

# NATURAL ENVIRONMENT REPORT (Level I & II)

Aggregate Resources Act Application Pike Pit, Municipality of Thames Centre 20 December 2020



# NATURAL ENVIRONMENT REPORT (Level I &II)

Aggregate Resources Act Application Pike Pit, Municipality of Thames Centre

#### Prepared for:

Thames Valley Aggregates Inc. 75 Blackfriars Street London, ON N6H 1K8

### Prepared by:

Terrastory Environmental Consulting Inc. 171 Glen Road Hamilton, ON L8S 3N2 905.745.5398

> Tristan Knight, M.E.S., M.Sc. Senior Ecologist | President

> > Project No.: 1944 20 December 2020

This report has been prepared by Terrastory Environmental Consulting Inc. (hereinafter "Terrastory") for the client. All information, conclusions, and recommendations contained in this report are subject to the scope and limitations set out in the agreement between Terrastory and the client and qualifications contained in this report. This report shall not be relied upon by any third parties without the prior written consent of Terrastory. Terrastory is not responsible for any injury, loss, or damages arising from improper use of this report by third parties. Excerpts of this report or alterations to this report taken without the authorization of Terrastory invalidates the report and any conclusions therein.



## TABLE OF CONTENTS

1	IN	TRO	DDUCTION	1
	1.1	Stu	dy Background	1
	1.2	Stu	dy Purpose	1
2	AF	PRC	OACH AND METHODS	2
	2.1	Bac	kground Biophysical Information Assessment	3
	2.2	Site	Assessments and Surveys	3
	2.3	Sign	nificance Assessment	5
	2.3	5.1	Definitions and Criteria	5
	2.3	5.2	Determination	6
	2.4	Eff	ects Assessment and Mitigation	6
	2.5	Nat	ural Heritage Policy Context	7
3	EX	KIST	ING BIOPHYSICAL CONDITIONS	8
	3.1	Lan	d-use and Landscape Setting	8
	3.2	Phy	sical Setting	8
	3.2	2.1	Bedrock Geology and Groundwater Resources	8
	3.2	2.2	Surficial Geology and Groundwater Resources	9
	3.2	2.3	Topography, Drainage, and Surface Water Features	9
	3.3	Ecc	ological Setting	10
	3.3	5.1	Vegetation Communities	10
	3.3	5.2	Vascular Plants	11
	3.3	5.3	Breeding Birds	11
	3.3	5.4	Bats	12
4	SIC	GNI	FICANCE ASSESSMENT	12
	4.1	Ide	ntified and Provincially Significant Wetlands	13
	4.2	Sign	nificant Woodlands	13
	4.3	Sign	nificant Wildlife Habitat	14
	4.3	5.1	Bat Maternity Colonies	14
	4.3	5.2	Reptile Hibernaculum	14
	4.3	5.3	Amphibian Breeding Habitats (Wetlands and Woodlands) and Movement Corrid	dors15
	4.3	5.4	Terrestrial Crayfish	15
	4.3	5.5	Eastern Wood-pewee	15
	4.3	5.6	Monarch	16
	4.3	<b>5.</b> 7	Yellow-banded Bumble Bee	16
	4.4	Hal	oitat of Endangered and Threatened Species	16

	4.4	4.1	Myotis Bats	16
	4.4	4.2	Barn Swallow	17
	4.4	4.3	Bobolink and Eastern Meadowlark	17
	4.5	Fisl	h Habitat	18
	4.6	Cou	unty Natural System	18
5	PI	HASI	NG, OPERATIONS, AND REHABILITATION PLANS	18
6	$\mathbf{E}$	FFEC	CTS ASSESSMENT AND MITIGATION	19
	6.1	Ide	ntified and Provincially Significant Wetlands	20
	6.2	Sign	nificant Woodlands	21
	6.3	Sign	nificant Wildlife Habitat	22
	6.4	Hal	bitat of Endangered and Threatened Species	23
	6.5	Fisl	h Habitat	23
	6.6	Nat	tural Environment Technical Recommendations	24
7	Al	PPLI	CABLE NATURAL HERITAGE AND ENVIRONMENTAL POLICIES	25
	7.1	Mu	nicipality of Thames Centre Official Plan (October 2020 consolidation)	25
	7.2	Mic	ldlesex County Official Plan (2006 consolidation)	27
	7.3	Agg	gregate Resources Act, R.S. O. 1990, c. A.8	27
	7.4	Pro	vincial Policy Statement 2020, pursuant to the Planning Act, R.S.O. 1990, c. P. 13	29
	7.5	Pro	vincial Endangered Species Act, S.O. 2007, c. 6	29
	7.6	Fed	leral Fisheries Act, R.S.C. 1985, c. F-14	30
	7.7	Fed	leral Migratory Birds Convention Act, S.C. 1994, c. 22	30
8	C	ONC	LUSIONS	30
9	R	EFEI	RENCES	32
F	iguı	res		and Eastern Meadowlark
			cation of the Subject Property.	34
	0			
Ί	able	es		
			kground Biophysical Information Acquired and Reviewed.	
T	able 2	2. Site	Assessments and Ecological Surveys performed within the Subject Property	4
T	able 3	<b>3.</b> Ap <sub>1</sub>	plicable Natural Heritage Policies	8
			nmary of the Assessment of Significant Natural Features within the Subject Property	y 13

#### TERRASTORY

environmental consulting inc.

### **Appendices**

Appendix 1. Curriculum Vitae

Appendix 2. Representative Photographs

Appendix 3. Vascular Plant List

**Appendix 4.** Breeding Bird Survey Results

Appendix 5. Significant Wildlife Habitat Assessment

Appendix 6. Endangered and Threatened Species Assessment

Appendix 7. Site, Operations, Phasing and Final Rehabilitation Plans

#### 1 INTRODUCTION

#### 1.1 Study Background

Terrastory Environmental Consulting Inc. (hereinafter "Terrastory") was retained by Thames Valley Aggregates Inc. (hereinafter "the Applicant") to prepare this Level I & II Natural Environment Report (NER) in support of a Category 1, Class A pit application pursuant to the *Aggregate Resources Act* (ARA) in the Municipality of Thames Centre (hereinafter "the Municipality"). The extraction area is referred to as "Pike Pit". The lands proposed for licensing are situated within an approximately 21 hectare (54 acre) parcel located at the southwest corner of Gore Road and Hunt Road. The Subject Property is currently designated Agricultural per Schedule A of the Municipality's Official Plan (OP) and also zoned Agricultural per Map 38 of Zoning By-law No. 75-2006. The location of the Study Area within its broader landscape setting is shown in **Figure 1**.

The following terminology is employed throughout this NER to describe certain noteworthy areas and features which are shown spatially on **Figure 1**.

- **Site** proposed area to be licensed.
- **Subject Property** parcel/property in which the ARA licence is situated (equivalent to the "Site" for this application).
- Adjacent Lands areas within 120 meters of the Subject Property/Site.
- **Study Area** Site, Subject Property, and Adjacent Lands collectively.
- **Northern Woodlot** approximately 2.5 hectare complex of deciduous woodland and wetland along Gore Road.
- **Southern Woodlot** approximately 1.4 hectare deciduous woodland at the southwest corner of the Subject Property.

The licence application includes a 21 ha licensed area and 16.30 ha extraction area. The operations plan consists of five (5) phases of extraction/rehabilitation (A-E) which commence from a 0 m setback along the southern limit of the Site and proceed northward. The Site will remain in agricultural use until extraction commences. All phases will involve below-water extraction. Portable processing equipment will be shifted to accommodate different phases of aggregate extraction. Entrance to and exit from the Site will be gained from Hunt Road.

#### 1.2 Study Purpose

This Level I & II NER has been prepared to address the requirements of the ARA and its associated regulation (O. Reg. 244/97) and policy standards. ARA licence applications must be made in accordance with the Provincial Standards (i.e., Aggregate Resources of Ontario: Provincial Standards, Version 1.0) per section 7 of O. Reg. 244/97. The Provincial Standards for Category 1, Class A pit licences require the submission of a supporting NER which may be either a Level I or II assessment depending upon the natural features present on or within 120 of the Site. "Site" is defined per section 1 of the ARA as "the land or land under water to which a licence or permit or an application therefor relates".

Per MNRF's Natural Environment Report Standards policy document (No. A.R. 2.01.07; OMNR 2006), the purpose of a Level I NER is to describe the existing natural environmental conditions on

Project No.: 1944

and within 120 m of the Site, and to determine whether any of the following natural features are present:

- Significant Wetlands;
- Habitat of Endangered and Threatened Species;
- Significant Areas of Natural and Scientific Interest (ANSIs);
- Significant Woodlands (south and east of the Canadian Shield);
- Significant Valleylands (south and east of the Canadian Shield);
- Significant Wildlife Habitat (SWH); and,
- Fish Habitat

When any of the above natural features are identified through a Level I NER, a Level II NER is required to assess the potential for negative impacts on the identified significant natural feature(s). If potential impacts are identified, the Level II NER must provide recommendations for appropriate preventative, mitigative, and remedial measures. As certain significant natural features were known within the Site at project commencement, this NER satisfies the requirements for both a Level I and II assessment.

In addition to satisfying ARA requirements, this NER is also submitted in support of the Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) applications to the Municipality to facilitate aggregate extraction. This NER further considers and assesses the consistency of the licence application with other applicable natural heritage policies including the Provincial Policy Statement (PPS), provincial *Endangered Species Act* and federal *Fisheries Act*.

#### 2 APPROACH AND METHODS

This study is composed of five (5) discrete components which are bulleted below and further described in the following sections.

- Acquire background biophysical information and mapping available for the Study Area and local landscape (see Section 2.1).
- Conduct site assessments and ecological surveys to field-verify the accuracy of the acquired background biophysical information and collect additional biophysical information as necessary (see Section 2.2).
- Assess the significance of the biophysical information collected and natural features identified within the context of applicable natural heritage and environmental policies (see Section 2.3).
- **Predict the effects** of the application on the identified significant natural features and natural environment, particularly the net effects once mitigation measures and technical recommendations are implemented (see **Section 2.4**).
- Determine whether the proposed application addresses applicable natural heritage and environmental policies at municipal, provincial, and federal levels (see Section 2.5).

All items associated with the preparation of this Level I & II NER – including background information gathering, site assessments and surveys, graphics, and reporting – were undertaken by Terrastory's Senior Ecologist/President (T. Knight). A curriculum vitae is provided in **Appendix 1**.

Project No.: 1944

### 2.1 Background Biophysical Information Assessment

This study is supported by background biophysical information and mapping acquired and reviewed from a variety of sources which are listed below in **Table 1**.

Table 1. Background Biophysical Information Acquired and Reviewed.

Type of Information Acquired	Description
Ortho-rectified Aerial Photographs	• 1954, 2006, 2009, 2012-2013, 2015-2018.
Natural Feature Mapping	Municipality of Thames Centre Official Plan (October 2020) Schedules.
	• County of Middlesex Official Plan (2006 consolidation) Schedules.
	• Land Information Ontario (LIO) accessed via MNRF's "Make a Map" web-based platform (accessed 6 November 2020).
	• Upper Thames River Conservation Authority (UTRCA) regulation mapping (accessed 6 November 2020).
Physiographic Resource	Topographic Survey of the Subject Property.
Mapping and Datasets	• Ontario Base Mapping produced by MNR (1:10,000) with 5 m contours.
	Ontario Well Records (publicly-available).
	• The Soils of Middlesex County (Hagerty and Kingston 1992).
	Agricultural Information Atlas (accessed 6 November 2020).
	• Paleozoic Geology of Southern Ontario (Armstrong and Dodge 2007).
	Surficial Geology of Southern Ontario (Ontario Geological Survey 2010).
	• Physiography of Southern Ontario (Chapman and Putnam 1984).
Ecological Resource Mapping and Datasets	• Natural Heritage Information Centre (NHIC) database accessed via MNRF's "Make a Map" web-based platform (squares: 17MH9864, 17MH9964, 17MH9863, 17MH9963, 17MH9862; accessed 6 November 2020).
	• iNaturalist "(NHIC) Rare species of Ontario" project (accessed 6 November 2020).
	• iNaturalist "Herps of Ontario" project (accessed 6 November 2020).
	• Ontario Breeding Bird Atlas (OBBA) database and the Atlas of the Breeding Birds of Ontario, 2001–2005 (Cadman et al. 2007) (square: 17MH96).
	• Ontario Butterfly Atlas database (square: 17MH96; accessed 6 November 2020).
	• Aquatic Species at Risk Maps by Fisheries and Oceans Canada (accessed 6 November 2020).
	• Atlas of the Mammals of Ontario (Dobbyn 2005).
Natural Heritage	Middlesex Natural Heritage Systems Study (UTRCA 2014).
Objectives and Strategies	• Dorchester Corridor Watershed Report Card (UTRCA 2017).
	<ul> <li>Great Lakes Conservation Blueprint for Terrestrial Biodiversity, Volume 2 (Henson and Brodribb 2005).</li> </ul>
	<ul> <li>Great Lakes Conservation Blueprint for Aquatic Biodiversity, Volume 2 (Phair et al. 2005)</li> </ul>

### 2.2 Site Assessments and Surveys

The acquired background information per **Table 1** helped direct several site assessments and surveys carried out by Terrastory staff (T. Knight). Additional site assessments and surveys were undertaken within the Southern Woodlot by others (MTE Engineering) as commissioned and

coordinated directly by the Applicant. **Table 2** below indicates the primary assessments/surveys performed during each site visit, weather conditions, and time on-site.

**Table 2.** Site Assessments and Ecological Surveys performed within the Subject Property.

Date	Assessments/Surveys Performed	Company (Staff)	Weather Conditions	Time On- site
24 May 2019	Site reconnaissance, stick nest survey, breeding bird survey #1, spring vascular plant survey.	Terrastory (Γ. Knight)	Air temperature 11-19°C, Beaufort wind 0-3; cloud cover 0-80%, no precipitation.	7:15-12:30
1 July 2019	Breeding bird survey #2, summer vascular plant survey, Ecological Land Classification.	Terrastory (Γ. Knight)	Air temperature 16-18°C, Beaufort wind 0-1; cloud cover 0-10%, no precipitation.	7:15-11:30
9 August 2019	Ecological Land Classification, late-summer vascular plant survey, natural feature delineation.	Terrastory (T. Knight)	Clear, hot.	9:30-15:00
27 September 2019	Vascular plant survey.	MTE ("WH"?)	n/a	n/a
18 November 2019	Bat maternity roost assessment.	MTE ("E.B., L.M.")	n/a	n/a
16 May 2020	Review of standing water conditions in the Northern Woodlot.	Terrastory (T. Knight)	Clear, warm.	13:30
5-19 June 2020	Bat acoustic monitoring (Southern Woodlot only).	MTE (H. Arsenault)	n/a	n/a
"August 2020"	American Ginseng survey.	MTE (L. McKay, ?)	n/a	n/a

The site assessments and surveys centred on characterizing the land use (e.g., historical development patterns, existing built features, land maintenance, etc.), physiographic (e.g., topography, drainage, surface water features, etc.), and ecological (e.g., vegetation, wildlife, habitats, etc.) conditions and features of the Subject Property and (where appropriate) Adjacent Lands. All land-use, physiographic, and ecological information described for Adjacent Lands was collected from either current aerial photographs or observations from inside the Subject Property and/or publicly-accessible areas (e.g., rights-of-way, etc.). The locations and boundaries of significant natural features and/or habitats were recorded on-site with a high-accuracy GPS (Mesa II) supported by representative photographs.

In addition to collecting general biophysical information, the following targeted assessments (i.e., feature- or species-specific surveys) were undertaken:

- Vegetation Mapping according to Ecological Land Classification (ELC): Vegetation
  communities on the Subject Property were characterized and mapped according to Ecological Land
  Classification (Lee et al. 1998) and the 2008 update to the Vegetation Type List (Lee 2008). Vegetation
  communities were initially identified based on current aerial photographs and then verified and refined
  (as necessary) on-site. ELC mapping was scaled to the finest level of resolution deemed appropriate (i.e.,
  either Ecosite or Vegetation Type). Vegetation communities mapped on Adjacent Lands were
  delineated predominantly via aerial photograph interpretation.
- Wetland Boundaries: Where wetlands were identified via ELC, their boundaries were delineated
  consistent with the "50% wetland vegetation rule" and presence of hydric soils per the procedures of
  the Ontario Wetland Evaluation System (OWES) (OMNRF 2014). All wetlands mapped on Adjacent
  Lands were delineated via aerial photograph interpretation.
- Vascular Plant Survey: Vascular plants were recorded based on a comprehensive area search
   ("wandering transects") within naturally-occurring (i.e., non-planted) or naturalizing areas of vegetation.
   Particular effort was paid to areas with the greatest potential to support significant vascular plants (i.e.,
   designated Species at Risk, provincially rare, etc.) and areas with the greatest potential for impact based
   on the proposed development plan. Nomenclature and common names for the recorded vascular plant
   species are generally consistent with the Southern Ontario Vascular Plant Species List (Bradley 2013)
   except where a name change has more recently been adopted by NHIC.
- Breeding Bird Surveys according to the Ontario Breeding Bird Atlas Protocol: Two rounds of breeding bird surveys were conducted in accordance with the Ontario Breeding Bird Atlas (OBBA) protocol (Bird Studies Canada et al. 2001). Surveys occurred within the appropriate season (May 24–July 10), time of day (between dawn and approximately 5 hours after dawn), and weather conditions (no rain, wind speed ≤3 on the Beaufort Wind Scale). While the OBBA protocol recommends that stations be situated at least 300 m apart (to avoid double counting), the stations established herein were often closer together to ensure more comprehensive survey coverage. Surveys occurred for a minimum duration of 10 minutes at each station.
- Bat Roosting Habitat Assessment and Ultrasonic Acoustic Monitoring: A targeted bat habitat
  survey within the Southern Woodlot focusing on identifying candidate maternity roost sites was
  undertaken by others (MTE) in fall 2019. Ultrasonic acoustic monitors were also deployed by others in
  2020 to document the local bat community. Terrastory requested but has not received the raw data files
  associated with bat ultrasonic monitoring by others.

#### 2.3 Significance Assessment

#### 2.3.1 Definitions and Criteria

"Significant natural features" as described herein represent natural features and habitats that have recognized status (and therefore policy significance) within the planning jurisdiction in which an application is proposed. Significant natural features are defined herein to include those outlined in the Natural Environment Report Standards policy document (No. A.R. 2.01.07; OMNR 2006), namely:

- Significant Wetlands;
- Habitat of Endangered and Threatened Species;
- Significant Areas of Natural and Scientific Interest (ANSIs);

- Significant Woodlands (south and east of the Canadian Shield);
- Significant Valleylands (south and east of the Canadian Shield);
- Significant Wildlife Habitat (SWH); and
- Fish Habitat

It is noted that the County OP provides provisions that consider and/or protect additional natural features beyond the requirements of the ARA Provincial Standards. The potential presence of these regionally significant features are outlined in section 2.2.1.1 of the County OP and include:

- Natural Hazards (e.g., steep slopes, unstable soils, fill regulated areas);
- Natural Environment Areas (e.g., floodplains, flood regulated watercourses, wetlands);
- Natural Heritage Features (e.g., significant woodlands, wildlife habitat, aquatic ecosystems, river, stream, ravines, and upland corridors, ANSIs, etc.); and
- Groundwater Features (e.g., recharge areas, discharge/headwater areas, well-head protection areas).

Criteria used to determine the presence or absence of the above significant natural features within the Study Area were considered from a variety of sources including the Natural Heritage Reference Manual (MNR 2010a) and (for Significant Wildlife Habitat) the Ecoregion 7E Criteria Schedule (MNRF 2015).

Like significant natural features, "significant species" represent individuals of wild species which have recognized status (and therefore policy significance) within the planning jurisdiction in which an application is proposed. Significant species are defined herein to include:

- Species designated Endangered, Threatened, or Special Concern under O. Reg. 230/08 pursuant to the provincial *Endangered Species Act*, 2007.
- Species designated Provincially Rare (i.e., S1, S2, or S3) by NHIC.
- Species considered Regionally Rare in Middlesex County pursuant to the *List of the V ascular Plants of Ontario's Carolinian Zone* (Oldham 2017).

#### 2.3.2 Determination

After collecting the background biophysical information and conducting the site assessments the data was interpreted to determine whether any significant natural features and/or significant species occur within the Study Area. If a natural feature or species met the significance criteria, it is considered "confirmed". If a natural feature or species may be present within the Study Area and/or Adjacent Lands given the prevailing biophysical or habitat conditions but was not confirmed based on either background or site-specific biophysical data, it is considered potential or "candidate". Candidate significant natural features and species are treated as confirmed where no additional information is available.

#### 2.4 Effects Assessment and Mitigation

The potential ecological effects of an application can be understood spatially as zones that radiate outward from the direct project footprint (e.g., building envelope, etc.) and associated areas of site

alteration (e.g., grading, etc.). While the greatest potential for effects typically occurs within areas directly subject to development or disturbance, surrounding areas may also be affected indirectly. Such indirect effects can include light or noise pollution that affects wildlife communities on Adjacent Lands, or degradation of water quality within a downstream receptor resulting from sediment runoff during extraction.

The following five-pronged approach is employed herein to assess the effects of an application on significant natural features and species and (where warranted) the natural environment in general:

- Scope the effects assessment to environmental components that warrant consideration. The effects
  assessment herein centres principally on significant natural features and species (i.e., those that have
  policy significance within the planning jurisdiction, as defined in Section 2.3) but may also consider
  general environmental effects where warranted.
- 2. Identify the predicted direct and indirect effects of the application on each significant natural feature or species during all project stages (i.e., pre- to -post-development) in the absence of mitigation. Direct effects are those where there is a cause-effect relationship between a proposed activity and an effect on a natural feature or species (e.g., tree clearance within a building footprint, etc.). Indirect effects result when an activity is linked to a direct effect through a chain of foreseeable interactions or steps.
- 3. **Evaluate the significance** of the predicted effects for each environmental component based on their attributes (i.e., spatial extent, magnitude, timing, frequency, and duration) and likelihood (i.e., high, medium, low).
- 4. Where the potential for negative effects are anticipated, **recommend ecologically-meaningful mitigation measures** to avoid such impacts first (where possible), and where impacts cannot be avoided to minimize, compensate, and/or enhance as appropriate.
- 5. **Identify the predicted residual or net effect**s of the application assuming implementation of all recommended mitigation measures.

Per step 4, mitigation measures are offered where the potential for negative effects are anticipated to a degree that cannot be supported given the prevailing policy context. Whenever possible, Terrastory works iteratively with the project team as a means to identify extraction options that avoid negative effects first; options that would minimize or mitigate such negative effects are less preferred and considered secondarily. In general, avoidance measures that have already been incorporated into the application or project design are not duplicated as technical recommendations herein. The Site Plans (phasing, operations, and rehabilitation) are described in **Section 5** while the effects assessment and recommended mitigation measures are provided in **Section 6**.

#### 2.5 Natural Heritage Policy Context

There is an overlapping municipal, provincial, and federal policy framework respecting the protection of natural heritage features and areas across southern Ontario. These requirements include objectives, policies, and directives which are principally contained in federal and provincial statutes, regulations, policy statements, Official Plans, and guidance documents. The overarching natural heritage policy framework directing development activities within the Subject Property is outlined below in **Table 3**. A determination of whether the applications considered herein address such policies is provided in **Section 7**.

**Table 3.** Applicable Natural Heritage Policies.

Level of Government	Natural Heritage or Environmental Policy Requirements		
Municipal	Municipality of Thames Centre Official Plan (October 2020 consolidation).		
	County of Middlesex Official Plan (2006 consolidation).		
Provincial	Aggregate Resources Act (ARA), R.S.O. 1990, c. A.8, including		
	<ul> <li>Ontario Regulation 244/97 – General</li> <li>Provincial Standards of Ontario – Category 1, Class A Pit Below Water</li> <li>Natural Environment Report Standards (A.R. 2.01.07)</li> </ul>		
	Provincial Policy Statement 2020, pursuant to the Planning Act, R.S.O. 1990, c. P.13, including:		
	<ul> <li>Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005 (MNR 2010a).</li> <li>Significant Wildlife Habitat Technical Guide (MNR 2010b).</li> <li>Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF 2015)</li> <li>Significant Wildlife Habitat Mitigation Support Tool (MNRF 2014).</li> </ul>		
	Endangered Species Act (ESA), S.O. 2007, c. 6, including:		
	<ul> <li>Ontario Regulation 230/08 – Species at Risk in Ontario List.</li> <li>Ontario Regulation 242/08 – General.</li> </ul>		
	Fish and Wildlife Conservation Act, S.O. 1997, c. 41.		
Federal	Fisheries Act, R.S.C. 1985, c. F-14, including:		
	<ul> <li>Fish and Fish Habitat Protection Policy Statement (DFO 2019).</li> </ul>		
	<ul> <li>Migratory Birds Convention Act, S.C. 1994, c. 22, including:</li> <li>Migratory Birds Regulations, C.R.C., c. 1035.</li> </ul>		

#### 3 EXISTING BIOPHYSICAL CONDITIONS

The following is a description of the biophysical features and conditions of the Site, which are shown spatially on **Figure 2**. Representative photographs are provided in **Appendix 2**.

#### 3.1 Land-use and Landscape Setting

The Site is situated in a rural setting with a mixture of land-uses and land cover classes including agricultural fields (mostly cash crops), woodlots, and aggregate extraction areas. The communities of Dorchester (Thames Centre) and Thamesford (Zorra) occur to the southwest and northeast, respectively.

#### 3.2 Physical Setting

#### 3.2.1 Bedrock Geology and Groundwater Resources

The bedrock underlying the Subject Property is characterized as Devonian-aged (i.e., 458 to 470 million-year-old) fossiliferous limestone and minor dolostone associated with the Dundee Formation (Armstrong and Dodge 2007). In Ontario, the Dundee Formation subcrops (i.e., acts as the stratigraphic unit closest to the ground surface) from Long Point to the shoreline of Lake Huron across most of Huron County. Bedrock was not encountered at the Site in any borehole advanced as

part of the Hydrogeological Assessment (LDS Consultants Inc.) but is expected to be at an elevation of approximately 250-260 metres above sea level (masl), or roughly 25 m in depth, based on bedrock topography mapping.

### 3.2.2 Surficial Geology and Groundwater Resources

The Site is situated within the Oxford Till Plain physiographic region (Chapman and Putnam 1984) and overlaps with several surficial deposits (Ontario Geological Survey 2010). An area of ice-contact stratified gravel (with some sand, silt, and till) is mapped from the southern portion of the Subject Property. These deposits are of glaciofluvial origin. The central and northern portion of the Subject Property contains sand, silt, and clay deposits of glaciolacustrine origin which were laid down in a foreshore/basin environment beneath a glacial lake. A soils assessment in association with Ecological Land Classification vegetation mapping (see **Section 3.3.1**) confirmed the preponderance of sandy silt substrate in the Northern Woodlot area. A small portion of the northeast corner of the Subject Property is mapped as organic deposits associated with a wetland environment.

Boreholes advanced in support of the Hydrogeological Assessment revealed the preponderance of surficial till across the Subject Property. Till depth ranges in height from 1 m below the ground surface (BGS) at BH6 to 4 m BGS at BH2.

Based on the results of the Hydrological Assessment, a shallow groundwater aquifer was encountered and is generally characterized as unconfined due to the limited thickness and variable permeability of the overburden silt. The shallow groundwater aquifer generally flows in a southerly direction throughout the Site towards the excavated pit pond on Adjacent Lands to the south. Additional aquifers identified include an intermediate confined overburden aquifer (contained within outwash sands and gravel beneath underlying till) and a bedrock aquifer contained in the shale or limestone bedrock at a depth of 25 m or more.

#### 3.2.3 Topography, Drainage, and Surface Water Features

The Subject Property contains gently rolling topography and is situated between approximately 276-281 masl, with overall relief of 5 m. The 280-281 masl contour is associated with a slope crest situated in the southcentral and southeastern portions of the Subject Property. The 276 masl contour is associated with a lowland swamp within the Northern Woodlot.

An area of discrete surface water drainage flows westward through a swamp (see Section 3.3.1) in the Northern Woodlot. Surface drainage enters the Northern Woodlot via a 525 mm wide corrugated plastic culvert at Hunt Road, flows diffusely westward through the swamp, and exits the Subject Property via another corrugated plastic culvert beneath Gore Road. This drainage is not mapped as a distinct surface water feature within publicly-available aquatic resource or watercourse mapping. Following conveyance northward beneath Gore Road, the drainage enters the Norsworthy Drain and then flows westward for just over 2 kilometres before discharging into the Caddy Creek Municipal Drain east of Elgin Road.

The overall direction of surface runoff within the Site is indicated on **Figure 2** based on existing topographic information. There is an absence of significant surface erosion or swales within the agricultural portions of the Site, indicating that stormwater runoff likely tends to sheet flow off-site or is absorbed into the surficial soils.

#### 3.3 Ecological Setting

#### 3.3.1 Vegetation Communities

Vegetation communities overlapping with the Northern Woodlot, Southern Woodlot, and Adjacent Lands are described below and mapped in **Figure 2**.

#### 3.3.1.1 Northern Woodlot

The Northern Woodlot contains a variety of upland and wetland vegetation communities. The central portion of the Northern Woodlot contains deciduous swamp (SWDM4) dominated by Freeman's Maple (Acer x freemanii) with abundant Hybrid Crack Willow (Salix x fragilis). Portions of this community were observed to contain expansive standing water in the spring (see Photographs 9 and 10 in Appendix 2), which had dried out by mid-summer in 2019 (see Photograph 12 in **Appendix 2**). Eastern White Cedar (*Thuja occidentalis*), Green Ash (*Fraxinus pennsylvanica*), and White Elm (Ulmus americana) are occasional in this community and restricted to areas with less depth and duration of standing water. Thicket areas with dense Spicebush (Lindera benzoin) occur in places, while the herbaceous flora consists of Virginia Wild Rye (*Elymus virginiana*), Skunk Cabbage (Symplocarpus foetidus), and Fowl Meadow Grass (Glyceria striata). Marsh Marigold (Caltha palustris) is abundant in the western portion of the swamp in spring (see Photograph 10 in Appendix 2). Abutting the deciduous swamp is a meadow marsh (MAMM1-3) dominated by Reed-canary Grass (Phalaris arundinacea) with occasional Spotted Joe-pye Weed (Eutrochium maculatum), Wild Black Currant (Ribes americanum), Ostrich Fern (Matteucia struthiopteris), Fowl Meadow Grass, and Skunk Cabbage (see Photograph 12 in Appendix 2). As described in Section 3.2.2, surface water is conveyed to the deciduous swamp and meadow marsh from other identified wetlands to the east via a culvert beneath Hunt Road.

