wetlands evaluation. Queen's Printer for Ontario. URL: https://www.ontario.ca/page/wetlands-evaluation

Ontario Nature. 2018. Ontario Reptile and Amphibian Atlas URL: http://www.ontarionature.org/protect/species/herpetofaunal_atlas.php. Accessed August 2018.

Rowe, J.S. 1972. Forest Regions of Canada. Publication No. 1300. Ottawa: Canadian Forestry Service, Department of the Environment.

Sandilands, A. 2007. Common Nighthawk, pp. 308-309 in Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources and Ontario Nature, Toronto, xxii + 706 pp.

# FIGURES




**LEGEND**

- WATERCOURSE
- LICENSE BOUNDARY
- STUDY AREA BOUNDARY
- ANSI, LIFE SCIENCE
- WETLAND
- WOODED AREA
- WATERBODY


0 500 1,000

1:25,000 METRES

**REFERENCE(S)**

SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
LAFARGE

PROJECT
PROPOSED LAFARGE BRANTFORD WEST EXTENSION
NATURAL ENVIRONMENT LEVEL 1/2 REPORT

TITLE
**SITE LOCATION**

CONSULTANT
GOLDER

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| YYYY-MM-DD | 2019-10-23 |
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**LEGEND**

- ANURAN CALL COUNT SURVEY
- BAT STATIONARY DETECTOR
- BREEDING BIRD SURVEY
- LIMIT OF EXTRACTION
- LICENSE BOUNDARY
- STUDY AREA BOUNDARY
- ELC CLASSIFICATIONS

| ELC CODE | DESCRIPTION |
|---|---|
| OAO | OPEN WATER |
| CUT | CULTURAL THICKET |
| CUM | CULTURAL MEADOW |
| RES | RESIDENTIAL |
| COMC | COMMERCIAL |
| EXT | EXTRACTION |
| OAGM | OPEN AGRICULTURAL |

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**REFERENCE(S)**

SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
LAFARGE

PROJECT
PROPOSED LAFARGE BRANTFORD WEST EXTENSION
NATURAL ENVIRONMENT LEVEL 1/2 REPORT

TITLE
**ECOLOGICAL LAND CLASSIFICATION AND SURVEY STATIONS**

CONSULTANT
GOLDER

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**APPENDIX A**

# Plant List

Vascular Plant List for the Lafarge Brantford West Extension Site

| Scientific Name | Common Name | Origin[a] | S Rank[b] | G Rank[b] | ESA[c] | Location[d] |
|---|---|---|---|---|---|---|
| **Trees (13 taxa)** | | | | | | |
| *Acer negundo* | Manitoba Maple | (N) | S5 | G5 | — | B |
| *Acer platanoides* | Norway Maple | I | SNA | GNR | — | B |
| *Juglans nigra* | Black Walnut | (N) | S4? | G5 | — | B |
| *Juniperus virginiana* | Eastern Red Cedar | N | S5 | G5T5 | — | B |
| *Morus alba* | White Mulberry | I | SNA | GNR | — | A, B |
| *Picea glauca* | White Spruce | N | S5 | G5 | — | B |
| *Pinus nigra* | Austrian Pine | I | SNA | GNR | — | B |
| *Pinus sylvestris* | Scots Pine | I | SNA | GNR | — | B |
| *Populus deltoides* | Eastern Cottonwood | N | S5 | G5 | — | A, B |
| *Populus tremuloides* | Trembling Aspen | N | S5 | G5 | — | A |
| *Quercus macrocarpa* | Bur Oak | N | S5 | G5 | — | B |
| *Robinia pseudoacacia* | Black Locust | I | SNA | G5 | — | B |
| *Ulmus pumila* | Siberian Elm | I | SNA | GNR | — | A, B |
| **Small trees, shrubs and woody vines (13 taxa)** | | | | | | |
| *Cornus sericea* | Red-osier Dogwood | N | S5 | G5 | — | A |
| *Lonicera tatarica* | Tartarian Honeysuckle | I | SNA | GNR | — | B |
| *Parthenocissus quinquefolia* | Virginia Creeper | N | S4? | G5 | — | A, B |
| *Prunus* sp. | Cherry sp. | — | — | — | — | B |
| *Rhus typhina* | Staghorn sumac | N | S5 | G5 | — | A, B |
| *Rosa multiflora* | Multiflora Rose | I | SNA | GNR | — | B |
| *Rubus idaeus* | Red Raspberry | N | S5 | G5T5 | — | A, B |
| *Salix discolor* | Pussy Willlow | N | S5 | G5T5 | — | A |
| *Salix interior* (*S. exigua*) | Sandbar Willow | N | S5 | GNR | — | A |
| *Salix petiolaris* | Slender Willow | N | S5 | G5 | — | A |
| *Solanum dulcamara* | Bittersweet Nightshade | I | SNA | GNR | — | A, B |
| *Syringa vulgaris* | Lilac | I | SNA | GNR | — | B |
| *Vitis riparia* | Riverbank Grape | N | S5 | G5 | — | A, B |
| **Graminoids (7 taxa)** | | | | | | |
| *Bromus inermis* | Smooth Brome | I | SNA | G5 | — | A, B |
| *Bromus* sp. | Brome sp. | — | — | — | — | B |
| *Dactylis glomerata* | Orchard Grass | I | SNA | GNR | — | A, B |
| *Elymus repens* | Quack Grass | I | SNA | GNR | — | B |
| *Phalaris arundinacea* | Reed Canary Grass | N | S5 | G5 | — | A |
| *Phleum pratense* | Timothy | I | SNA | GNR | — | A |
| *Poa pratensis* | Kentucky Bluegrass | N | S5 | G5 | — | A, B |
| **Forbs (28 taxa)** | | | | | | |
| *Achillea millefolium* | Yarrow | I | SNA | G5 | — | A, B |
| *Alliaria petiolata* | Garlic Mustard | I | SNA | GNR | — | B |
| *Ambrosia artemisiifolia* | Common Ragweed | N | S5 | G5 | — | B |
| *Arctium lappa* | Giant Burdock | I | SNA | GNR | — | B |
| *Asclepias syriaca* | Common Milkweed | N | S5 | G5 | — | A, B |
| *Asparagus officinalis* | Asparagus | I | SNA | G5? | — | B |
| *Chenopodium album* | Lamb's-quarters | I | SNA | G5 | — | B |
| *Cichorium intybus* | Chicory | I | SNA | GNR | — | B |
| *Cirsium vulgare* | Bull Thistle | I | SNA | GNR | — | B |
| *Clinopodium vulgare* | Wild Basil | N | S5 | G5 | — | B |
| *Daucus carota* | Wild Carrot | I | SNA | GNR | — | A, B |
| *Erigeron annuus* | Daisy Fleabane | N | S5 | G5 | — | A, B |
| *Galium aparine* | Cleavers | N | S5 | G5 | — | B |
| *Leonurus cardiaca* | Motherwort | I | SNA | GNR | — | A, B |
| *Leucanthemum vulgare* | Oxeye Daisy | I | SNA | GNR | — | B |
| *Medicago sativa* | Alfalfa | I | SNA | GNR | — | B |
| *Melilotus officinalis* | Yellow Sweet-Clover | I | SNA | GNR | — | A, B |

