February 2016

COLACEM CANADA INC.
L'ORIGNAL ONTARIO

Environmental Impact Study

Submitted to:
Colacem Canada Inc.
2540, boulevard Daniel-Johnson
Bureau 808
Laval, QC H7T 2S3

REPORT

Report Number: 1529718

Distribution:

1 E-Copy – Colacem Canada Inc.
1 E-Copy - Golder Associates Ltd.
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Golder Associates

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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been retained by Colacem Canada Inc. (Colacem) to conduct natural heritage studies for the proposed 3,000 tonnes/day (1.16 million tonnes/year) L'Orignal Cement Plant (the 'project'), located in the Township of Champlain, County of Prescott and Russell, Ontario (the 'site') (Map 1).

1.1 Objective

This report specifically addresses the requirements of an Environmental Impact Study (EIS) as outlined by the United Counties of Prescott and Russell (UCPR) Official Plan and the Terms of Reference provided by the Township of Champlain (D. Lefebvre, pers. comm. 2011) in support of an amendment to the UCPR Official Plan and Township of Champlain Zoning By-law.

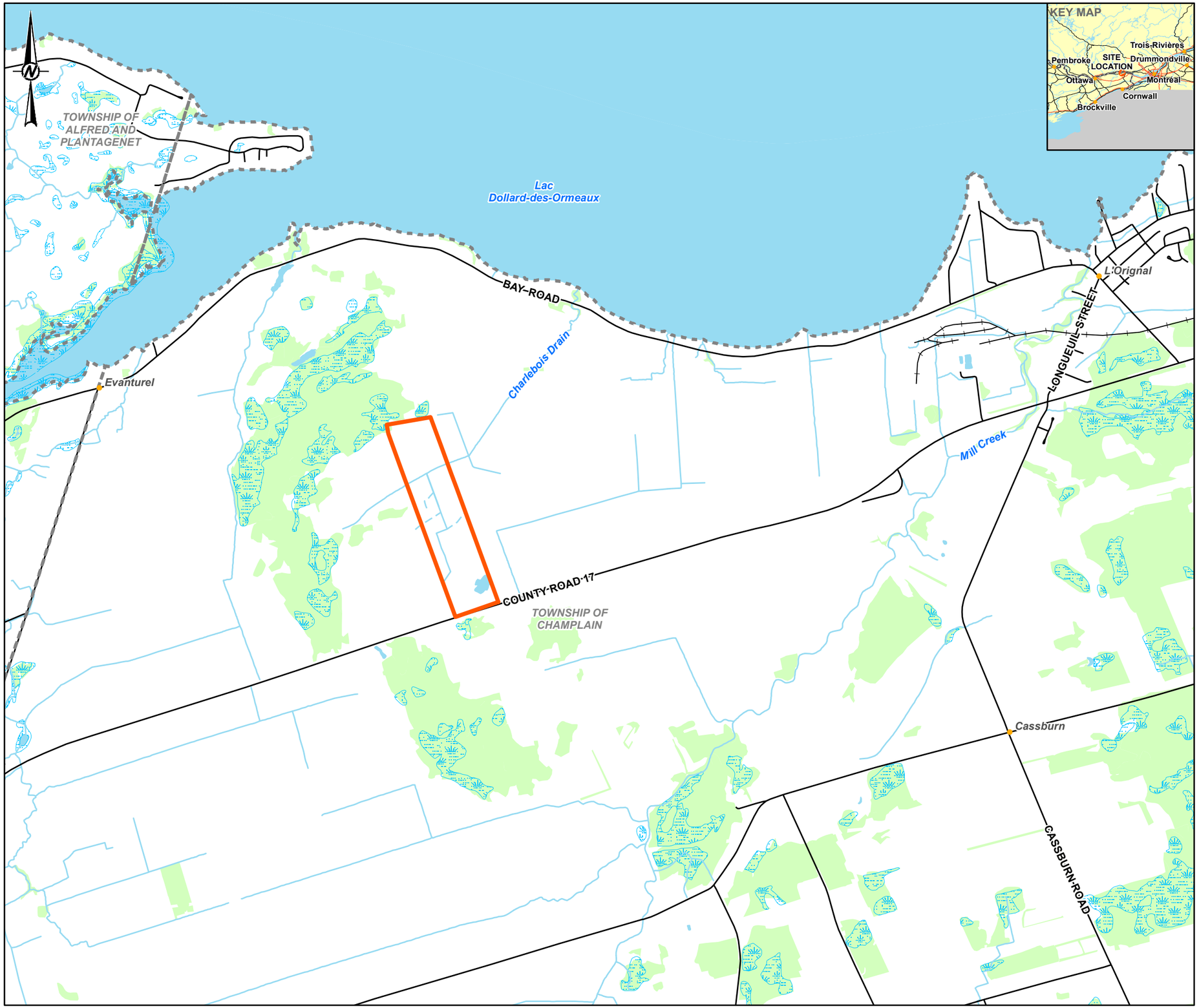
This report characterizes the natural heritage features on the site and on adjacent lands (the 'study area').

1.2 Site Description

The site is approximately 56 ha in size and is located on Lot 217, Plan M100, on County Road 17 in L'Orignal, Ontario. The site consists of agricultural fields, a small abandoned quarry pond, two small deciduous forests and areas of meadow and thicket (Map 2).

1.2.1 Adjacent Land Use

The site is generally surrounded by lands used for agricultural crop. An operational quarry (L'Orignal Quarry), owned and operated by Colacem, is located immediately west of the site. There are rural residences and agricultural fields to the west, east and south of the site. There is a woodland immediately north of the site and a portion overlaps the northwest corner of the site (Map 2).



LEGEND

- ROAD
- WATERCOURSE
- WATERCOURSE, INTERMITTENT
- WATERBODY
- WETLAND
- WOODED AREA
- MUNICIPAL BOUNDARY
- SITE BOUNDARY

0 1,000 2,000

1:30,000 METRES

REFERENCE(S)

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MNR LIO, OBTAINED 2015
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PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

CLIENT
COLACEM CANADA

PROJECT
L'ORIGINAL CEMENT PLANT SITE

TITLE
KEY PLAN

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-09-08
DESIGNED	ME
PREPARED	ME
REVIEWED	AS
APPROVED	HM

PROJECT NO.	CONTROL	REV.	MAP
1529718	-	1	1

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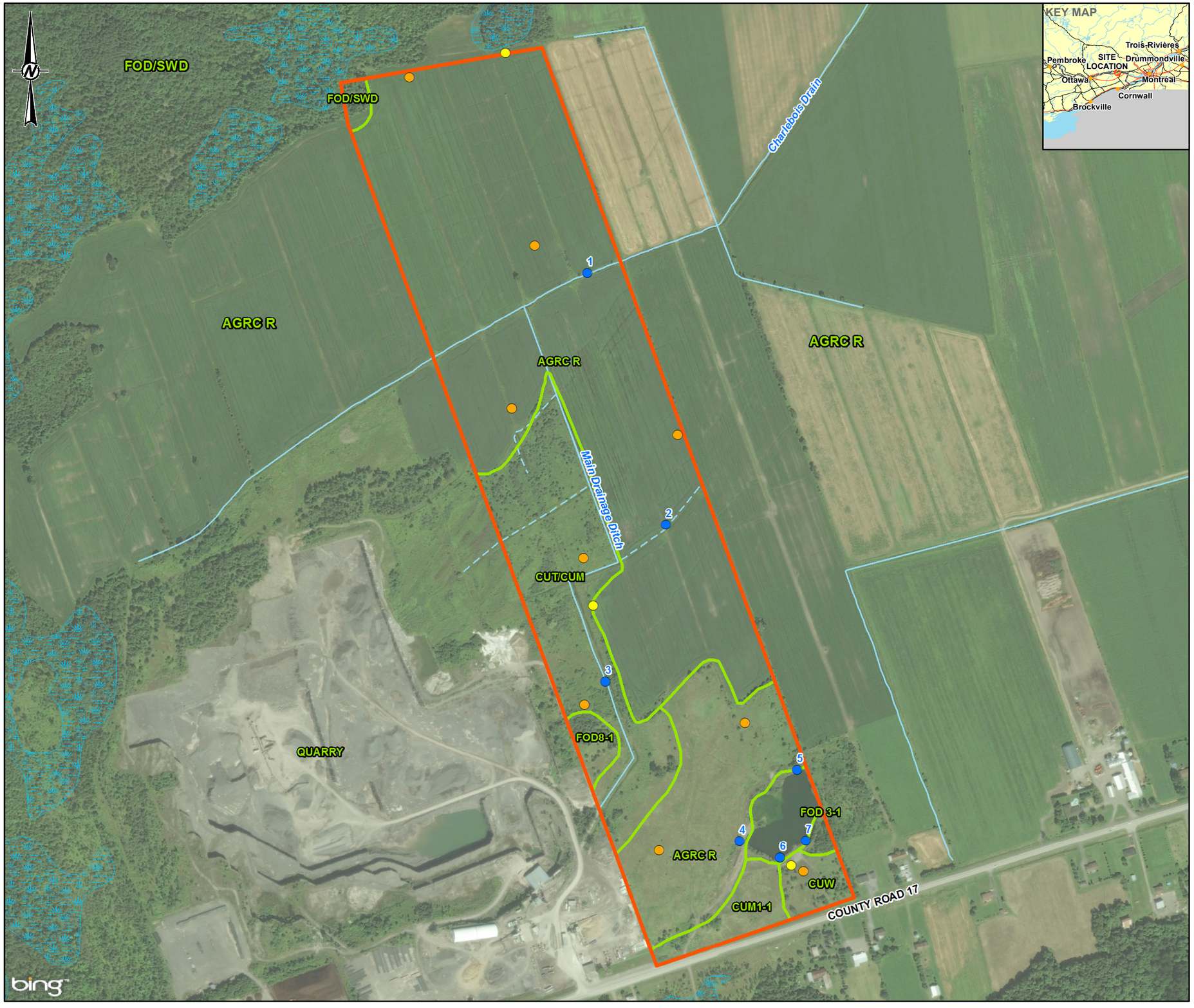

LEGEND

- BREEDING BIRD STATION
- NOCTURNAL AMPHIBIAN STATION
- AQUATIC STATION
- WATERCOURSE
- WATERCOURSE, INTERMITTENT
- WETLAND
- SITE BOUNDARY
- ECOLOGICAL LAND CLASSIFICATION
- AGRC R - AGRICULTURAL ROW CROP
- CUM1-1 - MIXED MEADOW
- CUT/CUM - DECIDUOUS THICKET/MIXED MEADOW COMPLEX
- CUW - WHITE ELM OPEN WOODLAND
- FOD 3-1 - FRESH POPLAR FOREST
- FOD/SWD - DECIDUOUS FOREST/DECIDUOUS SWAMP
- FOD8-1 - FRESH- MOIST POPLAR FOREST

0 200 400

1:6,500 METRES

REFERENCE(S)

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PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

CLIENT
COLACEM CANADA

PROJECT
L'ORIGINAL CEMENT PLANT SITE

TITLE
ECOLOGICAL LAND CLASSIFICATION AND SURVEY STATIONS

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-10-01
DESIGNED	ME
PREPARED	ME
REVIEWED	AS
APPROVED	HM

PROJECT NO.	CONTROL	REV.	MAP
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2.0 ENVIRONMENTAL POLICY CONTEXT

2.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) was issued under Section 3 of the *Planning Act*, and came into effect on April 30, 2014 and replaces the PPS issued March 1, 2005.

The natural heritage policies of the PPS (MMAH 2014) 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; and

  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; and

  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; and
- 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*.

2.2 Species at Risk

2.2.1 *Species at Risk Act* (SARA)

At a federal level, species at risk 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, species are added to the federal List of Wildlife Species at Risk (Government of Canada, 2008). 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.

2.2.2 *Endangered Species Act* (ESA)

Species at risk 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 Natural Resources and Forestry, species are added to the provincial *Endangered Species Act, 2007* (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 SARO List is contained in O. Reg. 230/08. O. Reg. 230/08 was last amended in March 2015.

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 Species at Risk in Ontario* (*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 process where alterations to protected species or their habitats may be considered.

2.3 *Fisheries Act*

The purpose of the *Fisheries Act* is to maintain healthy, sustainable and productive Canadian fisheries through the prevention of pollution, and the protection of fish and their habitat. In 2012, changes were made to the *Fisheries Act* to enhance Fisheries and Oceans Canada's (DFO) ability to manage threats to Canada's commercial, recreational and Aboriginal (CRA) fisheries.

Projects affecting waterbodies supporting Canada's CRA fisheries must comply with the provisions of the *Fisheries Act*. The proponent is responsible for determining if the project is likely to cause impacts to CRA fish and if these impacts can be avoided or mitigated. The proponent must gather information on the type and scale of impact on the fishery and determine if the impacts will result in *serious harm to fish.* Proponents have a duty to maintain records of self-assessments completed for projects they undertake, and need to provide this information to DFO upon request. Serious harm to fish is defined as: the death of fish; and/or any permanent alteration to, or destruction of, fish habitat. If it is determined that the impacts cannot be avoided or mitigated and will result in serious harm to fish, an application for authorization must be submitted to DFO. Projects that have

the potential to obstruct fish passage or, affect flows needed by fish also require an authorization; even if these occur outside of CRA fishery areas (DFO 2013a).