While surface water inputs to the wetland were confirmed during the 2019/2020 site assessments (based on visible flow entering and exiting the wetland via culverts at Hunt Road and Gore Road, respectively), this feature may also be supported by seasonal groundwater inputs. Monitoring well BH1 was situated in proximity to the Northern Woodlot at a ground surface elevation of 275.26 m based on the Hydrogeological Assessment (LDS Consultants Inc). The groundwater elevation within BH1 was found to be 0.15 m BGS on 5 March 2020. The ground surface elevation of the western portions of the deciduous swamp are around or slightly below the elevation of BH1, suggesting that the water table in the wetland was elevated and near (or at) the ground surface at this time. This indicates that at least a portion of the wetland in the Northern Woodlot may be supported by seasonal groundwater inputs (in addition to surface water inputs).

Upland forest/woodland communities occur on either side of the wetlands in the Northern Woodlot. The southwest corner consists of deciduous forest (FODM4) dominated by Sugar Maple (Acer saccharum) with lesser amounts of Black Cherry (Prunus serotina), Black Walnut (Juglans nigra), Red Oak (Quercus rubra), and Eastern White Pine (Pinus strobus). The shrub layer contains Choke Cherry (Prunus virginiana), Prickly Gooseberry (Ribes cynosbati), and regenerating White Ash (Fraxinus americana). The herbaceous layer contains Enchanter's Nightshade (Circaea canadensis), Virginia Creeper (Parthenocissus quinquefolia), and Jack-in-the-Pulpit (Arisaema triphyllum). The soils in this community were assessed as sandy silt. North of the wetland is a moist, open woodland (WODM5) dominated by Black Walnut with American Basswood (Tilia americana) and European Buckthorn (Rhamnus cathartica). Ostrich Fern, White Avens (Geum canadense), Rough-leaved Goldenrod (Solidago rugosa) are also common. East of the open woodland is a deciduous forest (FODM7) dominated by American Basswood with several associates including Black Walnut, Bitternut Hickory (Carya

cordiformis), Hackberry (Celtis occidentalis), and Glossy Buckthorn (Frangula alnus). A small, moist meadow dominated by Tall Goldenrod (Solidago altissima), Kentucky Bluegrass (Poa pratensis), Redtop (Agrostis gigantea), Panicled Aster (Symphyotrichum lanceolatum), and Dudley's Rush (Juncus dudleyi) abuts the southeast corner of the Northern Woodlot along Hunt Road.

#### 3.3.1.2 Southern Woodlot

The Southern Woodlot consists of a mature deciduous woodland (FODM5-9) dominated by Sugar Maple. Black Cherry (*Prunus serotina*), Ironwood (*Ostrya virginiana*), Bitternut Hickory (*Carya cordiformis*), and American Basswood are secondary associates, while Choke Cherry and European Buckthorn are the most commonly encountered shrubs. The extreme northern section of the forest contains dense carpets of Garlic Mustard (*Alliaria petiolata*), while the southerly areas contain a rich spring ephemeral flora including Wild Ginger (*Arisaema triphyllum*), Blue Cohosh (*Caulophyllum giganteum*), and Wild Leek (*Allium tricoccum*). The sedge flora is diverse and includes James' Sedge (*Carex jamesii*), Hitchcock's Sedge (*Carex hitchcockiana*), White Bear Sedge (*Carex albursina*), and Wood's Sedge (*Carex woodii*). The assemblage of summer herbaceous flora consists of Zig-zag Goldenrod (*Solidago flexicaulis*), Enchanter's Nightshade (*Circaea canadensis*), Herb Robert (*Geranium robertianum*), and Virginia Waterleaf (*Hydrophyllum virginianum*). The Southern Woodlot appears to have been recently logged and contains an old shed (use unknown; see Photograph 7 in **Appendix 2**).

A fencerow (TAGM5) extends northward from the Southern Woodlot along the western boundary of the Subject Property. This community contains a variety of deciduous tree species including Manitoba Maple (*Acer negundo*), Freeman's Maple, Black Cherry, and Hackberry.

#### 3.3.1.3 Adjacent Lands

Wetlands associated with the Provincially Significant North Dorchester Swamp (UT 24) occur on the north side of Gore Road. Minor updates to the wetland mapping based on aerial photograph interpretation are shown on **Figure 2**. Additional identified wetlands occur east of Hunt Road (both north and south of Gore Road). West and south of the Subject Property are lands that are currently (or formerly) used for aggregate extraction. The remaining Adjacent Lands are under agricultural uses.

#### 3.3.2 Vascular Plants

A total of 231 vascular plant species were recorded within the Subject Property (see **Appendix 3**). No provincially rare or species at risk vascular plants were documented. James' Sedge (*Carex jamesii*) was documented by Terrastory in the Southern Woodlot in several locations and while considered "Uncommon" in Middlesex County is rare across the Carolinian Zone (Oldham 2017).

#### 3.3.3 Breeding Birds

Breeding bird surveys were undertaken at five (5) stations on 24 May and 1 July 2019. A total of 41 bird species were recorded during the breeding bird surveys. One (1) additional bird species (Yellow-billed Cuckoo) was recorded incidentally during the course of other field activities (i.e., August 2019 site assessment). The assemblage and abundance of birds recorded generally reflects the prevailing structure and composition of on-site vegetation communities and variable habitats of the Study Area (e.g., forest, woodland, treed swamp, fencerow, tilled agricultural fields, etc.). The locations of each survey station are shown on **Figure 2** while the full survey results indicating each species' breeding status by survey station can be found in **Appendix 4**. The locations of significant bird species

recorded are shown on **Figure 2**. A general summary of the breeding bird communities present within the Study Area is provided below.

Station BB-1 was situated to capture breeding birds in the Southern Woodlot. Bird species considered confirmed or probable breeders in the Southern Woodlot include (amongst others) American Robin (*Turdus migratorius*), Brown-headed Cowbird (*Molothrus ater*), Eastern Wood-pewee (*Contopus virens*), Red-winged Blackbird (*Agelaius phoeniceus*), Song Sparrow (*Melospiza melodia*), Warbling Vireo (*Vireo gilvus*), and Yellow Warbler (*Setophaga petechia*). Stations BB-2 and BB-5 focused on the agricultural fields (including their treed margins) and Adjacent Lands. Birds documented as probable breeders at these stations include (amongst others) American Goldfinch (*Spinus tristis*), American Robin, Brown-headed Cowbird, European Starling (*Sturnus vulgaris*), House Sparrow (*Passer domesticus*), Killdeer (*Charadrius vociferus*), Red-winged Blackbird, Savannah Sparrow (*Passerculus sandwichensis*), and Song Sparrow. Stations BB-3 and BB-4 focused on the Northern Woodlot. Birds documented as probable breeders at these stations include (amongst others) American Goldfinch, American Robin, Baltimore Oriole (*Icterus galbula*), Common Yellowthroat (*Geothlypis trichas*), Grey Catbird (*Dumetella carolinensis*), Indigo Bunting (*Passerina cyanea*) Red-winged Blackbird, Song Sparrow, and Warbling Vireo.

Four (4) significant bird species were recorded during the targeted breeding bird surveys: Barn Swallow (*Hirundo rustica*), Bobolink (*Dolichonyx oryzivorus*), Eastern Meadowlark (*Sturnella magna*), and Eastern Wood-pewee. All documented locations of these species within the Study Area along with their habitat requirements are described in **Section 4.3**.

#### 3.3.4 Bats

Ultrasonic acoustic monitoring for bats was undertaken in the Southern Woodlot by others (see **Table 1**) through coordination directly with the Applicant. It is understood that one (1) unit was deployed from 5-19 June (exact location unknown) resulting in a total of 71 passes of Little Brown Myotis (*Myotis lucifugus*) over 12 of the 14 nights, and 3 passes of Northern Myotis (*Myotis septentrionalis*) over 2 of 14 nights. Terrastory notes that distinguishing between *Myotis* species based on spectral signatures alone is often not possible given significant overlap. It is further understood that a total of 1630 bat vocalizations ("passes") were recorded during the survey period; however, Terrastory has not received any raw data files which would permit assigning each recording to a particular bat species.

#### 4 SIGNIFICANCE ASSESSMENT

Based on the biophysical information collected during background information gathering (per **Table 1**) and the results of the site assessments and surveys (per **Sections 2.2** and **3**), **Table 4** below provides a determination of the presence (or potential presence) of each significant natural feature considered herein. Shaded rows denote features which were confirmed or may be present within the Subject Property or Adjacent Lands and are considered further as part of the effects assessment in **Section 5**. Significant natural feature mapping is provided in **Figure 3**.

**Table 4.** Summary of the Assessment of Significant Natural Features within the Subject Property and Adjacent Lands.

Significant Natural Feature	Status on the Subject Property	Status on Adjacent Lands (i.e., < 120 m from the Subject Property)			
Significant Natural Features per ARA Provincial Standards					
Significant Wetlands	Absent. See Section 4.1.	Present. See Section 4.1.			
Significant Woodlands	Present. See Section 4.2.	Present. See Section 4.2.			
Significant Valleylands	Absent.	Absent.			
Significant Wildlife Habitat	Confirmed/Candidate. See Section 4.3.	Candidate. See Section 4.3.			
Significant Areas of Natural and Scientific Interest	Absent.	Absent.			
Habitat of Endangered and Threatened Species (per ESA)	Present. See Section 4.4.	Present. See Section 4.4.			
Fish Habitat (per Fisheries Act)	Absent. See Section 4.5.	Candidate. See Section 4.5.			
County Natural System (certain components not considered by ARA Provincial Standards)					
Natural Hazards, Natural Environment Areas, Natural Heritage Features, Groundwater Features	Confirmed. See Section 4.6.	Confirmed. See Section 4.6.			

#### 4.1 Identified and Provincially Significant Wetlands

Identified wetlands are present within the Northern Woodlot including deciduous swamp and meadow marsh communities (see **Section 3.3.1**). Neither of these wetlands have been evaluated pursuant to the Ontario Wetland Evaluation System (OWES). While the identified/unevaluated wetlands are not considered significant natural features per the ARA Provincial Standards, they contain candidate Significant Wildlife Habitat (SWH; see **Section 4.3**) and form part of the County Natural System. Wetland units associated with the Provincially Significant North Dorchester Swamp (UT 24) occur on the north side of Gore Road. Additional identified wetlands also occur on Adjacent Lands east of Hunt Road (Township of Zorra).

An assessment of potential effects to identified and significant wetlands associated with the proposed pit operations plan is provided in **Section 6.1**.

#### 4.2 Significant Woodlands

The Northern Woodlot is a designated Significant Woodland per Schedule C of the County's OP. The dripline associated with the Northern Woodlot is shown on **Figure 3**. The Southern Woodlot is not mapped as a Significant Woodland per the Municipality's or County's OP Schedules and does not contain interior habitat (maximum width from dripline to dripline is approximately 130 m).

An assessment of potential effects to the Significant Woodland in the Northern Woodlot associated with the proposed pit operations plan is provided in **Section 6.2**.

#### 4.3 Significant Wildlife Habitat

An assessment of the likelihood that any candidate or confirmed SWH features or areas occur within the Subject Property or Adjacent Lands is provided in **Appendix 5**. Based on the results of this assessment, six (6) SWH features are considered further through this study:

- Seasonal Concentration Areas of Animals
  - 1. Bat Maternity Colonies
  - 2. Reptile Hibernaculum
- Rare Vegetation Communities or Specialized Habitats for Wildlife
  - 3. Amphibian Breeding Habitat (Woodlands)
- Habitat of Species of Conservation Concern
  - 4. Terrestrial Crayfish
  - 5. Special Concern and Rare Wildlife Species
- Animal Movement Corridors
  - 6. Amphibian Movement Corridors

Also based on this assessment, a total of three (3) Special Concern or provincially rare species are considered to have a possible likelihood of occurrence on the Subject Property (or were confirmed) given their habitat associations and current distribution in southern Ontario:

- 1) Eastern Wood-pewee (Contopus virens)
- 2) Monarch (Danaus plexippus)
- 3) Yellow-banded Bumblebee (Bombus terricola)

A general description of each SWH type and Special Concern/provincially rare species and their habitat within the Site is offered below. An assessment of potential effects to the candidate/confirmed SWH type and Special Concern/provincially rare species associated with the proposed pit operations plan is provided in **Section 6.3**.

### 4.3.1 Bat Maternity Colonies

Big Brown Bat (*Eptesicus fuscus*) and Silver-haired Bat (*Lasionycteris noctivagans*) form maternity colonies that roost with pups in various features, particularly cracks, cavities, or loose bark associated with large-diameter trees (≥25 cm diameter at breast height), snags, and buildings. Snags/cavity trees in earlier stages of decay (i.e., decay classes 1-3) may be preferred.

Ultrasonic acoustic monitoring for bats was undertaken in the Southern Woodlot by others (see **Table 1**) through coordination directly with the Applicant. Terrastory requested but has not received any raw data files associated with the ultrasonic acoustic monitoring; however, it is known that 1630 bat recordings ("passes") were made during the survey period. The Northern Woodlot was not surveyed for bats and contains candidate significant habitat for bat maternity colonies.

#### 4.3.2 Reptile Hibernaculum

Snakes in Ontario hibernate in areas which provide access below the frost line or that do not freeze during winter. A wide array of features may function as snake hibernacula, including natural (e.g., small mammal burrows, crevices in bedrock, etc.) and human-built (e.g., rock piles, old stone foundations, etc.) features. Survey methodologies for confirming snake use of a potential hibernacula typically involve spring or (less preferred) fall surveys to identify congregations of snakes

Project No.: 1944

near their point of exit or emergence from a hibernaculum; however, such surveys may still produce a false negative (i.e., fail to successfully identify hibernacula) given the camouflaged, cryptic nature of snakes and variability in emergence/exit dates.

While it is recognized that snakes may hibernate in non-descript features (i.e., small mammal burrows), the Site lacks features that have a high potential to support significant congregations of overwintering snakes.

### 4.3.3 Amphibian Breeding Habitats (Wetlands and Woodlands) and Movement Corridors

Wetland communities in the Northern Woodlot may provide breeding habitat for early-season breeding Anurans, particularly Spring Peeper (*Pseudacris crucifer*), Western Chorus Frog (*Pseudacris triseriata*), and Wood Frog (*Lithobates sylvaticus*). Although it is possible that the extent of standing water in spring is not of a sufficient depth and duration to support successful amphibian breeding (i.e., egg laying, tadpole development, etc.) under average weather conditions, Anuran calling surveys were not undertaken as part of this study to confirm the presence or absence of this SWH type. As such, both wetland communities in the Northern Woodlot are considered candidate significant habitat for breeding amphibians.

#### 4.3.4 Terrestrial Crayfish

Historically, terrestrial (or "burrowing") crayfish in Ontario have been referred to two species: Digger Crayfish (*Creaserinus fodiens*) and Devil Crayfish (*Lacunicambarus diogenes*). These species are considered primary burrowers and spend most of their lives underground. A third species – Calico Crayfish (*Faxonius immunis*) – is a secondary burrower which may only dig burrows to escape drying waterbodies. A fourth species – Paintedhand Mudbag (*Lacunicambarus polychromatus*) – was recently documented at three sites in the Windsor area (Jones and Glon 2019).

Terrestrial crayfish excavate burrows in areas of moist/wet soil with a high water table such as marshes, wet meadows, and even manicured lawn. The burrows are flooded by groundwater and open to the ground surface by a "chimney" consisting of rounded soil pellets. Burrows produced from clay often exhibit the definitive chimney structure while those excavated from organic substrate (i.e., peat) may appear as a circular collapsed mound.

One (1) terrestrial crayfish chimney was recorded at the interface of the agricultural field and meadow marsh in the Northern Woodlot (see **Figure 3** and Photograph 16 in **Appendix 2**). The terrestrial crayfish species responsible for excavating the chimney is unknown as no individuals were observed.

#### 4.3.5 Eastern Wood-pewee

Eastern Wood-pewee is designated Special Concern in Ontario per O. Reg. 230/08 pursuant to the Endangered Species Act (ESA) and is federally designated Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). This species is most commonly associated with relatively open, deciduous and mixed forests of various sizes, as well as forest edges and other areas with relatively continuous canopy cover (e.g., parks, cemeteries, etc.). This species' preference for open forests and forest edges may be attributed to its aerial foraging behaviour (COSEWIC 2012). Territory sizes were shown to average approximately 1.75 ha (representing a circle with a radius of 75 m) in a study in southern Ontario (as cited in COSEWIC 2012).

Eastern Wood-pewee was documented as a probable breeder at BB-1 in the Southern Woodlot.

#### 4.3.6 Monarch

Monarch is designated Special Concern in Ontario per O. Reg. 230/08 pursuant to the ESA and is federally designated Endangered by COSEWIC. Monarch is well-known to be host-specific and oviposits exclusively on species of milkweed (*Asclepias* spp.). This species is a generalist forager and may nectar in any area with wildflowers.

Monarch was observed within the Site and is expected to be relatively common in the wider landscape. While no confirmed breeding via observations of ovipositing individuals, eggs, or caterpillars was documented, the presence of Common Milkweed (*Asclepias syriaca*) indicates that Monarch may breed within the Site.

#### 4.3.7 Yellow-banded Bumble Bee

Yellow-banded Bumble Bee is designated Special Concern in Ontario per O. Reg. 230/08 pursuant to the ESA and is federally designated Special Concern by COSEWIC. This species occupies a range of open areas that contain nectaring sites and nests underground in abandoned rodent burrows or decomposing logs, typically in woodlands.

Current records in southern Ontario suggest that this species is associated with more densely forested landscapes north of the Carolinian zone. Notwithstanding this, given that the Site provides potentially suitable nectaring, nesting, and overwintering habitat for this species, and bumble bee surveys were not undertaken as part of this study, the Site is assumed to contain suitable habitat for Yellow-banded Bumble Bee.

#### 4.4 Habitat of Endangered and Threatened Species

An assessment of the likelihood that any Endangered and Threatened species or their habitats occur within the Subject Property or Adjacent Lands is provided in **Appendix 6**. A total of five (5) Endangered or Threatened species are considered to have a possible likelihood of occurrence on the Subject Property (or were confirmed) given their habitat associations and current distribution in southern Ontario:

- 1) Little Brown Myotis (Myotis lucifugus)
- 2) Northern Myotis (Myotis septentrionalis)
- 3) Barn Swallow (Hirundo rustica)
- 4) Bobolink (Dolichonyx oryzivorus)
- 5) Eastern Meadowlark (Sturnella magna)

A general description of each Endangered/Threatened species and their habitat is offered below. An assessment of potential effects to these Endangered/Threatened species associated with the proposed pit operations plan is provided in **Section 6.4**.

#### 4.4.1 Myotis Bats

Little Brown Myotis and Northern Myotis are designated Endangered in Ontario per O. Reg. 230/08 pursuant to the ESA and are federally designated Endangered by COSEWIC. Both species form maternity colonies that roost in large-diameter trees with cracks, crevices, and/or exfoliating bark; Little Brown Myotis will also frequently roost in buildings (e.g., attics, barns, etc.). Individuals

(i.e., non-reproductive females and males) of both bat species may roost in smaller diameter trees and other spaces (e.g., beneath house siding, etc.) which are not occupied by maternity colonies. Overwintering habitat includes caves and mines that maintain temperatures above 0°C. White Nose Syndrome (a fungal disease caused by an introduced pathogen) has devastated populations of each species across their ranges. The fungus causes hibernating individuals to become dehydrated, leading to excessive arousal, depleted fat reserves, and ultimately emaciation and/or death.

Little Brown Myotis and Northern Myotis were documented in the Southern Woodlot via ultrasonic acoustic monitoring by others (the Northern Woodlot was not surveyed as it is proposed for protection through this application). It is understood that a total of 71 passes of Little Brown Myotis were recorded over 12 of the 14 survey nights, and 3 passes of Northern Myotis were recorded over 2 of 14 survey nights. Terrastory notes that distinguishing between *Myotis* species based on spectral signatures alone is often not possible given significant overlap.

#### 4.4.2 Barn Swallow

Barn Swallow is designated Threatened in Ontario per O. Reg. 230/08 pursuant to the ESA and is federally designated Threatened by COSEWIC. Prior to European settlement Barn Swallow nested in or on natural features (e.g., caves, cliff faces, etc.); today most nesting is associated with built structures such as barns, bridge/culvert undersides, and awnings/overhangs on the sides of buildings (COSEWIC 2011a). Foraging habitat includes a variety of open areas such as agricultural lands, old fields, and open water. Foraging distances from nest sites depend on habitat quality and social characteristics, but have been found to extend greater than one (1) kilometre (Brown and Brown 1999) though may only average a few hundred metres for most forays (Turner 1981).

Barn Swallow was documented foraging over agricultural fields within the Subject Property at stations BB-2, BB-4, and BB-5. These individuals may be associated with breeding colonies that occupy barns west of the Subject Property and east of Hunt Road.

#### 4.4.3 Bobolink and Eastern Meadowlark

Bobolink is designated Threatened in Ontario per O. Reg. 230/08 pursuant to the ESA and is federally designated Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Prior to European settlement this species may have been rare in Ontario and was likely restricted to tallgrass prairie habitats in the southwest. With widespread conversion of forests to forage crops, Bobolink's range shifted eastward with Ontario containing a significant portion of the current breeding population (COSEWIC 2010). This species is semi-colonial and nests in hayfields, pastures, meadows, grasslands, and prairies, particularly those with tall, dense vegetation, moderate litter depths, and very limited woody cover. While territory size has been found to range between 0.5 ha to 2.5 ha (with higher quality sites permitting smaller territories), Bobolink is well-recognized as area-sensitive and generally will not occupy habitat patches that are less than 4-10 ha (Dechant et al. 2001).

Eastern Meadowlark is also designated Threatened in Ontario federally designated Threatened by COSEWIC. Like Bobolink, Eastern Meadowlark may have been rare in southern Ontario prior to European settlement and was likely restricted to tallgrass prairie habitats in the southwest. While Eastern Meadowlark and Bobolink often occupy the same habitats and both are considered areasensitive, Eastern Meadowlark has a greater tolerance for woody cover and may be found in fields with as much as 25% shrub cover (COSEWIC 2011b).

Both Bobolink and Eastern Meadowlark were documented in a hayfield on Adjacent Lands to the west. This field was rotated to oats in 2020 and likely did not provide suitable breeding habitat for these species during the 2020 breeding season.

#### 4.5 Fish Habitat

The Norsworthy Drain is a Class F Municipal Drain flowing westward on the north side of Gore Road. While Class F drains are intermittent, they may provide direct (seasonal) fish habitat during periods of flow.

An assessment of potential effects to fish habitat associated with the proposed pit operations plan is provided in **Section 6.5**.

#### 4.6 County Natural System

The Northern Woodlot is designated Significant Woodland per Schedule C of the County's OP. The Northern Woodlot also contains wetland (not currently mapped on provincial or municipal natural feature datasets). The presence of Significant Woodland and wetland indicates that the Northern Woodlot forms part of the County Natural System and is therefore subject to applicable policies outlined in section 2.2.1 of the County OP.

#### 5 PHASING, OPERATIONS, AND REHABILITATION PLANS

Thames Valley Aggregates Inc. is applying for a new Category 1, Class A licence to facilitate belowwater pit extraction within the Site. The ARA plans are provided in **Appendix 7**. The total area to be licensed, extracted, and rehabilitated is as follows:

- Total area to be licensed: 21.00 hectares
- Total area to be extracted: 16.30 hectares
- Total area to be rehabilitated: 16.30 hectares, plus 0.46 ha of reforestation outside the extraction area.

The operations plan consists of five phases of extraction (A-E) that proceed northward from a 0 m setback along the southern property boundary. Extraction within each of the designated three (3) Areas will generally occur as follows:

- Construct or upgrade the perimeter fencing.
- Remove trees and other vegetation within the Southern Woodlot, allowing salvage of large stumps and trees for habitat creation along the Northern Woodlot (Phase 1, Area 1 only).
- Strip topsoil and overburden separately and use to construct acoustic berms (or store for progressive rehabilitation).
- Commence above-water extraction, followed by below-water extraction.
- Continue/complete progressive rehabilitation in previously extracted Areas.

Upon completion of extraction (Phase E), areas below approximately ±273 masl will become permanently flooded encompassing 11.33 ha. The northern margins of the pit pond will be rehabilitated to wetland habitat through contouring (shallow nearshore slopes), shoreline plantings, and inclusion of woody debris and other structural elements. Additional native upland plantings are also identified on the Rehabilitation Plan.

#### 6 EFFECTS ASSESSMENT AND MITIGATION

The purpose of this NER is to present a biophysical characterization of the Study Area as a means to identify the potential for adverse effects on the natural environment and natural heritage features stemming from the proposed pit extraction activities. Several significant natural features and species were documented (or may occur) within the Site pursuant to the assessments in **Section 4**. The following effects assessment provides an evaluation of the potential for the proposed pit application to result in negative effects to such environmental components and offers technical recommendations to mitigate such effects where warranted. Certain technical recommendations offered herein apply to several natural features and/or species simultaneously; as such, all technical recommendations should be read and considered in their entirety. The baseline or existing conditions against which the application is assessed are treated as the state of the Site at the time of the site assessments. The effects assessment herein is based on the Site Plans provided in **Appendix 7**.

All pits and quarries in Ontario are subject to a set of standards and conditions which are specific to the type of licence being applied for. The effects assessment herein assumes that all pit operations within the Site will be undertaken consistent with the Prescribed Conditions for Category 1, Class A licences and the Operational Standards which pertain to all licence categories. Such conditions and standards that have bearing on protection of the natural environment are not duplicated as technical recommendations herein as they already represent licence requirements. Relevant Prescribed Standards and Operational Standards include the following:

- Dust will be mitigated, and the use of dust suppressants will be applied to internal haul roads and processing areas as required (Prescribed Standard 3.1 and 3.2).
- A Spills Contingency Program will be developed prior to site preparation (Prescribed Standard 3.5).
- Fuel storage tanks will be installed and maintained according to the *Gasoline Handling Act* (Prescribed Standard 3.6).
- An Environmental Compliance Approval will be secured for water discharged off-site (Prescribed Standard 3.7).
- A Permit to Take Water will be secured if required (Prescribed Standard 3.9).
- Topsoil will be stripped sequentially prior to aggregate extraction (Operational Standard 5.4).
- Topsoil and overburden stripped during the operation will be stored separately with vegetated stable slopes (Operational Standard 5.6).
- Adequate vegetation will be established and maintained to control erosion of any berm or stockpile (Operational Standard 5.7).
- Scrap cannot be located within 30 m of any body of water and 30 metres from the boundary of the Site (Operational Standard 5.9).
- Excavation is to be set back 15 metres from the boundaries of the Site and 30 metres from any body of water that is not the result of excavation below the water table (Operational Standard 5.10).
- All excavation faces are to be stabilized to prevent erosion (Operational Standard 5.12).
- All stripped topsoil or overburden will be used in the rehabilitation of the Site (Operational Standard 5.17).

Project No.: 1944

- Adequate vegetation is established and maintained to control erosion of any topsoil or overburden replaced for rehabilitation purposes (Operational Standard 5.18).
- Rehabilitation will ensure adequate drainage and vegetation is provided and any compaction is alleviated (Operational Standard 5.21).

Technical recommendations above and beyond the aforementioned conditions and standards are offered herein to avoid and/or minimize impacts to the significant natural features identified, particularly removal of the Southern Woodlot and protection of the Northern Woodlot. Certain technical recommendations apply to several natural features and/or species simultaneously; as such, all technical recommendations should be read and considered in their entirety. All technical recommendations offered herein are incorporated into the ARA Site Plans provided in **Appendix 7** while the recommended feature and habitat setbacks from the Northern Woodlot are also shown in **Figure 3**.

#### 6.1 Identified and Provincially Significant Wetlands

Where development and/or site alteration activities are proposed adjacent to wetlands, adverse effects may occur via the following pathways:

- Alterations to surface water and/or groundwater contributions to the wetland from construction (e.g., dewatering, etc.), grading that modifies the existing topography or drainage, and/or increased coverage of impervious surfaces (e.g., roads, roofs, etc.);
- Increased sediment loadings and/or nutrient enrichment within the wetland via runoff exiting from development areas during and post construction. This may alter wetland water quality and vegetation communities via increased turbidity, eutrophication, contamination by toxic substances, changes in pH, etc.
- Noise and/or light pollution that may adversely affect the ability of wetland wildlife to successfully carry out their life processes (e.g., breeding, feeding, etc.); and
- Increased human activity (i.e., encroachment) within the wetland which may result in soil compaction, dumping, etc.

Terrastory worked closely and iteratively with the project team to define an ecologically appropriate extraction limit during preparation of the Site Plans. The extraction limit in the vicinity of the Northern Woodlot (and wetlands therein) incorporates the greater of the following two (2) setbacks:

- 15 m from the Significant Woodland dripline, or
- 30 m from the wetland boundary as delineated by Terrastory staff in 2019 in accordance with OWES protocols.

The extraction limit incorporated into the Site Plans (see **Appendix 7**) reflects the setbacks outlined above.

A detailed assessment of potential impacts to the shallow groundwater aquifer stemming from below-water pit extraction within the Site was undertaken through the Hydrological Assessment (LDS Consultants Inc.). The following potential impacts were identified:

• The removal of sand/gravel during below-water pit extraction may have short-duration localized effects on the groundwater elevation along the pond perimeter.

- Changes in the water budget of the Site may result from either 1) increases in evaporation from the pit pond (deficit) and/or 2) increased surface runoff into the pond (surplus).
- Permanent changes may result from an overall flattening of the groundwater elevation in the pit pond which will stabilize at the central range of groundwater elevations (±273 masl) present under existing conditions.
- Increases in groundwater temperature would be anticipated once the groundwater surface is exposed in the pit pond.