Vascular Plant List for the Lafarge Brantford West Extension Site

| Scientific Name | Common Name | Origin[a] | S Rank[b] | G Rank[b] | ESA[c] | Location[d] |
|---|---|---|---|---|---|---|
| *Mentha canadensis* | Wild Mint | N | S5 | G5 | — | B |
| *Oxalis* sp. | Wood Sorrel sp. | — | — | — | — | A |
| *Potentilla* sp. | Cinquefoil sp. | — | — | — | — | A, B |
| *Rumex crispus* | Curly Dock | I | SNA | GNR | — | A, B |
| *Saponaria officinalis* | Bouncing Bet | I | SNA | GNR | — | A, B |
| *Silene vulgaris* | Bladder Campion | I | SNA | GNR | — | B |
| *Solidago* sp. | Goldenrod sp. | — | — | — | — | A, B |
| *Taraxacum officinale* | Common Dandelion | I | SNA | GNR | — | B |
| *Tragopogon porrifolius* | Salsify | I | SNA | GNR | — | B |
| *Tussilago farfara* | Coltsfoot | I | SNA | GNR | — | A, B |
| *Verbascum thapsus* | Common Mullein | I | SNA | GNR | — | A, B |

[a] Origin: N = Native; (N) = Native but not in study area region; I = Introduced.

[b] Ranks based upon determinations made by the Natural Heritage Information Centre (2017).

G = Global; S = Provincial; Ranks 1-3 are considered imperiled or rare; Ranks 4 and 5 are considered secure.

NA = Not applicable [used mainly for abundance of non-natives; NR = Not ranked [used mainly for non-natives];

[c] *Endangered Species Act* (ESA), 2007 (O.Reg 242/08 last amended 27 March 2018 as O.Reg 219/18). Species at Risk in Ontario

END= Endangered; SC = Special Concern; THR = Threatened.

[d] Locations: A - Pond Area; B - Hedgerows

**APPENDIX B**

# Species at Risk Screening

| Taxon | Common Name | Scientific Name | Endangered Species Act[1] | Species at Risk Act (Sch 1)[2] | COSEWIC[3] | Provincial (SRank)[4] | Habitat Requirements[5] | Potential to Occur on Site or in the Study Area | Rationale for Potential to Occur on Site or in the Study Area |
|---|---|---|---|---|---|---|---|---|---|
| Amphibian | Jefferson X Blue-spotted salamander, Jefferson genome dominates | *Ambystoma hybrid pop. 1* | — | — | — | S2 | In Ontario, Jefferson x blue-spotted salamander prefers moist, well-drained deciduous and mixed forests with a closed canopy. It overwinters underground in mammal burrows and rock fissures, and moves to vernal pools and ephemeral wetlands in the early spring to breed. Breeding ponds are typically located in or near to forested habitats, and contain submerged debris (i.e. sticks, vegetation) for egg attachment sites. Ephemeral breeding pools need to have water until at least mid-summer (mid to late July) (Jefferson Salamander Recovery Team 2010). | Low | The pond on Site is isolated from any connection to nearby suitable terrestrial habitat and unlikely to support breeding. |
| Amphibian | Western chorus frog - Great Lakes St. Lawrence / Canadian Shield population | *Pseudacris triseriata* | — | THR | THR | S3 | In Ontario, habitat of this amphibian species typically consists of marshes or wooded wetlands, particularly those with dense shrub layers and grasses, as this species is a poor climber. They will breed in almost any fishless pond including roadside ditches, gravel pits and flooded swales in meadows. This species hibernates in terrestrial habitats under rocks, dead trees or leaves, in loose soil or in animal burrows. During hibernation, this species is tolerant of flooding (Environment Canada 2015). | Low | Although the pond on Site and the pond to the west of the Site, within the Study Area, may provide suitable habitat, no individuals were observed during field surveys. |
| Arthropod | Black dash | *Euphyes conspicua* | — | — | — | S3 | This small skipper primarily inhabits large graminoid meadow marshes, but can also be found in open areas along small streams. The main larval host is tussock sedge (*Carex stricta*) (Layberry et al. 1998). | Low | There is no meadow marsh or riparian stream habitat on the Site or in the Study Area. |
| Arthropod | Hackberry emperor | *Asterocampa celtis* | — | — | — | S3 | Found along woodland edges, wooded creeks and wooded roadsides. Caterpillars feed on various hackberries (*Celtis* spp.). Adults rarely take nectar from flowers, instead foraging on sap, rotting fruit, dung and carrion (NatureServe 2018). | Low | There is no woodland habitat on the Site or in the Study Area, and no hackberry plants were observed during the field surveys. |
| Arthropod | Monarch | *Danaus plexippus* | SC | SC | END | S2N, S4B | In Ontario, monarch is found throughout the northern and southern regions of the province. This butterfly is found wherever there are milkweed (*Asclepias* spp.) plants for its caterpillars and wildflowers that supply a nectar source for adults. It is often found on abandoned farmland, meadows, open wetlands, prairies and roadsides, but also in city gardens and parks. Important staging areas during migration occur along the north shores of the Great Lakes (COSEWIC 2010). | Moderate | Although suitable foraging and host plants may grow along the edges of the agricultural field on the Site, no monarchs were observed during field surveys. |
| Arthropod | Tawny emperor | *Asterocampa clyton* | — | — | — | S3 | In Ontario, tawny emperor is found in woodlands where its larval foodplant, hackberry (*Celtis* spp.) grows (Layberry et al. 1998). | Low | There is no woodland habitat on the Site or in the Study Area, and no hackberry plants were observed during the field surveys. |
| Arthropod | Yellow-banded bumble bee | *Bombus terricola* | SC | SC | SC | S2 | This species is a forage and habitat generalist. Mixed woodlands are commonly used for nesting and overwintering, but it also occupies various open habitats including native grasslands, farmlands and urban areas. It is an early emerging species, making it likely an important pollinator of early blooming wild flowering plants (e.g. wild blueberry) and agricultural crops (e.g., apple). Nest sites are mostly abandoned rodent burrows (COSEWIC 2015). | Moderate | Flowering plants along the field edges and roadsides on the Site and in the Study Area may provide suitable foraging habitat. This species may nest in hedgerows on Site. |
| Bird | Acadian flycatcher | *Empidonax virescens* | END | END | END | S2S3B | In Ontario, Acadian flycatcher breeds in the understory of large, mature, closed-canopy forests, swamps and forested ravines. This bird prefers forests greater than 40 ha in size, and exhibits edge sensitivity preferring the deep interior of the forest. Its nest is loosely woven and placed near the tip of branch in a small tree or shrub often, but not always, near water (Whitehead and Taylor 2002). | Low | There is no suitable forest habitat on the Site or in the Study Area. In addition, no individuals were observed during field surveys. |