Proponents of projects requiring a *Fisheries Act* authorization are required to submit a Habitat Offsetting Plan, which provides details of how the serious harm to fish will be offset, as well as outlining associated costs and monitoring commitments (DFO 2013b). Proponents also have a duty to notify DFO of any unforeseen activities that cause serious harm to fish and outline the steps taken to address them.

2.4 United Counties of Prescott and Russell

According to the UPCR Official Plan (2006), the site is currently designated as a Rural Area. Uses permitted within this designation include a range of residential and non-residential uses, such as resource uses (e.g., forestry, wayside pits/quarries), commercial and industrial (e.g., recreational, veterinary offices, motor vehicle sales), institutional, and infrastructure (e.g., waste disposal facilities).

A significant woodland is located north of the site (Map 2). A small portion of this woodlot overlaps the northwest corner of the site, according to Schedule B (Natural Resources) of the Official Plan (UCPR 2006). Development within and adjacent to significant woodlands may be permitted (in accordance with the underlying land use designation) if it is demonstrated that no negative impacts will occur on the feature or function as a result of the development (UCPR 2006). In addition, prior to any vegetation clearing carried out as part of the project; a site inventory must be completed to search for butternut (UCPR 2006).

The municipal drain, known as Charlebois Drain, that flows west to east across the northern half of the site is designated as fish habitat, according to Schedule B of the Official Plan (Map 2). Development is prohibited within fish habitat, except in accordance with provincial or federal legislation. Development adjacent to fish habitat may be permitted if it is demonstrated that no negative impacts will occur on the feature or its function (UCPR 2006).

2.5 Township of Champlain

The Township of Champlain does not have an Official Plan for the rural areas of the township and any development within the rural area is deferred to the policies of the UCPR's Official Plan. Based on communication with the Township in 2011, there are watercourses and fish habitat on the site, and is adjacent to a significant woodland (D. Lefebvre, pers. comm. 2011; Appendix A). These features were identified based on mapping in the UCPR's Official Plan (UCPR 2006) as described in Section 2.4.

The Township has also indicated that a Zoning by-law amendment is required to change the zoning of the site from Rural Zone to Industrial Heavy Zone to allow the construction and operation of the proposed cement plant (D. Lefebvre, pers. comm. 2011; Appendix A).

According to the Terms of Reference received from the Township in 2011 (Appendix A), the site is adjacent to lands designated as agricultural and requires the completion of a Minimum Distance Separation (MDS) calculation in compliance with Section 2.3.3.3 of the PPS (2014) to demonstrate that the proposed change in use of the site will not impact existing or future agricultural operations (D. Lefebvre, pers. comm. 2011).

3.0 DESCRIPTION OF PROPOSED DEVELOPMENT

The total area of the site to be developed is approximately 40 ha. The facility will be comprised of 52 buildings and structures, including: raw material storage/silos, hoppers, conveyors, crushing and grinding systems, raw mill, preheater, rotary kiln, cooler and cooling tower, cement mill, and administrative offices and control room (Map 3).

All raw materials will be stored in enclosed structures to preserve the material's integrity and minimize impacts to the environment. Limestone will be sourced from the adjacent quarry and trucked to the plant. Additional materials, including silica sand and shale, iron mill scale, bauxite and gypsum will be transported to the site by truck. The facility will use petcoke to fuel the plant, which will be trucked to site and stored outdoors on a concrete pad.

Access to the facility will be provided via Highway 17. One new internal trucking route will be constructed between the adjacent quarry and the cement plant for the delivery of limestone.

An estimated 550 m^3/day, or 180,000 m^3/year, of water will be required to produce the cement. This water will be sourced from the adjacent quarry, from water being pumped from the upper quarry sump. The cement plant is designed as a closed loop system, and consequently, there is no process water discharge from the plant. Excess water from the manufacturing process is released as water vapour. A stormwater management pond will be constructed on the property to monitor water quality and control discharge from the site to the Charlebois municipal drain, located approximately 95 m north of the proposed development limit (Map 3).

LEGEND

- WATERCOURSE
- WATERCOURSE, INTERMITTENT
- WETLAND
- SITE BOUNDARY

0 120 240

1:6,500 METRES

REFERENCE(S)

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PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

CLIENT
COLACEM CANADA

PROJECT
L'ORIGINAL CEMENT PLANT SITE

TITLE
SITE PLAN WITH DEVELOPMENT FOOTPRINT

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-01-29
DESIGNED	ME
PREPARED	JMC
REVIEWED	AS
APPROVED	HM

PROJECT NO.	CONTROL	REV.	MAP
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4.0 METHODS

4.1 Background Review

The investigation of existing conditions on the site and 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.

As part of the background review, a number of resources were used to evaluate the existing conditions on the site including:

- Official Plan for the UCPR (2006; 2015);
- Natural Heritage Information Centre (NHIC) database maintained by the Ontario Ministry of Natural Resources and Forestry (MNRF) (NHIC 2015);
- Species at Risk Public Registry (EC 2015);
- Species at Risk in Ontario (SARO) List (MNRF 2015a);
- Royal Ontario Museum (ROM) range maps (ROM 2010);
- Atlas of Breeding Birds of Ontario (OBBA) (Cadman, et al. 2007);
- Bat Conservation International (BCI) range maps (BCI 2013);
- Ontario Butterfly Atlas (Jones et al. 2015);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Ontario's Reptile and Amphibian Atlas (Ontario Nature 2013);
- Land Information Ontario (MNRF 2015b); and
- Existing aerial photography.

To develop an understanding of the ecological communities, wildlife habitat and potential natural heritage features that may be affected by the project, MNRF Land Information Ontario (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, Areas of Natural and Scientific Interest (ANSIs), life science sites, rare vegetation communities, rare, threatened or endangered species and other natural heritage features within 1 km of the site.

4.2 Species at Risk Screening

Species at Risk (SAR) considered for this report include those species listed in the ESA and SARA, as well as species ranked S1-S3 (NHIC) and regionally rare species. 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 (Appendix B).

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. High potential indicates a known species record in the study area (including during field surveys or background data review) and good quality habitat is present.

During field surveys, suitable habitats for all SAR identified through the desktop screening were searched for, and signs of individuals were recorded. If the potential for the species to occur in the study area was moderate or high, the screening was refined based on data collected during field investigations (i.e., habitat assessment) and/or species-specific surveys. Any habitat identified during ground-truthing or other field surveys with potential to provide suitable conditions for additional SAR not already identified through the desktop screening was also assessed and recorded.

4.3 Site Investigation

The habitats and communities on site were characterized through field surveys. The following sections outline the methods used for each of the field surveys on site. During all surveys, area searches and visual encounter surveys 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 Site

Date	Type of Survey
April 22, May 27, and June 22, 2015	Nocturnal Anuran Call Count Surveys
May 27, and June 22, 2015	Crepuscular and Nocturnal Bird Surveys
April 22, May 27, June 22, and August 14, 2015	Herpetile and other Wildlife Visual Encounter Surveys
June 5 and July 5, 2015	Breeding Bird Surveys
April 22, June 5, and August 14, 2015	Ecological Land Classification, Botanical Inventory and Wetland Community Surveys
August 14, 2015	Aquatic Habitat and Fish Surveys

4.3.1 Ecological Land Classification and Botanical Inventory

Plant communities on the site were first delineated at a desktop level using high-resolution aerial imagery, then ground-truthed in the field using the Ecological Land Classification (ELC) system for Southern Ontario (Lee et al. 1998). These inventories were carried out by systematically traversing the site to ensure a thorough survey of species and communities. During the field surveys, information on plant community structure and composition, and soils 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 to the extent possible. The searches were conducted by systematically walking through all habitats on the site, in a meandering fashion, generally paralleling the principal (long) axis of a natural area, where feasible, and ensuring that the full width of the area was examined. Lists of all plant species identified during any of the surveys were compiled.

Incidental observations of plant species during all other field surveys were also recorded. Common and scientific nomenclature of plant species in this report follows Newmaster et al. (1998).

4.3.2 Breeding Bird Survey

Breeding bird point count surveys for songbirds and other diurnal birds were conducted at nine stations on the site (Map 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 found in the study area 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).

Nocturnal and Crepuscular Bird Survey

Nocturnal and crepuscular bird surveys were conducted concurrently with the last two nocturnal anuran call count surveys. Surveys began one half-hour after sunset and ended by midnight on nights with suitable weather conditions (i.e., calm winds, temperatures above 7°C and no precipitation). The surveys were completed at the same three stations as anuran call count surveys for a duration of 10 minutes. All birds seen or heard during the nocturnal surveys were recorded.

4.3.3 Anuran Call Count Survey

Surveys to determine the presence and relative abundance of calling anurans (frogs and toads) were completed at three locations on the site (Map 2).

Surveys were completed using the Marsh Monitoring Program (MMP) method for vocalizing frog surveys (Bird Studies Canada 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 begin one half-hour after sunset and end 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).

Potential locations for anuran call count survey stations were identified prior to the first survey using aerial photographs and then confirmed and adjusted, as necessary, in the field. Survey station locations were chosen based on wetland habitat and minimum distance between stations to maximize the number of survey points on site.

4.3.4 Fish and Fish Habitat Assessment

Surveys to assess fish and fish habitat were completed at seven locations on the site (Map 2). Survey stations were established in suitable aquatic habitat (i.e., no dense vegetation coverage) across the site to maximize spatial coverage.

Electrofishing was conducted at three of the stations (at survey stations 1, 2 and 3), and Gee traps were set at four locations around the pond (at survey stations 4, 5, 6 and 7). The stream length and sampling effort for electrofishing completed at each station is provided in Table 2. The aquatic habitat at each of the seven stations was also assessed. Parameters recorded included water flow, morphology, in-stream vegetation and substrates, and riparian conditions.

Table 2: Electrofishing Sampling Information

Station	Length of Stream Sampled (m)	Effort (sec)
1	100	445
2	100	932
3	100	902

m = metres; sec = seconds.

4.3.5 General Wildlife Surveys

General wildlife surveys (visual encounter 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, 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. Nests for large, conspicuous bird species, including raptor, owl and heron were also noted. Observations of wildlife species or signs during all field surveys were recorded.

Visual encounter surveys for turtles and snakes as well as turtle and snake habitat (with a focus on SAR) were conducted on site. All suitable habitats for reptiles 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.

All forested areas on site were assessed to evaluate the potential to provide suitable maternity roosting habitat for bat species. Forest age, structure and size and availability of suitable cavity or snag trees was recorded.

4.4 Analysis of Significance and Sensitivity

An assessment was conducted to determine if any significant environmental features, species at risk, or other significant species exist, or have moderate or high potential to exist, in the study area and assess whether the development would negatively impact surrounding significant natural heritage features or species at risk. Preventative, mitigative, and remedial measures were considered in assessing the net effects of the project on the surrounding ecosystem.

5.0 EXISTING CONDITIONS

5.1 Ecosystem Setting

The site is located in the Lower Ottawa – South Nation tertiary watershed. There is no Conservation Authority responsible for the study area. Water resources in the study area are regulated by the Township of Champlain. The site is part of the Ottawa River watershed, which drains approximately 146,300 square kilometres (km^2) of eastern Ontario. It travels a distance of 1,271 km from the source at Lake Capimitchigama in Quebec to the confluence with the St. Lawrence River. The watershed encompasses two ecozones: the Boreal Shield and Mixedwood Plains. The site is located within the Mixedwood Plains, which is characterized by agricultural and urban development (ORK 2015).

5.2 Regional Context

5.2.1 Terrain

The site is located in the Ottawa Valley Clay Flats physiographic region (Chapman and Putnam 1984). This region is composed of clay plains interspersed with ridges of rock or sand. Dominant soils in this region are clay loams that often have poor or imperfect drainage. As a result, municipal drains have been cut throughout the region to aid in drainage. Hay, corn and grain are the main crops grown in this region, in addition to pasture field (Chapman and Putnam 1984). Based on available mapping, the soils in the north and eastern portions of the site are clay or clay-loams, while soils in the south and west are silt loam or loamy (LIO 2014). Where the clay-based soils occur on site the soil is very poorly drained, and where the silt loam or loam soils occur, drainage is moderately well-drained (LIO 2014).

5.3 Surface Water Resources

There are three main surface water features on the site, including a municipal drain (known as the Charlebois Drain) that flows west to east across the site, a drainage ditch (the ‘main drainage ditch’) that flows north through the central portion of the site, and a pond in the southeast corner of the site. In addition, there are three other intermittent marshy ditches that connect to the main drainage ditch (Map 2).

The Charlebois Drain is defined as an open drain system and is designated as “not rated” under the DFO Drain Classification System (LIO 2014; DFO 1999). The drain begins approximately 600 m west of the site on the adjacent quarry property and flows northwards to empty into the Ottawa River at Baie de L’Orignal (Schedule B, UCPR 2006).