The results of the Hydrogeological Assessment suggest that the potential for adverse effects to the wetlands in the Northern Woodlot in association with alterations to the Site water balance or groundwater elevation would be negligible. Localized, short-duration groundwater elevation changes along the pond perimeter during early extraction were calculated to be less than 3 cm (recovering in 24 hours) and are less when the pond approaches its maximum size. Evapotranspiration losses from the pit pond are expected to be offset by greater runoff entering the pond, resulting in a small net gain to the groundwater system. The Hydrogeological Assessment further substantiates that "[a] Iterations to the Site within the extraction area and the creation of the pond are not expected to significantly alter the base flows which sustain the northern woodland and the wetland area contained there-in (p. 33). As the groundwater flow direction is predominantly southward, any warming effects due to sun exposure in the pit pond would not be expected to adversely affect the wetland, which is upgradient.

The area between the dripline of the Northern Woodlot and extraction limit will be extensively planted per a Northern Woodlot Enhancement Plan (see **Section 6.6** and the Rehabilitation Plan) to address the removal of probable breeding habitat for Eastern Wood-pewee (see **Section 6.3**) and overlapping considerations related to loss of this mature woodland feature. Additional upland plantings are incorporated into the Rehabilitation Plans along the north side of the eventual pit pond which will further expand the limit of the Northern Woodlot southward. These plantings and enhancements will provide greater ecological function and buffering capacity to the Northern Woodlot between the extraction limit and wetlands to the north.

#### 6.2 Significant Woodlands

Where development and/or site alteration activities are proposed within or adjacent to forests or woodlands, adverse effects may occur via the following pathways:

- Direct vegetation removal (e.g., trees, shrubs, herbaceous vegetation, etc.), resulting in loss of woodland area and functions (e.g., wildlife habitat, carbon sequestration, runoff attenuation, etc.).
- Mechanical injury to the trunk, roots, branches, and/or foliage of retained woody vegetation.
- Soil compaction from the use of heavy machinery.
- Smothering or exposure of roots due to changes in grade.
- Noise and/or light pollution that may adversely affect the ability of woodland wildlife to successfully carry out their life processes (e.g., breeding, feeding, etc.).
- Increased human activity (i.e., encroachment) within or adjacent to the woodland which may result in soil compaction, dumping, etc.

The Northern Woodlot is a designated Significant Woodland per Schedule C of the County's OP. The dripline associated with the Northern Woodlot is shown on **Figure 3**. The extraction limit in

the vicinity of the Northern Woodlot incorporates the greater of a 15 m setback from the dripline or 30 m setback from wetlands therein. The area between the dripline of the Northern Woodlot and extraction limit will be extensively planted per a Northern Woodlot Enhancement Plan (see **Section 6.6**) to address the removal of probable breeding habitat for Eastern Wood-pewee (see **Section 6.3**) and overlapping considerations related to loss of this mature woodland feature. This will increase the size of the Significant Woodland by >0.6 ha. Additional upland plantings are incorporated into the Rehabilitation Plans along the north side of the eventual pit pond which will further expand the limit of the Northern Woodlot southward.

#### 6.3 Significant Wildlife Habitat

Per the assessment in **Section 4.3**, a total of six (6) SWH features were considered further through this study:

- Seasonal Concentration Areas of Animals
  - 1. Bat Maternity Colonies
  - 2. Reptile Hibernaculum
- Rare Vegetation Communities or Specialized Habitats for Wildlife
  - 3. Amphibian Breeding Habitat (Woodlands)
- Habitat of Species of Conservation Concern
  - 4. Terrestrial Crayfish
  - 5. Special Concern and Rare Wildlife Species
- Animal Movement Corridors
  - 6. Amphibian Movement Corridors

Also based on this assessment, a total of three (3) Special Concern or provincially rare species are considered to have a possible likelihood of occurrence on the Subject Property (or were confirmed) given their habitat associations and current distribution in southern Ontario:

- 1) Eastern Wood-pewee (*Contopus virens*)
- 2) Monarch (Danaus plexippus)
- 3) Yellow-banded Bumblebee (Bombus terricola)

All SWH types and Special Concern/provincially rare species associated with the Northern Woodlot will be adequately protected by recommended extraction limit setback. This includes candidate habitat for bat maternity colonies, candidate woodland Anuran breeding and movement habitats, and confirmed habitat for terrestrial crayfish.

No specific recommendations are offered herein to minimize impacts to potential foraging and breeding habitat for Monarch or Yellow-banded Bumblebee. Both species are habitat generalists and abundant nectaring habitat exists within the wider landscape surrounding the Subject Property. Oviposition sites for Monarch (e.g., Common Milkweed), overwintering habitat for Yellow-banded Bumblebee, and general nectaring habitat for both species is present within the wider local landscape.

Probable breeding habitat for Eastern Wood-pewee was documented in the Southern Woodlot, which is proposed for removal through this application. Terrastory has worked closely with the project team as part of preparation of the Site Plans to allow for replacement of Eastern Wood-pewee habitat along the southern margin of the Northern Woodlot through enhancement plantings

and other measures. Eastern Wood-pewee was not documented within the Northern Woodlot based on 2019 surveys; implementation of the Northern Woodlot Enhancement Plan would provide greater opportunities for occupation of this feature by this species during the breeding season over the long-term. Technical recommendations to compensate for loss of the Eastern Wood-pewee habitat in the Northern Woodlot are outlined in Section 6.6.

#### Habitat of Endangered and Threatened Species

Per the assessment in **Appendix 6**, a total of five (5) Endangered or Threatened species are considered to have a possible likelihood of occurrence on the Subject Property (or were confirmed) given their habitat associations and current distribution in southern Ontario:

- 1) Little Brown Myotis (Myotis lucifugus)
- 2) Northern Myotis (Myotis septentrionalis)
- 3) Barn Swallow (Hirundo rustica)
- 4) Bobolink (Dolichonyx oryzivorus)
- 5) Eastern Meadowlark (Sturnella magna)

No impacts to individuals or the habitat of Barn Swallow, Bobolink, or Eastern Meadowlark are anticipated through this application. All breeding sites/habitats for these species occur on Adjacent Lands at a sufficient distance from the limit of pit extraction.

An Information Gathering Form (IGF) was prepared and submitted to MECP in late August 2020 by others to ascertain whether removal of the Southern Woodlot would contravene section 10 of the Endangered Species Act. As noted in Section 3.3.4, it is understood that a total of 71 passes of Little Brown Myotis were recorded in the Southern Woodlot over 12 of the 14 survey nights, while 3 passes of Northern Myotis were recorded over 2 of the 14 survey nights. It is further understood that MECP has not yet confirmed whether or not the proposed removal of the Southern Woodlot would result in loss of habitat for Endangered Myotis bats (i.e., contravention of section 10) or if any specific mitigation measures will be requested through a Letter of Advice or other guidance. Confirmation that the proposed pit operations plan is consistent with the requirements of the ESA is necessary as part of the ARA and *Planning Act* application review process.

At a minimum, a timing restriction on tree removal within the Southern Woodlot is required to avoid potential impacts to roosting bats (including both individuals and maternity colonies). This recommendation is provided in **Section 6.6** below. To simplify the site plan requirements, the tree removal timing window combines both the principal bat activity period and bird nesting period (in Ecoregion 7E) to address the overlapping requirements of the Migratory Birds Convention Act.

#### 6.5 Fish Habitat

Where development and/or site alteration activities are proposed adjacent to watercourses that support (or are assumed to support) fish and/or aquatic organisms, adverse effects may occur via the following pathways (amongst others):

Alterations to surface water and/or groundwater contributions to the watercourse from construction (e.g., dewatering, etc.), grading that modifies the existing topography or drainage, and/or increased coverage of impervious surfaces (e.g., roads, roofs, etc.);

Project No.: 1944

- Increased sediment loadings and/or nutrient enrichment within the watercourse via runoff exiting from development areas during and post construction. This may alter water quality and/or degrade habitat quality via increased turbidity, eutrophication, contamination by toxic substances, changes in pH, etc.
- Introduction of invasive species including aquatic organisms and aquatic plants.
- Increased human activity (i.e., encroachment) in the vicinity of the watercourse which may result in bank compaction, exploitation of fish, dumping, etc.

The Norsworthy Drain is a Class F Municipal Drain and may contain seasonal fish habitat. This feature is over 120 m from the limit of extraction. As the Hydrogeological Assessment (LDS Consultants Inc.) has confirmed no negative impacts to the wetland in the Northern Woodlot as part of the proposed pit operations, and this wetland outlets directly into the Norsworthy Drain, no impacts to fish habitat are anticipated to occur within (or downstream of) the Norsworthy Drain.

#### 6.6 Natural Environment Technical Recommendations

The Southern Woodlot was found to contain the following significant characteristics/habitats:

- Feeding and potential roosting habitat for Endangered *Myotis* bats.
- Probable breeding habitat for Eastern Wood-pewee (Special Concern species).
- Mature forest dominated by native tolerant hardwoods and (in places) a diverse, remnant herbaceous flora consisting of spring ephemerals and upland sedges.

The entirety of the Southern Woodlot within the Subject Property is proposed for removal. Only a small portion of the woodland edge that extends onto Adjacent Lands will remain as a fencerow/hedgerow following removal of this feature. While the Southern Woodlot is not a designated Significant Woodland per the County's OP, it contains SWH (probable breeding habitat for Eastern Wood-pewee). Per the PPS and ARA Provincial Standards, development/extraction activities cannot engender negative impacts to SWH.

Removal of the Southern Woodlot is proposed to occur during Phase A since pit extraction will commence from a 0 m setback along the southern property boundary and will proceed northward. The following recommendations are offered to address loss of the Southern Woodlot (and significant features/habitats therein):

- ➤ The Northern Woodlot Enhancement Area shown in Figure 3 is to be removed from cultivation and planted with native species during (or before) removal of the Southern Woodlot. A Northern Woodlot Enhancement Plan is to be prepared which includes the following elements (minimum):
  - o Composition, density, and sizing of woody plant material. All plant installations are to be native to Middlesex County.
  - Measures to transplant native saplings (e.g., Sugar Maple, Bitternut Hickory, etc.) from the Southern Woodlot to the Northern Woodlot Enhancement Area.
  - Measures to transplant soils mats (containing native herbaceous flora, mycorrhizal fungi, etc.) from the Southern Woodlot to the

Northern Woodlot Enhancement Area. Soil mats will not be excavated from areas containing dense coverage of Garlic Mustard or other non-native flora. Some soil mats are to contain populations of the regionally rare James' Sedge (*Carex jamesii*) and other spring ephemerals and upland sedges.

- O Structural elements (e.g., coarse woody debris such as stumps, logs, etc.) will be added to the Northern Woodlot Enhancement Area from material removed from the Southern Woodlot.
- A monitoring plan will be prepared for the purposes of determining the success of the plantings (including the new plant installations and transplanted flora/soil mats) for a period of no less than three (3) growing seasons.

There is a potential for impacts to nesting birds and roosting bats during removal of the Southern Woodlot. To eliminate this potential, the following timing restriction on vegetation removal is recommended:

All tree and shrub removals within the Southern Woodlot will be completed outside the primary bird nesting and bat activity periods (i.e., to be completed between October 1 and March 31).

To minimize impacts to wildlife habitat and activities within the Northern Woodlot during the proposed future pit operations, the following measure is recommended:

Any necessary lighting to support pit operations will be directed away from the Northern Woodlot to the extent practicable.

The above technical recommendations have been incorporated directly onto the Site Plans.

## 7 APPLICABLE NATURAL HERITAGE AND ENVIRONMENTAL POLICIES

The following sections summarize the various municipal, provincial, and federal environmental policies that apply to the proposed pit operations plan and describe how the recommendations provided in this study will address these policies (where applicable).

#### 7.1 Municipality of Thames Centre Official Plan (October 2020 consolidation)

The Municipality's OP is a legal document prepared as required under section 14.7(3) of the *Planning Act*. An OP sets out goals, objectives, and policies that direct and manage land-use and future development activities and their effects on the social and natural environment of a municipality. Provincial plans that offer direction on matters of provincial interest are implemented principally through the Municipality's OP. Provided herein is a description of relevant environmental and natural heritage policies contained within the Municipality's OP and an assessment of whether the application addresses such policies.

The Subject Property is designated Agricultural per Schedule A (Land Use Plan) of the Municipality's OP and is also zoned Agricultural per Map 38 of the Township's Zoning Bylaw (No.

75-2006). The Northern Woodlot contains a natural feature overlay designation (Woodland Under 4 Hectares in Area), while the Southern Woodlot does not.

A list of key natural heritage provisions of the Municipality's OP that pertain to the pit application considered herein is provided below.

- Section 3.2 outlines the Natural Heritage Feature and Natural Hazard Area policies.
- **Section 3.2.1** outlines the components of the Thames Centre "Green-space" System, which includes:
  - Group A Features Provincially Significant Wetlands, Habitat for Endangered and Threatened Species, and Fish Habitat.
    - Development or site alteration is generally prohibited in Group A Features.
  - O Group B Features Regionally Significant Woodlands, Significant Woodlands and woodland patches identified by the Middlesex Natural Heritage Study, Significant Valleylands, Significant Wildlife Habitat, Provincially Significant ANSIs, Regionally Significant ANSIs, and ESAs.
    - Development and site alteration may be permitted in Group B Features provided no negative impacts to the features or their associated functions.
  - o Group C Features Stream Corridors and Floodplains, natural hazard lands.
    - Development and site alteration may be permitted where compliance with the natural heritage and hazard policies of the OP can be demonstrated and Conservation Authority requirements are addressed.
- Section 3.2.2 offers the goals of the Natural Heritage "Green-Space" System, including (amongst others) 1) the identification, protection, and enhancement of natural and environmental features and functions, and 2) recognition that natural heritage and environmental features relate to one another and are best protected through a landscape approach.
- **Section 3.2.3.1** requires the submission of an Environmental Impact Study (EIS) in support of proposals for new development or site alteration where such applications are near or within the general locations of all Group A, B, or C Features.

The results of this study have confirmed the presence of the following Natural Heritage "Green-Space" System components:

- Habitat for Endangered Myotis Bats (Group A Feature).
- Significant Woodland and candidate/confirmed Significant Wildlife Habitat within the Northern Woodlot (Group B Feature).
- Confirmed Significant Wildlife Habitat (probable breeding habitat for Eastern Wood-pewee) within the Southern Woodlot (Group B Feature).
- Wetland in the Northern Woodlot which may be considered a "natural hazard" (Group C Feature).

Terrastory reviewed potential impacts to the identified Green-space System components in **Section 6** of this NER. The Site Plan includes an extraction setback no closer than 15 m from the dripline of the Northern Woodlot or 30 m from wetlands therein. Provided that Terrastory's recommended mitigation measures related to replacement of the Southern Woodlot are implemented in full (per **Section 6.6**), no negative impacts are anticipated to any natural feature that forms part of the

Municipality's Green-Space System with the possible exception of habitat for Endangered *Myotis* Bats. The project team is awaiting MECP review of the application for consistency with the requirements of the *Endangered Species Act*.

#### 7.2 Middlesex County Official Plan (2006 consolidation)

A list of key provisions from Middlesex County's OP that pertain to the protection of natural heritage features and areas are provided below.

- **Section 2.2.1** identifies the components of the County Natural System as including the following:
  - O Natural Hazards (e.g., steep slopes, unstable soils, fill regulated areas);
  - Natural Environment Areas (e.g., floodplains, flood regulated watercourses, wetlands);
  - O Natural Heritage Features (e.g., significant woodlands, wildlife habitat, aquatic ecosystems, river, stream, ravines, and upland corridors, ANSIs, etc.); and
  - O Groundwater Features (e.g., recharge areas, discharge/headwater areas, well-head protection areas).
- Section 2.2.1.2 provides general policies for the County's Natural System, including the need to direct new development away from the Natural System (where possible) and the need to prepare a Development Assessment Report (DAR) which summarizes the proposed development, on-site natural features, potential impacts, and recommended mitigation measures.
- Section 2.2.1.3 provides more specific policies for the County's Natural System, including:
  - A prohibition on development in Natural Environment Areas on Schedule A (including wetlands) and Significant portions of Endangered Species Habitats.
  - An allowance for limited development within portions of the County's Natural System where it can be demonstrated that no negative impact on the natural features or their ecological functions will occur.

The Northern Woodlot is a designated Significant Woodland per Schedule C of the County's OP. The Northern Woodlot also contains wetland (not currently mapped on provincial or municipal natural feature datasets). The presence of Significant Woodland and wetland indicates that the Northern Woodlot forms part of the County Natural System and is therefore subject to applicable Natural System Policies of the County OP. The Southern Woodlot is not considered a Significant Woodland per Schedule C but contains SWH (probable breeding habitat for Eastern Wood-pewee) and regionally rare flora (James' Sedge).

The County's natural heritage policies are generally consistent with the Municipality's OP as described in **Section 7.1**. Provided that Terrastory's technical recommendations are implemented in full, no impacts to any significant natural heritage feature protected by the County's OP are anticipated with the possible exception of habitat for Endangered *Myotis* Bats. The project team is awaiting MECP review of the application for consistency with the requirements of the *Endangered Species Act*.

#### 7.3 Aggregate Resources Act, R.S. O. 1990, c. A.8

The information and recommendations provided in this report satisfy the requirements for Natural Environment Level 1 and Level 2 Assessments pursuant to a Category 1, Class A licence:

- 2.2.1 Natural Environment Level 1: determine whether any of the following features exist on and within 120 metres of the site: significant wetland, significant portions of the habitat of endangered or threatened species, fish habitat, significant woodlands (south and east of the Canadian Shield), significant valley lands (south and east of the Canadian Shield), significant wildlife habitat and significant areas of natural and scientific interest; and
- 2.2.2 Natural Environment Level 2: impact assessment where the Level 1 identified any features on and within 120 metres of the site in order to determine any negative impacts on the natural features or ecological functions for which the area is identified, and any proposed preventative, mitigative or remedial measures.

The following significant natural features per ARA policies were identified within the Study Area:

- Provincially Significant Wetland (Adjacent Lands only).
- Significant Woodland (Northern Woodlot).
- Candidate or Confirmed Significant Wildlife Habitat, including:
  - o Bat Maternity Colonies (candidate);
  - o Reptile Hibernaculum (candidate);
  - o Woodland Amphibian Breeding Habitats and Movement Corridors (candidate);
  - o Terrestrial Crayfish (confirmed);
  - o Eastern Wood-pewee (confirmed);
  - o Monarch (candidate);
  - o Yellow-banded Bumble Bee (candidate).
- Confirmed Habitat of Endangered and Threatened Species, including:
  - o Barn Swallow (foraging habitat only);
  - o Bobolink and Eastern Meadowlark (Adjacent Lands only);
  - o Little Brown Myotis and Northern Myotis.
- Candidate Fish Habitat (Norsworthy Drain).

The extraction limit incorporated into the Site Plan reflects the greater of a minimum 15 m setback from the Significant Woodland dripline or 30 m setback from wetlands (which contain candidate SWH) within the Northern Woodlot. These setbacks, in combination with a determination of no negative impacts to the Northern Woodlot wetlands made herein and through the Hydrogeological Assessment (LDS Consultants Inc.), allow for adequate protection of all significant natural features overlapping with the Northern Woodlot consistent with ARA Provincial Standards.

Probable breeding habitat for Eastern Wood-pewee in the Southern Woodlot will be replaced through implementation of a Northern Woodlot Enhancement Plan (see **Section 6.6**). Additional plantings along the northern pond perimeter will further expand the Northern Woodlot southward as part of final rehabilitation (see **Appendix 7**).

The project team is awaiting MECP review of the proposed removal of the Southern Woodlot for potential impacts on Endangered *Myotis* Bats. Consistency of the proposed pit application with the requirements of the ESA will be determined once MECP has reviewed and responded to an IGF submitted in late August 2020 by others.

#### 7.4 Provincial Policy Statement 2020, pursuant to the Planning Act, R.S.O. 1990, c. P. 13

The Provincial Policy Study (PPS) is promulgated under the authority of the *Planning Act* and came into effect on 1 May 2020. The PPS provides direction to municipalities on land-use matters of provincial interest and sets the policy framework for regulating the use and development of land. Municipal OP's must be consistent with the PPS. Per its preamble, the PPS *provides for appropriate development while protecting resources of provincial interest, public health and safety, and the quality of the natural and built environment.* 

The principal PPS policies that apply to natural heritage protection are outlined in section 2.1. While recognizing that the natural heritage protection framework is not intended to limit the ability of agricultural uses to continue (Policy 2.1.9), the PPS instructs that *natural features and areas shall be protected for the long term* (Policy 2.1.1) and that their diversity and connectivity be *maintained, restored or, where possible, improved* (Policy 2.1.2). In Ecoregions 6E and 7E the PPS separates significant features into three categories:

- 1) Those in which development and site alteration are not permitted, including 1) Provincially Significant Wetlands and 2) Significant Coastal Wetlands (Policy 2.1.4);
- 2) Those in which development and site alteration are not permitted unless it can be demonstrated that no negative impacts on the significant natural feature and/or its functions will occur, including: 1) Significant Woodlands, 2) Significant Valleylands, 3) Significant Wildlife Habitat, 4) Significant Areas of Natural and Scientific Interest, 5) Non-significant Coastal wetlands, and 6) Adjacent Lands (Policy 2.1.5 and 2.1.8).
- 3) Those in which development and site alteration are not permitted except in accordance with federal/provincial requirements, including: 1) fish habitat (Policy 2.1.6) and 2) habitat of Endangered and Threatened Species (Policy 2.1.7).

In considering the aforementioned PPS policies, it has been determined that the proposed pit operations plan addresses relevant natural heritage provisions of the PPS for the following reasons:

- Per Table 4 of this report, no Significant Areas of Natural or Scientific Interest or Valleylands are
  present within the Study Area.
- Per Section 6 of this report, no negative impacts to the Significant Woodland and overlapping candidate/confirmed Significant Wildlife Habitat in the Northern Woodlot are anticipated given the setbacks incorporated into the proposed pit operations plan.
- Per **Section 6.5** of this report, no impacts to potential (seasonal) fish habitat in the Norsworthy Drain are anticipated.

The project team is awaiting MECP review of the proposed removal of the Southern Woodlot for potential impacts on Endangered *Myotis* Bats. Consistency of the proposed pit application with the requirements of the ESA will be determined once MECP has reviewed and responded to an IGF submitted in late August 2020 by others.

#### 7.5 Provincial Endangered Species Act, S.O. 2007, c. 6

The Endangered Species Act (ESA) is administered by MECP and protects designated Endangered and Threatened species in Ontario from being killed, harmed, or harassed (s. 9) or having their habitat damaged or destroyed (s. 10). The protection afforded to Endangered and Threatened species

"habitat" is either prescribed by O. Reg. 242/08, or (for those species that lack regulated habitat) is defined as an area on which the species depends, directly or indirectly, to carry on its life processes, including life processes such as reproduction, rearing, hibernation, migration or feeding. Activities that constitute habitat damage and/or destruction can only proceed subject to requirements of s. 17 or (in limited circumstances) an activity registration under O. Reg. 242/08.

A detailed assessment of potential Endangered and Threatened habitat within the Study Area is provided in **Appendix 6**. The project team is awaiting MECP review of the proposed removal of the Southern Woodlot for potential impacts on Endangered *Myotis* Bats. Consistency of the proposed pit application with the requirements of the ESA will be determined once MECP has reviewed and responded to an IGF submitted in late August 2020 by others.

#### 7.6 Federal Fisheries Act, R.S.C. 1985, c. F-14

The amended federal Fisheries Act (Bill C-68) received Royal Assent in June 2019 while the updated fish and fish habitat protection provisions came into force in August 2019. Subsection 34.4(1) of the amended Fisheries Act prohibits all work, undertaking, or activity from causing the death of fish (other than fishing). Subsection 35(1) requires that project activities not result in the "harmful alteration, disruption or destruction of fish habitat" (HADD) unless undertaken in accordance with the requirements of a statutory exemption per subsection 35(2). Based on the Fish and Fish Habitat Protection Policy Statement (August 2019), HADD is interpreted by DFO to include "any temporary or permanent change to fish habitat that directly or indirectly impairs the habitat's capacity to support one or more life processes of fish".

No in-water works or fill placement below the high-water mark of a surface water feature containing fish habitat is proposed through this application. Consistent with the assessment carried out in **Section 6.5**, it has been determined that the proposed pit operations plan is consistent with the fish and fish habitat protection provisions outlined in the *Fisheries Act*.

#### 7.7 Federal Migratory Birds Convention Act, S.C. 1994, c. 22

Section 6 of the Migratory Birds Regulations under the *Migratory Birds Convention Act, 1994* (MBCA) prohibits the disturbance or destruction of nests, eggs, or nest shelters of a migratory bird. The provincial *Fish and Wildlife Conservation Act, 1997* extends the protection of bird nests and eggs to certain species not listed under the Migratory Birds Regulations (e.g., Corvids, Strigids, Accipitrids, etc.).

Provided that the recommendations outlined in **Section 6.6** are implemented in full (i.e., prohibition on vegetation removal during the bird breeding season), no impacts to breeding birds or bird nests protected by the MBCA or FWCA are anticipated.

#### 8 CONCLUSIONS

In accordance with the application standards for Category 1, Class A pit licences pursuant to the *Aggregate Resources Act*, the preceding Level I & II Natural Environment Report provides a detailed characterization of the natural environment occurring within and adjacent to the proposed Pike Pit. This NER has been prepared in support of the ARA licence application along with Official Plan Amendment and Zoning By-law Amendment applications to the Municipality of Thames Centre. Included herein is a comprehensive approach to identifying the presence or absence of several significant natural features afforded varying degrees of protection by applicable environmental

policies, particularly the ARA Provincial Standards, PPS, Municipal/County OPs, and *Endangered Species Act*. Potential negative impacts to the identified significant natural features are described with mitigation measures and technical recommendations offered to avoid or minimize such impacts and/or offer enhancements as appropriate.

Based on the findings presented in this report, the following natural features with ecological and/or policy significance have been identified within the Study Area:

- Significant Woodland, Identified Wetlands, and Significant Wildlife Habitat within the Northern Woodlot.
- Provincially Significant Wetland (North Dorchester Swamp) and additional Identified Wetlands on Adjacent Lands to the north/northeast of the Site.
- Feeding habitat and potential roosting habitat for **Endangered Myotis Bats**, probable breeding habitat for **Eastern Wood-pewee**, and **Regionally Rare Flora** (James' Sedge) in the Southern Woodlot.
- Probable breeding habitat for the Threatened Barn Swallow, Eastern Meadowlark, and Bobolink on Adjacent Lands in 2019.

The extraction limit incorporates a minimum 15 m dripline setback or 30 m wetland setback from the Northern Woodlot. The proposed removal of the Southern Woodlot (and habitats therein) will be addressed through a Northern Woodlot Enhancement Plan to be prepared as indicated on the Site Plan notes. The project team is awaiting MECP review of the proposed removal of the Southern Woodlot for potential impacts on Endangered *Myotis* Bats. Consistency of the proposed pit application with the requirements of the ESA will be determined once MECP has reviewed and responded to an IGF submitted in late August 2020 by others.

#### 9 REFERENCES

- Armstrong, D. K., and J. E. P. Dodge. 2007. "Paleozoic Geology of Southern Ontario."
- Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, and Ontario Ministry of Natural Resources Ontario Nature. 2001. "Ontario Breeding Bird Atlas: Guide for Participants."
- Bradley, D. J. 2013. "Southern Ontario Vascular Plant Species List."
- Brown, R.C., and M.B. Brown. 1999. "Barn Swallow (Hirundo Rustica)." In *The Birds of North America Online*, edited by A. Poole. Ithaca: Cornell Lab of Ornithology.
- Cadman, M. D., D. A. Sutherland, G. G. Beck, D. Lepage, and A. R. Couturier. 2007. *Atlas of the Breeding Birds of Ontario*, 2001–2005.
- Chapman, L.J., and D.F. Putnam. 1984. "Physiography of Southern Ontario."
- COSEWIC. 2010. "COSEWIC Assessment and Status Report on the Bobolink in Canada."
- ——. 2011a. "COSEWIC Assessment and Status Report on the Barn Swallow (Hirundo Rustica) in Canada."
- ———. 2011b. "COSEWIC Assessment and Status Report on the Eastern Meadowlark in Canada."
- ——. 2012. "COSEWIC Assessment and Status Report on the Eastern Wood-Pewee (Contopus Virens) in Canada."
- Dechant, J.A., M.L. Sondreal, D.H. Johnson, L.D. Igl, C. M. Goldade, A. L. Zimmerman, and B. R. Euliss. 2001. "Effects of Management Practices on Grassland Birds."
- DFO. 2019. "Fish and Fish Habitat Protection Policy Statement."
- Dobbyn, J. S. 2005. Atlas of the Mammals of Ontario.
- Hagerty, T. P., and M. S. Kingston. 1992. "The Soils of Middlesex County."
- Henson, B. L., and K. E. Brodribb. 2005. "Great Lakes Conservation Blueprint for Terrestrial Biodiversity." Vol. 2.
- Jones, Colin, and Mael Glon. 2019. "First Record of the Paintedhand Mudbug (Lacunicambarus Polychromatus) in Ontario and Canada and the Significance of INaturalist in Making New Discoveries." Canadian Field Naturalist 133 (2): 160–66. https://doi.org/10.22621/cfn.v133i2.2223.
- Lee, H. T. 2008. "Southern Ontario Ecological Land Classification: Vegetation Type List."
- Lee, H. T., W. D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. "Ecological Land Classification for Southern Ontario: First Approximation and Its Application."

environmental consulting inc

MNR. 2010a. "Natural Heritage Reference Manual."

———. 2010b. "Significant Wildlife Habitat Technical Guide."

MNRF. 2014. "Significant Wildlife Habitat Mitigation Support Tool."

———. 2015. "Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E," no. January.

Oldham, M. 2017. "List of Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E)."

OMNRF. 2014. Ontario Wetland Evaluation System: Southern Manual.