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|---|---|---|---|---|---|---|---|---|---|
| Bird | Bank swallow | *Riparia riparia* | THR | THR | THR | S4B | In Ontario, bank swallow breeds in a variety of natural and anthropogenic habitats, including lake bluffs, stream and river banks, sand and gravel pits, and roadcuts. Nests are generally built in a vertical or near-vertical bank. Breeding sites are typically located near open foraging sites such as rivers, lakes, grasslands, agricultural fields, wetlands and riparian woods. Forested areas are generally avoided (Garrison 1999). | Moderate | Several bank swallows were observed foraging over the Site during field surveys. There is no suitable nesting habitat on the Site, but stockpiles in the adjacent Brantford Pit may provide nesting habitat. |
| Bird | Barn swallow | *Hirundo rustica* | THR | THR | THR | S4B | In Ontario, barn swallow breeds in areas that contain a suitable nesting structure, open areas for foraging, and a body of water. This species nests in human made structures including barns, buildings, sheds, bridges, and culverts. Preferred foraging habitat includes grassy fields, pastures, agricultural cropland, lake and river shorelines, cleared right-of-ways, and wetlands (COSEWIC 2011). Mud nests are fastened to vertical walls or built on a ledge underneath an overhang. Suitable nests from previous years are reused (Brown and Brown 1999). | High | Barn swallow was observed nesting in the barn on Site and foraging over the agricultural fields on Site during field surveys. |
| Bird | Bobolink | *Dolichonyx oryzivorus* | THR | THR | THR | S4B | In Ontario, bobolink breeds in grasslands or graminoid dominated hayfields with tall vegetation (Gabhauer 2007). Bobolink prefers grassland habitat with a forb component and a moderate litter layer. They have low tolerance for presence of woody vegetation and are sensitive to frequent mowing within the breeding season. They are most abundant in established, but regularly maintained, hayfields, but also breed in lightly grazed pastures, old or fallow fields, cultural meadows and newly planted hayfields. Their nest is woven from grasses and forbs. It is built on the ground, in dense vegetation, usually under the cover of one or more forbs (Renfrew et al. 2015). | Low | There is no suitable grassland habitat on the Site or in the Study Area to support breeding. In addition, no individuals were observed during field surveys. |
| Bird | Canada warbler | *Cardellina canadensis* | SC | THR | THR | S4B | In Ontario, breeding habitat for Canada warbler consists of moist mixed forests with a well-developed shrubby understory. This includes low-lying areas such as cedar and alder swamps, and riparian thickets (McLaren 2007). It is also found in densely vegetated regenerating forest openings. Suitable habitat often contains a developed moss layer and an uneven forest floor. Nests are well concealed on or near the ground in dense shrub or fern cover, often in stumps, fallen logs, overhanging stream banks or mossy hummocks (Reitsma et al. 2010). | Low | There is no forest habitat on the Site or in the Study Area to support breeding. In addition, no individuals were observed during field surveys. |
| Bird | Cerulean warbler | *Setophaga cerulea* | THR | END | END | S3B | In Ontario, breeding habitat of cerulean warbler consists of second-growth or mature deciduous forest with a tall canopy of uneven vertical structure and a sparse understory. This habitat occurs in both wet bottomland forests and upland areas, and often contains large hickory and oak trees. This species may be attracted to gaps or openings in the upper canopy. The cerulean warbler is associated with large forest tracks, but may occur in woodlots as small as 10 ha (COSEWIC 2010). Nests are usually built on a horizontal limb in the mid-story or canopy of a large deciduous tree (Buehler et al. 2013). | Low | There is no forest habitat on the Site or in the Study Area to support breeding. In addition, no individuals were observed during field surveys. |