Water pumped from the adjacent quarry is discharged into the main drainage ditch at the western edge of the site and flows north to the Charlebois Drain. The maximum allowable discharge rate of the adjacent quarry is 4,400 litres/minute (L/min). Charlebois Drain was measured to have flow during periods in which the adjacent quarry was not actively pumping water and discharging into the drain. It was determined that Charlebois Drain is not dependent on water pumped from the adjacent quarry to maintain flow.

Based on field surveys, the pond does not appear to be connected to any other surface water features on, or off-site. Based on field observations the pond appears to be an abandoned quarry that has flooded back to stabilized water level condition. Although the depth of the pond is unknown, the water level in the flooded excavation is likely representative of the groundwater level on site in areas where the bedrock is near ground surface.

5.4 Aquatic Habitat and Fish

5.4.1 Aquatic Habitat

The survey stations are shown on Map 2 and the aquatic habitat at each survey station is briefly described in Table 3. A photo log of the survey stations is included in Appendix C. It was determined that all survey stations provide fish habitat. It was also noted that when the adjacent quarry pumps water for their operations, the main drainage ditch as well as the other intermittent ditches on site become inundated with water.

Table 3: Aquatic Habitat on the Site

Station(s)	Waterbody	Habitat Description
1	Municipal Drain (Charlebois Drain)	An open-channel municipal drain that flows west to east across the northernmost extent of the site through crop fields. Flow was observed to be a run, with few riffles or pools, and a water depth of 0.25 to 1.0 m. The drain was approximately 4 m in wetted width, with very steep banks and fine substrates. Water quality measurements conducted in the drain indicate a conductivity of 580 µS/cm, dissolved oxygen (DO) level of 6.75 mg/L, a pH of 7.74, very turbid water and a water temperature of 18.5°C. In-stream vegetation consisted primarily of cattail and emergent vegetation. The occasional tree was observed on the banks of the drain. Riparian vegetation consisted of a thin band of meadow on both the north and south sides of the drain.
2	Drainage Ditch / Intermittent side stream	A ditch that flows east to west across the central portion of the site through a crop field and flows into the main drainage ditch. Water flow was intermittent, but was observed to be moderate to slow at the time of the survey at a depth of 0.05 to 0.25 m. Water quality measurements conducted in the ditch indicate a conductivity of 760 µS/cm, DO level of 8.40 mg/L, a pH of 7.92, moderate turbidity and a water temperature of 20°C. The ditch was approximately 1.2 m in wetted width with fine substrates of clay and silt. The ditch had dense in-stream vegetation of emergent and submerged vegetation. Riparian vegetation consisted of a thin band of meadow on both sides of the drain.

Table 3: Aquatic Habitat on the Site

Station(s)	Waterbody	Habitat Description
3	Main Drainage Ditch	A surface drain that enters the site on the west side from the adjacent quarry property. The drain initially flows west to east to the center of the site where it is realigned to flow north and connect with Charlebois Drain. This drain was approximately 4 m in wetted width and included primarily runs, with occasional riffle and pool habitats. Water quality measurements conducted in the main drainage ditch indicate a conductivity of 720 µS/cm, DO level of 9.10 mg/L, a pH of 8.06, very turbid water and a water temperature of 19.9°C. It had a mix of fine, silt substrates and exposed bedrock. In-stream vegetation was primarily emergent vegetation over silt substrates, and submerged vegetation over bedrock. This drainage ditch is located in the thicket/meadow complex, but there are several riparian trees along the east and west banks.
4 to 7	Pond	A constructed pond in the southeast corner of the site, with steep vertical banks of 0-3 m and water of unknown depth. Based on field observations, the pond appears to be a historic quarry pond. The pond is approximately 90 m at the widest point and contains some areas of narrow shelf that extend 1 – 5 m from the bank. Water quality measurements conducted in the pond indicate a conductivity of 340 µS/cm, DO level of 10.42 mg/L, a pH of 8.46, and a water temperature of 22.8°C. The pond contained a narrow and shallow littoral zone containing aquatic macrophytes and algae. There were patches of trees around the perimeter of the pond. It was surrounded by agricultural field to the north, meadow to the southwest and woodland to the southeast and east.

5.4.2 Fish

A total of 87 fish of six species were captured during fish sampling at the seven survey stations on the site (Table 4).

Table 4: Fish Species Captured on the Site

Station(s)	Sampling Method	Fish Species Captured	Total Number of Fish Captured
1	Electrofishing	brook stickleback; bluntnose minnow; central mudminnow	4
2	Electrofishing	none captured; brook stickleback incidentally observed	3
3	Electrofishing	bluntnose minnow; creek chub; unknown species incidentally observed	10
4	Gee Traps	none	0

Table 4: Fish Species Captured on the Site

Station(s)	Sampling Method	Fish Species Captured	Total Number of Fish Captured
5	Gee Traps	bluntnose minnow, brown bullhead, brassy minnow, and unknown species.	14
6	Gee Traps	bluntnose minnow, and brassy minnow	25
7	Gee Traps	bluntnose minnow, brown bullhead, and brassy minnow	31

Significant and Sensitive Species

None of the species at risk with ranges which overlap the study area (Appendix B) were identified in the field. All fish species observed during field surveys are provincially ranked S5 and G5, or very common provincially and globally (Appendix D).

5.5 Vegetation

5.5.1 Regional Setting

The site is located in the Great Lakes-St. Lawrence Forest Region and the Upper St. Lawrence sub-region. This forest region contains a wide variety of coniferous and deciduous species. Species characteristic of the Upper St. Lawrence sub-region include sugar maple (*Acer saccharum*) and beech (*Fagus sylvatica*) in combination with basswood (*Tilia americana*), red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), white ash (*Fraxinus americana*), largetooth aspen (*Populus grandidentata*), red oak (*Quercus rubra*), and bur oak (*Quercus macrocarpa*). Local occurrences of white oak (*Quercus alba*), rock elm (*Ulmus thomasii*), blue-beech (*Carpinus caroliniana*) and bitternut hickory (*Carya cordiformis*) also occur in this forest sub-region. White elm (*Ulmus americana*) is also a dominant species in settled portions of the region. Butternut (*Juglans cinerea*), eastern cottonwood (*Populus deltoides*) and slippery elm (*Ulmus rubra*) are sporadically known from river valleys (Rowe 1977). These deciduous species are common on the deep calcareous soils, while coniferous species such as eastern hemlock (*Tsuga canadensis*) and white pine (*Pinus strobus*) are more common on shallow, acidic soils.

Topography of the Upper St. Lawrence River valley is generally flat, underlain by limestones and Cambrian bedrock covered with glacial deposits. Soils are mainly gray-brown luvisols and melanic brunisols (Rowe 1977).

5.5.2 Plant Communities

Overall, the site consists of agricultural row crops, meadows, thickets, woodlands, a pond, and a series of marshy ditches and streams. Based on the field surveys conducted, there are seven plant communities on site. The ELC communities are shown on Map 2 and are briefly described in Table 5. A photo log of representative communities is located in Appendix C.

Table 5: Plant Communities on the Site

ELC Community	Field Description	SRank[(a)]
Anthropogenic		
ARGC-R Agricultural Row Crop	This community makes up a large portion of the study area and includes large fields that are contiguous on adjacent lands. Soya and wheat crops were planted in 2015.	n/a
Cultural (CU)		
CUM1-1 Mixed Meadow	This is a relatively dry field at the southern edge of the site. It includes a mix of forbs and grasses such as wild carrot (*Daucus carota*) and Timothy (*Phleum pratense*). There are scattered and small patches of trees and shrubs, such as white elm (*Ulmus americana*), and red raspberry (*Rubus Idaeus),* throughout the meadow.	n/a
CUT/CUM Deciduous Thicket/Mixed Meadow Complex	This is a fairly moist, large band of mixed and dense vegetation along the western side of the site. It is a mosaic of meadow plants interspersed with thickets and small trees. Species dominance varies throughout, with a variety of tall meadow plants such as Canada goldenrod (*Solidago canadensis*) and smooth brome (*Bromus inermis*), in addition to shrubs and small trees, including willows (*Salix* spp.), and Manitoba maple (*Acer negundo*). There is a slow moving, marshy stream that flows through this plant community that appears to occasionally cause small amounts of flooding, especially during pumping events from the adjacent, upstream quarry. Some areas of this community have poor drainage. Moisture tolerant plants such as red-osier dogwood (*Cornus stolonifera*) and reed canary grass (*Phalaris arundinacea*) occur in these poorly drained areas.	n/a
CUW White Elm Open Woodland	This small woodland is in the southeastern corner of the site. It has a similar species composition to the adjacent mixed meadow (CUM1-1), discussed above, but has a higher proportion of immature and sapling trees. Trees such as white elm and Manitoba maple are dominant in this community.	n/a
Deciduous Forest (FOD)		
FOD/SWD Deciduous Forest/Deciduous Swamp	This is a large forest community which primarily occurs off-site. A small portion overlaps the northwestern corner of the site. Since this forest primarily occurs on adjacent lands where access was not obtained, and it is far from the project (i.e., approximately 560 m to the north of the development limit), surveys were not completed within it, and little information is known. The forest appears to be a mix of several deciduous forest and swamp communities, with a mixed forest component as well.	n/a

Table 5: Plant Communities on the Site

ELC Community	Field Description	SRank[(a)]
FOD 3-1 Dry-Fresh Poplar Deciduous Forest	This is a piece of a small woodlot that is contiguous off-site to the east. It is a mix of deciduous trees, including trembling aspen (*Populus tremuloides*), white elm, and white birch (*Betula papyrifera*) on very rocky and shallow soils. The canopy is open, and the understory and groundcover are moderate to dense with shrubs and forbs such as buckthorns (*Rhamnus* spp.), poison ivy (Rhus radicans), and thimbleweed (*Anemone cylindrica*). Downed woody debris and snags are rare in this community.	S5
FOD 8-1 Fresh-Moist Poplar Deciduous Forest	This is a small, almost pure stand of sapling trembling aspen within the thicket/meadow complex (CUT/CUM) at the western edge of the site. Species diversity is low, and snags and downed woody debris are rare to absent.	S5

a) An SRank is a provinicial –level rank indicating the conservation status of a species or plant community and is assigned by the NHIC in Ontario (NHIC 2015). 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).

5.5.3 Vascular Plants

A total of 141 vascular plant species were observed during the botanical surveys completed on the site (Appendix E). Of these, 88 (62%) are native species, and 53 (38%) are exotic. The plant species observed are commonly found in the community types recorded on site, as well as in the broader region.

Significant and Sensitive Species

All of the plant species identified through the vegetation surveys are secure and common in Ontario and globally (S4 or S5; G4 or G5). None of the plant species identified in the desktop SAR screening as having ranges which overlap the study area were found during the botanical, or other, field surveys (Appendix B).

5.6 Wildlife

5.6.1 Breeding Bird Survey

A total of 410 individuals of 47 species of birds were observed during the breeding bird surveys (Appendix D). Species observed on the site included those that are common in meadow, thicket and edge habitats such as song sparrow (*Melospiza melodia*) and common yellowthroat (*Geothlypis trichas*). No raptor, owl or heron nests were observed during specific searches for these features.

Nocturnal and Crepuscular Birds

During the nocturnal and crepuscular bird surveys, the only species observed were American woodcock (*Scolopax minor*) and Wilson's snipe (*Gallinago gallinago*) (Appendix D).

Significant and Sensitive Species

All but one of the bird species observed during the surveys are provincially ranked S4 (apparently secure - uncommon, but not rare), S5 (secure – common, widespread and abundant in the province), or SNA (not applicable – species is not a target for conservation).

One bird species, barn swallow (*Hirundo rustica*), was recorded during surveys on site. Barn swallow, designated as threatened under the ESA, nests in artificial structures such as barns, garages, and sheds that are near to open habitats including farmland and wetlands over which they forage (COSEWIC 2011). No suitable nesting structures for barn swallow were observed on the site. All individuals recorded during the surveys were restricted to the airspace above the site (i.e., foraging or flying through). Habitat protection provisions under the ESA for barn swallow are focused on the nest and area immediately surrounding the nest (MNRF 2013). Because there is no nesting habitat on the site, no negative impacts are expected to occur and barn swallow is not carried forward to the impact assessment.

There is no suitable habitat on site for any of the other avian SAR that was identified as having ranges that overlap the study area (Appendix B). Specifically, there is no suitable habitat for grassland birds such as bobolink (*Dolichonyx oryzivorus*) or eastern meadowlark (*Sturnella magna*) on the site.

5.6.2 Anuran Call Count Survey

A total of four species were observed during anuran call count surveys (Appendix D). The most abundant species observed was spring peeper (*Pseudacris crucifer*). The highest breeding incidence was recorded at the station adjacent to the pond in the southeast corner of the site. The thicket/meadow complex (CUT/CUM) at the western edge of the site also supported a moderate number of breeding amphibians. No amphibians were detected at the station at the north end of the site (Map 2).