Ontario Geological Survey. 2010. "Surficial Geology of Southern Ontario."

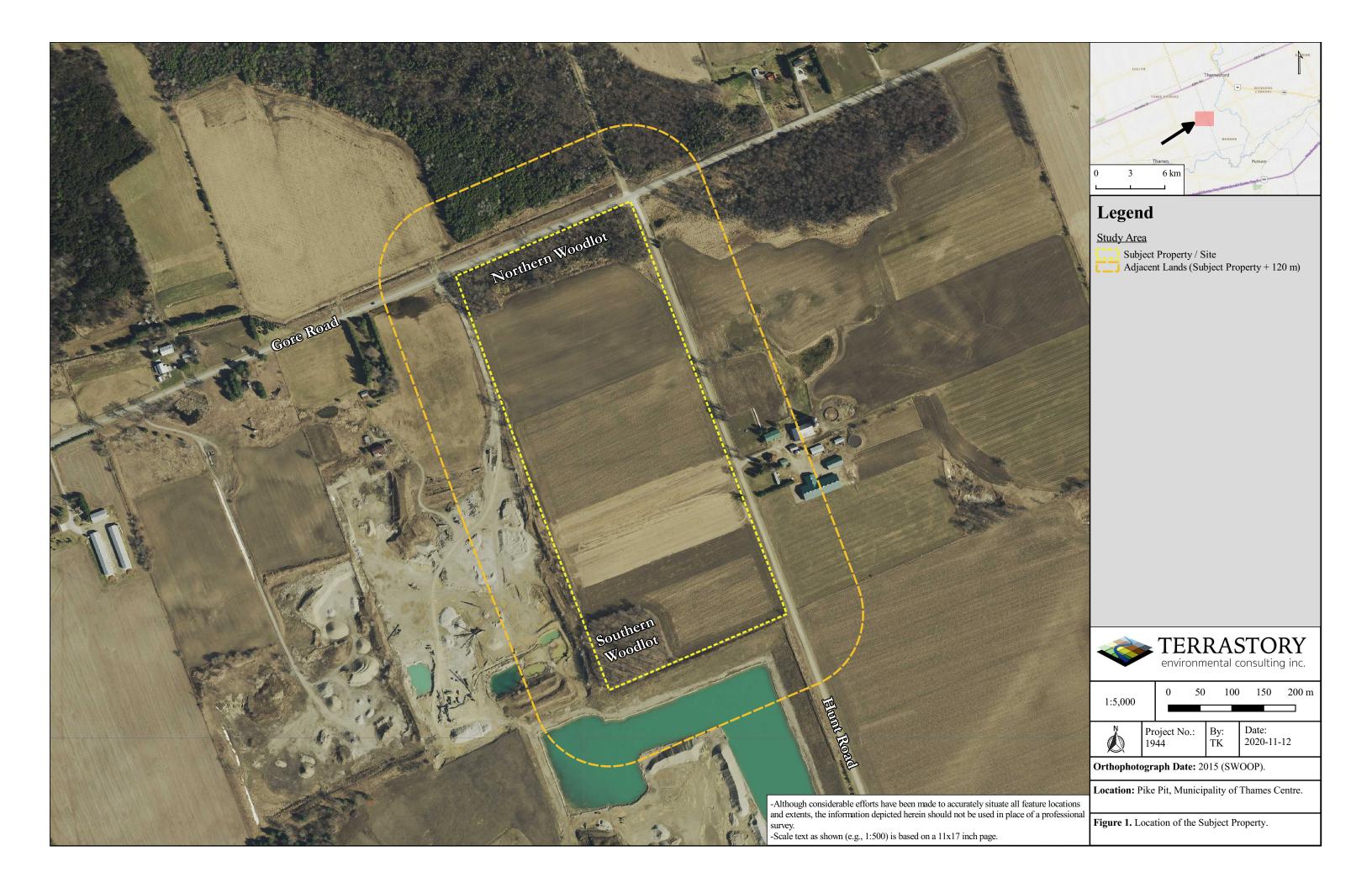
Phair, C., B.L. Henson, and K.E. Brodribb. 2005. "Great Lakes Conservation Blueprint for Aquatic Biodiversity." Vol. 2.

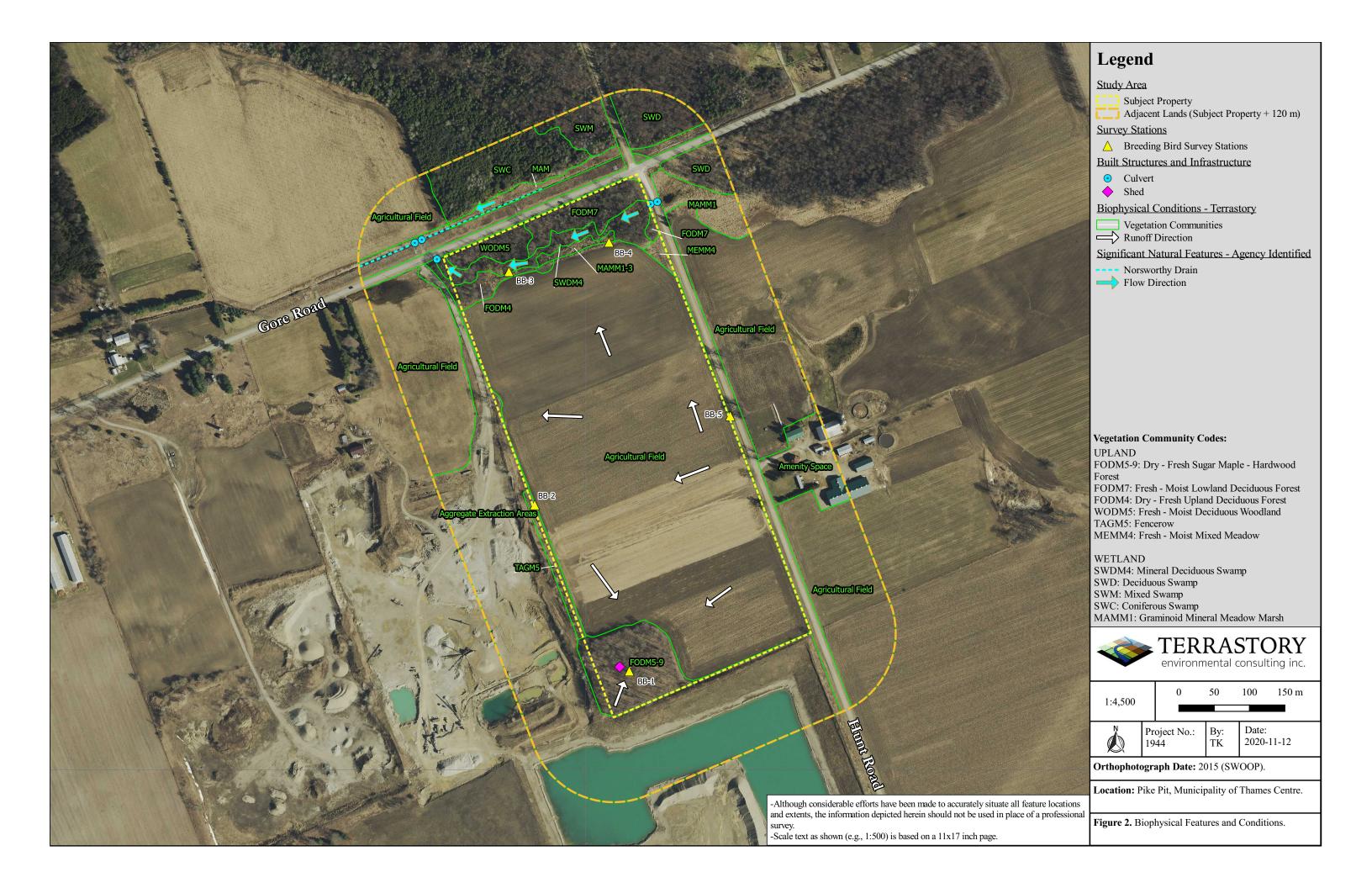
Turner, Angela. 1981. "The Use of Time and Energy by Aerial Foraging Birds."

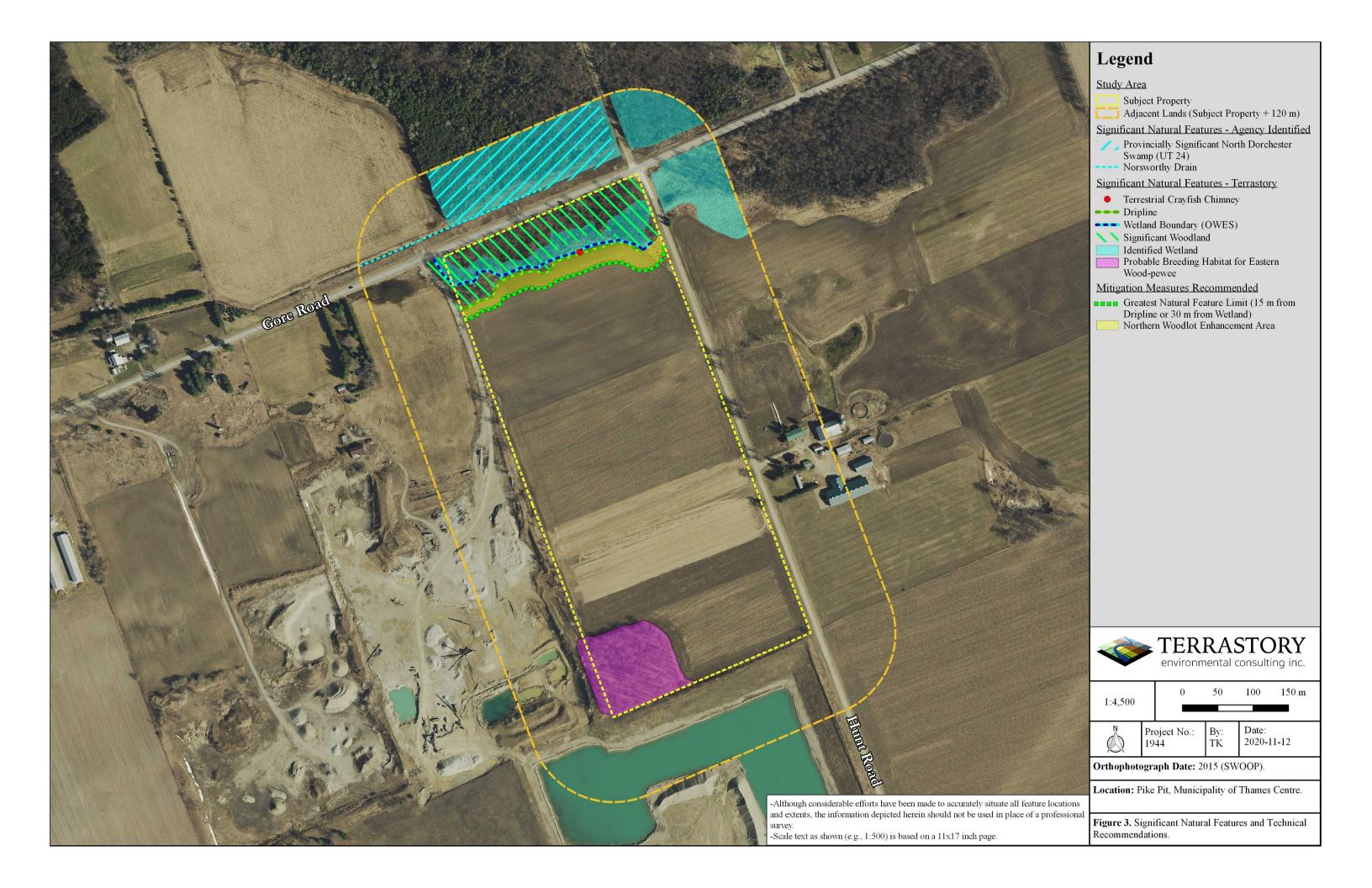
UTRCA. 2014. "Middlesex Natural Heritage Systems Study."

——. 2017. "Dorchester Corridor Watershed Report Card 2017."

Level I & II NER – Pike Pit Project No.: 1944











Tristan L. Knight, M.E.S., M.Sc. Senior Ecologist / President

## **CAREER AND ACADEMIC HISTORY**

2018 - Present	Senior Ecologist / President, Terrastory Environmental Consulting Inc.
2014 - 2018	Ecologist / Botanist, RiverStone Environmental Solutions Inc.
2013 - 2014	Watershed Restoration Technician, Credit Valley Conservation Authority
2012 - 2013	Terrestrial Ecologist, Aquafor Beech Ltd.
2011 - 2012	Wetland Biologist / Asst. SAR Biologist, Ontario Ministry of Natural Resources
2009 - 2011	Master of Science, SUNY College of Environmental Science and Forestry, Syracuse, NY
2007 - 2009	Master of Environmental Studies, York University, Toronto, ON
2003 - 2007	Hons. Bachelor of Arts, University of Western Ontario, London, ON

#### PROFESSIONAL EXPERIENCE

Tristan has ten years of experience as an environmental professional acting in diverse private- and public-sector roles. He has assisted a wide array of clients across the development industry (e.g., residential, aggregates, municipal infrastructure, green energy, etc.) and has extensive project management experience with projects big and small. Tristan is an accomplished field ecologist and certified Arborist with professional training in a vast array of provincial data collection protocols including but not limited to Ecological Land Classification, Ontario Wetland Evaluation System, Ontario Stream Assessment Protocol, Ontario Benthos Biomonitoring Network, and Vegetation Sampling Protocol. He is regularly involved in providing opinions and conformity assessments associated with federal, provincial, and municipal environmental policies, conducting environmental impact assessments, and identifying creative solutions to development challenges. Tristan is single-mindedly focused on generating high quality, time-sensitive, cost-competitive environmental reporting and advice.

The following is a partial list of Tristan's consulting project experience since 2012.

# **Environmental Impact Studies / Natural Heritage Assessments**

- Natural Environment Level 1 & 2 Technical Report in the Municipality of Huron East; for private client;
   Key Tasks: extensive terrestrial/wetland/aquatic surveys, species at risk surveys (birds, turtles, bats, etc.),
   significant wildlife habitat assessments, graphics, reporting in support of a quarry application for a licence expansion and new licence.
- Environmental Impact Statement in the **Township of Southgate**; Flato Developments Inc.; **Key Tasks:** extensive terrestrial/wetland/aquatic surveys, species at risk surveys, significant wildlife habitat assessments, Endangered Species Act approvals, Fisheries Act authorization, graphics, reporting in support of a ~500-unit plan of subdivision.
- Natural Environment Report in the Town of Caledon/City of Brampton; for the Regional Municipality of Peel; Key Tasks: ELC, breeding bird surveys, tree inventory and health assessment, fish and aquatic habitat surveys, anuran calling surveys, botanical inventory, identification and assessment of significant natural heritage features, mitigation opportunities, permitting under the Endangered Species Act (Redside Dace), permitting under the Conservation Authorities Act, graphics, and reporting in support of 14 km of improvements to Mayfield Road.

- Natural Environment Addendum in the City of Kawartha Lakes; for Giofam Investments Inc.; Key Tasks: breeding bird surveys, significant wildlife habitat assessment, graphics, reporting in support of a quarry application.
- Environmental Impact Study in the Town of Huntsville; for private client; Key Tasks: ELC, breeding bird surveys, graphics, and reporting in support of a multiple lot severance.
- Natural Heritage Impact Statement in the City of Toronto; for the City of Toronto; Key Tasks: ELC, aquatic
  habitat assessment, tree inventory and health assessment, identification of mitigation opportunities,
  graphics, Conservation Authorities Act approval, and reporting in support of bridge works on Bloor Street over
  Etobicoke Creek.
- Environmental Impact Statement in the Town of Georgina; for private client; Key Tasks: ELC, identification and assessment of significant natural heritage features, mitigation opportunities, graphics, reporting in support of a lot severance.
- Environmental Impact Statement in the **Town of Aurora**; *for private client*; **Key Tasks**: ELC, identification and assessment of significant natural heritage features, mitigation opportunities, graphics, reporting in support of a rezoning application.
- Site Evaluation Report in the **Township of Muskoka Lakes**; *for private client*; **Key Tasks**: ELC, wetland boundary delineation, identification and assessment of significant natural heritage features, mitigation opportunities, graphics reporting in support of a lot severance.
- Natural Heritage Evaluation in the **Township of Hamilton**; *for private client*; **Key Tasks**: ELC, identification and assessment of significant natural heritage features, Butternut Health Assessment, mitigation opportunities, graphics, reporting in support of a site plan application.
- Environmental Impact Statement and Site Evaluation Report in the Town of Gravenhurst; for private client;
   Key Tasks: ELC, identification and assessment of significant natural heritage features, mitigation opportunities, graphics, reporting in support of a multiple lot severance.
- Natural Heritage Evaluation in the Township of King; for private client; Key Tasks: ELC, identification and
  assessment of significant natural heritage features, significant woodland assessment, mitigation
  opportunities, graphics, reporting in support of a site plan application.
- Site Evaluation Report in the **Municipality of Dysart et al.**; for private client; **Key Tasks:** ELC, identification and assessment of significant natural heritage features, fish and aquatic habitat assessment, mitigation opportunities, graphics, reporting in support of a single lot severance.

## Municipal Class Environmental Assessments

- Municipal Class Assessment (Schedule B) in the Town of Caledon; for IBI Group. Key Tasks: fish habitat
  assessments, vegetation surveys, tree inventory, breeding bird surveys, graphics, alternatives assessment for
  a bridge replacement project.
- Municipal Class Environmental Assessment (Schedule C) in the Town of Milton; for Delcan Corporation. Key
  Tasks: calling anuran surveys, significant woodland assessment, graphics, reporting in support of the
  expansion of Britannia Road.

## **Environmental Servicing/Implementation Reports**

• Environmental Implementation Report in the **Township of Southgate**; for Flato Developments Inc. **Key Tasks:** comprehensive construction mitigation plan integrating a variety of disciplines and construction activities (i.e., grading, installation of watercourse crossing structures, landscaping for stormwater retention ponds, etc.).



 Master Environmental Servicing Plan in the City of Brampton; for Candevcon Ltd. Key Tasks: ELC, summer and fall botanical inventories, significant wildlife habitat assessment, hedgerow assessment, natural heritage system recommendations, mitigation opportunities, graphics, reporting in support of a Master Environmental Servicing Plan.

## Species at Risk Surveys and Habitat Assessments

- Surveys for Pale-bellied Frost Lichen in the County of Hastings; for private client; Key Tasks: two (2) days of
  inventories for Pale-bellied Frost Lichen, reporting.
- Species at Risk Habitat Assessment in the **Township of Guelph/Eramosa**; for River Valley Developments Inc.; **Key Tasks**: assessment and collection of background information, identification and assessment of species at risk habitat in support of a new quarry licence application.
- SAR Habitat Assessment in the City of Brampton; for Planmac Inc.; Key Tasks: Redside Dace, Eastern Meadowlark and Bobolink habitat assessment in support of bridge works.
- Butternut Health Assessment in the **Town of Caledon**; *for the Town of Caledon*; **Key Tasks**: Butternut Health Assessment in support of culvert works.
- Butternut Health Assessment in the **City of Toronto**; *for the City of Toronto*; **Key Tasks:** Butternut Health assessment in support of watercourse works.
- Butternut Health Assessment in the **Town of Orangeville**; *for the City of Toronto*; **Key Tasks:** Butternut Health Assessment in support of watercourse works.

#### Fisheries and Fish Habitat Assessments

- Fish Habitat Impact Assessment in the Township of Muskoka Lakes; for private client; Key Tasks: fish and
  aquatic habitat assessment, graphics, reporting in support of a quarry application.
- Fish Sampling and Habitat Assessments across eastern Ontario; for Trans Canada Pipelines; Key Tasks: fish sampling, fish habitat assessments in support of a pipeline expansion.
- Fish Rescue in the Township of Muskoka Lakes; for private client; Key Tasks: fish rescue in support of bridge works.
- Water Quality Monitoring in the Village of Burks Falls; for private client; Key Tasks: water quality sampling
  in support of post-construction monitoring efforts on a wind farm.

## **Tree Inventories and Arborist Reports**

- Tree Inventory and Recommendations in the Town of Richmond Hill; for The Municipal Infrastructure Group;
   Key Tasks: tree inventory and health assessment, tree retainment recommendations in support of stormwater pond maintenance activities.
- Tree Inventory and Preservation Plan in the **Town of Georgina**; for Oxford Developments; **Key Tasks**: tree inventory and health assessment, tree retainment recommendations in support of a sidewalk extension.
- Arborist Report in the Town of Aurora; for private client; Key Tasks: tree inventory and health assessment, tree retainment recommendations, significant species presence/absence survey, mitigation options, reporting in support of watercourse and culvert works.
- Tree Inventory and Health Assessment in the **Town of New Tecumseth**; *for Granite Condos*: **Key Tasks:** tree inventory and health assessment, tree retainment recommendations, mitigation options, graphics, reporting in support of a site plan application for a retirement home.

environmental consulting inc.

- Tree Inventory and Health Assessment in the **City of Burlington**; *for private client*; **Key Tasks:** tree inventory and health assessment, tree retainment recommendations, mitigation options, graphics, reporting in support of watercourse works.
- Tree Inventory and Health Assessment in the **City of Mississauga**; *for private client*; **Key Tasks:** tree inventory and health assessment, tree retainment recommendations, mitigation options, graphics, reporting in support of watercourse works.
- Tree Inventory and Health Assessment in the City of Toronto; for private client; Key Tasks: tree inventory
  and health assessment, tree retainment recommendations, mitigation options, graphics, reporting in support
  of watercourse works.

## **Environmental Constraints Analyses**

- Environmental Constraints Analysis in the **Town of Fort Erie**; *for private client*; **Key Tasks:** natural feature constraints analysis, assessment of significant natural heritage features, guidance as part of due diligence.
- Environmental Protection Zone Assessment in the Town of Gravenhurst; for private client; Key Tasks:
   ELC, identification and assessment of significant natural heritage features, graphics, reporting in support of a site plan application.
- Environmental Constraints Analysis in the **Town of Gravenhurst**; *for private client*; **Key Tasks**: identification and assessment of species at risk habitat and significant natural heritage features, graphics, reporting in support of a multiple lot severance.
- Environmental Constraints Analysis in the Town of Huntsville; for private client; Key Tasks: wetland boundary delineation, graphics, reporting in support of a site plan application for a resort development.
- Construction Mitigation Plan in the **Town of Caledon**; *for private client*; **Key Tasks:** significant wildlife habitat assessment, mitigation opportunities, graphics, reporting in support of a site plan application.

#### **Peer Review**

Peer Review and Opinion Letter in the City of Kawartha Lakes; for private client; Key Tasks: critical
assessment of several reports pertaining to flooding/environmental damages, wetland conditions and
functional assessment.

## **Policy Research**

 Multi-Jurisdictional Review of Endangered Species Act Concepts report; for the Ontario Ministry of Natural Resources; Key Tasks: intensive literature review, interviews, policy guidance, reporting.

### **Restoration Plans**

- Restoration Options Plan in the Village of Burks Falls; for private client; Key Tasks: identification of
  restoration opportunities to minimize soil erosion in support of post-construction monitoring efforts on a
  wind farm.
- Shoreline Stabilization and Restoration Plan in the Town of Gravenhurst; for private client; Key Tasks:
  existing conditions assessment, vegetation plan, shoreline stabilization plan in support of shoreline
  stabilization efforts.
- Watercourse and Riparian Zone Restoration Plan in the Town of Innisfil; for private client; Key Tasks: identification of restoration opportunities to restore watercourse and riparian zone functions, graphics, reporting in support of efforts to restore a degraded watercourse.



environmental consulting inc.

## **Bird Nesting Surveys**

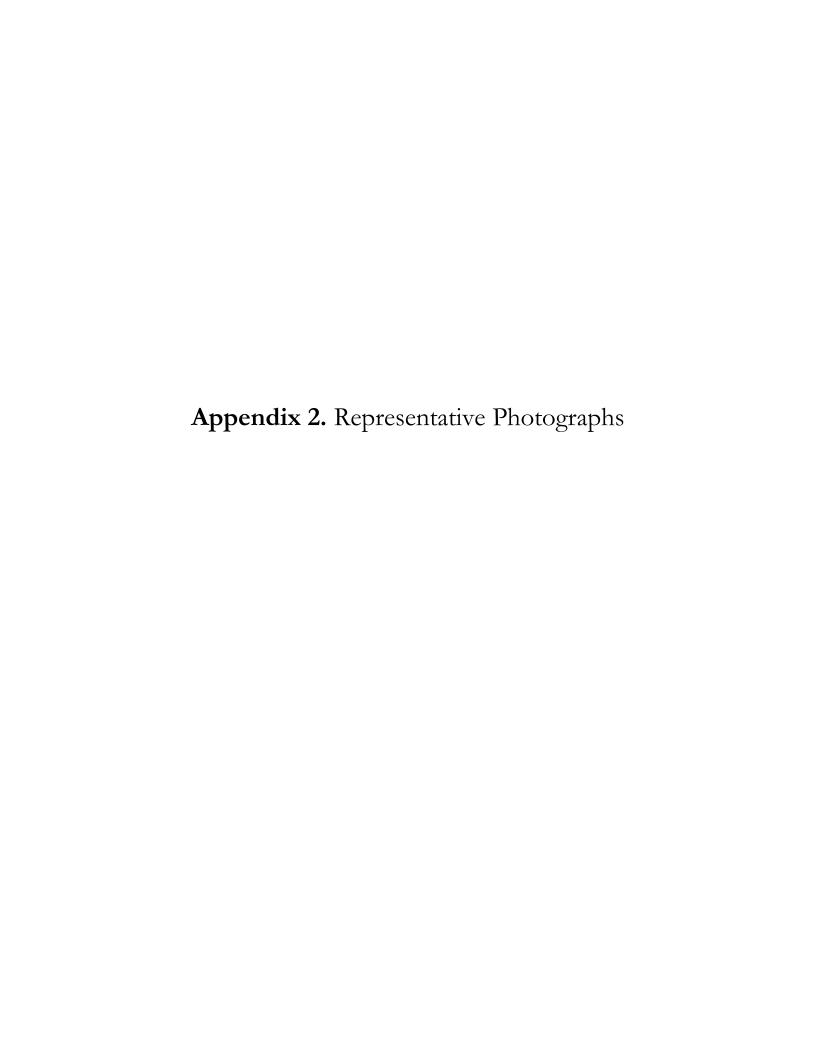
- Bird Nesting Survey in the **Town of East Gwillimbury**; *for AECOM*; **Key Tasks:** area-search for nesting birds in support of a development application.
- Bird Nesting Survey in the **Town of Smooth Rock Falls**; *for private client*; **Key Tasks:** area-search for nesting birds in support of the construction of a new hydroelectric plant.

### RELEVANT CERTIFICATIONS AND TRAINING COURSES

2018	MTO RAQS Terrestrial and Fisheries Assessment Specialist (pending)
2016	Tree Risk Assessment Qualification (TRAQ)
2016	Managed Forest Plan Approver (#421)
2015	Vegetation Sampling Protocol
2014	Ontario Stream Assessment Protocol
2014	Fish Identification "Level 2"
2014	Electrofishing "Class 2"
2014	Butternut Health Assessor (#268)
2013	ISA Certified Arborist #ON-1663A
2012	Ontario Benthos Biomonitoring Network
2012	Ontario Wetland Evaluation System Instructor
2011	Family-level Benthic Invertebrate ID Workshop
2011	Ontario Wetland Evaluation System
2011	Ecological Land Classification

## **PUBLICATIONS**

- Knight, T. (2010). Enhancing the flow of ecological goods and services to society: Key principles for the design of marginal and ecologically significant agricultural land retirement programs in Canada. Canadian Institute for Environmental Law and Policy.
- De Costa, R., & Knight, T. (2011). Asymmetric encounters in Native Canada. *American Review of Canadian Studies*, 41:3, 212-227.





**Photo 1.** Corn and alfalfa fields looking west from the eastern Subject Property boundary along Hunt Road (9 August 2019).



**Photo 2.** Southern Woodlot looking northward from the fencerow (24 May 2019).



**Photo 3.** Southern Woodlot looking west from the eastern Subject Property boundary along Hunt Road (24 May 2019).



**Photo 4.** Southern Woodlot showing density of Garlic Mustard (24 May 2019).

Photo 5. Southern Woodlot with dense carpet of Wild Ginger and Photo 6. Southern Woodlot (9 August 2019). cut stump (9 August 2019).





Photo 7. Shed in Southern Woodlot (9 August 2019).



Photo 8. Northern Woodlot looking northwest from the mixed meadow (9 August 2019).

Photo 9. Deciduous swamp with Skunk Cabbage (24 May 2019).



Photo 10. Deciduous swamp with Marsh Marigold (16 May 2020).



**Photo 11.** Deciduous swamp after standing water recedes by mid-summer (9 August 2019).



**Photo 12.** Meadow marsh with dense Reed-canary Grass and Spotted Joe-pye Weed (9 August 2019).





Photo 13. Outlet of drainage from the deciduous swamp in the Northern Woodlot at the Gore Road culvert looking south (16 May 2020).