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| Bird | Chimney swift | *Chaetura pelagica* | THR | THR | THR | S4B, S4N | In Ontario, chimney swift breeding habitat is varied and includes urban, suburban, rural and wooded sites. They are most commonly associated with towns and cities with large concentrations of chimneys. Preferred nesting sites are dark, sheltered spots with a vertical surface to which the bird can grip. Unused chimneys are the primary nesting and roosting structure, but other anthropogenic structures and large diameter cavity trees are also used (COSEWIC 2007). | Low | There are no suitable chimney structures or suitable large diameter cavity trees on Site or in the Study Area to provide nesting sites. In addition, no individuals were observed during field surveys. |
| Bird | Common nighthawk | *Chordeiles minor* | SC | THR | SC | S4B | In Ontario, these aerial foragers require areas with large open habitat. This includes farmland, open woodlands, clearcuts, burns, rock outcrops, alvars, bogs, fens, prairies, gravel pits and gravel rooftops in cities (Sandilands 2007) | Moderate | The corn field on Site does not provide suitable nesting habitat. The cultural meadow off-Site, in the northeast corner of the Study Area may provide suitable nesting habitat. |
| Bird | Eastern meadowlark | *Sturnella magna* | THR | THR | THR | S4B | In Ontario, eastern meadowlark breeds in pastures, hayfields, meadows and old fields. Eastern meadowlark prefers moderately tall grasslands with abundant litter cover, high grass proportion, and a forb component (Hull 2003). They prefer well drained sites or slopes, and sites with different cover layers (Roseberry and Klimstra 1970) | Low | There is no suitable grassland habitat on the Site or in the Study Area to support breeding. In addition, no individuals were observed during field surveys. |
| Bird | Eastern wood-pewee | *Contopus virens* | SC | SC | SC | S4B | In Ontario, eastern wood-pewee inhabits a wide variety of wooded upland and lowland habitats, including deciduous, coniferous, or mixed forests. It occurs most frequently in forests with some degree of openness. Intermediate-aged forests with a relatively sparse midstory are preferred. In younger forests with a relatively dense midstory, it tends to inhabit the edges. Also occurs in anthropogenic habitats providing an open forested aspect such as parks and suburban neighborhoods. Nest is constructed atop a horizontal branch, 1-2 m above the ground, in a wide variety of deciduous and coniferous trees (COSEWIC 2012). | Low | There is no forest or open woodland habitat on the Site or in the Study Area to support breeding. In addition, no individuals were observed during field surveys. |
| Bird | Golden-winged warbler | *Vermivora chrysoptera* | SC | THR | THR | S4B | In Ontario, golden-winged warbler breeds in regenerating scrub habitat with dense ground cover and a patchwork of shrubs, usually surrounded by forest. Their preferred habitat is characteristic of a successional landscape associated with natural or anthropogenic disturbance such as rights-of-way, and field edges or openings resulting from logging or burning. The nest of the golden-winged warbler is built on the ground at the base of a shrub or leafy plant, often at the shaded edge of the forest or at the edge of a forest opening (Confer et al. 2011). | Low | There is no suitable shrubland or early successional habitat on the Site or in the Study Area to support breeding. In addition, no individuals were observed during field surveys. |
| Bird | Grasshopper sparrow *pratensis* subspecies | *Ammodramus savannarum* (pratensis subspecies) | SC | SC | SC | S4B | In Ontario, grasshopper sparrow is found in medium to large grasslands with low herbaceous cover and few shrubs. It also uses a wide variety of agricultural fields, including cereal crops and pastures. Close-grazed pastures and limestone plains (e.g. Carden and Napanee Plains) support highest density of this bird in the province (COSEWIC 2013). | Low | There is no suitable grassland habitat on the Site or in the Study Area to support breeding. In addition, no individuals were observed during field surveys. |

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| Bird | Red-headed woodpecker | *Melanerpes erythrocephalus* | SC | THR | END | S4B | In Ontario, red-headed woodpecker breeds in open, deciduous woodlands or woodland edges and are often found in parks, cemeteries, golf courses, orchards and savannahs (Woodliffe 2007). They may also breed in forest clearings or open agricultural areas provided that large trees are available for nesting. They prefer forests with little or no understory vegetation. They are often associated with beech or oak forests, beaver ponds and swamp forests where snags are numerous. Nests are excavated in the trunks of large dead trees (Smith et al. 2000). | Low | There is no open woodland habitat or suitable large snag trees in the hedgerows on the Site or in the Study Area to provide nesting or roosting habitat. In addition, no individuals were observed during field surveys. |
| Bird | Wood thrush | *Hylocichla mustelina* | SC | THR | THR | S4B | In Ontario, wood thrush breeds in moist, deciduous hardwood or mixed stands that are often previously disturbed, with a dense deciduous undergrowth and with tall trees for singing perches. This species selects nesting sites with the following characteristics: lower elevations with trees less than 16 m in height, a closed canopy cover (>70%), a high variety of deciduous tree species, moderate subcanopy and shrub density, shade, fairly open forest floor, moist soil, and decaying leaf litter (COSEWIC 2012). | Low | There is no forest habitat on the Site or in the Study Area to support breeding. In addition, no individuals were observed during field surveys. |
| Mammal | Eastern small-footed myotis | *Myotis leibii* | END | — | — | S2S3 | This species is not known to roost within trees, but there is very little known about its roosting habits. The species generally roosts on the ground under rocks, in rock crevices, talus slopes and rock piles. It occasionally inhabits buildings. Areas near the entrances of caves or abandoned mines may be used for hibernaculum, where the conditions are drafty with low humidity, and may be subfreezing (Humphrey 2017). | Moderate | No rock piles, exposed bedrock or talus slopes were identified on the Site or in the Study Area. Although the barn on Site may provide suitable maternity roost habitat and the species was detected during acoustic monitoring, the species was assessed to have low potential for roosting on the Site. No potential hibernacula features were identified on the Site or in the Study Area. |
| Mammal | Little brown myotis | *Myotis lucifugus* | END | END | END | S4 | In Ontario, this specie's range is extensive and covers much of the province. It will roost in both natural and man-made structures. Roosting colonies require a number of large dead trees, in specific stages of decay and that project above the canopy in relatively open areas. May form nursery colonies in the attics of buildings within 1 km of water. Caves or abandoned mines may be used as hibernacula, but high humidity and stable above freezing temperatures are required (ECCC 2018). | Moderate | There is no forest habitat on the Site or in the Study Area. Although the barn on Site may provide suitable maternity roost habitat and the species was detected during acoustic monitoring, the species was assessed to have low potential for roosting on the Site. No potential hibernacula features were identified on the Site or in the Study Area. |
| Mammal | Northern myotis | *Myotis septentrionalis* | END | END | END | S3 | In Ontario, this species' range is extensive and covers much of the province. It will usually roost in hollows, crevices, and under loose bark of mature trees. Roosts may be established in the main trunk or a large branch of either living or dead trees. Caves or abandoned mines may be used as hibernacula, but high humidity and stable above freezing temperatures are required (ECCC 2018). | Low | There is no forest habitat on the Site or in the Study Area. This species does not typically roost in anthropogenic structures. In addition, no individuals were observed during field surveys. No potential hibernacula features were identified on the Site or in the Study Area. |