Significant and Sensitive Species

All of the species observed during the surveys are provincially ranked S4 (apparently secure – uncommon, but not rare), or S5 (secure – common, widespread and abundant in the province).

5.6.3 General Wildlife Survey

Butterflies and Dragonflies

Seventeen species of butterflies and dragonflies were observed during the field surveys (Appendix D). This included common species such as beaverpond baskettail (*Epitheca canis*) and cabbage white (*Pieris rapae*).

Reptiles

Two species of reptiles were observed during surveys: eastern gartersnake (*Thamnophis sirtalis*) and red-bellied snake (*Storeria occipitomaculata*) (Appendix D). One individual of each was observed in the thicket/meadow complex (CUT/CUM) at the western edge of the site (Map 2).

Mammals

Ten species of mammals were observed through visual observations or distinctive signs and tracks on the site (Appendix D). This included common species such as white-tailed deer (*Odocoileus virginianus)* and racoon (*Procyon lotor*).

Significant and Sensitive Species

The majority of wildlife species observed during the field surveys are provincially ranked S5 and G5, or very common provincially and globally (Appendix D). No species designated as threatened or endangered under the ESA were identified on the site during any of the field surveys.

Two adult monarchs, a species listed as special concern under the ESA and SARA, were observed in August, nectaring on flowers near the edge of the fields (AGRC-R and CUM1-1) at the south end of the site (Map 2). There is abundant similar habitat with nectaring flowers in the surrounding region maintained in edge habitats to support monarch. In addition, because the meadow habitats on the site are small, the site is unlikely to support a large population of monarch. Because habitat for this species is not limiting in the area, and the habitat on site is not likely significant for monarch or other migratory butterflies (MNRF 2015c), monarch is not carried forward to the impact assessment.

6.0 SIGNIFICANT NATURAL HERITAGE FEATURES

This section assesses the natural heritage features and functions (as outlined in Section 2.0) located within the study area.

6.1 Habitat of Endangered or Threatened Species

The MNRF designates "significant" or critical habitat that is necessary for the maintenance, survival, and/or recovery of naturally occurring or reintroduced populations of endangered and threatened species, and where those areas of occurrence are occupied or habitually occupied by the species during all or any part(s) of their life cycles.

No endangered or threatened species were recorded on the site during any of the field surveys. In addition, no suitable habitat was noted on site for any of the endangered or threatened species that were identified as having ranges which overlap the study area (Appendix B). No further analysis is warranted.

6.2 Significant Wetlands

The MNRF designates provincially significant wetlands (PSW). PSWs are designated based on a standardized evaluation system known as the Ontario Wetland Evaluation System (OWES). Wetlands are assessed based on a range of criteria, including biology, hydrology, societal value and special features (MNRF 2015d). There are no significant wetlands in the study area and no further analysis is warranted.

6.3 Fish Habitat

To assess the implications of the federal *Fisheries Act*, fish habitat impacts are described in terms of direct, on-site habitat and indirect, off-site effects of the project.

As discussed in Section 5.4 and 5.5, there are three main surface water features on the site that provide fish habitat (Map 2). In addition, the drainage ditch/intermittent side stream located in the east-central portion of the site connected to the main drainage ditch was also assessed to provide fish habitat.

The project will reduce surface drainage to the pond by approximately 45%. However, based on field observation and background information (e.g., surficial geology), it is assumed that the pond is groundwater fed and the reduced surface drainage will not affect the volume of water maintained in the pond. All drainage ditches on site will be eliminated during the construction phase. New drainage features will be constructed as part of the site plan to support the operation phase. The new drainage features will be constructed as shallow,

grassed ditches that would not provide suitable fish habitat. The drainage features will be constructed to flow northerly along the western perimeter of the property to meet with the Charlebois Drain.

A portion of the water currently pumped from the quarry and discharged into the main drainage ditch on site will be diverted and used as the water supply in the operation phase of the project. The maximum allowable discharge rate of the adjacent quarry is 4,400 litres/minute (L/min), and the project will require 550 m^3/day (382 L/min) for operations. The diverted water will be used in a closed-loop system that creates no discharge. The remainder of the quarry discharge water will enter the constructed drainage features, bypassing the stormwater management system on site, and continue flowing to the Charlebois Drain.

A stormwater management pond (SWMP) will be constructed in the northeast portion of the development limit. An outflow channel will connect the SWMP to the Charlebois Drain along the eastern edge of the site. The discharge from the SWMP is not expected to significantly increase flow in the Charlebois Drain.

Because negative impacts to the surface water conditions on the site are expected, fish habitat is carried forward to the impact assessment.

6.4 Significant Woodlands

Significant woodlands should be defined and designated by the planning authority. General guidelines for determining significance of these features are presented in the NHRM for Policy 2.3 of the PPS (MNR 2010). UCPR has designated significant woodlands in the county, and are included in their Official Plan in Schedule B. Significant woodlands in the UCPR Official Plan (2006) were mapped using a GIS/digital approach have not been ground-truthed.

Based on mapping in the UCPR Official Plan (2006) and correspondence with the Township of Champlain (D. Lefebvre, pers. comm. 2011), there is a significant woodland in the study area. A small portion of the significant woodland (i.e., <0.5 ha) overlaps the northwest corner of the site (FOD/SWD) (Map 2). The significant woodland is approximately 500 m to the north of the footprint of the proposed project (Map 3), and no impact or disturbance to the significant woodland is anticipated as a result of the project. However, to avoid any potential indirect impacts to the significant woodland, general mitigation measures are recommended. Further details are outlined in Section 8.0.

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 (MMAH 2014) include prominence as a distinctive landform, degree of naturalness, importance of its ecological functions, restoration potential, and historical and cultural values. The UCPR have not identified and mapped significant valleylands in their Official Plan. There are no valleylands in the study area and no further analysis is warranted.

6.6 Significant Areas of Natural or Scientific Interest (ANSIs)

Areas of Natural and Scientific Interest (ANSI) are designated by the province according to standardized evaluation procedures. There are no ANSIs in the study area and no further analysis is 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 SWH. These documents were used as reference material for this study. SWH should be evaluated in the context of the entire planning authority's jurisdiction, and only the best examples are considered significant.

There are four general types of SWH: migration corridors, seasonal concentration areas, rare or specialized habitats, and habitat for species of conservation concern. The specific habitats considered in this report are evaluated based on the criteria outlined in the Ecoregion 6E Criterion Schedule (MNRF 2015c). All types of SWH are discussed below in relation to the site and the project.

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, bird nesting colonies, bat hibernacula, raptor roosts, and passerine migration concentrations. If a species is at risk, 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 6E Criterion Schedule (MNRF 2015c) identifies the following 12 types of seasonal concentrations of animals that may be considered SWH:

- 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; and
- migratory butterfly stopover areas.

Overall, the significant woodland (i.e., FOD/SWD) within the study area is greater than 200 ha in size and has potential to support deer winter congregation areas (Map 2). A small portion (i.e., <0.5 ha) of this woodland overlaps the northwest corner of the site. No development is proposed within this woodland, and no disturbance to the feature is anticipated (Map 3). Because no negative impact is anticipated on the woodland, this SWH type is not carried forward to the impact assessment.

The study area may also provide habitat for bat maternity colonies. The potential for bat maternity colonies was assessed based on the availability of suitable habitat. The significant woodland within the study area may provide suitable habitat. No development is proposed within this woodland, and no disturbance to the feature is anticipated (Map 3). There are two other patches of deciduous forest on the site (i.e., FOD3-1 and FOD8-1; Map 2), but they are small and lack a high density of snag trees. It was determined during field surveys that

neither of these forest patches provide suitable maternity roosting habitat. In the case of the FOD8-1, the community is almost entirely composed of sapling trembling aspen, which are not the appropriate size to support maternity colonies. Because no negative impact is anticipated to the significant woodland, and the other two deciduous forests on site have been determined to be unsuitable, no further analysis is 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 SWH, these corridors would be a critical link between habitats that are regularly used by wildlife.

Although a candidate deer winter congregation area was identified within the significant woodland (i.e., FOD/SWD) in Section 6.7.1, the significant woodland will not be impacted by the project and there are no naturalized vegetation corridors on site that would connect the woodland to other natural features in the study area or broader region (Map 2). No further analysis is 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 6E Criterion Schedule (MNRF 2015c) defines 7 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 specialized habitats were identified on the site or in the study area based on field surveys. Although the significant woodland at the north end of the site (FOD/SWD; Map 2) is large and provides interior forest habitat that may support several types of specialized habitat, no indicator species were identified during any of the surveys on site to indicate the potential for any candidate SWH. No further analysis is warranted.

6.7.4 Rare Habitat

This category includes plant 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.

The majority of plant communities in the study area are cultural or anthropogenic and are, therefore, not ranked. The deciduous forest communities (i.e., FOD3-1 and FOD8-1) in the southern half of the site are both ranked as S5 (Map 2). It is anticipated that there will be no adverse effect to significant woodland (i.e., FOD/SWD) at the northwest corner of the site (Map 2) as a result of the project (Map 3). In addition, based on Appendix M of the SWHTG (MNR 2000), there are no rare plant communities known to occur in UCPR. No further analysis is warranted.

6.7.5 Habitat for Species of Conservation Concern

Habitat for Species of Conservation Concern (SOCC) includes four types of species: those that are rare, those whose populations are significantly declining, those that have been identified as being at risk to certain common activities, and those with relatively large populations in Ontario compared to the rest of the world.

Rare species are considered at five levels: globally rare, nationally rare, provincially rare, regionally rare; and locally rare (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 SWH. 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 SOCC 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 6E Criterion Schedule (MNRF 2015c) defines 5 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; and
- special concern and rare wildlife species.

Although two of the indicator species for open country bird breeding habitat were recorded during breeding bird surveys on site (i.e., savannah sparrow and vesper sparrow), the area of grassland habitat (i.e., CUM/CUT and CUM1-1; Map 2) on the site is less than 10 ha and is therefore too small to be considered significant habitat. No further analysis is warranted.

Potential suitable habitat for one special concern species and one rare wildlife species was recorded in the study area during field surveys. Wood thrush (*Hylocichla mustelina*), designated special concern under the ESA, was assessed to have moderate potential to occur in the study area. Wood thrush breeds in moist deciduous or mixed forests with dense deciduous undergrowth and tall trees for singing perches. This species prefers

closed canopies and an open forest floor (COSEWIC 2012). No suitable habitat was identified on the site, and no individuals were recorded during any of the field surveys. There is potential that the larger deciduous forest community off-site to the north and northwest may support wood thrush (i.e., FOD/SWD; Map 2). Because no negative impact to this forest is anticipated (Map 3), no further analysis is warranted.

Tri-colored bat (*Perimyotis subflavus*) is provincially ranked as a "S3?" species (i.e., rare to uncommon), and is also listed as endangered under SARA. The "?" qualifier following the S3 ranking indicates the number is inexact due to insufficient knowledge regarding the species. This species was assessed to have a low to moderate potential to occur in the study area. 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 (COSEWIC 2013). The deciduous forest (FOD/SWD) in the northwest corner of the site, and the FOD3-1 community in the southeast corner of the site may provide suitable roosting habitat for this species (Map 2). No targeted bat surveys were conducted on the site so occurrence and use of the site and study area by tri-colored bat is not known. In addition, little is known about the habitat preferences for this species.

The FOD3-1 is located within the footprint of the project and is likely to be removed during the construction phase (Map 3). Daily operations (i.e., noise, dust, etc.) may reduce habitat suitability of the remaining portion of this forest located on the adjacent land to the east. The amount of habitat being removed is not large and would not be considered significant based on the SWHTG (MNR 2000). The FOD/SWD that overlaps the northwest corner of the site (Map 2) provides similar habitat to the FOD3-1, is much larger, provides more better quality habitat, and is not expected to be impacted by the project (Map 3). Potential habitat for tri-colored bat in the study area is not limited in the study area and is not carried forward to the impact assessment.

7.0 IMPACT ANALYSIS

The project was assessed for potential direct and indirect effects on the natural environment. Fish habitat was identified on site and has potential to be adversely impacted by the project. No other significant natural heritage features occur within the proposed development limit.

7.1 Fish Habitat

There are three main surface water features on site, in addition to the drainage ditch/intermittent side stream in the east-central portion of the site, that have been assessed to provide fish habitat and that may be impacted by the project.

During the field surveys, both the main drainage ditch on site and the drainage ditch/intermittent side stream in the east-central portion of the site were assessed to have flow and support several fish species. Because both drainage ditches will be removed during construction, there will be a direct loss of fish habitat which constitutes serious harm to fish under the *Fisheries Act*. Serious harm to fish is defined as death of fish or any permanent alteration to, or destruction of, fish habitat (Canada 1985).

The pond in the southeast corner of the site also supports a fish community. Because the pond is assumed to be groundwater-fed, the reduced volume of surface water draining to the pond will not affect the water volume and no serious harm to fish is anticipated as a result of the project. Construction best management practices designed to avoid or mitigate erosion and sediment hazards will be implemented and are discussed in Section 8.1.