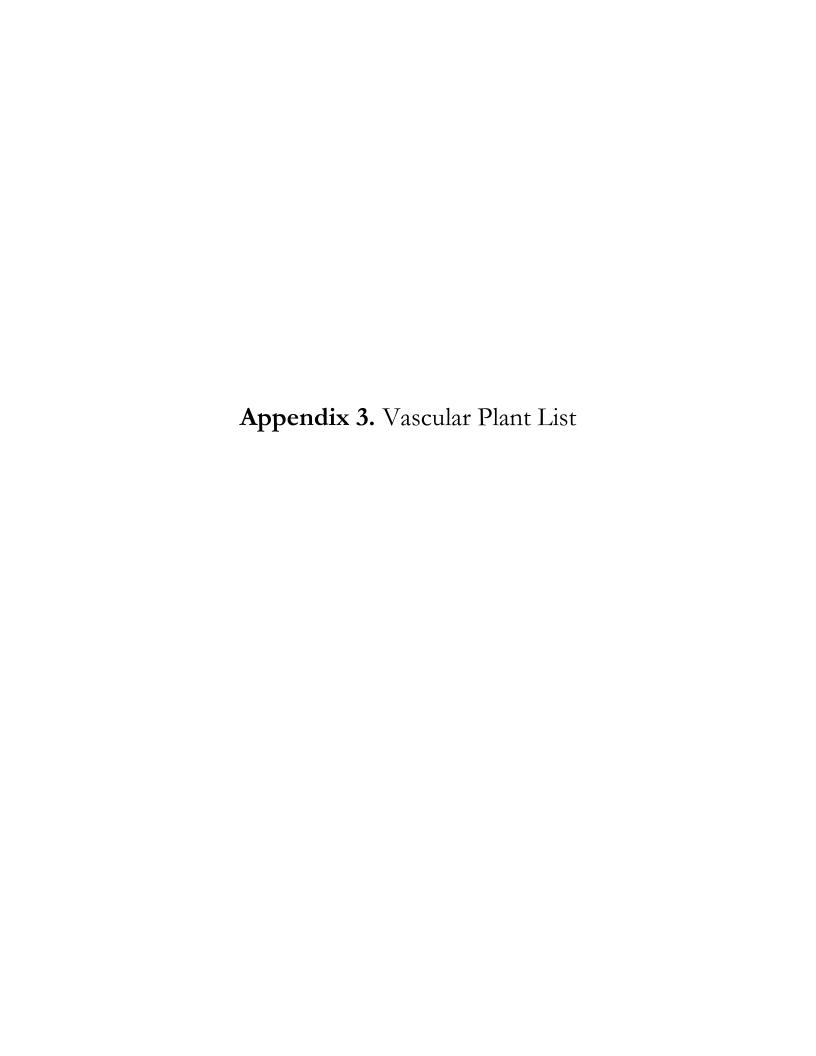
**Photo 14.** Upland forest in the Northern Woodlot (9 August 2019).



Photo 15. Mixed meadow adjacent to the Northern Woodlot looking southward (9 August 2019).



Photo 16. Terrestrial crayfish chimney (9 August 2019).



Terrastory Environmental Consulting Inc.

Appendix 3. Vascular Plant List

Scientific Name	Common Name	Family	•	Documented by	S-Rank (per	Coefficient of	Coefficient of
			Terrastory	MTE	NHIC)	Conservatism	Wetness
Acer negundo	Manitoba Maple	Aceraceae	X		S5	0	0
Acer nigrum	Black Maple	Aceraceae	X		S4?	7	3
Acer saccharum	Sugar Maple	Aceraceae	X	X	S5	4	3
Acer × freemanii	Freeman's Maple	Aceraceae	X		SNA	6	-5
Actaea pachypoda	White Baneberry	Ranunculaceae	X	X	S5	6	5
Actaea rubra	Red Baneberry	Ranunculaceae	X		S5	6	3
Agrimonia gryposepala	Hooked Agrimony	Rosaceae	X		S5	2	3
Agrostis gigantea	Redtop	Poaceae	X		SNA	n/a	-3
Alliaria petiolata	Garlic Mustard	Brassicaceae	X	X	SNA	n/a	0
Allium tricoccum	Wild Leek	Liliaceae	X	X	S4	7	3
Ambrosia artemisiifolia	Common Ragweed	Asteraceae	X		S5	0	3
Angelica atropurpurea	Purple-stemmed Angelica	Apiaceae	X		S5	6	-5
Aralia nudicaulis	Wild Sarsaparilla	Araliaceae	X		S5	4	3
Arctium lappa	Great Burdock	Asteraceae	X		SNA	n/a	3
Arctium minus	Common Burdock	Asteraceae	X	X	SNA	n/a	3
Arenaria serpyllifolia	Thyme-leaved Sandwort	Caryophyllaceae	X		SNA	n/a	0
Arisaema triphyllum	Jack-in-the-pulpit	Araceae	X	X	S5	5	-3
Asarum canadense	Canada Wild-ginger	Aristolochiaceae	X	X	S5	6	5
Asclepias syriaca	Common Milkweed	Asclepiadaceae	X		S5	0	5
Athyrium filix-femina var. angustum	Northeastern Lady Fern	Dryopteridaceae	X		S5	4	0
Barbarea vulgaris	Bitter Wintercress	Brassicaceae	X		SNA	n/a	0
Betula alleghaniensis	Yellow Birch	Betulaceae	X		S5	6	0
Bidens frondosa	Devil's Beggarticks	Asteraceae	X	X	S5	3	-3
Boehmeria cylindrica	False Nettle	Urticaceae	X		S5	4	-5
Bromus inermis	Smooth Brome	Poaceae	X		SNA	n/a	5
Caltha palustris	Yellow Marsh Marigold	Ranunculaceae	X		S5	5	-5
Capsella bursa-pastoris	Common Shepherd's Purse	Brassicaceae	X		SNA	n/a	3
Carex albursina	White Bear Sedge	Cyperaceae	X		S5	7	5
Carex bromoides	Brome-like Sedge	Cyperaceae	X		S5	7	-3
Carex crinita	Fringed Sedge	Cyperaceae	X		S5	6	-5
Carex cristatella	Crested Sedge	Cyperaceae	X		S5	3	-3
Carex gracillima	Graceful Sedge	Cyperaceae	X		S5	4	3
Carex hirtifolia	Pubescent Sedge	Cyperaceae	X		S4S5	5	5
Carex jamesii	James' Sedge	Cyperaceae	X		S4	8	5
Carex lupulina	Hop Sedge	Cyperaceae	X		S5	6	-5
Carex plantaginea	Plantain-leaved Sedge	Cyperaceae	X		S5	7	5
Carex radiata	Eastern Star Sedge	Cyperaceae	X		S5	4	0
Carex rosea	Rosy Sedge	Cyperaceae	X		S5	2	5
Carex sprengelii	Sprengel's Sedge	Cyperaceae	X		S5	6	0
Carex vulpinoidea	Fox Sedge	Cyperaceae	X		S5	3	-5

Level I and II NER – Pike Pit

Appendix 3. Vascular Plant List

Scientific Name	Common Name	Family	Documented by	Documented by	S-Rank (per	Coefficient of	Coefficient of
			Terrastory	MTE	NHIC)	Conservatism	Wetness
Carex woodii	Wood's Sedge	Cyperaceae	X		S4	6	3
Carya cordiformis	Bitternut Hickory	Juglandaceae	X	X	S5	6	0
Caulophyllum giganteum	Giant Blue Cohosh	Berberidaceae	X	X	S5	5	5
Celastrus scandens	Climbing Bittersweet	Celastraceae	X		S5	3	3
Celtis occidentalis	Common Hackberry	Ulmaceae	X		S4	8	0
Chenopodium album	White Goosefoot	Chenopodiaceae	X		SNA	n/a	3
Circaea canadensis subsp. canadensis	Canada Enchanter's Nightshade	Onagraceae	X	X	S5	2	3
Cirsium arvense	Canada Thistle	Asteraceae	X		SNA	n/a	3
Cirsium vulgare	Bull Thistle	Asteraceae	X		SNA	n/a	3
Clematis virginiana	Virginia Virgin's-bower	Ranunculaceae	X		S5	3	0
Cornus alternifolia	Alternate-leaved Dogwood	Cornaceae	X		S5	6	3
Cornus racemosa	Gray Dogwood	Cornaceae	X	X	S5	2	0
Cornus stolonifera	Red-osier Dogwood	Cornaceae	X		S5	2	-3
Crataegus crus-galli	Cockspur Hawthorn	Rosaceae	X		S4	4	0
Crepis tectorum	Narrow-leaved Hawksbeard	Asteraceae	X		SNA	n/a	5
Cystopteris bulbifera	Bulblet Fern	Dryopteridaceae	X		S5	5	-3
Dactylis glomerata	Orchard Grass	Poaceae	X	X	SNA	n/a	3
Daucus carota	Wild Carrot	Apiaceae	X	X	SNA	n/a	5
Dianthus armeria	Deptford Pink	Caryophyllaceae	X		SNA	n/a	5
Dicentra cucullaria	Dutchman's Breeches	Fumariaceae	X		S5	6	5
Digitaria sanguinalis	Hairy Crabgrass	Poaceae	X		SNA	n/a	3
Dryopteris carthusiana	Spinulose Wood Fern	Dryopteridaceae	X		S5	5	-3
Dryopteris marginalis	Marginal Wood Fern	Dryopteridaceae	X		S5	5	3
Echinochloa crus-galli	Large Barnyard Grass	Poaceae	x		SNA	n/a	-3
Echinocystis lobata	Wild Mock-cucumber	Cucurbitaceae	X	X	S5	3	-3
Elymus hystrix	Bottlebrush Grass	Poaceae	X		S5	5	5
Elymus repens	Creeping Wildrye	Poaceae	X		SNA	n/a	3
Elymus virginicus var. virginicus	Virginia Wildrye	Poaceae	X		S5	5	-3
Epilobium coloratum	Purple-veined Willowherb	Onagraceae	X		S5	3	-5
Epilobium hirsutum	Hairy Willowherb	Onagraceae	X		SNA	n/a	-3
Epilobium parviflorum	Small-flowered Willowherb	Onagraceae	X	X	SNA	n/a	3
Epipactis helleborine	Eastern Helleborine	Orchidaceae	x		SNA	n/a	3
Eragrostis cilinensis	Stinkgrass	Poaceae	x		SNA	n/a	3
Erigeron annuus	Annual Fleabane	Asteraceae	X	X	S5	0	3
Erigeron canadensis	Canada Horseweed	Asteraceae	X	X	S5	0	3
Erigeron philadelphicus var. philadelphicus	Philadelphia Fleabane	Asteraceae	X		S5	1	-3
Erigeron strigosus	Rough Fleabane	Asteraceae	X		S5	4	3
Erucastrum gallicum	Common Dogmustard	Brassicaceae	X		SNA	n/a	5
Erythronium americanum subsp. americanum	Yellow Trout-lily	Liliaceae	X		S5	5	5
Euonymus obovatus	Running Strawberry Bush	Celastraceae	X	X	S4	6	5

Level I and II NER – Pike Pit

Appendix 3. Vascular Plant List

Scientific Name	Common Name	Family	•	Documented by	-	Coefficient of	Coefficient of
			Terrastory	MTE	NHIC)	Conservatism	Wetness
Eupatorium perfoliatum	Common Boneset	Asteraceae	X		S5 S5	2	-3
Euthamia graminifolia	Grass-leaved Goldenrod	Asteraceae	X	X		2	0
Eutrochium maculatum var. maculatum	Spotted Joe Pye Weed	Asteraceae	X		S5	3	-5
Fagus grandifolia	American Beech	Fagaceae	X		S4	6	3
Fallopia convolvulus	Black Bindweed	Polygonaceae	X		SNA	n/a	3
Fragaria virginiana	Wild Strawberry	Rosaceae	X		S5	2	3
Frangula alnus	Glossy Buckthorn	Rhamnaceae	X	X	SNA	n/a	0
Fraxinus americana	White Ash	Oleaceae	X		S4	4	3
Fraxinus nigra	Black Ash	Oleaceae	X		S4	7	-3
Fraxinus pennsylvanica	Green Ash	Oleaceae	X		S4	3	-3
Galium aparine	Cleavers	Rubiaceae	X		S5	4	3
Geranium maculatum	Spotted Geranium	Geraniaceae	X	X	S5	6	3
Geranium robertianum	Herb-Robert	Geraniaceae	X	X	S5	2	3
Geum aleppicum	Yellow Avens	Rosaceae	X	X	S5	2	0
Geum canadense	White Avens	Rosaceae	X		S5	3	0
Glyceria striata	Fowl Mannagrass	Poaceae	X		S5	3	-5
Hepatica acutiloba	Sharp-lobed Hepatica	Ranunculaceae	X	X	S5	8	5
Hesperis matronalis	Dame's Rocket	Brassicaceae	X	X	SNA	n/a	3
Hydrophyllum canadense	Canada Waterleaf	Hydrophyllaceae	X	X	S4	8	0
Hydrophyllum virginianum	Virginia Waterleaf	Hydrophyllaceae	X	X	S5	6	0
Hypericum majus	Larger Canadian St. John's-wort	Clusiaceae	X		S5	5	-3
Hypericum perforatum	Common St. John's-wort	Clusiaceae	X		SNA	n/a	5
Juglans nigra	Black Walnut	Juglandaceae	X		S4?	5	3
Juncus dudleyi	Dudley's Rush	Juncaceae	X		S5	1	-3
Lactuca biennis	Tall Blue Lettuce	Asteraceae	X	X	S5	6	0
Laportea canadensis	Wood Nettle	Urticaceae	X	X	S5	6	-3
Leonurus cardiaca subsp. cardiaca	Common Motherwort	Lamiaceae	X	X	SNA	n/a	5
Lindera benzoin	Spicebush	Lauraceae	X		S4	6	-3
Lobelia inflata	Indian-tobacco	Campanulaceae	X		S5	3	3
Lobelia siphilitica	Great Blue Lobelia	Campanulaceae	X		S5	6	-3
Lolium arundinaceum	Tall Fescue	Poaceae	X		SNA	n/a	3
Lolium pratense	Meadow Fescue	Poaceae	X		SNA	n/a	3
Lonicera tatarica	Tartarian Honeysuckle	Caprifoliaceae	X		SNA	n/a	3
Lysimachia ciliata	Fringed Loosestrife	Primulaceae	X		S5	4	-3
Maianthemum canadense	Wild Lily-of-the-valley	Liliaceae	X		S5	5	3
Maianthemum racemosum	Large False Solomon's Seal	Liliaceae	X	X	S5	4	3
Maianthemum stellatum	Star-flowered False Solomon's Seal	Liliaceae	X		S5	6	0
Malus pumila	Common Apple	Rosaceae	X		SNA	n/a	5
Malva neglecta	Dwarf Cheeseweed	Malvaceae	X		SNA	n/a	5
Matteuccia struthiopteris	Ostrich Fern	Dryopteridaceae	X		S5	5	0

Level I and II NER – Pike Pit

Terrastory Environmental Consulting Inc.

Appendix 3. Vascular Plant List

Scientific Name	Common Name	Family	•	Documented by	S-Rank (per	Coefficient of	Coefficient of
			Terrastory	MTE	NHIC)	Conservatism	Wetness
Medicago lupulina	Black Medic	Fabaceae	X	X	SNA	n/a	3
Medicago sativa subsp. sativa	Variable Alfalfa	Fabaceae	X		SNA	n/a	5
Morus alba	White Mulberry	Moraceae	X		SNA	n/a	0
Nepeta cataria	Catnip	Lamiaceae	X	X	SNA	n/a	3
Oenothera biennis	Common Evening Primrose	Onagraceae	X		S5	0	3
Oenothera perennis	Perennial Evening Primrose	Onagraceae	X		S5	6	0
Onoclea sensibilis	Sensitive Fern	Dryopteridaceae	X		S5	4	-3
Osmorhiza longistylis	Smooth Sweet Cicely	Apiaceae	X		S5	6	3
Ostrya virginiana	Eastern Hop-hornbeam	Betulaceae	X	X	S5	4	3
Oxalis stricta	Upright Yellow Wood-sorrel	Oxalidaceae	X	X	S5	0	3
Panicum capillare	Common Panicgrass	Poaceae	X		S5	0	0
Parthenocissus quinquefolia	Virginia Creeper	Vitaceae	X		S4?	6	3
Parthenocissus vitacea	Thicket Creeper	Vitaceae	X		S5	4	3
Persicaria maculosa	Spotted Lady's-thumb	Polygonaceae	X		SNA	n/a	-3
Phalaris arundinacea	Reed Canary Grass	Poaceae	X		S5	0	-3
Phleum pratense	Common Timothy	Poaceae	X		SNA	n/a	3
Phlox divaricata	Wild Blue Phlox	Polemoniaceae	X		S4	7	3
Phryma leptostachya	Lopseed	Verbenaceae	X		S4S5	6	3
Picris hieracioides	Hawkweed Oxtongue	Asteraceae	X		SNA	n/a	5
Pilea pumila	Dwarf Clearweed	Urticaceae	X	X	S5	5	-3
Pinus strobus	Eastern White Pine	Pinaceae	X		S5	4	3
Plantago lanceolata	English Plantain	Plantaginaceae	X		SNA	n/a	3
Poa compressa	Canada Bluegrass	Poaceae	X		SNA	n/a	3
Poa pratensis subsp. pratensis	Kentucky Bluegrass	Poaceae	X		SNA	n/a	3
Podophyllum peltatum	May-apple	Berberidaceae	X		S5	5	3
Polygonatum pubescens	Hairy Solomon's Seal	Liliaceae	X		S5	5	5
Polygonum aviculare	Prostrate Knotweed	Polygonaceae	X		S4?	0	3
Polystichum acrostichoides	Christmas Fern	Dryopteridaceae	X		S5	5	3
Populus deltoides	Eastern Cottonwood	Salicaceae	X		S5	4	0
Populus tremuloides	Trembling Aspen	Salicaceae	X		S5	2	0
Potentilla recta	Sulphur Cinquefoil	Rosaceae	X		SNA	n/a	5
Prunus pensylvanica	Pin Cherry	Rosaceae	X		S5	3	3
Prunus serotina	Black Cherry	Rosaceae	X	X	S5	3	3
Prunus virginiana	Choke Cherry	Rosaceae	X	X	S5	2	3
Quercus macrocarpa	Bur Oak	Fagaceae	X		S5	5	3
Quercus rubra	Northern Red Oak	Fagaceae	X		S5	6	3
Ranunculus abortivus	Kidney-leaved Buttercup	Ranunculaceae	X		S5	2	0
Ranunculus acris	Tall Buttercup	Ranunculaceae	X		SNA	n/a	0
Ranunculus recurvatus var. recurvatus	Hooked Buttercup	Ranunculaceae	X		S5	4	-3
Rhamnus cathartica	Common Buckthorn	Rhamnaceae	X	X	SNA	n/a	0

Level I and II NER – Pike Pit

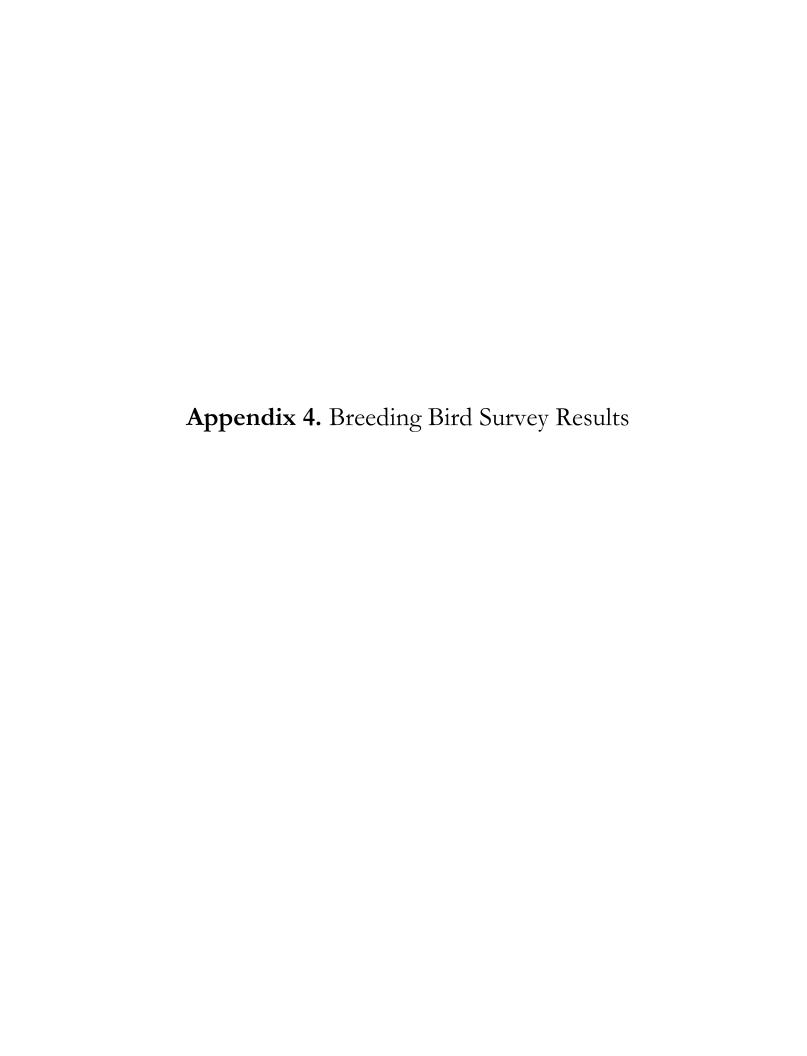
Appendix 3. Vascular Plant List

Scientific Name	Common Name	Family	•	Documented by	S-Rank (per	Coefficient of	Coefficient of
			Terrastory	MTE	NHIC)	Conservatism	Wetness
Rhus typhina	Staghorn Sumac	Anacardiaceae	X		S5	1	3
Ribes americanum	Wild Black Currant	Grossulariaceae	X		S5	4	-3
Ribes cynosbati	Prickly Gooseberry	Grossulariaceae	X	X	S5	4	3
Ribes rubrum	Northern Red Currant	Grossulariaceae	X		SNA	n/a	5
Ribes triste	Swamp Red Currant	Grossulariaceae	X		S5	6	-5
Robinia pseudoacacia	Black Locust	Fabaceae	X		SNA	n/a	3
Rorippa palustris subsp. palustris	Marsh Yellowcress	Brassicaceae	X		S5?	3	-5
Rubus allegheniensis	Allegheny Blackberry	Rosaceae	X		S5	2	3
Rubus idaeus subsp. Strigosus	Wild Red Raspberry	Rosaceae	X		S5	2	3
Rubus occidentalis	Black Raspberry	Rosaceae	X	X	S5	2	5
Rubus odoratus	Purple-flowering Raspberry	Rosaceae	X		S5	3	5
Rumex crispus	Curly Dock	Polygonaceae	X		SNA	n/a	0
Rumex obtusifolius	Bitter Dock	Polygonaceae	X	X	SNA	n/a	-3
Salix amygdaloides	Peach-leaved Willow	Salicaceae	X		S5	6	-3
Salix bebbiana	Bebb's Willow	Salicaceae	X		S5	4	-3
Salix eriocephala	Heart-leaved Willow	Salicaceae	X		S5	4	-3
Salix x fragilis	(Salix alba X Salix euxina)	Salicaceae	X		SNA	n/a	0
Salix x sepulcralis	(Salix alba X Salix babylonica)	Salicaceae	X		SNA	n/a	0
Sambucus canadensis	Common Elderberry	Caprifoliaceae	X		S5	5	-3
Sambucus racemosa subsp. pubens	Red Elderberry	Caprifoliaceae	X	X	S5	5	3
Sanguinaria canadensis	Bloodroot	Papaveraceae	X	X	S5	5	3
Scirpus atrovirens	Dark-green Bulrush	Cyperaceae	X		S5	3	-5
Setaria pumila subsp. pumila	Yellow Foxtail	Poaceae	X		SNA	n/a	0
Setaria viridis	Green Foxtail	Poaceae	X		SNA	n/a	5
Silene latifolia	White Campion	Caryophyllaceae	X		SNA	n/a	5
Sisymbrium officinale	Common Tumble Mustard	Brassicaceae	X		SNA	n/a	5
Solanum dulcamara	Bittersweet Nightshade	Solanaceae	X	X	SNA	n/a	0
Solidago altissima	Tall Goldenrod	Asteraceae	X	X	S5	1	3
Solidago flexicaulis	Zigzag Goldenrod	Asteraceae	X	X	S5	6	3
Solidago rugosa subsp. rugosa	Northern Rough-stemmed Goldenrod	Asteraceae	X		S5	4	0
Sonchus arvensis subsp. arvensis	Smooth Sow-thistle	Asteraceae	X		SNA	n/a	3
Sonchus arvensis subsp. uliginosus	Smooth Sow-thistle	Asteraceae	X		SNA	n/a	3
Sonchus asper	Prickly Sow-thistle	Asteraceae	X		SNA	n/a	3
Sorbus aucuparia	European Mountain-ash	Rosaceae	X		SNA	n/a	5
Sphenopholis intermedia	Slender Wedge Grass	Poaceae	X		S4S5	6	0
Stellaria media	Common Chickweed	Caryophyllaceae	X	X	SNA	n/a	3
Symphyotrichum firmum	Glossy-leaved Aster	Asteraceae	X		S4?	4	-3
Symphyotrichum lanceolatum	Panicled Aster	Asteraceae	X	X	S5	3	-3
Symphyotrichum lateriflorum var. lateriflorum	Calico Aster	Asteraceae	X		S5	3	0
Symphyotrichum novae-angliae	New England Aster	Asteraceae	X	X	S5	2	-3

Level I and II NER – Pike Pit

Appendix 3. Vascular Plant List

Scientific Name	Common Name	Family	Documented by	Documented by	S-Rank (per	Coefficient of	Coefficient of
		•	Terrastory	MTE	NHIC)	Conservatism	Wetness
Symphyotrichum pilosum	White Heath Aster	Asteraceae	X	X	S5	0	3
Symphyotrichum urophyllum	Arrow-leaved Aster	Asteraceae	X	X	S4	6	5
Symplocarpus foetidus	Skunk Cabbage	Araceae	X		S5	7	-5
Taraxacum officinale	Common Dandelion	Asteraceae	X		SNA	n/a	3
Thalictrum dioicum	Early Meadow-rue	Ranunculaceae	X		S5	6	3
Thalictrum pubescens	Tall Meadow-rue	Ranunculaceae	X		S5	5	-3
Thelypteris palustris var. pubescens	Eastern Marsh Fern	Thelypteridaceae	X		S5	5	-3
Thuja occidentalis	Eastern White Cedar	Cupressaceae	X		S5	4	-3
Tiarella cordifolia	Heart-leaved Foam-flower	Saxifragaceae	X		S5	6	3
Tilia americana	American Basswood	Tiliaceae	X	X	S5	4	3
Toxicodendron radicans var. radicans	Eastern Poison Ivy	Anacardiaceae	X	X	S5	2	0
Trifolium hybridum	Alsike Clover	Fabaceae	X		SNA	n/a	3
Trifolium pratense	Red Clover	Fabaceae	X		SNA	n/a	3
Trillium erectum	Red Trillium	Liliaceae	X		S5	6	3
Trillium grandiflorum	White Trillium	Liliaceae	X		S5	5	3
Tussilago farfara	Colt's-foot	Asteraceae	X		SNA	n/a	3
Typha latifolia	Broad-leaved Cattail	Typhaceae	X		S5	1	-5
Ulmus americana	American Elm	Ulmaceae	X		S5	3	-3
Urtica dioica subsp. gracilis	Slender Stinging Nettle	Urticaceae	X		S5	2	0
Verbascum thapsus	Common Mullein	Scrophulariaceae	X	X	SNA	n/a	5
Verbena hastata	Blue Vervain	Verbenaceae	X		S5	4	-3
Verbena urticifolia	White Vervain	Verbenaceae	X	X	S5	4	0
Veronica persica	Bird's-eye Speedwell	Scrophulariaceae	X		SNA	n/a	5
Viburnum lentago	Nannyberry	Caprifoliaceae	X		S5	4	0
Viburnum opulus subsp. trilobum var. americanum	Highbush Cranberry	Caprifoliaceae	X		S5	5	-3
Viola canadensis	Canada Violet	Violaceae	X		S5	6	3
Viola labradorica	Labrador Violet	Violaceae	X		S5	3	0
Viola sororia	Woolly Blue Violet	Violaceae	X		S5	4	0
Vitis riparia	Riverbank Grape	Vitaceae	X		S5	0	0
Zanthozylum americanum	Common Prickly-ash	Rutaceae	X		S5	3	3



environmental consulting ind

					Breed	ing Bird S	Stations <sup>1</sup> and Breeding Status <sup>2</sup>
Common Name	Scientific Name	BI-1	BI-2	BI-3	BI-4	BI-5	Comments
Alder Flycatcher	Empidonax alnorum				Po		
American Crow	Corvus brachyrhynchos	Ро	Po		Po	Po	
American Goldfinch	Spinus tristis	Ро	Pr	Pr			
American Redstart	Setophaga ruticilla					Po	Recorded on adjacent lands to the west only.
American Robin	Turdus migratorius	Со	Со	Po	Pr	Pr	•
Baltimore Oriole	Icterus galbula			Pr	Po	Po	
Bank Swallow	Riparia riparia		О				
Barn Swallow	Hirundo rustica		О		O	О	Individual s recorded may be associated with breeding colonies occupying barns/structures west of the Site and east of Hunt Road.
Bobolink	Dolichonyx oryzivorus		Pr				Recorded on adjacent lands to the west only.
Brown-headed Cowbird	Molothrus ater	Pr	Pr	Po		Po	
Canada Goose	Branta canadensis	О		О			
Cedar Waxwing	Bombycilla cedrorum					Po	
Chipping Sparrow	Spizella passerina				Po	Po	
Common Grackle	Quiscalus quiscula	Po					
Common Yellowthroat	Geothlypis trichas		Po	Pr			
Downy Woodpecker	Picoides pubescens			Po			
Eastern Kingbird	Tyrannus tyrannus		Po				
Eastern Meadowlark	Sturnella magna		Po				Recorded on adjacent lands to the west only.
Eastern Wood-pewee	Contopus virens	Pr					
European Starling	Sturnus vulgaris	Pr		Po	Pr	Pr	
Field Sparrow	Spizella pusilla		Pr				
Gray Catbird	Dumetella carolinensis	Po	Co	Pr			
Great Crested Flycatcher	Myrarchus crinitus			Po	Pr		
House Sparrow	Passer domesticus					Pr	
House Wren	Troglodytes aedon			Po	Po		
Indigo Bunting	Passerina cyanea			Po	Pr		
Killdeer	Charadrius vociferus					Pr	
Mourning Dove	Zenaida macroura			Po		Po	
Northern Cardinal	Cardinalis cardinalis	Po		Po			
Northern Flicker	Colaptes auratus			Po	Po		
Red-bellied Woodpecker	Melanerpes carolinus					Po	
Red-tailed Hawk	Buteo jamaicensis				О		Recorded on adjacent lands to the east only.
Red-winged Blackbird	Agelaius phoeniceus	Pr	Pr	Po	Pr	Po	
Rock Pigeon	Columba livia					Po	

environmental consulting inc

6 N	0 : .: .:	Breeding Bird Stations <sup>1</sup> and Breeding Status <sup>2</sup>						
Common Name	Scientific Name	BI-1	BI-2	BI-3	BI-4	BI-5	Comments	
Savannah Sparrow	Passerculus sandwichensis		Pr			Pr		
Song Sparrow	Melospiza melodia	Pr	Pr	Pr	Pr	Po		
Tree Swallow	Tachycineta bicolor		Po					
Turkey Vulture	Cathartes aura					О		
Warbling Vireo	Vireo gilvis	Pr		Pr				
Willow Flycatcher	Empidonax traillii		Po					
Yellow Warbler	Setophaga petechia	Pr	Po				_	

<sup>&</sup>lt;sup>1</sup>Locations of breeding bird survey stations are indicated on **Figure 2**.