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| Mammal | Tri-colored bat | *Perimyotis subflavus* | END | END | END | S3? | In Ontario, tri-colored bat may roost in foliage, in clumps of old leaves, hanging moss or squirrel nests. They are occasionally found in buildings although there are no records of this in Canada. They typically feed over aquatic areas with an affinity to large-bodied water and will likely roost in close proximity to these. Hibernation sites are found deep within caves or mines in areas of relatively warm temperatures. These bats have strong roost fidelity to their winter hibernation sites and may choose the exact same spot in a cave or mine from year to year (ECCC 2018). | Low | There is no forest habitat on the Site or in the Study Area. This species does not typically roost in anthropogenic structures. In addition, no individuals were observed during field surveys. No potential hibernacula features were identified on the Site or in the Study Area. |
| Mammal | Woodland vole | *Microtus pinetorum* | SC | SC | SC | S3? | In Ontario, woodland vole is associated with mature deciduous forests with soft, often sandy soils and a deep litter and humic layer, suitable for burrowing. Common associates include oaks, hickory, black walnut, American beech and tulip tree. This species is often found at woodland edges near roads, railway tracks and field edges. Woodland vole is restricted to the Carolinian forest zone (COSEWIC 2010). | Low | There is no deciduous forest on the Site or in the Study Area to support this species. |
| Reptile | Blanding's turtle - Great Lakes / St. Lawrence population | *Emydoidea blandingii* | THR | THR | END | S3 | In Ontario, Blanding's turtle will use a range of aquatic habitats, but favor those with shallow, standing or slow-moving water, rich nutrient levels, organic substrates and abundant aquatic vegetation. They will use rivers, but prefer slow-moving currents and are likely only transients in this type of habitat. This species is known to travel great distances over land in the spring in order to reach nesting sites, which can include dry conifer or mixed forests, partially vegetated fields, and roadsides. Suitable nesting substrates include organic soils, sands, gravel and cobble. They hibernate underwater and infrequently under debris close to water bodies (COSEWIC 2016). | Low | The pond on Site is shallow and located in a depression with steep slopes. It is isolated from any nearby wetlands or waterbodies, and lacks suitable soft substrates and aquatic vegetation to provide summer or overwintering habitat. It does not provide suitable habitat for Blanding's turtle. |
| Reptile | Eastern hog-nosed snake | *Heterodon platirhinos* | THR | THR | THR | S3 | Eastern hog-nosed snake can be classified as a habitat generalist as it uses a variety of habitats across its range. In Ontario, this snake typically uses habitat with open vegetation cover, including open woodlands, wetlands, fields, forest edges, beaches and dunes, and disturbed sites, most often near water. In the Georgian Bay area, disturbed fields, rock barrens and forests appear to be preferred habitats. This species relies on sandy well drained soils. Hibernation occurs in sandy soils below the frost line. This species has been observed excavating hibernation sites in mixed intolerant upland forests. Nesting and oviposition has been noted in upland sandy areas and rock outcrops under large flat rocks. The majority of their diet is comprised of American toad and Fowler's toad (Kraus 2011). | Low | The agricultural landscape of the Study Area lacks any large woodland or wetland features to provide habitat. |
| Reptile | Milksnake | *Lampropeltis triangulum* | NAR | SC | SC | S4 | In Ontario, milksnake uses a wide range of habitats including prairies, pastures, hayfields, wetlands and various forest types, and is well-known in rural areas where it frequents older buildings. Proximity to water and cover enhances habitat suitability. Hibernation takes place in mammal burrows, hollow logs, gravel or soil banks, and old foundations (COSEWIC 2014). | Moderate | The agricultural and rural landscape of the Site and Study Area may provide suitable habitat for milksnake. |

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| Reptile | Queensnake | *Regina septemvittata* | END | END | END | S2 | In Ontario, queensnake requires permanent aquatic habitat with large flat rocks, either submerged or on the bank/shoreline. Individuals rarely leave the shoreline of permanent bodies of water with abundant shoreline cover and a healthy population of crayfish. They are fairly intolerant of silty substrates and most commonly are found in streams with bedrock and gravel substrates. The best sites have water temperatures that remain at or above 18◦C during the active season, have a swift to moderate current and woodland surroundings. Hibernacula may occur in the abutments of old bridges, in clay slopes above the high-water mark and in bedrock fissures (Gillingwater 2011). | Low | There are no watercourses or waterbodies on the Site or in the Study Area to provide suitable habitat. |
| Reptile | Northern map turtle | *Graptemys geographica* | SC | SC | SC | S3 | In Ontario, the northern map turtle prefers large waterbodies with slow-moving currents, soft substrates, and abundant aquatic vegetation. Ideal stretches of shoreline contain suitable basking sites, such as rocks and logs. Along Lakes Erie and Ontario, this species occurs in marsh habitat and undeveloped shorelines. It is also found in small to large rivers with slow to moderate flow. Hibernation takes place in soft substrates under deep water (COSEWIC 2012). | Low | The pond on Site is shallow and located in a depression with steep slopes. It is isolated from any nearby wetlands or waterbodies, and lacks suitable soft substrates and aquatic vegetation to provide summer or overwintering habitat. It does not provide suitable habitat for northern map turtle. |
| Reptile | Snapping turtle | *Chelydra serpentina* | SC | SC | SC | S3 | In Ontario, snapping turtle uses a wide range of waterbodies, but shows preference for areas with shallow, slow-moving water, soft substrates and dense aquatic vegetation. Hibernation takes place in soft substrates under water. Nesting sites consist of sand or gravel banks along waterways or roadways (COSEWIC 2008). | Low | The pond on Site is shallow and located in a depression with steep slopes. It is isolated from any nearby wetlands or waterbodies, and lacks suitable soft substrates and aquatic vegetation to provide summer or overwintering habitat. It does not provide suitable habitat for snapping turtle. |
| Reptile | Spiny softshell | *Apalone spinifera* | END | END | THR | S2 | In Ontario, spiny softshell will typically inhabit rivers with soft bottoms but occasionally lakes, impoundments, bays, marshy lagoons, as well as ditches and ponds near rivers. Soft sandy or muddy substrates with aquatic vegetation are essential habitat features. Hibernation takes place in deep pools with soft substrates. Nesting areas consist of sandy or gravelly areas, relatively free of vegetation and close to water (COSEWIC 2016). | Low | The pond on Site is shallow and located in a depression with steep slopes. It is isolated from any nearby wetlands or waterbodies, and lacks suitable soft substrates and aquatic vegetation to provide summer or overwintering habitat. It does not provide suitable habitat for spiny softshell. |
| Vascular Plant | American chestnut | *Castanea dentata* | END | END | END | S1S2 | In Ontario, American chestnut occurs in mixed or deciduous forests in the Carolinian zone (Farrar 1995). It is often found in communities with dense canopy cover and often associated with oak and maple. This tree grows primarily on acidic, sand or gravel soils (Boland et al. 2012). | Low | No individuals were observed during field surveys. |
| Vascular Plant | American columbo | *Frasera caroliniensis* | END | END | END | S2 | In Ontario, American columbo is most commonly associated with open deciduous forested slopes, but it can also be found in thickets, swamps and clearings. It is often associated with oak, hickory and sassafras trees. American columbo grows on a wide variety of soils, particularly dry mesic to mesic clay and clay loam soils (Environment Canada 2016). | Low | There is no forest habitat on the Site or in the Study Area to support growing conditions. In addition, no individuals were observed during field surveys. |
| Vascular Plant | Biennial gaura | *Oenothera gaura* | — | — | — | S3 | In Ontario, biennial gaura grows on river banks and disturbed areas, such as roadsides and vacant lots in southwestern Ontario (Oldham and Brinker 2009; Reznicek et al. 2011). | Low | No individuals were observed on the Site during field surveys. |