Because the drainage ditches on site will be removed, and water pumped from the adjacent quarry will be diverted to be used in project operations, surface water flow to the Charlebois Drain will be reduced. According to the Permit to Take Water (PTTW) for the adjacent quarry, the quarry is permitted to discharge a maximum of 4,400 L/min (6,336 m^3/day) to the Charlebois Drain. However, based on pumping records from 2012-2014, the average daily discharge was 1,507 m^3/day (2012), 1,052 m^3/day (2013) and 1,809 m^3/day (2014). In addition, the total number of days pumped from 2012-2014 was between 249 and 336. As such, the fish in Charlebois Drain are accustomed to fluctuations in daily flow conditions.

Although outflow from the SWMP will be discharged into the drain, it is not anticipated to significantly alter flow in the drain. The Charlebois Drain supports a fish community and is also designated as fish habitat on Schedule B of the UCPR Official Plan (2006). Because the base flow of the drain is sufficient to support fish, and the fish community has already adapted to fluctuating flow conditions, there is no anticipated negative impact to fish or fish habitat within Charlebois Drain.

A Project Review by DFO in accordance with the *Fisheries Act* is required for removal of the main drainage ditch and the drainage ditch/intermittent side stream in the east-central portion of the site to determine if an Authorization is required under Paragraph 35(2)(b) to proceed with the project. A Request for Project Review will be prepared and submitted to DFO prior to commencement of construction on site. The request will summarize the existing conditions on site, anticipated project activities and construction schedule, the potential pathways of effects, and applicable mitigation measures. Measures to avoid or mitigate harm to fish, which will be implemented as part of this project, are described in Section 8.2.

The removal of surface water features (i.e., the drainage ditches) on site will be conducted based on recommendations from DFO, such as guidance contained in the Fisheries Protection Policy Statement (DFO 2013a) and Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2013c).

8.0 MITIGATION

8.1 General Best Management Practices

Standard Best Management Practices to be followed during construction to mitigate damage to the adjacent natural features include the following:

- Clearly demarcate and maintain the development boundaries shown on the site plan;
- Avoid removal of vegetation during the active season for breeding birds (April 15 – August 15), unless construction disturbance is preceded by a nesting survey conducted by a qualified biologist;
- Avoid activities resulting in major noise and vibration levels during the breeding bird season (April 15 – August 15), if possible;
- Avoid the storage of construction materials or fill adjacent to the significant woodland to minimize disturbance to the forest community and resident wildlife; and
- Implement standard best management practices, including sediment and erosion controls, spill prevention, etc. during the construction phase of the project.

8.2 Fish Habitat

The following mitigation measures will be implemented during construction to minimize harm to fish and fish habitat:

- Submit a request for review to DFO for the removal of the onsite drainage ditches.
- Implement standard and accepted mitigation measures outlined in the Land Development Guidelines for the Protection of Aquatic Habitat (DFO 1993), Fisheries Protection Policy Statement (DFO 2013a) and Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2013c) during construction.
- **Fish Protection:** DFO considers the following measure an appropriate measure to avoid harm to fish and fish habitat: “Retain a qualified environmental professional to ensure applicable permits for relocating fish are obtained and to capture any fish trapped within an isolated/enclosed area at the work site and safely relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur on the Site”. Where it is not possible to relocate in the same waters, all attempts should be made to relocate the fish to waters in the same watershed (DFO 2013c). Prior to any work associated with the drainage ditches and pond, a fish collection permit will be obtained from the MNRF. The fish will be salvaged and relocated to a nearby surface water feature (such as the Charlebois Drain). Any non-native species encountered during the fish salvage will be euthanized and disposed of using appropriate methods. The euthanization of non-native, invasive species is a standard practice and is generally included as a condition of the collection permit from the MNRF in order to comply with the *Fisheries Act*.
- **Timing:** Since the fish community on site is classified as warm to cool water, no in-water work will occur between the restriction periods for southern Ontario (March 15 to July 15; DFO 2013d), subject to confirmation with DFO. However, if during this timing window the intermittent ditches on site are dry, these ditches will be isolated from the rest of the existing drainage network with earthen cofferdams and will be excavated and/or in-filled. If activities must occur during these timing windows and fish are present, a permit to relocate fish will be sought prior to any in-water works.

- **Erosion and Sediment Control**: As part of the site plan, an erosion and sediment control plan will be developed to minimize the risk of sedimentation of the Charlebois Drain and the pond in the southeast corner of the site during all phases of the project. These include installation of sediment barriers on all catch basin and maintenance holes and a silt fence barrier along all areas that sheet drain off-site, and installation of straw bale check dams in outlet ditches, etc. Exposed soils will be stabilized if above the high water mark and any in-water work will be isolated via turbidity curtains, etc. All sedimentation and erosion control measures will be regularly inspected and adapted to meet needs.
- **Contamination and Spill Management**: A response plan will be developed that will be implemented immediately in the event of a sediment release or spill of a deleterious substance and an emergency spill kit will be kept on site.
- **Operation of Machinery**: Machinery will be operated on land above the high water mark where possible. All water crossings will occur over temporary crossing structures, that will be constructed as necessary. All refueling, washing, and servicing of machinery will be completed beyond 30 m of the water courses where fish are present.

9.0 CONCLUSIONS AND RECOMMENDATIONS

The project has been assessed for potential ecological impacts under the Provincial Policy Statement, the policies of the UCPR Official Plan, as well as other relevant legislation, including the ESA and *Fisheries Act*.

Based on these analyses and the implementation of appropriate mitigation measures, it is expected that there will be no residual negative impacts to the significant natural features and functions in the study area. These conclusions are based on the following recommendations and assumptions:

- No tree removal or disturbance will occur within the significant woodland (FOD/SWD) at the north end of the site;
- Best management practices for construction will be implemented;
- Mitigation measures to avoid harm to fish will be implemented;
- Any in water work will be completed outside of the restricted activity timing windows (March 15 to July 15);
- A Request for Review will be submitted to the DFO for the removal of the on-site drainage ditches prior to the commencement of construction activities on the site; and
- A fish collection permit will be obtained from the MNRF to relocate fish in the drainage ditches prior to commencement of construction activities on site.

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Report Signature Page

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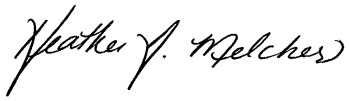

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APPENDIX A

Terms of Reference

LA CORPORATION DU / THE CORPORATION OF

CANTON DE CHAMPLAIN TOWNSHIP

BUREAU ADMINISTRATIF / ADMINISTRATION OFFICE
948 EST, CHEMIN PLEASANT CORNER ROAD EAST
VANKLEEK HILL, ONTARIO (KOB 1RO)

613-678-3003 / (FAX) 613-678-3363

July 21st, 2011

"By Email Only"

Mr. Moreno Capolli
Chief Manager
Colacem Canada
1235, chemin Kilmar
Grenville-sur-la-rouge, Québec
J0V 1B0

SUBJECT: Proposed Industrial Project
Lot 217, Plan M100, County Road 17, Township of Champlain

Sir:

Thank you for the opportunity to participate in commenting the above noted project. Following the July 11th meeting, which provided the occasion to understand the proposed cement plant project, we offer the following comments.

The subject site is currently designated Rural under the Official Plan (OP) of the United Counties of Prescott and Russell (UCPR). The adjacent site, to the West, is currently designated Quarry under the OP of the UCPR. Please refer to the map attached hereto which illustrates the land uses and constraints of the OP of the UCPR.

The Planning and Forestry Department of the UCPR is of the opinion that an official plan amendment is required given that the proposed project is of a heavy industrial nature. Consequently, supportive studies will be required as additional information for Council to make a decision on the proposal. It is our understanding that the lands designated as Agriculture will not be part for the proposed project.

It is noted that a watercourse traverses the subject properties. In order to ensure consistency with Section 2 of the Provincial Policy Statement (PPS) and of Section 5.5.7 of the OP of the UCPR, we require an Environmental Impact Study as per Section 5.6 of the OP of the UCPR to ensure there are no negative impacts to the quality of water and fish habitat as a result of the proposed development. The Environmental Impact Study would also serve to ensure consistency with PPS 2.1.4 and of Section 5.5.6 of the OP of the UCPR as it is noted that the subject site is adjacent to identified significant woodlands. I also would like to underline the fact that the Endangered Species Act (2007) which is administered by the Ministry of Natural Resources (MNR) affects to this project.

As a watercourse traverses the site, the subject area is deemed as an area of archaeological potential in accordance with the Ministry of Tourism and Culture's criteria. In this regard, we require a Phase 1 Archaeological Study to be undertaken as supportive information to ensure consistency with PPS 2.6.2 and with Section 7.6.4 of the Op of the UCPR.

Furthermore, PPS 1.7.1(e) states that "Long-term economic prosperity should be supported by planning so that major facilities (such as airports, transportation/transit/rail infrastructure and corridors, intermodal facilities, waste management systems, oil and gas pipelines, industries and resource extraction activities) and sensitive land uses are appropriately designed, buffered and/or separated from each other to prevent adverse effects from odour, noise and other contaminants, and minimize risk to public health and safety." In this regard, we require a Land Use Compatibility Study to ensure consistency with the PPS and Section 6.9.3 of the OP of the UCPR and to ensure that the proposed use complies with the Ministry of the Environment's D-Series Guidelines.

The proposed site is adjacent to lands designated as Agriculture, we require a Minimum Distance Separation (MDS) calculation to be undertaken to ensure that the use does not hinder existing or future agricultural operations. This would ensure that the proposal is consistent with PPS 2.3.3.3 which states "New land uses, including the creation of lots, and new or expanding livestock facilities shall comply with the minimum distance separation formulae."

Since the proposed development will generate substantial trucking traffic, the UCPR requires a traffic impact analysis, pursuant to Section 3.3.3 of the OP of the UCPR, completed to the satisfaction of the Director of Public Works.

At a municipal level, a Zoning by-law application is required to change the zoning from "Rural Zone (RU)" to an "Industrial Heavy Zone (MG)". Moreover, prior to the issuance of a building permit a Site Plan Agreement is required to be concluded with the Municipality.

Our biggest concern refers to the current Aggregates Study underway by the UCPR. The subject site is identified as a potential aggregate resource in the current mapping efforts for the Aggregates Study, thus we recommend examining site suitability through various studies. The Township of Champlain and the UCPR must ensure that their decisions are consistent with the Provincial Policy Statement (2005) which includes the long term protection of the resource as well as protecting operations and designated areas from development activities that would preclude/hinder expansion, continued use or establishment of future operations of the aggregate on or adjacent to the site. Consequently, the UCPR must consider the long term resource access and the possible sterilization of the resource that would be located underneath the cement plant.

However, a cement plant would not likely be a non-compatible land use adjacent to a quarry. The studies are requested in order to get a better sense of matters as it relates to this particular site and adjacent lands. Therefore, we strongly advise that you contact MNR early on in the process in order to determine next steps as it relates to the Aggregate Resources Act.

I hope this information is helpful and please don't hesitate to contact me should you require further information or have any questions.

Sincerely,

Dominique Lefebvre, MCIP, RPP
Planner

Encl.
C.c. Mr. Pier Federico Baldinucci, Colacem Gruppo Financo
Mr. Anthony Ciccone, Golder Associates
Mr. James D. Parkin, MHBC Planning Urban Design & Landscape Architecture
Mrs. Lynne F. Groulx, Ministry of Economic Development and Trade
Mr. Gary J. Barton, Mayor
Mr. Jean Thériault, Chief Administrative Officer/Clerk-Treasurer

APPENDIX B

Species at Risk Screening

Common Name	Scientific Name	Species At Risk Act (Sch 1)[1]	Endangered Species Act[2]	COSEWIC[3]	Provincial (SRank)[4]	Habitat Requirements[5]	Potential to Occur on Site	Rationale for Potential to Occur on Site
Western chorus frog - Great Lakes St. Lawrence/Canadian Shield Population	*Pseudacris triseriata*	THR	—	THR	S3	In Ontario, this amphibian species habitat 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.	Low	Although the marshy ditches on Site and flooded areas at the western edge of the site provide suitable habitat for this species, none were observed during targeted field surveys.
Monarch	*Danaus plexippus*	SC	SC	SC	S2N, S4B	In Ontario, monarch is found throughout the northern and southern regions. This butterfly is found wherever there are milkweed (*Asclepius* spp.) plants for its caterpillars and wildflowers that supply a nectar source for adults; 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.	High	The meadows, habitat edges and marshy ditches have milkweed species (*Asclepius* spp.) throughout the site, and provide suitable habitat for this species. In addition two adults were observed on site.
West Virginia white	*Pieris virginiensis*	—	SC	—	S3	In Ontario, West Virginia white is found primarily in the southern region of the province. This butterfly lives in moist, mature, deciduous woodlands, and the caterpillars feed only on the leaves of toothwort (*Cardamine* spp), which are small, spring-blooming plants of the forest floor. These woodland habitats are typically maple-beech-birch dominated.	Low	This species is primarily found in the southern region of the province. No habitat identified on site and no individuals were observed during surveys.
Bank swallow	*Riparia riparia*	—	THR	THR	S4B	In Ontario, the 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.	Low	There are no suitable banks or similar habitat on the site to support nesting of this species. In addition no individuals were observed during targeted surveys.
Barn swallow	*Hirundo rustica*	—	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 rights-of-way, and wetlands. Mud nests are fastened to vertical walls or built on a ledge underneath an overhang. Suitable nests from previous years are reused.	High	Although barn swallow were observed during targeted surveys, they are restricted to the airspace above the site as there are no suitable nesting structures on site.
Black tern	*Chlidonias niger*	—	SC	NAR	S3B	In Ontario, the black tern breeds in freshwater marshlands where it forms small colonies. It prefers marshes or marsh complexes greater than 20 ha in area and which are not surrounded by wooded area. Black terns are sensitive to the presence of agricultural activities. The black tern nests in wetlands with an even combination of open water and emergent vegetation, and still waters of 0.5-1.2 m deep. Preferred nest sites have short dense vegetation or tall sparse vegetation often consisting of cattails, bulrushes and occasionally burreed or other marshland plants. Black terns also require posts or snags for perching.	Low	There is no suitable wetland habitat on the site to support black tern.

