



**Capital Paving Inc. Proposed  
Montrose Pit - Part of Lots 71, 74 &  
75 G.C.T., Township of Woolwich,  
Region of Waterloo  
Level II Natural Environment  
Technical Report**

Prepared for:  
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## Executive Summary

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This Level II Natural Environment study was undertaken to identify the natural features and their functions that occur on the Subject Property and in the surrounding area (up to 120 metres), and to assess the potential impacts of the proposed aggregate extraction plan, as required for a Category 1 Class 'A' license under the Aggregate Resources Act (ARA). The Subject Property is located in the Township of Woolwich, Region of Waterloo. Features identified during the study that are considered provincially significant as per the Provincial Policy Statement (PPS) include:

- Habitat of Threatened and Endangered species in the Grand River; and
- Fish Habitat:
  - Warm water fisheries habitat (Grand River);
  - Fish habitat lower reaches of Tributary East of Letson Drive (located beyond 120 metre zone of investigation);

Effects of the proposed development to non-provincial environmental features were considered, including woodlands and adjacent unevaluated wetlands. Potential impacts to these significant features were also assessed. Based on the study and analysis, the following conclusions were reached:

- All environmental features of local and provincial significance are associated with the adjacent wetlands and woodlands, and the Grand River and its tributaries;
- There will be no direct negative impacts to these features as the final plan ensures the protection of the form, function and size of these features;
- Indirect impacts to significant features that could arise from changes in groundwater quantity and quality are not anticipated;
- Minor shifts in groundwater levels that are expected to occur on the Subject Property have been minimized through careful design of pond size and location, and will not have an impact on either the form or function of the Grand River or riparian wetland area found in the floodplain;
- Progressive site rehabilitation will, over time, increase the area and function of the wooded area compared to conditions in the existing agricultural landscape; and,
- Fencing proposed for the west license boundary of the site will be influential in protecting floodplain features adjacent to the Grand River from impacts realized through current cattle grazing activities.

Technical recommendations provided to ensure that natural heritage features are protected include:

**CAPITAL PAVING INC. PROPOSED MONTROSE PIT - PART OF LOTS 71, 74 & 75 G.C.T.,  
TOWNSHIP OF WOOLWICH, REGION OF WATERLOO  
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT  
EXECUTIVE SUMMARY  
April 7, 2008**

---

- Installation of a paige wire fence on the western limit of the license area to restrict livestock access to wooded lands and riparian wetlands found along the Grand River floodplain;
- Retain a qualified biologist to stake the limits of the wetland along the Grand River floodplain, in consultation with the Ontario Ministry of Natural Resources and the Grand River Conservation Authority.

Progressive rehabilitation for this site will be implemented as specified in the Site Plans. The mitigation measures, initiatives and recommendations included in the design, as well as Industry Standard Best Management Practices, are included on the Site Plans and will be monitored and enforced under the provision of the ARA.

## Table of Contents

EXECUTIVE SUMMARY	E.1
<hr/>	
<b>1.0 INTRODUCTION</b>	<b>1.1</b>
1.1 BACKGROUND	1.1
1.2 APPLICABLE LEGISLATION	1.1
<hr/>	
<b>2.0 APPROACH</b>	<b>2.1</b>
2.1 BACKGROUND RESOURCES	2.1
2.2 REGIONAL REVIEW	2.2
2.3 SITE RECONNAISSANCE AND DETAILED FIELD SURVEYS	2.2
2.4 METHODS	2.2
2.4.1 Vegetation Community Assessment	2.2
2.4.2 Herpetofaunal Survey (Amphibians and Reptiles)	2.3
2.4.3 Breeding Birds	2.3
2.4.4 Invertebrates	2.4
2.4.5 Terrestrial Wildlife	2.5
2.4.6 Mammals	2.6
2.4.7 Endangered, Threatened and Species of Conservation Concern	2.6
2.4.8 Aquatic Resource Assessment	2.6
<hr/>	
<b>3.0 REGIONAL CONTEXT OVERVIEW OF NATURAL FEATURES</b>	<b>3.1</b>
3.1 REGIONAL DESCRIPTION	3.1
3.2 DESIGNATED FEATURES – WATERCOURSES, WETLANDS, ANSIS AND ESAS	3.1
3.2.1 Watercourses	3.2
3.2.2 Wetlands	3.2
3.2.3 Areas of Natural and Scientific Interest (ANSIs) and Environmentally Sensitive Areas (ESAs)	3.3
3.2.4 Regional Summary – Linkage and Corridors	3.3
<hr/>	
<b>4.0 SITE CONDITIONS</b>	<b>4.1</b>
4.1 TOPOGRAPHY	4.1
4.2 SOILS AND AGRICULTURE	4.1
4.3 SURFACE DRAINAGE AND AQUATIC RESOURCES	4.1
4.3.1 Endangered, Threatened and Species of Concern	4.4
4.4 VEGETATION COMMUNITIES AND VASCULAR PLANTS	4.6
4.4.1 Vegetation Communities	4.6
4.4.2 Vascular Plant Species	4.6
4.4.3 Unevaluated Wetland Area	4.7
4.4.4 Butternut Tree Survey	4.7
4.4.5 Threatened, Endangered and Species of Conservation Concern	4.7
4.5 WILDLIFE	4.7
4.5.1 Butterflies and Odonata	4.8