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| Vascular Plant | Bird's-foot violet | *Viola pedata* | END | END | END | S1 | In Ontario, bird's-foot violet is typically found in open black oak savannahs and fields in dry to moist, sandy, acidic soils. Bird's-foot violet is at the northernmost edge of its range in Ontario (Environment Canada 2016). It is known at only five sites in southern Ontario. | Low | There is no suitable savannah or moist field habitat on the Site or in the Study Area. In addition, no individuals were observed during field surveys. |
| Vascular Plant | Broad beech fern | *Phegopteris hexagonoptera* | SC | — | SC | S3 | In Ontario, broad beech fern inhabits rich, undisturbed mature deciduous forest dominated by beech and maple. It typically grows in moist to wet, sandy soils of lower valley slopes and occasionally swamps (van Overbeeke et al. 2013). | Low | There is no forest habitat on the Site or in the Study Area to support growing conditions. In addition, no individuals were observed during field surveys. |
| Vascular Plant | Butternut | *Juglans cinerea* | END | END | END | S2? | In Ontario, butternut is found along stream banks, on wooded valley slopes, and in deciduous and mixed forests. It is commonly associated with beech, maple, oak and hickory (Voss and Reznicek 2012). Butternut prefers moist, fertile, well-drained soils, but can also be found in rocky limestone soils. This species is shade intolerant (Farrar 1995). | Low | There is no forest habitat on the site. Although butternut may grow in the hedgerows on Site, no individuals were observed during field surveys. |
| Vascular Plant | Common hoptree | *Ptelea trifoliata* | SC | SC | SC | S3 | In Ontario, common hoptree grows in open woodlands, thickets, dry prairies and along dry, and rocky shorelines. It typically occurs in sunny areas with dry sandy or rocky soils (Farrar 1995). | Low | There is no forest habitat on the Site or in the Study Area to support growing conditions. In addition, no individuals were observed during field surveys. |
| Vascular Plant | Green dragon | *Arisaema dracontium* | SC | — | SC | S3 | In Ontario, green dragon occurs in somewhat-wet to wet deciduous forests along streams. In particular, it grows in maple forest and forest dominated by red ash and white elm trees. Green dragon is restricted to shaded or partially shaded seasonally inundated floodplains (Donley et al. 2013). It is primarily restricted to southwestern Ontario. | Low | There is no forest habitat on the Site or in the Study Area to support growing conditions. In addition, no individuals were observed during field surveys. |
| Vascular Plant | Prairie violet | *Viola pedatifida* | — | — | — | S1 | In Ontario, prairie violet grows in prairies and savannahs, often with a history of disturbance (Reznicek et al. 2011). | Low | There is no suitable savannah habitat on the Site or in the Study Area. In addition, no individuals were observed during field surveys. |
| Vascular Plant | Side-oats grama | *Bouteloua curtipendula* | — | — | — | S2 | Side-oats grama grows in openings in dry sandy oak woods, prairies and alvars or limestone plains. It can be found in southern Ontario. (Reznicek et al. 2011). | Low | There is no suitable prairie, open woodland or alvar habitat on the Site or in the Study Area. In addition, no individuals were observed during field surveys. |

[1] *Endangered Species Act* (ESA), 2007 (O. Reg 242/08 last amended 27 March 2018 as O. Reg 219/18). Species at Risk in Ontario List, 2007 (O. Reg 230/08 last amended 1 Aug 2018 as O. Reg 404/18, s. 1.); Schedule 1 (Extirpated - EXP), Schedule 2 (Endangered - END), Schedule 3 (Threatened - THR), Schedule 4 (Special Concern - SC)

[2] *Species at Risk Act* (SARA), 2002. Schedule 1 (Last amended 25 January 2020); Part 1 (Extirpated), Part 2 (Endangered), Part 3 (Threatened), Part 4 (Special Concern)

[3] Committee on the Status of Endangered Wildlife in Canada (COSEWIC) http://www.cosewic.gc.ca/

[4] Provincial Ranks (SRANK) are Rarity Ranks assigned to a species or ecological communities, by the Natural Heritage Information Centre (NHIC). These ranks are not legal designations. SRANKS are evaluated by NHIC on a continual basis and updated lists produced annually. SX (Presumed Extirpated), SH (Possibly Extirpated - Historical), S1 (Critically Imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNA (Not Applicable), S#S# (Range Rank), S? (Not ranked yet), SAB (Breeding Accident), SAN (Non-breeding Accident), SX (Apparently Extirpated). Last assessed November 2017.

[5] References

Boland, G.J., J. Ambrose, B. Husband, K.A. Elliott and M.S. Melzer. 2012. Recovery Strategy for the American Chestnut (*Castanea dentata*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. vi + 43 pp.

Brown, C.R. and M.B. Brown. 1999. Barn Swallow (*Hirundo rustica*). The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. URL: http://bna.birds.cornell.edu/bna/species/452

Buehler, D.A., P.B. Hamel, and T. Boves. 2013. Cerulean Warbler (*Setophaga cerulean*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. URL: http://bna.birds.cornell.edu/bna/species/511

Confer, J.L., P. Hartman and A. Roth. 2011. Golden-winged Warbler (*Vermivora chrysoptera*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. URL: http://bna.birds.cornell.edu/bna/species/020 doi:10.2173/bna.20

COSEWIC. 2007. COSEWIC assessment and status report on the Chimney Swift *Chaetura pelagica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 49 pp.