Common Name	Scientific Name	Species At Risk Act (Sch 1)[1]	Endangered Species Act[2]	COSEWIC[3]	Provincial (SRank)[4]	Habitat Requirements[5]	Potential to Occur on Site	Rationale for Potential to Occur on Site
Bobolink	*Dolichonyx oryzivorus*	—	THR	THR	S4B	In Ontario, the bobolink breeds in grasslands or graminoid dominated hayfields with tall vegetation. Bobolinks prefer grassland habitat with a broad-leaf component and a substantial litter layer. They have low tolerance for presence of woody vegetation and are sensitive to extensive mowing. They are found in greater numbers in old fields where mowing and re-sowing are infrequent. 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 broad-leaved forbs.	Low	The row crops and small dense meadows on site are not suitable nesting habitat for this species. In addition none were observed during targeted surveys.
Canada warbler	*Cardellina canadensis*	THR	SC	THR	S4B	In Ontario, breeding habitat for the 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. 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.	Low	The portion of the forest on the site is too small and lacking the appropriate structure to provide habitat for this species. In addition no individuals were observed during targeted surveys
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.	Low	The preferred anthropogenic nesting structures do not occur on the site and no large complex snags were observed. In addition no individuals were observed during targeted surveys.
Common nighthawk	*Chordeiles minor*	THR	SC	THR	S4B	These aerial foragers require areas with large open habitat. This includes farmland, open woodlands, clearcuts, burns, rock outcrops, alvars, bog ferns, prairies, gravel pits and gravel rooftops in cities.	Low	The row crops and small dense meadows/thickets on the site do not provide suitable nesting habitat for this species. In addition no individuals were observed during targeted surveys.
Eastern meadowlark	*Sturnella magna*	—	THR	THR	S4B	In Ontario, the eastern meadowlark breeds in pastures, hayfields, meadows and old fields. Eastern meadowlarks prefer moderately tall grasslands with abundant litter cover, high grass proportion, and a forb component. They prefer well drained sites or slopes, and sites with different cover layers.	Low	The row crops and small dense meadows on site are not ideal nesting habitat for this species. In addition no individuals were observed during targeted surveys.
Eastern wood-pewee	*Contopus virens*	—	SC	SC	S4B	In Ontario, the 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. Tends to inhabit edges of younger forests having a relatively dense midstory. Also occurs in anthropogenic habitats providing an open forested aspect such as parks and suburban neighborhoods. Nest is constructed atop a horizontal branch, one to two meters above the ground, in a wide variety of deciduous and coniferous trees.	Low	The portions of forest on Site do provide some potential for this species, however, none were observed during targeted surveys

Common Name	Scientific Name	Species At Risk Act (Sch 1)[1]	Endangered Species Act[2]	COSEWIC[3]	Provincial (SRank)[4]	Habitat Requirements[5]	Potential to Occur on Site	Rationale for Potential to Occur on Site
Grasshopper sparrow (*pratensis* subspecies)	*Ammodramus savannarum (pratensis* subspecies*)*	—	SC	SC	S4B	In Ontario, grasshopper sparrow prefers grasslands, hayfields, pastures and prairies. This species prefers vegetation of moderate height, low cover of bare soil, and moderately thick litter layer. They typically occur in central and southern Ontario.	Low	The row crops and small dense meadows on site are not ideal nesting habitat for this species. In addition no individuals were observed during targeted surveys.
Least bittern	*Ixobrychus exilis*	THR	THR	THR	S4B	In Ontario, the least bittern breeds in marshes, usually greater than 5 ha, with emergent vegetation, relatively stable water levels and areas of open water. Preferred habitat has water less than 1 m deep (usually 10 – 50 cm). Nests are built in tall stands of dense emergent or woody vegetation. Clarity of water is important as siltation, turbidity, or excessive eutrophication hinders foraging efficiency.	Low	There is no suitable wetland habitat on the site to support least bittern.
Peregrine falcon (*anatum* subspecies)	*Falco peregrinus anatum*	SC	SC	SC	S3B	In Ontario, the peregrine falcon breeds in areas containing suitable nesting locations and sufficient prey resources. Such habitat includes both natural locations containing cliff faces (heights of 50 - 200 m preferred) and also anthropogenic landscapes including urban centres containing tall buildings, open pit mines and quarries, and road cuts. Peregrine falcons nest on cliff ledges and crevices and building ledges. Nests consist of a simple scrape in the substrate.	Low	There are no steep cliffs on site, and there are no tall anthropogenic structures to provide suitable nesting sites. There is potential adjacent to the site in the quarry. In addition none were observed during targeted surveys.
Redhead	*Aythya americana*	—	—	—	S2B,S4N	Redheads nest in aquatic habitats, such as lakes, ponds, slow moving rivers and other wetlands. This species prefers deep water wetlands for breeding.	Low	The pond on site lacks suitable aquatic vegetation to provide nesting habitat for redhead. In addition, none were observed during any of the field surveys.
Short-eared owl	*Asio flammeus*	SC	SC	SC	S2N,S4B	In Ontario, the short-eared owl breeds in a variety of open habitats including grasslands, tundra, bogs, marshes, clearcuts, burns, pastures and occasionally agricultural fields. The primary factor in determining breeding habitat is proximity to small mammal prey resources. Nests are built on the ground at a dry site and usually adjacent to a clump of tall vegetation used for cover and concealment.	Low	Although there is a meadow in the southern portion of the site, it is likely too small to support this grassland bird.
Eastern whip-poor-will	*Antrostomus vociferus*	THR	THR	THR	S4B	In Ontario, the whip-poor-will breeds in semi-open forests with little ground cover. Breeding habitat is dependent on forest structure rather than species composition, and is found on rock and sand barrens, open conifer plantations and post-disturbance regenerating forest. Territory size ranges from 3 to 11 ha. No nest is constructed and eggs are laid directly on the leaf litter.	Low	The majority of the site is open agricultural field or meadow. The forest at the northern end of the site appears to be too dense to provide suitable habitat for whip-poor-will.
Wilson's phalarope	*Phalaropus tricolor*	—	—	—	S3B	In Ontario, Wilson's phalarope breeds on the borders of quite, shallow lakes, ponds and rivers with low grasses and sedges covering the banks and surrounding area.	Low	This species typically breeds in the south-western and southern portions of the Province. In addition, the quarry lake on site is too deep and has very steep sides that would not provide suitable habitat.

Common Name	Scientific Name	Species At Risk Act (Sch 1)[1]	Endangered Species Act[2]	COSEWIC[3]	Provincial (SRank)[4]	Habitat Requirements[5]	Potential to Occur on Site	Rationale for Potential to Occur on Site
Wood thrush	*Hylocichla mustelina*	—	SC	THR	S4B	During the breeding season, the wood thrush is found in moist, deciduous hardwood or mixed stands, often previously disturbed, with dense deciduous undergrowth and with tall trees for singing perches. Wood thrush chooses habitats based on the structure of the forest. Specifically, this species selects nesting sites with the following characteristics: lower elevations with trees >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.	Moderate	The portions of forest on site do provide some potential for this species, however no individuals were observed during surveys
American eel	*Anguilla rostrata*	—	END	THR	S1?	In Ontario, the American eel is native to Lake Ontario, St. Lawrence River and Ottawa River watersheds. Their current distribution includes lakes Huron, Erie, and Superior and their tributaries. The Ottawa River population is considered extirpated. The preferred habitat of the American Eel is cool water of lakes and streams with muddy or silty substrates in water temperatures between 16 and 19°C. The American eel is a catadromous fish that lives in fresh water until sexual maturity then migrates to the Sargasso Sea to spawn.	Low	The watercourses on site are too small and of the wrong habitat type to support this fish species. In addition, none were caught or observed during targeted surveys.
Channel darter	*Percina copelandi*	THR	THR	THR	S2	In Ontario, the channel darter is found in the lower Great Lakes basin along the shores of Lake Erie, Detroit River, St. Clair River, Lake St. Clair, Ottawa River and some of its tributaries, and in drainages of the Bay of Quinte. Channel darter are freshwater member of the perch family of fishes. Channel darter can be found in three general types of habitats, depending on which aquatic system they occupy: 1) in lakes, they are found in gravel and coarse sand beach areas; 2) in large river systems, they are typically found in gravel and cobble shoals and riffles; and, 3) in small- to medium-sized rivers, they are typically found in the riffles and pools. Communal spawning occurs in the spring and early summer in upstream areas with moderate to fast current and over fine gravel or small rocks.	Low	The watercourses on site are of the wrong habitat type to support this fish species. In addition, none were caught or observed during targeted surveys.
Lake sturgeon - Great Lakes / upper St.Lawrence Population	*Acipenser fulvescens*	—	THR	THR	S2	In Ontario, the lake sturgeon, a large prehistoric freshwater fish, is found in all the Great Lakes and in all drainages of the Great Lakes and of Hudson Bay. This species typically inhabits highly productive shoal areas of large lakes and rivers. They are bottom dwellers, and prefer depths between 5-10 m and mud or gravel substrates. Small sturgeons are often found on gravelly shoals near the mouths of rivers. They spawn in depths of 0.5 to 4.5 metres in areas of swift water or rapids. Where suitable spawning rivers are not available, such as in the lower Great Lakes, they are known to spawn in wave action over rocky ledges or around rocky islands.	Low	The watercourses on site are too small and of the wrong habitat type to support this fish species. In addition, none were caught or observed during targeted surveys
River redhorse	*Moxostoma carinatum*	SC	SC	SC	S2	In Ontario, the river redhorse is known to occur in the Mississippi River, Ottawa River, Madawaska River, Grand River, Trent River, and Thames River systems. They inhabit moderate to large rivers. The majority of their time is spent in pool habitats with slow-moving water and abundant vegetation. Spawning occurs in areas of shallow, moderate to fast-flowing waters in riffle-run habitats with coarse substrates of gravel and cobble.	Low	The watercourses on site are too small and of the wrong habitat type to support this fish species. In addition, none were caught or observed during targeted surveys

Common Name	Scientific Name	Species At Risk Act (Sch 1)[1]	Endangered Species Act[2]	COSEWIC[3]	Provincial (SRank)[4]	Habitat Requirements[5]	Potential to Occur on Site	Rationale for Potential to Occur on Site
Eastern cougar	*Puma concolor couguar*	—	END	DD	SU	This species historically inhabited extensive forested areas in Ontario.	Low	The site is primarily agricultural fields with a small portion of forest in the northern edge. The surrounding region is too fragmented to provide suitable forest habitat for cougar. In addition, there have been no reliable or confirmed records of this species within the region for over a hundred years.
Grey fox	*Urocyon cinereoargenteus*	THR	THR	THR	S1	While the Ontario range of this species extends across much of southern and southeastern Ontario, the only known population in the province is on Pelee Island, with very rare sightings elsewhere in the province at points close to the border with the United States. This species inhabits deciduous forests and marshes, and will den in a variety of features including rock outcroppings, hollow trees, burrows or brush piles, usually where dense brush provides cover and in close proximity to water. This species is considered a habitat generalist.	Low	This species is only currently known to occur on Pelee Island.
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.	Low	There are no rock piles, crevices, talus slopes or other suitable habitat on site for this species.
Little brown myotis	*Myotis lucifugus*	END	END	END	S4	In Ontario, this species range is extensive and covers much of the province. It will roost in both natural and man-made structures. They 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 for hibernaculum, but high humidity and stable above freezing temperatures are required.	Low	Forests on adjacent lands may be suitable for this species; however the portions of the forest on the site do not contain suitable maternity roost trees.
Tri-colored bat	*Perimyotis subflavus*	END	—	END	S3?	The appearance of this species at tree-top levels indicate that they may roost in foliage or in high tree cavities and crevices. They are not often found in buildings or in deep woods, seeming to prefer edge habitats near areas of mixed agricultural use. 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.	Low-Moderate	While the majority of the site is open agricultural field or meadow, the forest in the northern portion of the site may provide suitable habitat.
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 for hibernaculum, but high humidity and stable above freezing temperatures are required.	Low	Forests on adjacent lands may be suitable for this species; however the portions of the forest on the site do not contain suitable maternity roost trees.