 $<sup>{}^{2}</sup>$ Co = Confirmed Breeder; **Pr** = Probable Breeder; **Po** = Possible Breeder; **O** = Observed (no evidence of breeding). Breeding status principally determined based on the results of the formal breeding bird surveys; however, where a higher level of breeding status was documented incidentally (i.e., during other field surveys), this is also captured in the above table.

Appendix 5. Significant Wildlife Habitat Assessment

environmental consulting inc

#### 1 SIGNIFICANT WILDLIFE HABITAT ASSESSMENT METHODOLGY

The PPS protects Significant Wildlife Habitat (SWH) from development and site alteration unless it can be demonstrated that no negative impacts on the feature or its function will occur. As outlined in the SWH Technical Guide (OMNR 2000) and supporting Ecoregion Criteria Schedules (OMNRF 2015), SWH is composed of four (4) principal components:

- Seasonal Concentration Areas of Animals
- Rare Vegetation Communities or Specialized Habitats;
- Habitat of Species of Conservation Concern; and
- Animal Movement Corridors.

The process for identifying SWH is outlined in s. 9.2.3 of the Natural Heritage Reference Manual (OMNR 2010). Step 1 considers the nature of the development application proposed and involves the assembly of background ecological information for the study area and adjacent lands. If the application triggers a need to protect SWH (e.g., change in land-use that requires approval under the Planning Act, etc.), a more thorough investigation of potential SWH features within the study area or adjacent lands must occur. Any confirmed SWH for the study area and adjacent lands as identified in relevant planning documents or by the MNRF should be noted at this stage. Where a need to protect SWH is triggered, step 2 involves undertaking a more thorough analysis of features, functions, and habitats within the study area via Ecological Land Classification (see Section 2.8). The list of ELC Ecosite codes generated for the study area is compared to those codes considered candidate SWH in the relevant Ecoregion Criterion Schedule (i.e., 5E, 6E, or 7E) in step 3. Where a positive match between an ELC Ecosite and candidate SWH exists, the area is considered candidate SWH.

Two options are available for candidate SWH: 1) the area may be protected without further study, or 2) the area may be evaluated to ascertain whether confirmed SWH is present. Evaluation may involve generating more detailed maps of vegetation cover or conducting surveys of the wildlife population within the candidate SWH including reproductive, feeding, and movement patterns. If the area is confirmed SWH, the final step in the process is the completion of an impact assessment to demonstrate that no negative impacts to the confirmed SWH or its function will occur. The impact assessment process is assisted by SWH Mitigation Support Tool (OMNRF 2014).

Level I & II NER – Pike Pit Project No.: 1944



# 2 RESULTS

 Table 1. Results of the Significant Wildlife Habitat Assessment.

Ecoregion 7E	Do any Features, Habitats, or Areas on the Subject Property or Adjacent Lands meet relevant criteria (Ecoregion 7E Criteria Schedule) as Candidate SWH?	Do any Features, Habitats, or Areas on the Subject Property or Adjacent Lands meet relevant criteria (Ecoregion 7E Criteria Schedule) as Confirmed SWH?	Likelihood that Negative Effects to SWH (i.e., "degradation that threatens the health and integrity" as defined in the 2020 PPS) will occur based on the Proposed Development Plan and any related Site Alteration Activities.
Seasonal Concentration Areas of	f Animals		
Waterfowl Stopover and Staging Areas (Terrestrial)	No. Meadows, fields, and/or thickets that annually flood during spring and could support significant congregations of migrating waterfowl are absent.		
Waterfowl Stopover and Staging Areas (Aquatic)	No. Large surface water features (e.g., ponds, lakes, bays, coastal inlets, large watercourses, etc.) and/or wetlands that annually flood during spring could support significant congregations of migrating waterfowl are absent.		
Shorebird Migratory Stopover Areas	No. Unvegetated open areas adjacent to surface water features (e.g., shorelines, beaches, mudflats, etc.) and could support significant congregations of migrating shorebirds are absent		
Raptor Wintering Areas	No. While forest and (to a lesser extent) meadow habitats are present, which may occasionally support wintering raptors, such habitats are too small to support significant congregations of wintering raptors. Agricultural fields within the Subject Property are routinely tilled, and therefore are expected to provide minimal habitat for small mammals during winter (major prey item for wintering raptors).		<del>-</del>
Bat Hibernacula	No. Natural features and habitats that could support hibernating bats (e.g., caves, mine shafts, crevices, karsts, etc.) are absent.		
Bat Maternity Colonies	Yes. Mature deciduous and mixed forests with a high-density (i.e., >10/ha) of large-diameter (i.e., ≥25 cm DBH) trees containing cracks/cavities may be present.	Possible. A survey for potential bat maternity roosts by others confirmed the presence of 11 candidate features in the Southern Woodlot. This includes trees ≥25 cm DBH containing knot holes, cracks, loose bark, and/or cavities. As the Southern Woodlot is 1.42 ha in size, candidate roost density is 7.7/ha which is less than the minimum threshold for candidate SWH.  The Northern Woodlot contains potential bat maternity roosts but was not surveyed in detail as it will be protected through this application.	Negligible. Extraction activities are restricted from the Northern Woodlor plus an ecologically appropriate setback (15-30 m). All necessary removal of trees within the Southern Woodlot, several of which may support bat maternity colonies based on surveys by others, will be subject to a timing restriction. See report for greater details.
Turtle Wintering Areas	No. Surface water features and/or wetlands with soft, muddy substrate which do not freeze to the bottom during winter are absent.		
Reptile Hibernaculum	Yes. Features (e.g., small mammal burrows, rock crevices, etc.) and/or habitats (e.g., certain wetlands with a fluctuating water table, etc.) that could provide snakes with access below the frost line may be present.	<u>Unknown.</u> Spring emergence surveys for snakes were not undertaken.	Negligible. The Southern Woodlot (proposed to be removed) lacks discret features (e.g., rock piles, old stone foundations, etc.) that have a greater potential to support significant congregations of overwintering snakes.
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)	No. Features that could support nesting by Cliff Swallow and Northern Rough-winged swallow (e.g., eroding banks, sandy hills, borrow pits, steep slopes, cliff faces, etc.) are absent.		
Colonially - Nesting Bird Breeding Habitat Breeding Habitat (Tree/Shrubs)	Yes. Swamp communities are present.	No. Colonial waterbird nests are absent.	

Ecoregion 7E	Do any Features, Habitats, or Areas on the Subject Property or Adjacent Lands meet relevant criteria (Ecoregion 7E Criteria Schedule) as Candidate SWH?	Do any Features, Habitats, or Areas on the Subject Property or Adjacent Lands meet relevant criteria (Ecoregion 7E Criteria Schedule) as Confirmed SWH?	Likelihood that Negative Effects to SWH (i.e., "degradation that threatens the health and integrity" as defined in the 2020 PPS) will occur based on the Proposed Development Plan and any related Site Alteration Activities.
Colonially - Nesting Bird Breeding Habitat (Ground)	No. Rocky islands or peninsulas along lakes or large rivers are absent.		<del></del>
Migratory Butterfly Stopover Areas	No. A mixture of fields and forests within 5 km from the shoreline of Lake Erie or Lake Ontario are absent.		
Landbird Migratory Stopover Areas	No. While migrating landbirds may temporarily stopover to feed and rest, the Subject Property is unlikely to support significant congregations of migrating landbirds as it is greater than 5 km from the shoreline of Lake Erie.		
Deer Winter Congregation Areas	No. The Subject Property and/or Adjacent Lands have not been identified as a deer wintering area by MNRF.		
Rare Vegetation Communities	or Specialized Habitats for Wildlife		
Cliffs and Talus Slopes	No. Cliffs and talus slope communities are absent.		
Sand Barren	No. Sand barren communities are absent.		
Alvar	No. Flora characteristic of alvars are absent.		
Old Growth Forest	Yes. The Southern and Northern Woodlots are visible in historical aerial photographs dating back to 1954.	No. While the Southern Woodlot contains certain old-growth characteristics (e.g., mature trees, snags and downed woody debris, rich herbaceous flora, etc.) it has been subject to extensive logging recently and portions are heavily dominated by Garlic Mustard. The Northern Woodlot contains some larger, mature Freeman's Maple but otherwise would not be appropriately characterized as old growth.	<del></del>
Savannah	No. Flora characteristic of savannahs are absent.		
Tallgrass Prairie	No. Flora characteristic of tallgrass prairies are absent.		
Other Rare Vegetation Community	No. Provincially rare vegetation communities are absent.		
Waterfowl Nesting Area	No. Wetland that could support nesting waterfowl are absent.		
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	Yes. The Southern Woodlot is adjacent to a large waterbody on Adjacent Lands (back-flooded aggregate pond).	No. Neither Bald Eagle nor Osprey were documented within the Subject Property or Adjacent Lands during site assessments by Terrastory. No nests associated with this species are present in the Southern Woodlot or other portions of the Subject Property.	
Woodland Raptor Nesting Habitat	Yes. Southern and Northern Woodlots may support raptor nesting.	No. While no stick nests were documented in either the Northern or Southern Woodlots, tree cavities that may support Barred Owl are present.  Notwithstanding this, the Subject Property does not contain interior forest habitat and is therefore unlikely to support nesting Barred Owl, which is rare in the local landscape.	
Turtle Nesting Areas	No. Exposed mineral soils adjacent to surface water features (e.g., lakes, ponds, etc.) and/or wetlands that may support turtles are absent.		



Ecoregion 7E	Do any Features, Habitats, or Areas on the Subject Property or Adjacent Lands meet relevant criteria (Ecoregion 7E Criteria Schedule) as Candidate SWH?	Do any Features, Habitats, or Areas on the Subject Property or Adjacent Lands meet relevant criteria (Ecoregion 7E Criteria Schedule) as Confirmed SWH?	Likelihood that Negative Effects to SWH (i.e., "degradation that threatens the health and integrity" as defined in the 2020 PPS) will occur based on the Proposed Development Plan and any related Site Alteration Activities.
Seeps and Springs	No. Areas where groundwater emerges at the surface and may support specialized habitat for plants and wildlife are absent.		
Amphibian Breeding Habitat (Woodland)	Yes. The deciduous swamp in the Northern Woodlot may support significant congregations of breeding amphibians.	<u>Unknown.</u> Anuran calling surveys and/or other amphibian surveys were not undertaken as part of this study.	<u>Negligible.</u> Wetlands in the Northern Woodlot which may support significant Anuran breeding are protected by a 30 m setback from extraction.
Amphibian Breeding Habitat (Wetlands)	<b>No.</b> Marsh wetlands and surface water features (e.g., ponds, lakes, etc.) that may support significant congregations of breeding amphibians are absent.		
Woodland Area-Sensitive Bird Breeding Habitat	No. Interior forest interior conditions (i.e., >200 m from edge) are absent.		
Habitat for Species of Conserva	tion Concern		
Marsh Bird Breeding Habitat	No. Wetlands with shallow water and emergent aquatic vegetation are absent.		
Open Country Bird Breeding Habitat	No. Meadow habitats of sufficient size are absent.		
Shrub/Early Successional Bird Breeding Habitat	No. Shrub/early-successional habitats of sufficient size are absent.	<del></del>	
Terrestrial Crayfish	Yes. Marsh and swamp communities and/or wet fields are present	Yes. One (1) Terrestrial crayfish chimney was documented (see Figure 3).	Negligible. The documented crayfish chimney and its associated habitat are protected by a 30 m setback from extraction.
Special Concern and Rare Wildlife Species	Yes. See Table 2 below.	Yes. See Table 2 below.	Possible. See Table 2 below.
Animal Movement Corridors			
Amphibian Movement Corridors	Yes. Candidate amphibian breeding habitat (woodlands) is present. Subject Property is not expected to act as a significant movement corridor between breeding and summer habitat for amphibians.	<u>Unknown.</u> Anuran movement surveys and/or other amphibian surveys were not undertaken as part of this study.	Negligible. Wetlands that may support significant Anuran breeding are protected by a 30 m setback from extraction. Areas proposed for extraction will not bisect any anticipated amphibian movement corridors.

Page 4 of 5

Table 2. Results of the Special Concern and Provincially Rare Species Assessment.

		-11			
Species	Status per O. Reg. 230/08 under the ESA and/or NHIC	Rationale for Consideration in this Study	General Description of Habitats and Features which the Species is Known to Occupy or Use within the Ecoregion in which this Study is Located	Likelihood that the Species Occupies the Area within or adjacent to proposed Development or Site Alteration <sup>1</sup>	Likelihood that Negative Effects to the Species or its Habitat (i.e., "degradation that threatens the health and integrity" as defined in the 2014 PPS) will occur based on the Proposed Development Plan and any related Site Alteration Activities.
Birds					
Eastern Wood-pewee (Contopus virens)	SC	OBBA, documented on-site.	Breeds and forages in relatively open, deciduous and mixed forests of various sizes (including urban forest fragments) and along forest edges.	<b>Confirmed.</b> Species documented as a probable breeder in the Northern Woodlot.	Low. While this species may not be rare in the local landscape, removal of the Southern Woodlot will result in a loss of breeding habitat within the Site. Implementation of the Northern Woodlot Enhancement Plan will replace breeding habitat for this species over the long-term.  Additional plantings are incorporated into the Rehabilitation Plan to extend the Northern Woodlot further south through site rehabilitation. See report for greater details.
Red-headed Woodpecker (Melanerpes erythrocephalus)	SC	OBBA	<ul> <li>Breeds and forages in open forests, savannahs, and forest edges that tend to contain large, mature trees.</li> </ul>	<u>Negligible</u> . Species not documented during breeding bird surveys.	
Wood Thrush (Hylocichla mustelina)	SC	OBBA	<ul> <li>Breeds and forages in second-growth and mature deciduous and mixed forests with a well-developed understory.</li> </ul>	Negligible. Species not documented during breeding bird surveys.	
Insects					
Monarch ( <i>Danaus plexippus</i> )	SC	Ont. Butterfly Atlas	<ul> <li>Oviposits on Milkweeds (Asclepias spp.).</li> <li>Generalist foraging that nectars in most areas with wildflowers.</li> </ul>	Possible. Ovipositing sites (i.e., species in the genus Asclepias) are present, and species may forage on the Subject Property.	Negligible. Areas of proposed extraction do not contain large stands of Milkweed. The landscape surrounding the Subject Property provides relatively abundant nectaring and ovipositing sites for this species.
Yellow Banded Bumble Bee (Bombus terricola)	SC	Habitat and distribution	<ul> <li>Occupies a range of open areas with nectaring sites.</li> <li>Nests underground in abandoned rodent burrows or decomposing logs.</li> </ul>	<u>Possible.</u> Species is a habitat generalist and occupies a wide range of areas.	Negligible. Areas of proposed extraction will not adversely affect nectaring opportunities for this species within the local landscape
Reptiles					
Snapping Turtle ( <i>Chelydra serpentina</i> )	SC	Habitat and distribution	<ul> <li>Occupies a variety of aquatic habitats with slow moving water.</li> <li>Nests in exposed, usually coarse, friable substrate.</li> <li>Known to make long-distance overland movements (i.e., several kilometers) between habitats.</li> </ul>	Unlikely. While the deciduous swamp in the Northern Woodlot could theoretically support feeding activities by this species during spring and early summer (e.g., when standing water is at a maximum, etc.), habitat potential is low. Deciduous swamp would not support all life processes for this species (e.g., basking, overwintering, etc.).	

<sup>&</sup>lt;sup>1</sup> Likelihood categories should be interpreted as follows:

**Negligible:** so limited that the assessed species can be assumed absent.

<u>Unlikely/Low</u>: while theoretically conceivable, species presence very improbable or temporary based on available information (e.g., habitat conditions, range, abundance in local landscape, etc.).

Possible: species presence plausible based on available information; no convincing evidence suggesting species could not occur on-site.

<u>Probable</u>: while not confirmed, available information suggests species has a high likelihood of being present.

**Confirmed:** species observed and/or evidence of occupation (e.g., tracks, etc.) documented.

Level I & II NER – Pike Pit

**Appendix 6.** Endangered and Threatened Species Assessment

Species	Status per O. Reg. 230/08 of the ESA	Rationale for Consideration in this Study	General Description of Habitats and Features which the Species is Known to Occupy within the Ecoregion in which this Study is Located	Likelihood that the Species Occupies the Area within or adjacent to proposed Development or Site Alteration <sup>1</sup>	Likelihood that Negative Effects to the Species or its Habitat (i.e., "Damage" or "Destruction" as defined in the ESA) will occur based on the Proposed Development Plan and any related Site Alteration Activities
Birds					
Bank Swallow ( <i>Riparia riparia</i> )	THR	OBBA	<ul> <li>Nests in natural or anthropogenically derived exposed, sandy substrates on vertical or steep surfaces.</li> <li>Forages in a variety of open areas including agricultural lands, meadows, prairies, woodland clearings, marshes, and above waterbodies.</li> </ul>	Negligible. While this species may forage over open areas within the Site for brief periods during migration or forays from adjacent breeding sites, suitable breeding sites are absent from the Subject Property.	
Barn Swallow ( <i>Hirundo rustica</i> )	THR	OBBA	<ul> <li>Nests in barns, bridge/culvert undersides, awnings/overhangs on sides of buildings, and (historically) tree cavities.</li> <li>Forages in a variety of open areas including agricultural lands, meadows, prairies, woodland clearings, marshes, and above waterbodies.</li> </ul>	Negligible. Species documented foraging over the Site during breeding bird surveys. Suitable breeding sites are absent from the Subject Property.	
Bobolink (Dolichonyx oryzivorus)	THR	OBBA	<ul> <li>Breeds and forages in hayfields, pastures, meadows, grasslands, and prairies which are often (but not always) greater 4 ha.</li> <li>May be found in more marginal habitats (e.g., shrubby fields, smaller fields, etc.) during migration or following disturbance to breeding habitats (e.g., hay cutting).</li> </ul>	Negligible. While this species was documented as a probable breeder in a hayfield on Adjacent Lands to the west, suitable breeding sites are absent from the Site.	
Eastern Meadowlark (Sturnella magna)	THR	OBBA	Breeds and forages in hayfields, savannahs, pastures, meadows, grasslands, prairies, and shrubby fields.	Negligible. While this species was documented as a probable breeder in a hayfield on Adjacent Lands to the west, suitable breeding sites are absent from the Site.	
Mammals					
Eastern Small-footed Myotis (Myotis leibii)	END	On-site habitats and distribution in southern Ontario.	<ul> <li>Maternal roosting sites include exposed rock outcrops, crevices, and cliffs.</li> <li>Overwinters in caves and mines that maintain temperatures above 0°C.</li> </ul>	<u>Unlikely.</u> While this species may forage above open habitats on the Site or Adjacent Lands, potential maternal roosting habitat (e.g., rock outcrops, cliffs, etc.) is absent.	
Little Brown Myotis (Myotis lucifugus)	END	On-site habitats and distribution in southern Ontario.	<ul> <li>Maternity roosts sites most often include buildings and large diameter trees with cracks, crevices, and/or exfoliating bark.</li> <li>Overwinters in caves and mines that maintain temperatures above 0°C.</li> </ul>	<u>Confirmed.</u> Species documented during bat acoustic monitoring surveys by others.	<u>Unknown.</u> A timing window restriction will be applied to tree removal activities within the Southern Woodlot to avoid impacting roosting bats (individuals or maternity colonies). MECP to confirm whether or not the proposed removal of the Southern Woodlot will contravene section 10 of the ESA through previous submission of an IGF in August 2020 by others.
Northern Myotis (Myotis septentrionalis)	END	On-site habitats and distribution in southern Ontario.	<ul> <li>Maternity roosts most often include large diameter trees with cracks, crevices, and/or exfoliating bark (buildings rarely used).</li> <li>Overwinters in caves and mines that maintain temperatures above 0°C.</li> </ul>	Confirmed. Species documented during bat acoustic monitoring surveys by others.	<u>Unknown.</u> A timing window restriction will be applied to tree removal activities within the Southern Woodlot to avoid impacting roosting bats (individuals or maternity colonies). MECP to confirm whether or not the proposed removal of the Southern Woodlot will contravene section 10 of the ESA through previous submission of an IGF in August 2020 by others.
Tri-colored Bat (Perimyotis subflavus)	END	On-site habitats and distribution in southern Ontario.	Maternal roosting sites include Maple (Acer spp.) and Oak (Quercus spp.) with dead/dying leaf clusters.	Negligible. Species was not documented during bat acoustic monitoring.	

Level I & II NER – Pike Pit Project No.: 1944

Species	Status per O. Reg. 230/08 of the ESA	Rationale for Consideration in this Study	General Description of Habitats and Features which the Species is Known to Occupy within the Ecoregion in which this Study is Located	Likelihood that the Species Occupies the Area within or adjacent to proposed Development or Site Alteration <sup>1</sup>	Likelihood that Negative Effects to the Species or its Habitat (i.e., "Damage" or "Destruction" as defined in the ESA) will occur based on the Proposed Development Plan and any related Site Alteration Activities
			• Overwinters in caves and mines that maintain temperatures above 0°C.		
Plants					
American Ginseng (Panax quinquefolius)	END	Known from Middlesex County.	Occupies rich, relatively undisturbed deciduous forests.	Negligible. Species was not documented during vascular plant surveys.	
Butternut (Juglans cinerea)	END	Known from Middlesex County.	<ul> <li>Occupies a variety of treed habitats including mature forests, early- successional forests, and hedgerows.</li> </ul>	Negligible. Species was not documented during vascular plant surveys.	<del></del>
Goldenseal (Hydrastis canadensis)	THR	Known from Middlesex County.	Occupies rich deciduous forests.	Negligible. Species was not documented during vascular plant surveys.	
Wood-poppy ( <i>Stylophorum diphyllum</i> )	END	Known from Middlesex County.	<ul> <li>Occupies rich mixed and deciduous woodlands, forested ravines and slopes.</li> </ul>	Negligible. Species was not documented during vascular plant surveys.	<del></del>

<sup>&</sup>lt;sup>1</sup> Likelihood categories are to be interpreted as follows:

Negligible: so limited that the assessed species can be assumed absent.

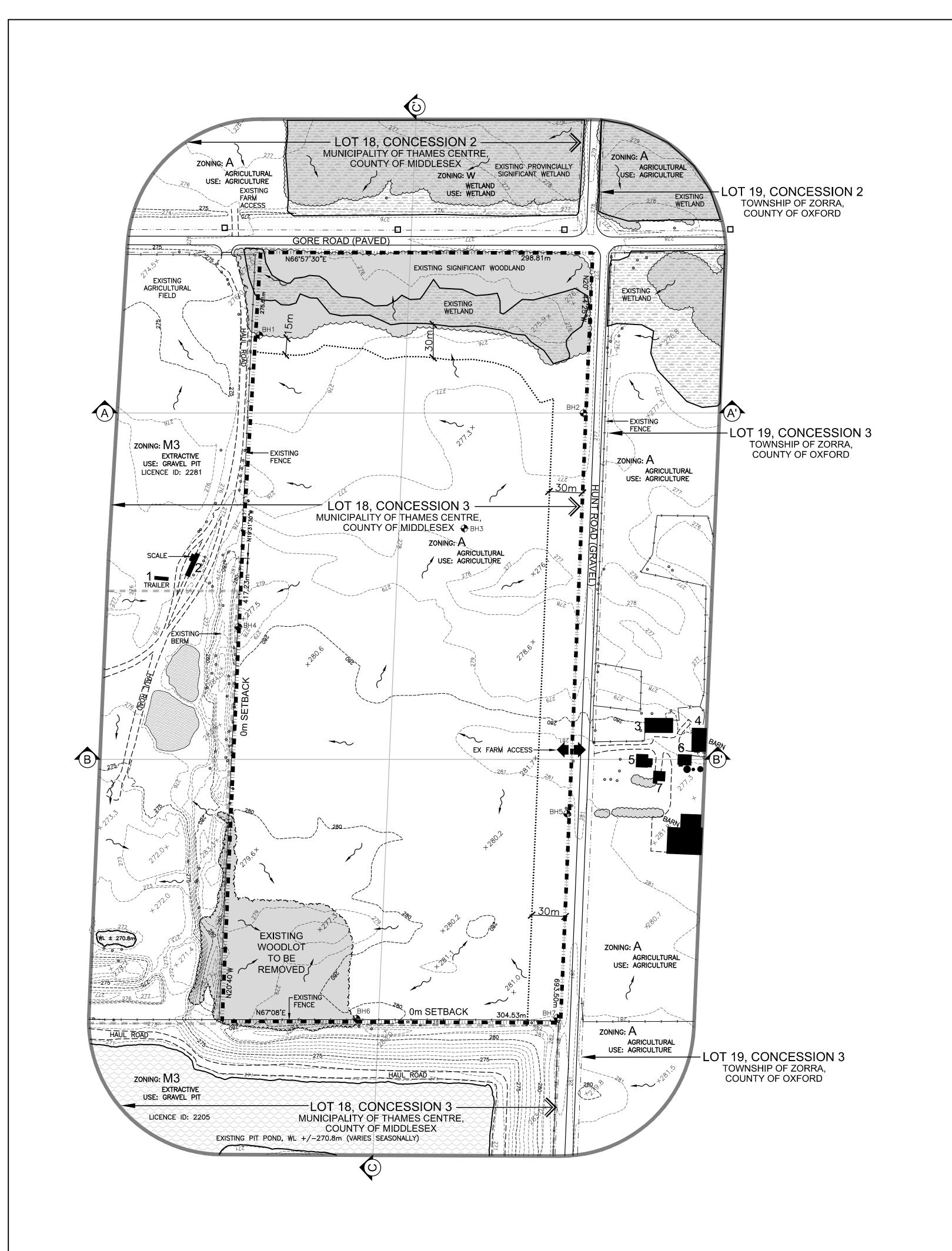
Low/Unlikely: while theoretically conceivable, species presence very improbable or temporary based on available information (e.g., habitat conditions, range, abundance in local landscape, etc.).

Possible: species presence plausible based on available information; no convincing evidence suggesting species could not occur on-site.

<u>Probable</u>: while not confirmed, available information suggests species has a high likelihood of being present.

Confirmed: species observed and/or evidence of occupation (e.g., tracks, etc.) documented.

**Appendix 7.** Site, Operations, Phasing and Final Rehabilitation Plans



# **EXISTING FEATURES NOTES**

# **GENERAL SITE PLAN INFORMATION**

- 1. THIS SITE PLAN CONSISTS OF 5 DRAWINGS AND MUST BE READ COLLECTIVELY.
- 2. ALL MEASUREMENTS SHOWN ON THIS SITE PLAN ARE IN METRES.
- LICENCE INFORMATION
- 3. THIS SITE PLAN IS PREPARED FOR SUBMISSION TO THE MINISTRY OF NATURAL RESOURCES AND FORESTRY UNDER THE AGGREGATE RESOURCES ACT FOR A CATEGORY 1 - CLASS 'A' LICENCE, PIT BELOW THE WATER TABLE.
- 4. APPLICANT: **THAMES VALLEY AGGREGATES** 174751 17TH LINE
- INGERSOLL, ON
- 5. TOTAL AREA TO BE LICENCED: TOTAL AREA TO BE EXTRACTED: TOTAL AREA TO REHABILITATED:

# **BASE INFORMATION**

- 6. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM FIRST BASE SOLUTIONS UTILIZING 2015 AIR PHOTOGRAPHY. ALL ELEVATIONS ARE GEODETIC AND ABOVE SEA
- THE SITE WAS FIELD CHECKED BY HARRINGTON MCAVAN LTD., APRIL 18, 2016.
- 7. THE PROPOSED LICENCE AREA IS ZONED A, GENERAL AGRICULTURE. AN APPLICATION FOR AN AMENDMENT TO THE ZONING BYLAW TO CHANGE THE DESIGNATION TO ME, AGGREGATE INDUSTRIAL HAS BEEN MADE TO THE MUNICIPALITY OF THAMES CENTRE. THE OFFICIAL PLAN DESIGNATES THE MAJORITY OF THIS SITE AS PRIMARY AGGREGATE RESOURCE.

# HYDROGEOLOGICAL INFORMATION

- 8. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORT BY LDS CONSULTANTS. DATED NOVEMBER 12, 2020.
- 9. THE WATER TABLE ELEVATION WITHIN THESE PROPERTIES IS ESTIMATED TO BE BETWEEN ± 276.5 - 271.5m ABOVE SEA LEVEL (A.S.L.) BASED ON ABOVE REPORT.

# **TECHNICAL REPORTS**

- 10. HYDROGEOLOGICAL INFORMATION WAS OBTAINED FROM REPORT BY LDS CONSULTANTS DATED NOVEMBER 12, 2020 (REFER TO SHEET 3 OF 5 FOR TECHNICAL RECOMMENDATIONS).
- 11. NATURAL ENVIRONMENT INFORMATION WAS OBTAINED FROM REPORT BY TERRASTORY DATED NOVEMBER 2020 (REFER TO SHEET 4 OF 5 FOR TECHNICAL
- 12. ARCHAEOLOGICAL INFORMATION WAS OBTAINED FROM REPORT BY TIMMINS MARTELLE HERITAGE CONSULTANTS INC. DATED JUNE 2016 (REFER TO SHEET 3 OF 5 FOR TECHNICAL
- 13. ACOUSTICAL INFORMATION WAS OBTAINED FROM NOISE REPORT BY HGC ENGINEERING DATED DECEMBER 9, 2020 (REFER TO SHEET 4 OF 5 FOR TECHNICAL RECOMMENDATIONS).