COSEWIC. 2008. COSEWIC assessment and status report on the Snapping Turtle *Chelydra serpentina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp.

COSEWIC. 2010. COSEWIC assessment and status report on the Cerulean Warbler *Dendroica cerulean* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 40 pp.
COSEWIC. 2010. COSEWIC assessment and status report on the Monarch *Danaus plexippus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 43 pp.
COSEWIC. 2010. COSEWIC assessment and status report on the Woodland Vole *Microtus pinetorum* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 35 pp.
COSEWIC. 2011. COSEWIC assessment and status report on the Barn Swallow *Hirundo rustica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 37 pp.
CCOSEWIC. 2012. COSEWIC assessment and status report on the Eastern Wood-pewee *Contopus virens* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 39 pp.
COSEWIC. 2012. COSEWIC assessment and status report on the Northern Map Turtle *Graptemys geographica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 63 pp.
COSEWIC. 2012. COSEWIC assessment and status report on the Wood Thrush *Hylocichla mustelina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 46 pp.
COSEWIC. 2013. COSEWIC assessment and status report on the Grasshopper Sparrow *pratensis* subspecies *Ammodramus savannarum pratensis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 36 pp.
COSEWIC. 2014. COSEWIC assessment and status report on the Milksnake *Lampropeltis triangulum* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x +61 pp.
COSEWIC. 2015. COSEWIC assessment and status report on the Yellow-banded Bumble Bee *Bombus terricola* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 60 pp
COSEWIC. 2016. COSEWIC assessment and update status report on the Blanding's Turtle *Emydoidea blandingii* (Nova Scotia population and Great Lakes/St. Lawrence population) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xix + 110 pp.
COSEWIC. 2016. COSEWIC assessment and update status report on the spiny softshell turtle *Apalone spinifera* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiii + 38 pp.
Donley, R., J.V. Jalava and J. van Overbeeke. 2013. Management plan for the Green Dragon (*Arisaema dracontium*) in Ontario. Ontario Management Plan Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. vi + 43 pp.
Environment Canada. 2015. Recovery Strategy for the Western Chorus Frog (*Pseudacris triseriata*), Great Lakes/ St. Lawrence - Canadian Shield population, in Canada, Species at Risk Act Recovery Strategy Series, Environment Canada, Ottawa, vi + 50 pp.
Environment Canada. 2016. Recovery Strategy for the Bird's-foot Violet (*Viola pedata*) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. 23 pp. + Annexes.
Environment and Climate Change Canada (ECCC). 2018. Recovery Strategy for the Little Brown Myotis (*Myotis lucifugus*), the Northern Myotis (*Myotis septentrionalis*), and the Tri-colored Bat (*Perimyotis subflavus*) in Canada. Species at Risk Act Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. ix + 172 pp.
Environment and Climate Change Canada (ECCC). 2019. Recovery Strategy for the American Columbo (*Frasera caroliniensis*) in Canada. Species at Risk Act Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. 3 parts, 27 pp. + vi + 23 pp. + 5 pp.
Farrar, J.L. 1995. Trees in Canada. Fitzhenry & Whiteside Limited, Markham, Ontario and Canadian Forest Service, Natural Resources Canada, Ottawa, Ontario. 502 pp. ISBN: 1-55041-199-3.
Gabhauer, M.A. 2007. Bobolink, pp. 586-587 in Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.T. Couturier, eds. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources and Ontario Nature, Toronto, xxii + 706 pp.
Garrison, B.A. 1999. Bank Swallow (*Riparia riparia*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. URL: http://bna.birds.cornell.edu/bna/species/414
Gillingwater, S.D. 2011. Recovery Strategy for the Queensnake (*Regina septemvittata*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. vi + 34pp.
Hull, S. D. 2003. Effects of management practices on grassland birds: Eastern Meadowlark. Northern Prairie Wildlife Research Center, Jamestown, ND. Northern Prairie Wildlife Research Center Online. URL: http://www.npwrc.usgs.gov/resource/literatr/grasbird/eame/eame.htm.
Humphrey, C. 2017. Recovery Strategy for the Eastern Small-footed Myotis (*Myotis leibii*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. vii + 76 pp.
Jefferson Salamander Recovery Team. 2010. Recovery strategy for the Jefferson Salamander (*Ambystoma jeffersonianum*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. vi + 29 pp.
Kraus, T. 2011. Recovery Strategy for the Eastern Hog-nosed Snake (*Heterodon platirhinos*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. i + 6 pp + Appendix vi + 24 pp. Adoption of the Recovery Strategy for the Eastern Hog-nosed Snake (*Heterodon platirhinos*) in Canada (Seburn 2009).
Layberry, R.A., P.W. Hall, and J.D Lafontaine. 1998. The Butterflies of Canada. University of Toronto Press. URL: http://www.cbif.gc.ca/eng/species-bank/butterflies-of-canada. Accessed December 19, 2018.
McLaren, P. 2007. Canada Warbler, pp. 528-529 in Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources and Ontario Nature, Toronto, xxii + 706 pp.
NatureServe. 2018. Hackberry Emperor. NatureServe Explorer. An Online Encyclopedia of Life [web application]. URL: http://explorer.natureserve.org/servlet/NatureServe?searchName=Asterocampa+celtis Accessed December 19, 2018
Oldham, M.J., and S.R. Brinker. 2009. Rare Vascular Plants of Ontario, Fourth Edition. Natural Heritage Information Centre, Ontario Ministry of Natural Resources. Peterborough, Ontario. 188 pp.
Reitsma, L., M. Goodnow, M.T. Hallworth and C.J. Conway. 2010. Canada Warbler (*Cardellina canadensis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. URL: http://bna.birds.cornell.edu/bna/species/421
Renfrew, R., A.M. Strong, N.G. Perlut, S.G. Martin and T.A. Gavin. 2015. Bobolink (*Dolichonyx oryzivorus*), The Birds of North America (P. G. Rodewald, Ed.). Ithaca: Cornell Lab of Ornithology. URL: https://birdsna.org/Species-Account/bna/species/boboli
Reznicek, A. A., E. G. Voss, and B. S. Walters. 2011. Michigan Flora Online. University of Michigan. URL: https://michiganflora.net. Accessed December 19, 2018.
Roseberry, J. L. and W. D. Klimstra. 1970. The nesting ecology and reproductive performance of the Eastern Meadowlark. Wilson Bull. 82:243-267.
Sandilands, A. 2007. Common Nighthawk, pp. 308-309 in Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources and Ontario Nature, Toronto, xxii + 706 pp.
Smith, K.G., J.H. Withgott and P.G. Rodewald. 2000. Red-headed Woodpecker (*Melanerpes erythrocephalus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. URL: http://bna.birds.cornell.edu/bna/species/518 doi:10.2173/bna.518
van Overbeeke, J.C., J.V. Jalava and R.H. Donley. 2013. Management Plan for the Broad Beech Fern (*Phegopteris hexagonoptera*) in Ontario. Ontario Management Plan Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. v + 25 pp.
Voss, E.G. and A.A. Reznicek. 2012. Field Manual of Michigan Flora. The University of Michigan Press, Ann Arbor, Michigan. 990 pp.
Whitehead, D. R. and T. Taylor. 2002. Acadian Flycatcher (*Empidonax virescens*). The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; URL: http://bna.birds.cornell.edu/bna/species/614
Woodliffe, P.A. 2007. Red-headed Woodpecker, pp. 320-321 in Cadman, M.D., D.A. Sutherland, G.G.Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706 pp.