Common Name	Scientific Name	Species At Risk Act (Sch 1)[1]	Endangered Species Act[2]	COSEWIC[3]	Provincial (SRank)[4]	Habitat Requirements[5]	Potential to Occur on Site	Rationale for Potential to Occur on Site
Blanding's turtle - Great Lakes/St.Lawrence population	*Emydoidea blandingii*	THR	THR	THR	S3	Blanding's turtle will utilize 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 to order 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.	Low	The flooded quarry lake on the site is very deep and has very steep slopes. This lake does not provide high-quality habitat for turtles.
Snapping turtle	*Chelydra serpentina*	SC	SC	SC	S3	Snapping turtle utilizes 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.	Low	The flooded quarry lake on the site is very deep and has very steep slopes. This lake does not provide suitable habitat for turtles.
Spiny softshell	*Apalone spinifera*	THR	THR	THR	S3	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.	Low	The flooded quarry lake on the site is very deep and has very steep sides. This lake does not provide suitable habitat for turtles.
Spotted turtle	*Clemmys guttata*	END	END	END	S3	Spotted turtle habitat consists of shallow, slow-moving and unpolluted water such as ponds, bogs, marshes, ditches, vernal pools and sedge meadows. It is also occasionally found in woodland streams or sheltered shallow bays. These habitats are characterized by soft substrates and abundant aquatic vegetation. Females lay eggs in soil and leaf litter in wooded areas close to wetlands. Hibernation takes place in substrates under water, often under moss hummocks or muskrat dens.	Low	There is no suitable habitat on the site for this species, or recent records in the area.
Atlantic sedge	*Carex atlantica*	—	—	—	S1	Atlantic sedge grows in the clearings of shrubby bogs and occasionally along shorelines, mostly in southeastern Ontario.	Low	There does not appear to be any suitable wetland habitat on the site.
Bog fern	*Thelypteris simulata*	—	—	—	S1	Bog fern occurs in densely shaded, bogs and swamps, and is often associated with sphagnum.	Low	There does not appear to be any suitable wetland habitat on the site.
Butternut	*Juglans cinerea*	END	END	END	S3?	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. Butternut prefers moist, fertile, well-drained soils, but can also be found in rocky limestone soils. This species is shade intolerant.	Low	This conspicuous species was searched for on the site and none were identified.
Cattail sedge	*Carex typhina*	—	—	—	S2	Cattail sedge is found in moist wood habitats, mainly near or along the Ottawa River.	Low	Suitable habitat may occur adjacent to the site, but none was identified on the site.

Common Name	Scientific Name	Species At Risk Act (Sch 1)[1]	Endangered Species Act[2]	COSEWIC[3]	Provincial (SRank)[4]	Habitat Requirements[5]	Potential to Occur on Site	Rationale for Potential to Occur on Site
Coast barnyard grass	*Echinochloa walteri*	—	—	—	S3	Coast barnyard grass grows in marshes and shorelines primarily in southwestern Ontario.	Low	There does not appear to be any suitable wetland habitat on the site.
Indian wild rice	*Zizania aquatica*	—	—	—	S3	Indian wild rice grows in marshes, wetlands.	Low	There does not appear to be any suitable wetland habitat on the site.
Rhodora	*Rhododendron canadense*	—	—	—	S1	Rhodara grows in bogs in far southeastern Ontario.	Low	There does not appear to be any suitable wetland habitat on the site.
Slender mountain-mint	*Pycnanthemum tenuifolium*	—	—	—	S3	Slender mountain-mint grows in open areas, dry fields and thickets.	Low	Although some small areas of suitable habitat exist on site, this conspicuous species was not observed during surveys.
Toothed flatsedge	*Cyperus dentatus*	—	—	—	S1	Toothed flatsedge grows in the open, sandy shorelines of lakes and rivers.	Low	The flooded quarry lake on site has steep cut banks and is not suitable for this species.

Notes:

[1] *Species at Risk Act* (SARA), 2002. Schedule 1 (Last amended 17 Dec 2014); Part 1 (Extirpated), Part 2 (Endangered), Part 3 (Threatened), Part 4 (Special Concern)

[2] *Endangered Species Act* (ESA), 2007 (O.Reg 242/08 last amended 26 Nov 2014 as O.Reg 232/14). Species at Risk in Ontario List, 2007 (O.Reg 230/08 last amended 31 Mar 2015 as O.Reg 66/15, s. 1.); Schedule 1 (Extirpated - EXP), Schedule 2 (Endangered - END), Schedule 3 (Threatened - THR), Schedule 4 (Special Concern - SC)

[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 (Critacally 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 August 2011.

[5] References:

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APPENDIX C

Photo Log

Photo 1: Agricultural soya field (AGRC-R) at north end of the site.

Photo 2: Agricultural winter wheat field (AGRC-R) at south end of the site.

Photo 3: Aquatic station 1, north end of the site (municipal drain).

Photo 4: Aquatic station 2, central portion of the site.

Photo 5: Aquatic station 3, west-central portion of the site.

Photo 6: Mixed Meadow (CUM1-1) and Fresh Poplar Deciduous Forest (FOD 3-1), south end of site.

Photo 7: Mixed Meadow (CUM1-1), south end of site.

Photo 8: Deciduous Thicket - Mixed Meadow Complex (CUT/CUM), west-central portion of the site.

Photo 9: Open Woodland (CUW), south-east corner of the site.

Photo 10: Flooded quarry lake in south-east corner of the site.

Photo 11: Fresh- Moist Poplar Forest (FOD8-1), west-central portion of the site.

Photo 12: Forest (FOD/SWD) adjacent to site, at the north end.

APPENDIX D

Wildlife Recorded on the Site

Common Name	Scientific Name	Survey Type[1]	S-Rank[2]	G-Rank[2]	SARA[3] (Sch 1)	ESA[4]	COSEWIC[5]
Dragonflies and butterflies (17 species)							
American copper	*Lycaena phlaeas*	I	S4	G5	—	—	—
Autumn meadowhawk	*Sympetrum vicinum*	I	S5	G5	—	—	—
Beaverpond baskettail	*Epitheca canis*	I	S5	G5	—	—	—
Cabbage white	*Pieris rapae*	I	SNA	G5	—	—	—
Canada darner	*Aeshna canadensis*	I	S5	G5	—	—	—
Canada tiger swallowtail	*Papilio canadensis*	I	S5	G5	—	—	—
Clouded sulphur	*Colias philodice*	I	S5	G5	—	—	—
Common ringlet	*Coenonympha tullia*	I	S5	G5	—	—	—
Common wood nymph	*Cercyonis pegala*	I	S5	G5	—	—	—
Dot-tailed whiteface	*Leucorrhinia intacta*	I	S5	G5	—	—	—
Dun skipper	*Euphyes vestris*	I	S5	G5	—	—	—
Hobomok skipper	*Poanes hobomok*	I	S5	G5	—	—	—
Monarch	*Danaus plexippus*	I	S2N, S4B	G5	SC	SC	SC
Orange sulphur	*Colias eurytheme*	I	S5	G5	—	—	—
Viceroy	*Limenitis archippus*	I	S5	G5	—	—	—
White-faced meadowhawk	*Sympetrum obtrusum*	I	S5	G5	—	—	—
Widow skimmer	*Libellula luctuosa*	I	S5	G5	—	—	—
Herpetofauna (6 species)							
American toad	*Anaxyrus (Bufo) americanus*	T	S5	G5	—	—	—
Eastern gartersnake	*Thamnophis sirtalis*	I	S5	G5T5	—	—	—
Green frog	*Lithobates (Rana) clamitans*	T	S5	G5	—	—	—
Gray treefrog	*Hyla versicolor*	T	S5	G5	—	—	—
Red-bellied snake	*Storeria occipitomaculata*	I	S5	G5T5	—	—	—
Spring peeper	*Pseudacris crucifer*	T	S5	G5	—	—	—
Birds (47 species)							
Alder flycatcher	*Empidonax alnorum*	T	S5B	G5	—	—	—
American crow	*Corvus brachyrhynchos*	T	S5B	G5	—	—	—
American goldfinch	*Carduelis tristis*	T	S5B	G5	—	—	—
American robin	*Turdus migratorius*	T	S5B	G5	—	—	—
American woodcock	*Scolopax minor*	I	S4B	G5	—	—	—
Baltimore oriole	*Icterus galbula*	T	S4B	G5	—	—	—
Barn swallow	*Hirundo rustica*	T	S4B	G5	—	THR	THR
Black-capped chickadee	*Poecile atricapilla*	T	S5	G5	—	—	—

Common Name	Scientific Name	Survey Type[1]	S-Rank[2]	G-Rank[2]	SARA[3] (Sch 1)	ESA[4]	COSEWIC[5]
Blue jay	*Cyanocitta cristata*	T	S5	G5	—	—	—
Brown-headed cowbird	*Molothrus ater*	T	S4B	G5	—	—	—
Canada goose	*Branta canadensis*	T	S5	G5	—	—	—
Cedar waxwing	*Bombycilla cedrorum*	T	S5B	G5	—	—	—
Chipping sparrow	*Spizella passerina*	T	S5B	G5	—	—	—
Common grackle	*Quiscalus quiscula*	T	S5B	G5	—	—	—
Common raven	*Corvus corax*	T	S5	G5	—	—	—
Common yellowthroat	*Geothlypis trichas*	T	S5B	G5	—	—	—
Downy woodpecker	*Picoides pubescens*	T	S5	G5	—	—	—
Eastern kingbird	*Tyrannus tyrannus*	T	S4B	G5	—	—	—
European starling	*Sturnus vulgaris*	T	SNA	G5	—	—	—
Gray catbird	*Dumetella carolinensis*	T	S4B	G5	—	—	—
Hairy woodpecker	*Picoides villosus*	T	S5	G5	—	—	—
House wren	*Troglodytes aedon*	T	S5B	G5	—	—	—
Indigo bunting	*Passerina cyanea*	T	S4B	G5	—	—	—
Killdeer	*Charadrius vociferus*	T	S5B, S5N	G5	—	—	—
Least flycatcher	*Empidonax minimus*	T	S4B	G5	—	—	—
Mallard	*Anas platyrhynchos*	T	S5	G5	—	—	—
Marsh wren	*Cistothorus palustris*	T	S4B	G5	—	—	—
Mourning dove	*Zenaida macroura*	T	S5	G5	—	—	—
Northern flicker	*Colaptes auratus*	T	S4B	G5	—	—	—
Ovenbird	*Seiurus aurocapilla*	T	S4B	G5	—	—	—
Red-eyed vireo	*Vireo olivaceus*	T	S5B	G5	—	—	—
Red-tailed hawk	*Buteo jamaicensis*	I	S5	G5	—	—	—
Red-winged blackbird	*Agelaius phoeniceus*	T	S4	G5	—	—	—
Ring-billed gull	*Larus delawarensis*	T	S5B, S4N	G5	—	—	—
Rock pigeon	*Columba livia*	T	SNA	G5	—	—	—
Savannah sparrow	*Passerculus sandwichensis*	T	S4B	G5	—	—	—
Sedge wren	*Cistothorus platensis*	T	S4B	G5	—	—	—
Song sparrow	*Melospiza melodia*	T	S5B	G5	—	—	—
Spotted sandpiper	*Actitis macularia*	T	S5	G5	—	—	—
Tree swallow	*Tachycineta bicolor*	T	S4B	G5	—	—	—
Turkey vulture	*Cathartes aura*	T	S5B	G5	—	—	—
Vesper sparrow	*Pooecetes gramineus*	T	S4B	G5	—	—	—

Common Name	Scientific Name	Survey Type[1]	S-Rank[2]	G-Rank[2]	SARA[3] (Sch 1)	ESA[4]	COSEWIC[5]
Warbling vireo	*Vireo gilvus*	T	S5B	G5	—	—	—
Wild turkey	*Meleagris gallopava*	T	S5	G5	—	—	—
Willow flycatcher	*Empidonax traillii*	T	S5B	G5	—	—	—
Wilson's snipe	*Gallinago delicata*	I	S5B	G5	—	—	—
Yellow warbler	*Setophaga petechia*	T	S5B	G5	—	—	—
Mammals (10 species)							
Coyote	*Canis latrans*	I	S5	G5	—	—	—
Eastern chipmunk	*Tamias striatus*	I	S5	G5	—	—	—
Grey squirrel	*Sciurus carolinensis*	I	S5	G5	—	—	—
Meadow vole	*Microtus pennsylvanicus*	I	S5	G5	—	—	—
Moose	*Alces alces*	I	S5	G5	—	—	—
Muskrat	*Ondatra zibethicus*	I	S5	G5	—	—	—
Racoon	*Procyon lotor*	I	S5	G5	—	—	—
Striped skunk	*Mephitis mephitis*	I	S5	G5	—	—	—
White-tailed deer	*Odocoileus virginianus*	I	S5	G5	—	—	—
Woodchuck	*Marmota monax*	I	S5	G5	—	—	—
Fish (6 species)							
Bluntnose minnow	*Pimephales notatus*	T	S5	G5	—	—	—
Brassy minnow	*Hybognathus hankinsoni*	T	S5	G5	—	—	—
Brook stickleback	*Culaea inconstans*	T	S5	G5	—	—	—
Brown bullhead	*Ameiurus nebulosus*	T	S5	G5	—	—	—
Central mudminnow	*Umbra limi*	T	S5	G5	—	—	—
Creek chub	*Semotilus atromaculatus*	T	S5	G5	—	—	—

Notes:

[1] T = Observed during targeted survey; I = Incidental observation

[2] Ranks based upon determinations made by the Natural Heritage Information Centre (2015).