# **LEGEND**

==== 285 EXISTING 5m CONTOUR LINE

**EXISTING 1m CONTOUR LINE** 

**EXISTING SPOT ELEVATION** 

**EXISTING VEGETATION** 

**EXISTING WETLAND** 

**EXISTING STOCKPILE** 

------------------EXISTING FENCE

REGULATORY SETBACK AND EXTRACTION LIMIT LINE **EXISTING BUILDING** 

120m INFORMATION BOUNDARY

BOUNDARY OF AREA TO BE LICENCED

BOUNDARY OF EXISTING LICENCED PITS

EXISTING HYDRO POLE DIRECTION OF SURFACE

WATER DRAINAGE BOREHOLE LOCATION AND NUMBER DRILLED



LOCATION OF SECTION

EX FARM ACCESS (NO GATES)

# **BUILDING LIST**

No.	
1.	TRAILER
2.	SCALE AND SCALEHOUSE
3.	SHED
4.	BARN
5.	HOUSE
6.	SHED
7.	BARN



Project Name

# Thames Valley Aggregates Inc. PIKE PIT

LICENCE No. PART LOT 18, CONCESSION 3 MUNICIPALITY OF THAMES CENTRE (FORMERLY TOWNSHIP OF NORTH DORCHESTER, COUNTY OF MIDDLESEX

Scale 1:2000 **Drawing Status** PRELIMINARY FOR DISCUSSION

Stamp

Drawing Title

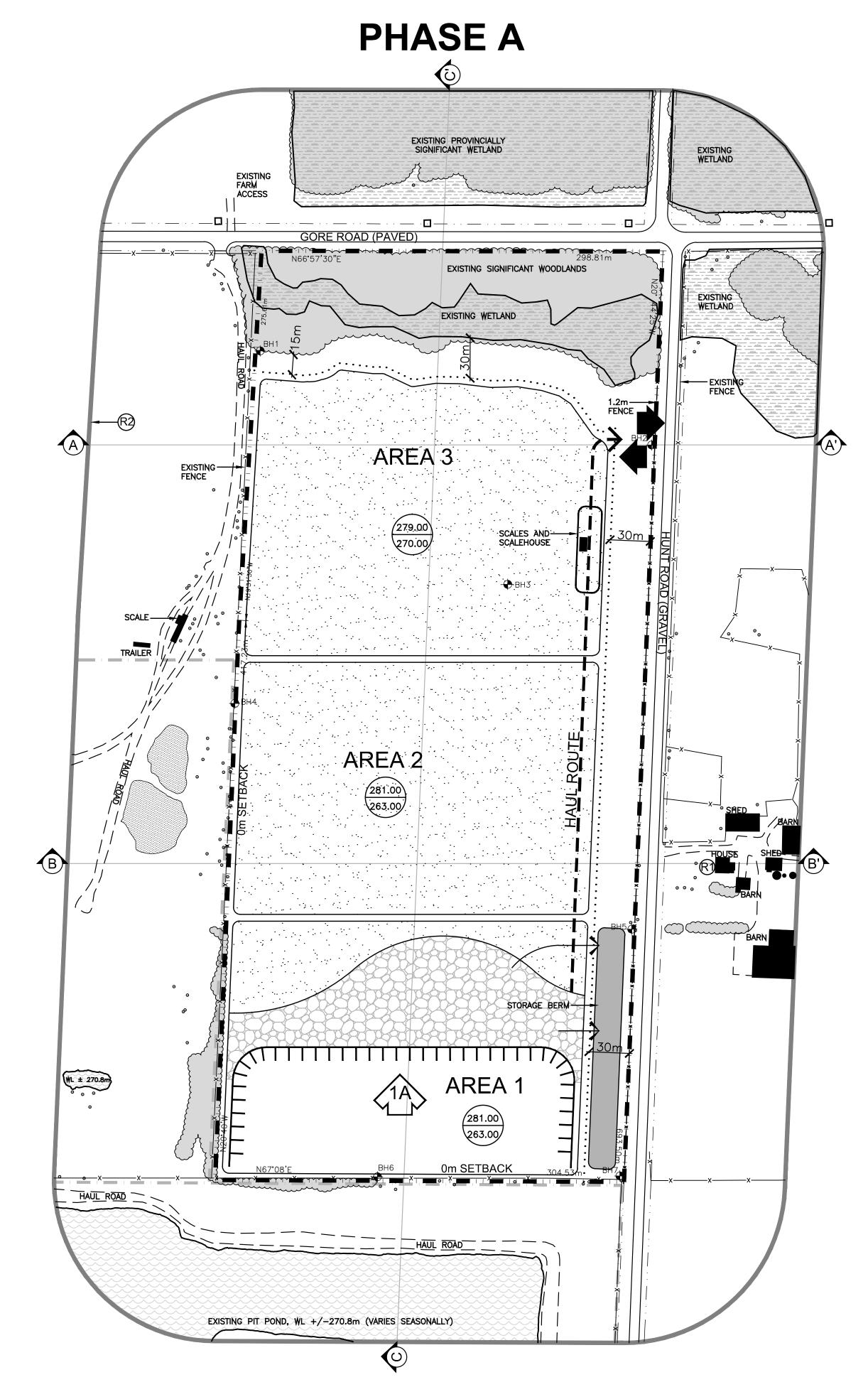
Checked MH/RM

Issue Date DEC 2020 **Project Number** 

20-23

**Drawing Number** 

**EXISTING FEATURES** 



# PHASE A

**PHASE A NOTES** 

AGRICULTURAL USE.

- 1. ESTABLISH THE ENTRANCE EXIT AND HAUL ROAD INTO THE SITE, ACCORDING TO THE APPROPRIATE MUNICIPAL STANDARDS.
- 2. PRIOR TO ANY ON SITE OPERATIONS, CONSTRUCT OR UPGRADE THE FENCING ON THE LICENCED BOUNDARIES (EXCEPT WHERE OVERRIDES EXIST) TO THE STANDARDS OF THE AGGREGATE RESOURCES ACT (1.2m HIGH POST AND WIRE FENCE). ALL FENCING SHALL BE MAINTAINED.
- 3. PREPARE SITE WITHIN AREA 1 BY REMOVING EXISTING TREES AND SCRUB VEGETATION IN THE AREA TO BE EXTRACTED. SALVAGE LARGER STUMPS AND TREES FOR HABITAT CREATION DURING PROGRESSIVE REHABILITATION
- 4. PRIOR TO ANY ON SITE OPERATIONS, STRIP TOPSOIL AND OVERBURDEN SEPARATELY USE THE MATERIALS TO CONSTRUCT STORAGE BERM ALONG
- 5. CONSTRUCT THE HAUL ROAD THROUGH AREA 1, 2 AND 3.
- 6. EXTRACTION OF AREA 1 WILL PROCEED IN DIRECTION SHOWN.
- 7. UNDISTURBED PORTIONS OF AREAS 2 AND 3 REMAIN IN

THIS PLAN DEPICTS A SCHEMATIC OPERATIONS AND REHABILITATION SEQUENCE FOR THIS PROPERTY BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION. PHASES SHOWN ARE SCHEMATIC AND MAY SLIGHTLY VARY WITH MATERIAL QUALITY, SITE HYDROLOGY AND HYDROGEOLOGY OR MARKET DEMAND. PHASES DO NOT REPRESENT ANY

EXTRACTION SHALL GENERALLY FOLLOW THE SEQUENCE SHOWN. WHEN PARTIAL REHABILITATION OF A PHASE IS POSSIBLE IT SHALL BE CARRIED OUT. NOT WITHSTANDING THE EXTRACTION AND REHABILITATION PROCESS ABOVE, DEMAND FOR CERTAIN PRODUCTS OR BLENDING OF MATERIALS MAY REQUIRE SOME DEVIATION IN THE EXTRACTION AND REHABILITATION PHASING. ANY MAJOR DEVIATIONS FROM THE OPERATIONS SEQUENCE SHOWN WILL REQUIRE APPROVAL FROM MNRF.

- 2. REFER TO DRAWING 1 OF 5, EXISTING FEATURES, FOR A DESCRIPTION OF EXISTING VEGETATION AND BUILDINGS WITHIN THE 120 METRE BOUNDARY AND ON SITE.

5. MAXIMUM NUMBER OF TONNES OF AGGREGATE TO BE REMOVED FROM THE SITE IN ANY CALENDAR YEAR IS 500,000 TONNES.

EXTRACTION OF SAND AND GRAVEL ABOVE WATER TABLE WILL TAKE PLACE IN TWO OR THREE BENCHES, WITH A MAXIMUM HEIGHT OF ±8 METRES. THE GROUNDWATER TABLE IS ESTIMATED TO BE BETWEEN ±276.5 - 271.5m ASL (SEE REPORT BY LDS DATED NOVEMBER 12, 2020) THERE WILL BE ONE LIFT BELOW THE WATER TABLE TO A MAXIMUM DEPTH OF ±263m ASL TO BE EXTRACTED BY EXCAVATOR. BACKHOE OR DRAG LINE, FRONT END LOADERS WILL BE USED TO EXTRACT MATERIAL AND HAUL TRUCKS OR CONVEYORS WILL CARRY MATERIAL TO THE PLANT FOR FURTHER PROCESSING. REFER TO SECTIONS A-A', B-B', AND C-C' ON DRAWING 4 OF 5 FOR FURTHER DETAILS.

PORTABLE PROCESSING EQUIPMENT, FOR CRUSHING AND SCREENING WILL BE USED ON SITE AND WILL BE LOCATED ON THE PIT FLOOR AND WILL FOLLOW THE EXTRACTION FACE. STOCKPILES OF PROCESSED AGGREGATE WILL BE PLACED BETWEEN R1 AND THE PROCESSING PLANT AS A NOISE BUFFER. IN ADDITION TO PROCESSING, SITE ACTIVITIES WILL INCLUDE STRIPPING AND REHABILITATION, OPERATIONAL EQUIPMENT MAY INCLUDE TRUCKS, LOADERS, EXCAVATOR, BACKHOES, BULLDOZERS, SCRAPERS, CONVEYORS AND OTHER RELATED EQUIPMENT. PROCESSING EQUIPMENT, STACKERS AND PRODUCT STOCKPILES WILL NOT EXCEED ±15 METRES IN HEIGHT AND WILL BE LOCATED IN THE PROCESSING AREA AND/OR CLOSE TO PIT FACES.

6. OFFICE/STORAGE BUILDING AND/OR SCALE/SCALEHOUSE MAY BE CONSTRUCTED WHERE SHOWN.

THERE MAY BE RECYCLING OF MATERIAL (ASPHALT AND CONCRETE) ON THIS SITE, MATERIAL IMPORTED FOR RECYCLING WILL BE STORED IN SEGREGATED STOCKPILES WITHIN THE PROCESSING AREA. RECYCLABLE ASPHALT MATERIALS WILL NOT TABLE. ANY REBAR AND OTHER STRUCTURAL METAL MUST BE REMOVED FROM THE RECYCLED MATERIAL DURING PROCESSING AND PLACED IN A DESIGNATED SCRAP PILE ON SITE WHICH WILL BE REMOVED ON AN ON-GOING BASIS. REMOVAL OF RECYCLED AGGREGATE IS TO BE ONGOING. ONCE THE AGGREGATE ON SITE HAS BEEN DEPLETED THERE WILL AND APPROVED IN ACCORDANCE WITH THE SITE PLAN, ALL RECYCLING OPERATIONS MUST CEASE.

EXCAVATION AND PROCESSING

# 12. WATER OR CALCIUM CHLORIDE WILL BE APPLIED TO INTERNAL HAUL ROADS AND PROCESSING AREAS AS OFTEN AS

# SITE MANAGEMENT INFORMATION

EXISTING VEGETATION WITHIN THE LICENCED AREA SHALL BE MAINTAINED IN A HEALTHY VIGOROUS GROWING CONDITION SITE IMPROVEMENTS OR PROGRESSIVE AND FINAL REHABILITATION WILL ALSO BE MAINTAINED IN A HEALTHY, VIGOROUS

PIT FLOOR CLOSE TO EXTRACTION FACE.

BERMS SHALL BE A MINIMUM OF ±2.5 METRES ABOVE THE EXISTING GRADE, OR AS SPECIFIED IN THE NOISE ASSESSMENT REPORT DATED DECEMBER 9, 2020 AND SHOWN ON OPS PLAN. BERMS SHALL NOT EXCEED 2:1. REFER TO TYPICAL BERM

REHABILITATE THE SITE. TOPSOIL CAN BE TEMPORARILY STOCKPILED ON THE PIT FLOOR.

ALL SCRAP, USED MACHINERY AND STUMPS GENERATED THROUGH THE OPERATIONS WITHIN THIS LICENCE WILL BE STORED IN THE PROCESSING AREA, A MINIMUM OF 30m FROM THE BOUNDARY OF THE SITE AND NOT WITHIN 30m OF ANY BODY OF WATER AND SHALL BE DISPOSED OF ON AN ONGOING BASIS. STUMPS/ WOODY MATERIAL MAY BE CHIPPED AND USED FOR SOIL ENHANCEMENT DURING PROGRESSIVE REHABILITATION. TREES WILL BE HARVESTED AND SOLD AS LUMBER OR UTILIZED FOR FIREWOOD AND/ OR THEIR BEST USE. UPON COMPLETION OF EXTRACTION, ALL SCRAP EQUIPMENT AND USED

PETROLEUM STORAGE INFORMATION

19 FUEL, OIL, RADIATOR AND HYDRAULIC FLUID, AND OTHER CHEMICALS NEEDED FOR THE MAINTENANCE AND FUNCTIONING OF ON-SITE AGGREGATE PROCESSING EQUIPMENT SHALL BE APPROPRIATELY STORED IN ABOVE-GROUND CONTAINERS AND SHALL MEET THE REQUIREMENTS OF THE GASOLINE HANDLING ACT, AS AMENDED, AND THE GASOLINE HANDLING CODE AND REGULATIONS, AS AMENDED BY THE TECHNICAL STANDARDS AND SAFETY ACT (TSSA) AND LIQUID FUELS HANDLING CODE, AND IN ACCORDANCE WITH THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARK'S CHEMICAL STORAGE GUIDELINES. ALL REFUELING SHALL BE WITHIN A CONTAINMENT PAD. ALL SPILLS TO THE ENVIRONMENT MUST BE REPORTED TO THE SPILLS ACTION CENTRE OF MECP. ANY SPILL SHALL BE REMOVED AND DISPOSED OF AT AN APPROPRIATE MECP

IMPORTED MATERIAL SHALL MEET THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARK'S PARAMETERS UNDER TABLE "1" OF MECP'S "SOIL, GROUND WATER AND SEDIMENT STANDARDS FOR USE UNDER PART XV.1 OF THE ENVIRONMENTAL

SAMPLING AND TESTING OF ALL IMPORTED MATERIAL SHALL BE PERFORMED AT SOURCE PRIOR TO THE IMPORTATION OF MATERIAL ONTO THE LICENSED SITE BY A QUALIFIED PERSON (QP) UNDER EPA. A QP SHALL ALSO DESIGN FILL MONITORING PROGRAM. RANDOM SAMPLING OF ALL IMPORTED MATERIAL SHALL BE CONDUCTED AT THE REQUEST OF MNRF.

THE LICENSEE SHALL KEEP DETAILED RECORDS OF THE AMOUNT OF MATERIAL BROUGHT ON SITE FOR REHABILITATION AND THE TESTING RESULTS OF ALL SAMPLES. ALL RECORDS AND TESTING RESULTS SHALL BE AVAILABLE UPON REQUEST BY MNRF

TO CREATE FINAL GRADES AS SHOWN MAY BE IMPORTED.

OBTAIN PERMIT TO TAKE WATER FROM MECP AND HAVE IT READY FOR INSPECTION. THE PERMIT TO TAKE WATER (PTTW) WILL BE ACCOMPANIED BY THE APPROPRIATE SUPPORTING DOCUMENTATION.

# **OPERATIONS NOTES**

# **GENERAL INFORMATION**

SPECIFIC OR EQUAL TIME PERIOD.

3. SITE PLAN OVERRIDES ARE LISTED IN THE SITE PLAN OVERRIDE TABLE SHOWN ON THIS PAGE.

### EXTRACTION/PROCESSING/HAULING INFORMATION TOTAL AREA TO BE EXTRACTED IS 16.3 HECTARES.

MATERIAL FROM OTHER PROPERTIES MAY BE IMPORTED INTO THE SITE FOR BLENDING, CUSTOM PRODUCTS AND/OR RESALE.

# **AGGREGATE RECYCLING**

BE STOCKPILED WITHIN 30m OF ANY WATER BODY OR MAN-MADE POND; OR 2m OF THE SURFACE OF THE ESTABLISHED WATER BE NO FURTHER IMPORTATION OF RECYCLABLE MATERIALS PERMITTED. ONCE FINAL REHABILITATION HAS BEEN COMPLETED

8. EQUIPMENT, SCRAP AND MACHINERY ASSOCIATED WITH THE EXTRACTION OPERATIONS WILL BE REMOVED UPON COMPLETION

# HYDROGEOLOGICAL INFORMATION

9. THE WATER TABLE ELEVATION VARIES ACROSS THIS LICENCE FROM APPROXIMATELY ±276.5 - ± 271.5m ABOVE SEA LEVEL (A.S.L.), BASED ON THE HYDROGEOLOGICAL REPORT. REFER TO SECTIONS ON SHEET 4 OF 5.

10. SURFACE DRAINAGE WILL BE DIRECTED TO THE POND, AND/ OR LOW AREAS FOR WATER TO INFILTRATE INTO THE GRANULAR MATERIALS ON THE PIT FLOOR.

# NOISE MITIGATION INFORMATION

HOURS OF OPERATION:
SITE PREPARATION AND REHABILITATION: 07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS 07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS 07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS

AIR QUALITY INFORMATION

# REQUIRED TO MITIGATE DUST.

UNTIL SEQUENTIAL STRIPPING BEGINS OR UNTIL THE REHABILITATION IS COMPLETE. ANY VEGETATION PLANTED AS PART OF

FENCING INFORMATION

14. BOUNDARIES OF THE AREA TO BE LICENCED THAT ARE PRESENTLY FENCED ARE SHOWN ON DRAWING 1 OF 5 EXISTING FEATURES. PRIOR TO ANY STRIPPING OR PREPARATION, FENCING ON THE LICENCED BOUNDARIES (EXCEPT WHERE OVERRIDES ARE EXIST) WILL BE UPGRADED TO 1.2m HIGH POST AND WIRE TO COMPLY WITH THE AGGREGATE RESOURCES ACT WHERE REQUIRED. ALL FENCING SHALL BE MAINTAINED.

TOPSOIL/SUBSOIL/OVERBURDEN STORAGE INFORMATION
15. TOPSOIL AND OVERBURDEN SHALL BE STRIPPED AND STORED SEPARATELY IN BERMS WHERE SHOWN AND STOCKPILES ON

CROSS SECTION ON DRAWING 4 OF 5 DETAILS AND SECTIONS. ALL BERMS SHALL BE SEEDED (USING GRASS/ LEGUME MIXTURE, SEE REHABILITATION PLAN) IMMEDIATELY UPON COMPLETION TO MINIMIZE NOISE, DUST AND EROSION.

17. ON COMPLETION OF THE BERMS, EXCESS ON-SITE OVERBURDEN WILL BE USED TO PROGRESSIVELY BACKFILL AND

MACHINERY SHALL BE REMOVED.

IMPORTATION OF FILL INFORMATION 20. IN ORDER TO MAXIMIZE RESOURCE RECOVERY, IMPORTATION OF CLEAN INERT FILL (EG. TOPSOIL AND/OR OVERBURDEN) MAY BE IMPORTED TO FACILITATE 3:1 SIDESLOPE REHABILITATION (ABOVE WATER TABLE SIDESLOPES). ONLY NATIVE ON SITE OVERBURDEN AND/OR OFF-SPEC MATERIALS WILL BE USED FOR BELOW WATER REHABILITATION. ONLY SUFFICIENT MATERIAL

WASH PLANT INFORMATION 21. SHOULD A WASH PLANT BE REQUIRED WITH A PREDICTED WATER USAGE OF 50,000L/DAY OR MORE, THE PRODUCER SHALL

**EXISTING VEGETATION** 

— × — × — EXISTING FENCE

**LEGEND** 

**BOUNDARY OF EXISTING LICENSED PITS** 120m INFORMATION BOUNDARY

BOUNDARY OF AREA TO BE LICENCED

REGULATORY SETBACK AND **EXTRACTION LIMIT LINE** 

EXISTING BUILDING EXISTING HYDRO POLE **LOCATION OF SECTION** 

**EXISTING WETLAND ENTRANCE/EXIT** 

**EXISTING STOCKPILE** KIT EXTRACTION FACE DIRECTION OF EXTRACTION BERM (MIN. HEIGHT AS SHOWN) **DIRECTION OF TOPSOIL AND** OVERBURDEN MOVEMENT

> UNDISTURBED AREA PRODUCT TRANSPORTATION VIA HAUL ROAD **AREA STRIPPED OF TOPSOIL** AND OVERBURDEN **LOCATION OF NOISE** PROPOSED OPEN WATER **EXISTING ELEVATION**

> > BOREHOLE LOCATION AND NUMBER DRILLED AND MONITORING **WELL INSTALLED BY** LDS JUNE 10-22, 2019

PROPOSED ELEVATION

# SITE PLAN OVERRIDE (VARIANCE)

THE FOLLOWING CONDITIONS ILLUSTRATED ON THESE PLANS VARY FROM THE OF THE PROVINCIAL STANDARDS MADE UNDER THE AGGREGATE RESOURCES ACT

I. SETBACK IS REDUCED TO 0m ALONG SOUTH AND WEST BOUNDARIES. ADJACENT LANDS | 5.10.1 LICENSED FOR AGGREGATE EXTRACTION. AS PER AGREEMENT WITH ADJACENT LICENSEE/ LANDOWNER.  $^{2}$ . NO FENCE ON NORTH BOUNDARY. ACCESS IS RESTRICTED DUE TO NATURAL FEATURES.  $\mid$  5.1



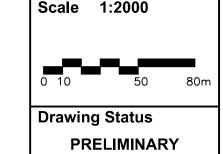
Tel: 905-294-8282 Fax: 905-294-7623 www.harringtonmcavan.com

41 Main Street, Unit 102

Unionville, Ontario L3R 2E5

# Thames Valley Aggregates Inc. PIKE PIT

LICENCE No. PART LOT 18, CONCESSION 3 MUNICIPALITY OF THAMES CENTRE (FORMERLY TOWNSHIP OF NORTH DORCHESTER, COUNTY OF MIDDLESEX



**Project Name** 

Stamp

FOR DISCUSSION

RM/SB Checked MH Drawn **Drawing Title** 

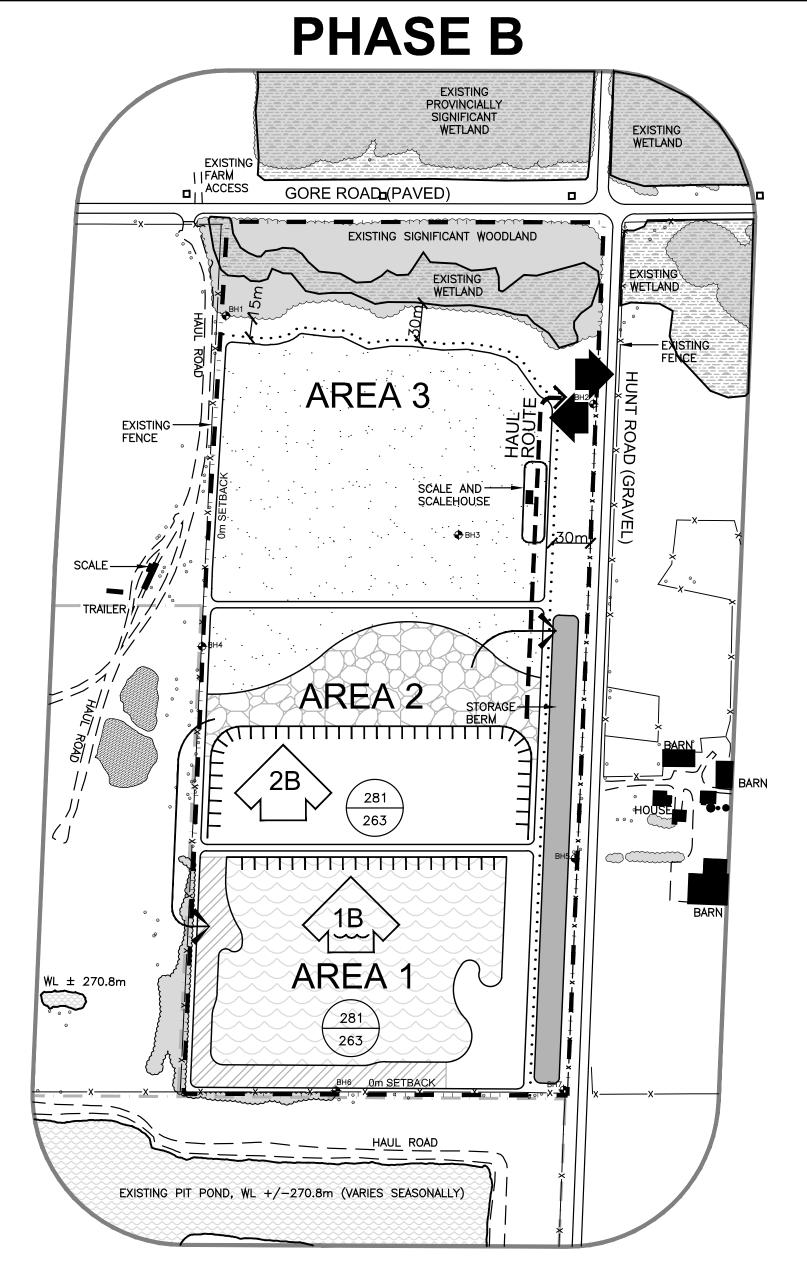
> **OPERATION PLANS PHASE A**

20-23

**Drawing Number** 

Issue Date DEC 2020

**Project Number** 



# PHASE B

- 1. STRIP TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 2 AND USE THE MATERIAL TO EXTEND THE STORAGE BERM ALONG HUNT ROAD, AND TO BEGIN PROGRESSIVE REHABILITATION OF THE SOUTHERN AND WESTERN PARTS OF
- BEGIN ABOVE WATER EXTRACTION OF AREA 2 IN DIRECTION SHOWN. SHIP MATERIAL TO TEMPORARY PLANT SITE (NOT SHOWN, PORTABLE PROCESSING
- 3. BEGIN BELOW WATER EXTRACTION OF AREA 1 IN DIRECTION SHOWN. MATERIAL EXTRACTED FROM BELOW WATER WILL BE PLACED IN WINDROWS ON THE PIT FLOOR TO DRAIN BEFORE BEING TRANSPORTED FOR PROCESSING. SHIP MATERIAL TO TEMPORARY PLANT SITE (NOT SHOWN, PORTABLE PROCESSING **EQUIPMENT TO BE USED).**
- 4. UNDISTURBED PORTION OF AREA 2 & 3 TO REMAIN IN AGRICULTURAL USE.
- 5. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.

# **TECHNICAL RECOMMENDATIONS**

- THE FOLLOWING ARE THE TECHNICAL RECOMMENDATIONS FROM ALL OF THE EXPERTS' REPORTS AS OF FEBRUARY 2019. ADDITIONAL RECOMMENDATIONS MAY BE INCLUDED AS A RESULT OF THE LICENCE REVIEW PROCESS.
- ARCHAEOLOGICAL ASSESSMENT TIMMINS MARTELLE HERITAGE CONSULTANTS INC. DATED JUNE 2016

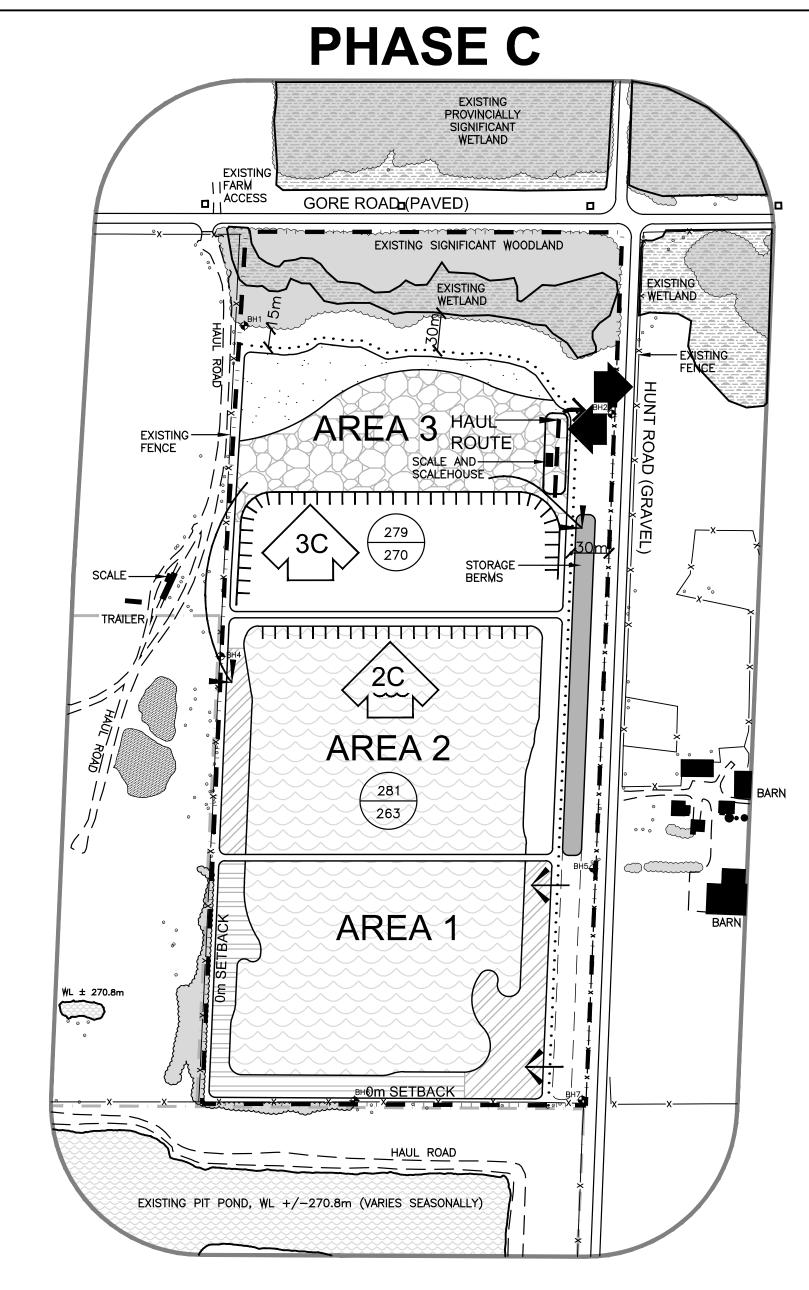
  1. SHOULD PREVIOUSLY UNDOCUMENTED (I.E., UNKNOWN OR DEEPLY BURIED) ARCHAEOLOGICAL RESOURCES BE THE FOLLOWING WATER WELL INTERFERENCE COMPLAINT PROTOCOL IS RECOMMENDED TO ADDRESS WATER ONTARIO HERITAGE ACT. THE PROPONENT OR PERSONA DISCOVERING THE ARCHAEOLOGICAL RESOURCES 150 M) TO THE SITE. MUST CEASE ALTERATION OF THE SITE IMMEDIATELY AND ENGAGE A LICENSED CONSULTANT ARCHAEOLOGIST 1. TO CARRY OUT ARCHAEOLOGICAL FIELDWORK, IN COMPLIANCE WITH SECTION 48 (1) OF THE ONTARIO HERITAGE ACT, FURTHER ARCHAEOLOGICAL SITES RECOMMENDED FOR FURTHER ARCHAEOLOGICAL FIELDWORK OR PROTECTION REMAIN SUBJECT TO SECTION 48 (1) OF THE ONTARIO HERITAGE ACT AND SHALL NOT BE ALTERED, 2.