**APPENDIX C**

# Wildlife List

Wildlife List for the Lafarge Brantford West Extension Site

| Common Name | Scientific Name | SRANK[a] | GRANK[a] | Status[b] |
|---|---|---|---|---|
| **Arthropods** | | | | |
| Bluet Damselfly sp. | — | — | — | — |
| **Amphibians** | | | | |
| American Toad | *Anaxyrus americanus* | S5 | G5 | — |
| Spring Peeper | *Pseudacris crucifer* | S5 | G5 | — |
| Wood Frog | *Lithobates sylvaticus* | S5 | G5 | — |
| **Birds** | | | | |
| American Crow | *Corvus brachyrhynchos* | S5B | G5 | — |
| American Goldfinch | *Spinus tristis* | S5B | G5 | — |
| American Robin | *Turdus migratorius* | S5B | G5 | — |
| Baltimore Oriole | *Icterus galbula* | S4B | G5 | — |
| **Bank Swallow** | ***Riparia riparia*** | **S4B** | **G5** | **THR** |
| **Barn Swallow** | ***Hirundo rustica*** | **S4B** | **G5** | **THR** |
| Black-capped Chickadee | *Poecile atricapillus* | S5 | G5 | — |
| Blackpoll Warbler | *Setophaga striata* | S4B | G5 | — |
| Blue Jay | *Cyanocitta cristata* | S5 | G5 | — |
| Brown Thrasher | *Toxostoma rufum* | S4B | G5 | — |
| Brown-headed Cowbird | *Molothrus ater* | S4B | G5 | — |
| Canada Goose | *Branta canadensis* | S5 | G5 | — |
| Cedar Waxwing | *Bombycilla cedrorum* | S5B | G5 | — |
| Chipping Sparrow | *Spizella passerina* | S5B | G5 | — |
| Common Grackle | *Quiscalus quiscula* | S5B | G5 | — |
| Eastern Kingbird | *Tyrannus tyrannus* | S4B | G5 | — |
| European Starling | *Sturnus vulgaris* | SNA | G5 | — |
| Field Sparrow | *Spizella pusilla* | S4B | G5 | — |
| Horned Lark | *Eremophila alpestris* | S5B | G5 | — |
| House Sparrow | *Passer domesticus* | SNA | G5 | — |
| House Wren | *Troglodytes aedon* | S5B | G5 | — |
| Indigo Bunting | *Passerina cyanea* | S4B | G5 | — |
| Killdeer | *Charadrius vociferus* | S5B,S5N | G5 | — |
| Mallard | *Anas platyrhynchos* | S5 | G5 | — |
| Northern Cardinal | *Cardinalis cardinalis* | S5 | G5 | — |
| Northern Flicker | *Colaptes auratus* | S4B | G5 | — |
| Red-winged Blackbird | *Agelaius phoeniceus* | S4 | G5 | — |
| Ring-billed Gull | *Larus delawarensis* | S5B,S4N | G5 | — |
| Savannah Sparrow | *Passerculus sandwichensis* | S4B | G5 | — |
| Song Sparrow | *Melospiza melodia* | S5B | G5 | — |
| Spotted Sandpiper | *Actitis macularius* | S5 | G5 | — |
| Vesper Sparrow | *Pooecetes gramineus* | S4B | G5 | — |
| Warbling Vireo | *Vireo gilvus* | S5B | G5 | — |
| Yellow Warbler | *Setophaga petechia* | S5B | G5 | — |

Wildlife List for the Lafarge Brantford West Extension Site

| Common Name | Scientific Name | SRANK[a] | GRANK[a] | Status[b] |
|---|---|---|---|---|
| **Mammals** | | | | |
| Big Brown Bat | *Eptesicus fuscus* | S4 | G5 | — |
| Eastern Chipmunk | *Tamias striatus* | S5 | G5 | — |
| Eastern Gray Squirrel | *Sciurus carolinensis* | S5 | G5 | — |
| Eastern Red Bat | *Lasiurus borealis* | S4 | G3G4 | — |
| **Eastern Small-footed Myotis** | ***Myotis leibii*** | **S2S3** | **G4** | **END** |
| Hoary Bat | *Lasiurus cinereus* | S4 | G3G4 | — |
| **Little Brown Myotis** | ***Myotis lucifugus*** | **S4** | **G3** | **END** |
| Silver-haired Bat | *Lasionycteris noctivagans* | S4 | G3G4 | — |

[a] Ranks based upon determinations made by the Ontario Natural Heritage Information Centre
G = Global; S = Provincial; Ranks 1-3 are considered imperiled or rare; Ranks 4 and 5 are considered secure.
SNA = Not applicable for Ontario Ranking (e.g. Exotic species)

[b] Status: *Endangered Species Act* , 2007
END= Endangered; SC = Special Concern; THR = Threatened; UN = Undetermined.

**Bolded text** indicates species at risk.


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