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

[3] *Species at Risk Act* (SARA), 2002. Schedule 1 (Last amended 17 Dec 2014); Part 1 (Extirpated), Part 2 (Endangered), Part 3 (Threatened), Part 4 (Special Concern).

[4] *Endangered Species Act* (ESA), 2007 (O.Reg 242/08 last amended 26 Nov 2014 as O.Reg 232/14). Species at Risk in Ontario List (O.Reg 230/08 last amended 31 Mar 2015 as O.Reg 66/15, s. 1.); Schedule 1 (Extirpated - EXP), Schedule 2 (Endangered - END), Schedule 3 (Threatened - THR), Schedule 4 (Special Concern - SC).

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

APPENDIX E

Vascular Plants Recorded on Site

Vascular Plants Observed in the Study Area

Scientific Name[a]	Common Name[b]	Origin[b]	G Rank[c]	S Rank[c]	SARA[d]	ESA[e]
Acer negundo	Manitoba maple	(N)	G5	S5	–	–
Acer rubrum	Red maple	N	G5	S5	–	–
Acer saccharinum	Silver maple	N	G5	S5	–	–
Acer saccharum	Sugar maple	N	G5	S5	–	–
Achillea millefolium	Common yarrow	I	G5T5?	SNA	–	–
Agalinis paupercula	Purple gerardia	N	G5	S4S5	–	–
Agrimonia gryposepala	Common agrimony	N	G5	S5	–	–
Agrostis stolonifera	Creeping bent	I	G5	S5	–	–
Alisma triviale	Small-flowered water plantain	N	G5	S5	–	–
Alnus incana	Speckled alder	N	G5	S5	–	–
Ambrosia artemisiifolia	Ragweed	N	G5	S5	–	–
Anemone cylindrica	Thimbleweed	N	G5	S4	–	–
Apocynum androsaemifolium	Spreading dogbane	N	G5	S5	–	–
Arctium minus	Common burdock	I	GNR	SNA	–	–
Asclepias incarnata	Swamp milkweed	N	G5	S5	–	–
Asclepias syriaca	Common milkweed	N	G5	S5	–	–
Betula papyrifera	White birch	N	G5	S5	–	–
Bidens frondosa	Beggar-ticks	N	G5	S5	–	–
Bromus inermis	Smooth brome	I	GNR	SNA	–	–
Carex bebbii	Bebb's sedge	N	G5	S5	–	–
Carex spp.	Sedges	N	?	?	–	–
Carex stipata	Awl-fruited sedge	N	G5	S5	–	–
Carex vulpinoidea	Fox sedge	N	G5	S5	–	–
Chenopodium album	Lamb's-quarters	I	G5T5	SNA	–	–
Circaea lutetiana	Enchanter’s nightshade	N	G5	S5	–	–
Cirsium arvense	Canada thistle	I	GNR	SNA	–	–
Cirsium vulgare	Bull thistle	I	GNR	SNA	–	–
Clematis virginiana	Virgin's-bower	N	G5	S5	–	–
Clinopodium vulgare	Wild basil	N	G5	S5	–	–
Clintonia borealis	Blue-bead lily	N	G5	S5	–	–
Conyza canadensis	Horseweed	N	G5	S5	–	–
Cornus stolonifera	Red osier dogwood	N	G5	S5	–	–
Crataegus	Hawthorn	N	G5	?	–	–
Dactylis glomerata	Orchard grass	I	GNR	SNA	–	–
Daucus carota	Wild carrot	I	GNR	SNA	–	–
Dichanthelium acuminatum	Small panic grass	N	G5T5	S4S5	–	–
Dichanthelium sp.	Panic grass	N	?	?	–	–
Digitaria sanguinalis	Large crab-grass	I	G5	SNA	–	–
Doellingeria umbellata	Flat-topped aster	N	G5T5	S5	–	–

Vascular Plants Observed in the Study Area

Scientific Name[a]	Common Name[b]	Origin[b]	G Rank[c]	S Rank[c]	SARA[d]	ESA[e]
Echinochloa crusgalli	Barnyard grass	I	GNR	SNA	—	—
Echium vulgare	Viper's bugloss	I	GNR	SNA	—	—
Elymus repens	Quack grass	I	GNR	SNA	—	—
Epipactis helleborine	Helleborine	I	GNR	SNA	—	—
Equisetum arvense	Field horsetail	N	G5	S5	—	—
Erigeron annuus	Daisy fleabane	N	G5	S5	—	—
Erigeron philadelphicus	Philadelphia fleabane	N	G5	S5	—	—
Erysimum cheiranthoides	Wormseed mustard	I	G5	SNA	—	—
Eupatorium perfoliatum	Boneset	N	G5	S5	—	—
Euthamia graminifolia	Grass-leaved goldenrod	N	G5	S5	—	—
Eutrochium maculatum	Joe-pye weed	N	G5TNR	S5	—	—
Fragaria virginiana	Common strawberry	N	G5	S5	—	—
Fraxinus americana	White ash	N	G5	S5	—	—
Hemerocallis fulva	Orange daylily	I	GNA	SNA	—	—
Hieracium aurantiacum	Orange hawkweed	I	GNR	SNA	—	—
Hieracium piloselloides	King devil	I	GNR	SNA	—	—
Hordeum jubatum	Foxtail barley	I	G5T5	SNA	—	—
Hypericum perforatum	Common St. John’s-wort	I	GNR	SNA	—	—
Impatiens capensis	Spotted jewelweed	N	G5	S5	—	—
Juncus effusus	Soft rush	N	G5	S5	—	—
Juncus spp.	Rushes	N	?	?	—	—
Lemna minor	Duckweed	N	G5	S5	—	—
Leonurus cardiaca	Common motherwort	I	GNR	SNA	—	—
Leucanthemum vulgare	Ox-eye daisy	I	GNR	SNA	—	—
Linaria vulgaris	Butter-and-eggs	I	GNR	SNA	—	—
Lonicera tatarica	Tartarian honeysuckle	I	GNR	SNA	—	—
Lycopus americanus	American water-horehound	N	G5	S5	—	—
Lycopus uniflorus	Northern water-horehound	N	G5	S5	—	—
Lythrum salicaria	Purple loosestrife	I	G5	SNA	—	—
Matricaria discoidea	Pineapple-weed	I	G5	SNA	—	—
Medicago lupulina	Black medick	I	GNR	S5	—	—
Medicago sativa	Alfalfa	I	GNR	S5	—	—
Melilotus alba	White sweet clover	I	G5	SNA	—	—
Najas flexilis	Slender naiad	N	G5	S5	—	—
Oenothera biennis	Common evening-primrose	N	G5	S5	—	—
Onoclea sensibilis	Sensitive fern	N	G5	S5	—	—
Panicum capillare	Witch grass	N	G5	S5	—	—
Panicum sp.	Panic grass	N	?	?	—	—
Parthenocissus inserta	Virginia creeper	N	G5	S5	—	—

Vascular Plants Observed in the Study Area

Scientific Name[a]	Common Name[b]	Origin[b]	G Rank[c]	S Rank[c]	SARA[d]	ESA[e]
Pastinaca sativa	Parsnip	I	GNR	SNA	—	—
Phalaris arundinacea	Reed canary grass	N	G5	S5	—	—
Phleum pratense	Timothy	I	GNR	SNA	—	—
Plantago lanceolata	Narrow-leaved plantain	I	G5	SNA	—	—
Plantago major	Common plantain	I	G5	SNA	—	—
Poa compressa	Canada bluegrass	I	GNR	SNA	—	—
Poa pratensis	Kentucky bluegrass	I	G5T5?	SNA	—	—
Populus balsamifera	Balsam poplar	N	G5	S5	—	—
Populus deltoides	Eastern cottonwood	N	G5T5	S5	—	—
Populus tremuloides	Trembling aspen	N	G5	S5	—	—
Potentilla argentea	Silvery cinquefoil	I	GNR	SNA	—	—
Potentilla norvegica	Rough cinquefoil	I	G5	S5	—	—
Potomogeton spp.	Pondweeds	N	?	?	—	—
Prunella vulgaris	Heal-all	N	G5T5	S5	—	—
Prunus pensylvanica	Pin cherry	N	G5	S5	—	—
Prunus virginiana	Choke cherry	N	G5	S5	—	—
Quercus macrocarpa	Bur oak	N	G5	S5	—	—
Rhamnus cathartica	Common buckthorn	I	GNR	SNA	—	—
Rhamnus frangula	Glossy buckthorn	I	GNR	SNA	—	—
Rhus radicans	Poison-ivy	N	G5T5	S5	—	—
Rhus typhina	Staghorn sumac	N	G5	S5	—	—
Ribes americanum	Wild black currant	N	G5	S5	—	—
Rubus idaeus	Red raspberry	N	G5T5	S5	—	—
Rudbeckia hirta	Black-eyed susan	N	G5	S5	—	—
Rumex acetosella	Sheep sorrel	I	GNR	SNA	—	—
Rumex crispus	Curled dock	I	GNR	SNA	—	—
Salix bebbiana	Beaked willow	N	G5	S5	—	—
Salix discolor	Pussy willow	N	G5	S5	—	—
Salix petiolaris	Slender willow	N	G5	S5	—	—
Schoenoplectus tabernaemontani	Softstem bulrush	N	G5	S5	—	—
Scirpus atrovirens	Green bulrush	N	G5?	S5	—	—
Scirpus cyperinus	Wool-grass	N	G5	S5	—	—
Setaria pumila	Yellow foxtail	I	GNR	SNA	—	—
Silene vulgaris	Bladder campion	I	GNR	SNA	—	—
Sinapis arvensis	Charlock	I	GNR	SNA	—	—
Sisyrinchium montanum	American blue-eyed grass	N	G5	S5	—	—
Solanum dulcamara	Climbing nightshade	I	GNR	SNA	—	—
Solidago canadensis	Canada goldenrod	N	G5T5	S5	—	—
Solidago juncea	Early goldenrod	N	G5	S5	—	—

Vascular Plants Observed in the Study Area

Scientific Name[a]	Common Name[b]	Origin[b]	G Rank[c]	S Rank[c]	SARA[d]	ESA[e]
Solidago nemoralis	Gray goldenrod	N	G5T5	S5	–	–
Solidago rugosa	Rough goldenrod	N	G5	S5	–	–
Sonchus arvensis	Common sow-thistle	I	GNR	SNA	–	–
Sonchus asper	Spiny sow-thistle	I	GNR	SNA	–	–
Spiraea alba	Meadowsweet	N	G5	S5	–	–
Symphoricarpos albus	Snowberry	N	G5T5	S4S5	–	–
Symphyotrichum cordifolium	Heart-leaved aster	N	G5	S5	–	–
Symphyotrichum lanceolatum	Panicled aster	N	G5T5	S5	–	–
Symphyotrichum lateriflorum	Calico aster	N	G5T?	S5	–	–
Symphyotrichum novae-angliae	New England aster	N	G5	S5	–	–
Symphyotrichum puniceum	Red-stemmed aster	N	G5	S5	–	–
Taraxacum officinale	Common dandelion	I	G5	SNA	–	–
Thalictrum sp.	Meadow rue	N	G5	S5	–	–
Tilia americana	Basswood	N	G5	S5	–	–
Tragopogon dubius	Goat's-beard	I	GNR	SNA	–	–
Trifolium aureum	Yellow hop-clover	I	GNR	SNA	–	–
Trifolium pratense	Red clover	I	GNR	SNA	–	–
Trifolium repens	White clover	I	GNR	SNA	–	–
Typha latifolia	Common cattail	N	G5	S5	–	–
Ulmus americana	White elm	N	G5?	S5	–	–
Viburnum lentago	Nannyberry	N	G5	S5	–	–
Vicia cracca	Cow-vetch	I	GNR	SNA	–	–
Viola spp.	Violets	N	?	?	–	–
Vitis riparia	Riverbank grape	N	G5	S5	–	–

[a] *Scientific names follow Morton & Venn (1990) and published volumes of the Flora of North America (1993-2010).*

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

[c] *Ranks based upon determinations made by the Ontario Natural Heritage Information Centre (2015).*
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)

[d] *Canada Species at Risk Act (Schedule 1; checked August 2015)*

[e] *Ontario Endangered Species Act (O. Reg. 4/12 amending O.Reg.230/08; checked August 2015)*

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