OR HAVE ARTIFACTS REMOVED FROM THEM, EXCEPT BY A PERSON HOLDING AN ARCHAEOLOGICAL LICENCE.

THE FUNERAL, BURIAL, AND CREMATION SERVICES ACT 2002, S.O. 2002, C. 33 REQUIRES THAT ANY PERSON DISCOVERING HUMAN REMAINS MUST NOTIFY THE POLICE OR CORONER AND THE REGISTRAR OF CEMETERIES 3. AT THE MINISTRY OF SMALL BUSINESS AND CONSUMER SERVICES. THE REGISTRAR OF CEMETERIES, CEMETERIES REGULATION UNIT CAN BE REACHED AT (416)326-8404 OR (416)326-8393.

- HYDROGEOLOGICAL ASSESSMENT LDS DATED NOVEMBER 12, 2020

  1. FUEL STORAGE, EQUIPMENT FILLING, AND EQUIPMENT MAINTENANCE SHALL BE CARRIED OUT IN ACCORDANCE 4. WITH BEST MANAGEMENT PRACTICES OUTLINED IN SECTION 6.1, INCLUDING DESIGNATED FUELING LOCATIONS AND IMPLEMENTATION OF SPILLS MANAGEMENT RESPONSE PLANS, AS APPROPRIATE TO REDUCE THE POTENTIAL AND MITIGATE RISKS ASSOCIATED WITH THE EQUIPMENT OPERATION.
- WATER LEVELS HAVE BEEN CARRIED OUT ON A MONTHLY BASIS SINCE THE INCEPTION OF THE MONITORING WELLS WHICH WERE INSTALLED ONSITE. GROUNDWATER LEVEL MONITORING SHALL CONTINUE AT THE SITE ON A QUARTERLY BASIS AFTER THE PIT IS LICENSED, AND CONTINUE UNTIL SITE RESTORATION IS COMPLETE.
- GROUNDWATER SAMPLES HAVE BEEN COLLECTED AT THE SITE TO ESTABLISH BASELINE WATER QUALITY CONDITIONS FOR SHALLOW GROUNDWATER WITHIN THE UNCONFINED AQUIFER WHICH IS EXPECTED TO BE ENCOUNTERED DURING THE AGGREGATE EXTRACTION OPERATION. FUTURE WATER QUALITY TESTING CAN BE COMPARED TO THE BACKGROUND INFORMATION PRESENTED IN THIS REPORT, IF REQUIRED.

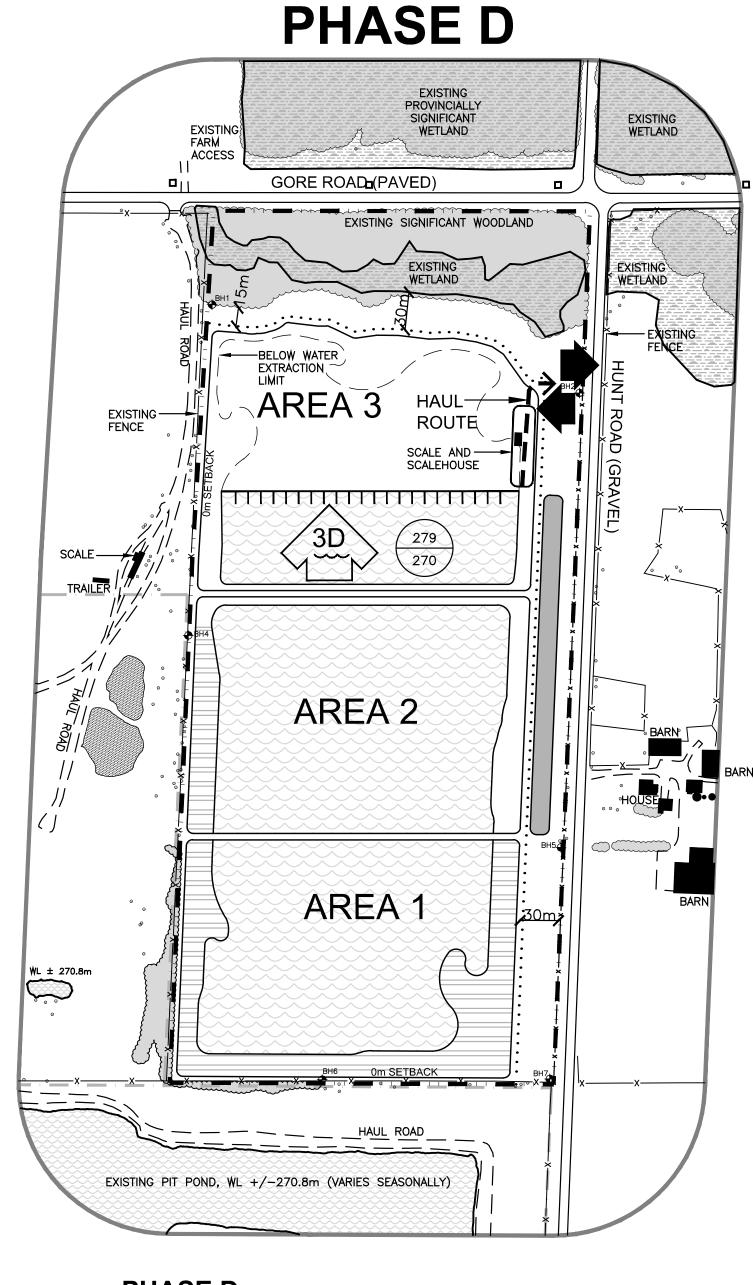


# PHASE C

- 1. STRIP TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 3 AND USE THE MATERIAL TO EXTEND STORAGE BERM (ASS REQUIRED) ALONG HUNT ROAD, AND TO BEGIN PROGRESSIVE REHABILITATION OF THE WESTERN PART OF AREA 2.
- 2. COMPLETE PROGRESSIVE REHABILITATION OF SOUTHERN AND WESTERN PARTS OF AREA1, THE AREA RETURNS TO POND/ WETLAND AND NATURAL AREA/OPEN
- 3. BEGIN PROGRESSIVE REHABILITATION OF EASTERN PART OF AREA 1 USING TOPSOIL AND OVERBURDEN STOCKPILED IN BERM ALONG AREA 1 OF HUNT ROAD. THE AREA RETURNS TO POND/ WETLAND AND NATURAL AREA /OPEN SPACE
- 4. BEGIN ABOVE WATER EXTRACTION OF AREA 3 IN DIRECTION SHOWN. SHIP MATERIAL TO TEMPORARY PLANT SITE (NOT SHOWN, PORTABLE PROCESSING EQUIPMENT TO BE USED).
- 5. BEGIN BELOW WATER EXTRACTION OF AREA 2 IN DIRECTION SHOWN. MATERIAL EXTRACTED FROM BELOW WATER WILL BE PLACED IN WINDROWS ON THE PIT FLOOR TO DRAIN BEFORE BEING TRANSPORTED FOR PROCESSING. SHIP MATERIAL TO TEMPORARY PLANT SITE (NOT SHOWN, PORTABLE PROCESSING EQUIPMENT TO BE USED).
- 6. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.
- 4. IF COMPLAINTS ARE RECEIVED FROM NEARBY OR NEIGHBOURING PROPERTY OWNERS (WITHIN 120 M OF THE SITE), THE WATER SUPPLY INTERFERENCE PROTOCOLS OUTLINED AS FOLLOWS SHALL BE ADHERED TO.
- DISCOVERED, THEY MAY BE A NEW ARCHAEOLOGICAL SITE AND THEREFORE SUBJECT TO SECTION 48(1) OF THE SUPPLY INTERFERENCE TO DOMESTIC AND FARM WATER SUPPLIES FOR PROPERTIES LOCATED IN PROXIMITY (WITHIN NEARBY AND NEIGHBOURING PROPERTIES SHALL BE PROVIDED WITH 24-HOUR EMERGENCY CONTACT
  - INFORMATION FOR THE LICENSEE, TO FACILITATE REPORTING OF PERCEIVED WATER SUPPLY IMPACTS.
  - NEARBY AND NEIGHBOURING PROPERTIES WHICH EXPERIENCE DISRUPTION OR QUALITY PROBLEMS SHALL NOTIFY THE LICENSEE, WHO WILL BE RESPONSIBLE TO REPORT THE WELL INTERFERENCE COMPLAINT TO MNRF
  - IN THE EVENT THAT THE WELL OWNER EXPERIENCES A SIGNIFICANT DISRUPTION IN THEIR WATER SUPPLY, OR EXPERIENCE SIGNIFICANT ADVERSE EFFECTS UPON THEIR WATER QUALITY: AND IF THE OPERATION OF THE PIT CANNOT OBVIOUSLY AND DEFINITIVELY BE EXCLUDED AS THE CAUSE. THE LICENSEE SHALL PROVIDE A TEMPORARY WATER SUPPLY WITHIN 24 HOURS AND THEREAFTER UNTIL SUCH TIME AS THE CAUSE OF THE DISTURBANCE CAN BE DETERMINED AND THE SITUATION ADDRESSED.
  - THE LICENSEE SHALL INVESTIGATE THE CAUSE OF THE WATER SUPPLY DISTURBANCE AND SHALL REPORT TO THE MNRF. MECP AND THE WELL OWNER.
  - IF IT IS DETERMINED THAT THE AGGREGATE EXTRACTION AT THE PIT HAS BEEN FOUND TO HAVE CAUSED A DOMESTIC OR FARM WATER SUPPLY TO BE ADVERSELY AFFECTED, THE LICENSEE SHALL, AT THE LICENSEES EXPENSE, EITHER RESTORE OR REPLACE THE WATER SUPPLY TO ENSURE THAT HISTORIC WATER SUPPLY AND QUALITY ARE RESTORED FOR SUCH A RESIDENT. IF IT IS DETERMINED THAT THE OPERATION OF THE PIT HAS NOT CAUSED ANY DOMESTIC OR FARM WATER SUPPLY TO BE ADVERSELY AFFECTED, THE TEMPORARY WATER SUPPLY WILL BE MAINTAINED FOR AN ADDITIONAL 24 HOURS TO ALLOW THE RESIDENT TO MAKE ALTERNATE

**TECHNICAL RECOMMENDATIONS CONTINUED ON PAGE 4 OF 5** 

WATER SUPPLY ARRANGEMENTS.

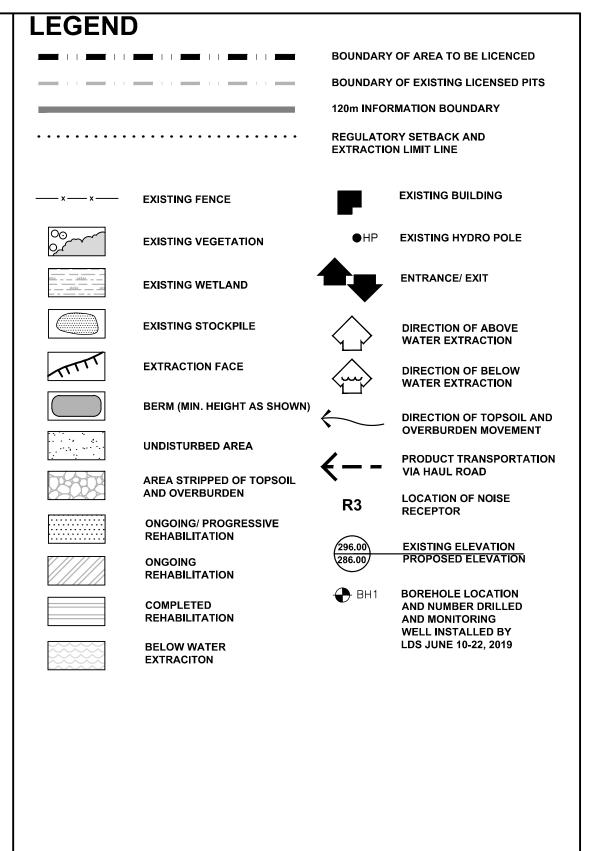


# PHASE D

- 1. COMPLETE PROGRESSIVE REHABILITATION OF AREA 1, THE AREA RETURNS TO POND/ WETLAND AND/ OR NATURAL AREA/ OPEN SPACE AFTER-USE.
- COMPLETE PROGRESSIVE REHABILITATION OF THE WESTERN PART OF AREA 2, THE AREA RETURNS TO POND/ WETLAND AND NATURAL AREA/ OPEN SPACE
- 3. COMPLETE BELOW WATER EXTRACTION IN AREA 2.
- 4. BEGIN BELOW WATER EXTRACTION OF AREA 3 IN DIRECTION SHOWN. MATERIAL EXTRACTED FROM BELOW WATER WILL BE PLACED IN WINDROWS ON THE PIT FLOOR TO DRAIN BEFORE BEING TRANSPORTED FOR PROCESSING. SHIP MATERIAL TO TEMPORARY PLANT SITE (NOT SHOWN, PORTABLE PROCESSING EQUIPMENT TO BE USED).
- 5. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.

# PHASE E (NOT SHOWN)

- 1. BEGIN PROGRESSIVE REHABILITATION OF EAST SIDE OF AREA 2 AND AREA 3 USING TOPSOIL AND OVERBURDEN STOCKPILED IN THE BERM ALONG AREA 3 OF HUNT ROAD. THE AREA RETURNS TO POND/ WETLAND AND NATURAL AREA/ OPEN SPACE/ REFORESTATION AFTER-USE.
- REMOVE ALL EQUIPMENT, STRUCTURES, STOCKPILES AND SCRAP FROM THE SITE AND REHABILITATE ALL HAUL ROADS USING TOPSOIL AND OVERBURDEN STOCKPILED IN REMAINING BERMS.
- COMPLETE PROGRESSIVE REHABILITATION IN AREA 3 USING MATERIAL REMAINING IN BERMS. AREA 1 & 2 RETURN TO POND/ WETLAND AND NATURAL AREA/ OPEN SPACE/ REFORESTATION AFTER-USE.
- 4. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.

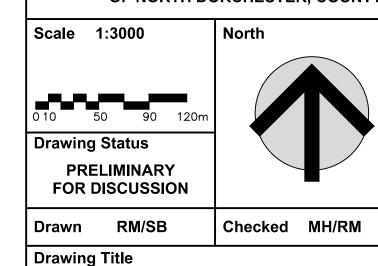




**Project Name** 

# Thames Valley Aggregates Inc. PIKE PIT

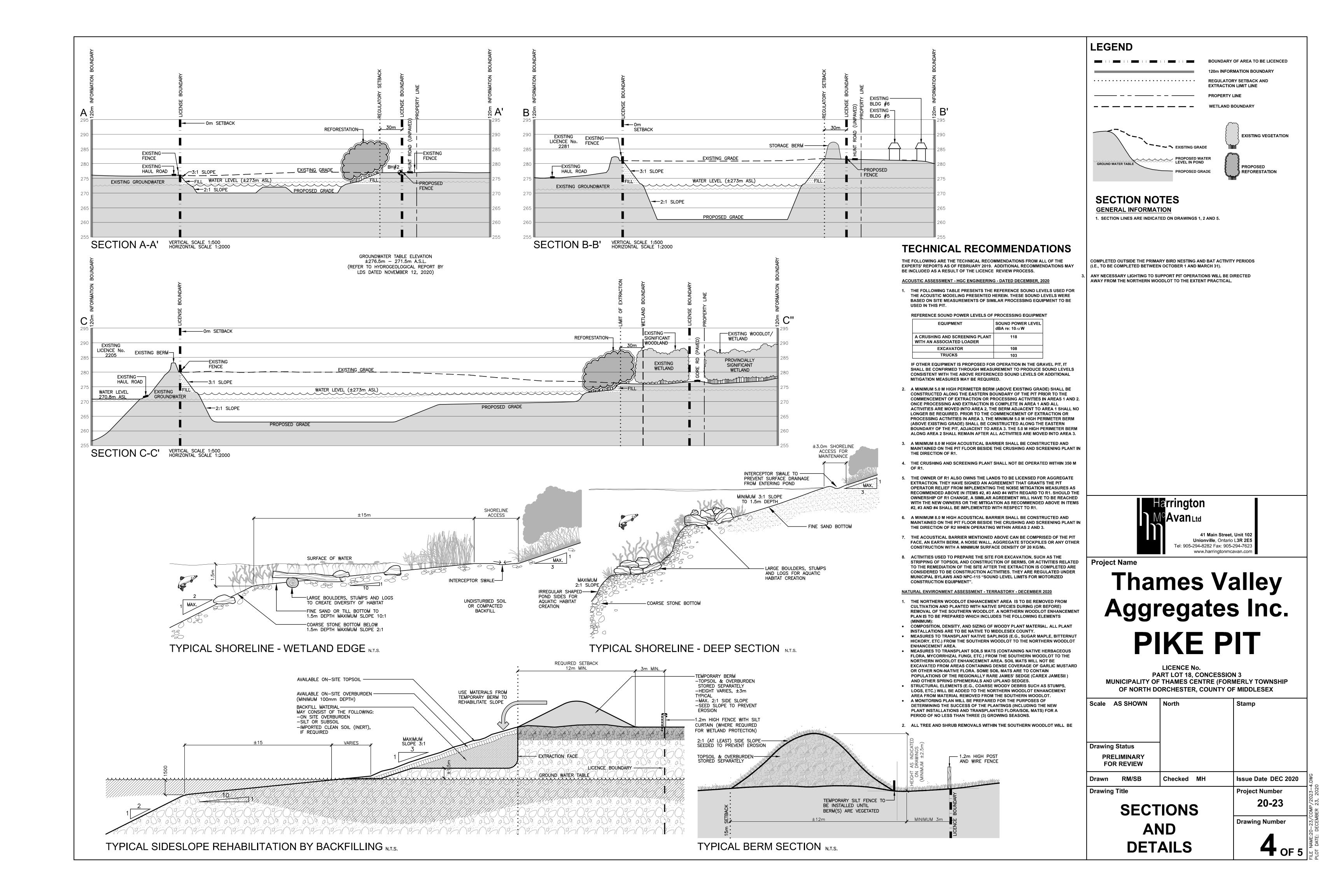
LICENCE No. PART LOT 18, CONCESSION 3 MUNICIPALITY OF THAMES CENTRE (FORMERLY TOWNSHIP OF NORTH DORCHESTER, COUNTY OF MIDDLESEX



**OPERATION** 

**PLANS** PHASE B TO E Issue Date DEC 2020 **Project Number Drawing Number** 

Stamp





# **REHABILITATION NOTES**

# **GENERAL INFORMATION**

1. REFER TO SHEET 4 OF 5 FOR SECTIONS, SHEET 2 AND 3 OF 5 FOR OPERATIONS AND PHASING DIAGRAMS AND NOTES AND SHEET 5 OF 5 FOR FINAL REHABILITATION AND NOTES.

2. PROPERTY SHALL BE REHABILITATED TO:

**OPEN WATER POND** 11.33 HA 0.80 HA REFORESTATION 0.76 HA SIDESLOPE/ MEADOW 3.41 HA FOR A TOTAL OF 16.30 HECTARES.

REFORESTATION OUTSIDE EXTRACTION AREA 0.46 HA

## **HYDROGEOLOGICAL INFORMATION**

- 3. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORT BY LDS CONSULTANTS. DATED NOVEMBER 12, 2020.
- 4. THE WATER TABLE ELEVATION WITHIN THESE PROPERTIES IS ESTIMATED TO BE BETWEEN ± 276.5 - 271.5m ABOVE SEA LEVEL (A.S.L.) BASED ON ABOVE REPORT.

# SIDESLOPE/ MEADOW REHABILITATION INFORMATION

**GRADING INFORMATION** 

5. REHABILITATED SLOPES WITHIN THE LICENCED AREA WILL BE CONSTRUCTED AS SHOWN ON THE CROSS SECTIONS. REHABILITATION OF ABOVE WATER SLOPES SHALL BE BY BACKFILLING (MINIMUM 3:1) AND/OR CUT AND FILL METHOD USING AVAILABLE ON-SITE OVERBURDEN AND TOPSOIL FROM WITHIN THE LICENSED AREA AND/OR CLEAN INERT IMPORTED FILL PER OPERATIONAL NOTE 20 ON PAGE 2.

# AVAILABLE OVERBURDEN REPLACED WILL BE APPROXIMATELY 100mm THICK.

REFER TO DRAWING 4 OF 5, SECTIONS, FOR MORE INFORMATION ON BACKFILLING AND CREATION OF REHABILITATED SIDESLOPES. TOPSOILING INFORMATION

# 6. ALL AVAILABLE TOPSOIL ON THE SITE WILL REMAIN TO BE USED FOR REHABILITATION

OF THIS SITE.

VEGETATION STABILIZATION INFORMATION 7. TOPSOIL SHALL BE SEEDED WITH A MIXTURE OF GRASSES AND LEGUMES THAT MAY INCLUDE THE FOLLOWING AT A RATE OF APPROXIMATELY 125KG/HA:

BUCKWHEAT TALL FESCUE

## OPEN WATER POND REHABILITATION INFORMATION

- 8. THE AVERAGE WATER LEVEL IN THE POST-EXTRACTION POND IS ESTIMATED TO BE 273m ASL (BASED ON LDS REPORT DATED NOVEMBER 12, 2020).
- 9. THE SHAPE AND GRADING OF THE PROPOSED POND IS APPROXIMATE, BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME OF LICENSING. ACTUAL EXTRACTION WILL FOLLOW THE BELOW WATER DEPOSIT AND REHABILITATION SHALL FOLLOW THE CONCEPT ILLUSTRATED.

## WETLAND REHABILITATION INFORMATION

- 10. AREAS SHALL BE REHABILITATED TO WETLAND HABITAT AS FOLLOWS: - UNDERWATER SLOPES WILL BE FORMED WITH ON-SITE FILL - UNDERWATER SLOPES SHALL BE A MAXIMUM OF 2:1
- 11. RESTORATION OF THE NEARSHORE, SHALLOW WETLAND ZONE AS SHOWN ON THE TYPICAL SHALLOW SHORELINE SECTION, SHEET 4 OF 5 WILL GENERALLY BE ACCOMPLISHED AS
- EXTRACTION AND ROUGH GRADING WILL CREATE A NEARSHORE SHORELINE AREA AT A
- FINAL SLOPING OF THE SHORELINE TO CREATE PHYSICAL DIVERSITY BY SCALLOPING THE SHORELINE AND ADDING STRUCTURES.
- WOODY DEBRIS- BRANCHES, TREE TRUNKS, STUMPS, ETC. CLEARED IN THE EXTRACTION PROCESS WILL BE SALVAGED WHERE POSSIBLE, FOR USE IN SHORELINE RESTORATION/
- **UNDERWATER HABITAT ENHANCEMENT**  STUMPS, LOGS, BRUSH BUNDLES, ETC. SHALL BE INSTALLED ±30m O.C. ALONG THE SHORELINE IN THE SHALLOW ZONE TO CREATE PHYSICAL DIVERSITY.
- OVERSIZE ROCKS NOT UTILIZED IN THE AGGREGATE OPERATIONS WILL ALSO BE PLACED IN THE SHALLOW ZONE TO CREATE PHYSICAL DIVERSITY.
- THE INITIAL SHORELINE RESTORATION AREA WILL BE SPORADICALLY PLANTED WITH TREES AND SHRUBS. SPECIES MAY INCLUDE THE FOLLOWING NATIVE PLANTS:

RED MAPLE PUSSY WILLOW SILVER MAPLE SPECKLED ALDER WHITE CEDAR LARCH

12. INITIAL SHORELINE WETLAND AREAS SHALL BE PLANTED WITH CLUMPS OF EMERGENT AND SUBMERGENT NATIVE WETLAND PLANTS TO INITIATE COLONIZATION OF THE SITE AS NUTRIENT LEVELS INCREASE TO SUPPORT THEM. NATIVE WETLAND PLANTS SUCH AS:

SOFTSTEM BULRUSH FLOATING PONDWEED COONTAIL PICKERELWEED WATER-LILY

WILL BE PLANTED IN CLUSTERS OF 5 AT APPROPRIATE DEPTHS TO BEGIN THE COLONIZATION.

13.THE AREA BETWEEN THE POND AND WETLAND WILL BE ALLOWED TO NATURALIZE. THE SIGNIFICANT WOODLANDS WILL PROVIDE A SEED SOURCE FOR PIONEER SPECIES TO ESTABLISH. TREE PLANTING WILL OCCUR IN THIS AREA AND WILL INCLUDE BUT NOT BE LIMITED TO THE

WHITE CEDAR RED MAPLE WHITE SPRUCE SILVER MAPLE EASTERN WHITE PINE SPECKLED ALDER BLACK CHERRY WHITE BIRCH

LARGE-TOOTHED ASPEN

PLANTINGS IN THE NATURALIZED AREA SHALL INCLUDE SCATTERED POCKETS OF TREES AND SHRUBS TO INCREASE DIVERSITY. PLANTINGS BETWEEN THE SOUTHERN SHORE OF THE POND AND THE SIGNIFICANT WETLAND SHALL BE MAXIMIZED TO FACILITATE THE USE OF THE AREA FOR WILDLIFE MOVEMENT. SMALL BRUSH AND STONE PILES SHALL BE PLACED IN THE NATURAL AREA TO ENHANCE VALUE FOR WILDLIFE HABITAT.

RED OSIER DOGWOOD

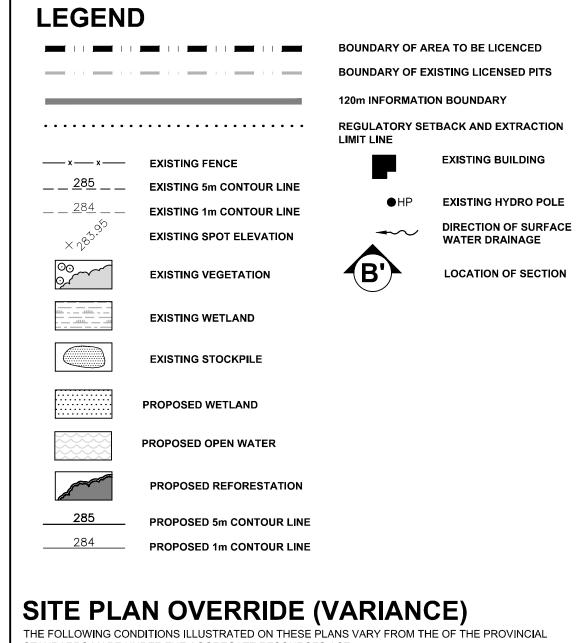
TREMBLING ASPEN

**ELDERBERRY** 

VEGETATION WILL BE MAINTAINED IN A HEALTHY, VIGOROUS GROWING CONDITION.

# SETBACK REHABILITATION INFORMATION

14. AFTER SIDESLOPES ARE CREATED AND REQUIRED BERMS ARE REMOVED FROM SETBACKS, THESE AREAS WILL BE IMMEDIATELY STABILIZED WITH A SUITABLE GROUNDCOVER.



STANDARDS MADE UNDER THE AGGREGATE RESOURCES ACT TO MAXIMIZE EXTRACTION BELOW WATER SLOPES MAY BE A MAXIMUM 2:1. 5.19.1



**Project Name** 

# Thames Valley Aggregates Inc. PIKE PIT

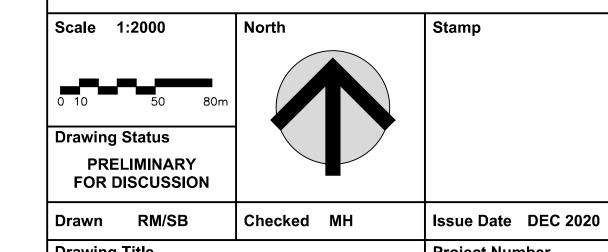
41 Main Street, Unit 102

Unionville, Ontario L3R 2E5

www.harringtonmcavan.com

Tel: 905-294-8282 Fax: 905-294-7623

LICENCE No. PART LOT 18, CONCESSION 3 MUNICIPALITY OF THAMES CENTRE (FORMERLY TOWNSHIP OF NORTH DORCHESTER, COUNTY OF MIDDLESEX



**Drawing Title** 

REHABILITATION **PLAN** 

**Drawing Number** 

**Project Number** 20-23