**CAPITAL PAVING INC. PROPOSED MONTROSE PIT - PART OF LOTS  
71, 74 & 75 G.C.T., TOWNSHIP OF WOOLWICH, REGION OF  
WATERLOO  
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT**

**Table of Contents**

4.5.2	Amphibians .....	4.9
4.5.3	Breeding Birds .....	4.9
4.5.4	Threatened, Endangered and Species of Conservation Concern .....	4.10
<hr/>		
<b>5.0</b>	<b>ANALYSIS OF NATURAL HERITAGE FEATURES .....</b>	<b>5.1</b>
5.1	SIGNIFICANT WETLANDS .....	5.1
5.2	SIGNIFICANT HABITAT OF ENDANGERED AND THREATENED SPECIES .....	5.1
5.3	FISH HABITAT.....	5.1
5.4	SIGNIFICANT WOODLANDS.....	5.2
5.5	SIGNIFICANT VALLEYLANDS.....	5.3
5.6	SIGNIFICANT WILDLIFE HABITAT .....	5.3
5.6.1	Seasonal Concentration Areas .....	5.4
5.6.2	Migration Corridors .....	5.5
5.6.3	Rare or Specialized Habitat .....	5.5
5.6.4	Species of Conservation Concern .....	5.6
5.7	SIGNIFICANT AREAS OF NATURAL AND SCIENTIFIC INTEREST (ANSIS).....	5.7
5.8	SUMMARY OF ENVIRONMENTAL FEATURES .....	5.7
<hr/>		
<b>6.0</b>	<b>PROJECT DESCRIPTION .....</b>	<b>6.1</b>
<hr/>		
<b>7.0</b>	<b>POTENTIAL IMPACTS AND MITIGATION .....</b>	<b>7.1</b>
7.1	POTENTIAL SURFACE WATER AND GROUNDWATER IMPACTS .....	7.1
7.2	FISH HABITAT.....	7.3
7.3	SIGNIFICANT HABITAT OF ENDANGERED AND THREATENED SPECIES .....	7.4
7.4	OTHER NATURAL HERITAGE FEATURES .....	7.5
7.4.1	Woodlands.....	7.5
7.4.2	Unevaluated Wetlands.....	7.5
7.5	MITIGATION STRATEGIES .....	7.5
7.6	SEDIMENT AND EROSION CONTROL.....	7.6
7.7	REHABILITATION .....	7.7
<hr/>		
<b>8.0</b>	<b>CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>8.1</b>
<hr/>		
<b>9.0</b>	<b>LITERATURE CITED .....</b>	<b>9.1</b>

**CAPITAL PAVING INC. PROPOSED MONTROSE PIT - PART OF LOTS  
71, 74 & 75 G.C.T., TOWNSHIP OF WOOLWICH, REGION OF  
WATERLOO  
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT**

**Table of Contents**

---

**APPENDICES**

---

- Appendix A. Figures
  - Appendix B. Tables
  - Appendix C. List of Vascular Plants
  - Appendix D. List of Wildlife
  - Appendix E. Curricula Vitae
- 

**LIST OF FIGURES**

**Appendix A**

- 
- Figure 1. Location of Subject Property
  - Figure 2. Study Area
  - Figure 3. Regional Study Area – Natural Heritage Features
  - Figure 4. Surface Drainage and Aquatic Resources
  - Figure 5. ELC Communities
  - Figure 6. Natural Heritage Areas – Survey Locations
  - Figure 7. Environmental Features
  - Figure 8. Proposed Extraction Footprint and Phases
  - Figure 9. Proposed Rehabilitation
- 

**LIST OF TABLES**

**Appendix B**

- 
- Table 1. Site Investigation Record Proposed Montrose Pit
  - Table 2. Soils Types in the Study Area
  - Table 3. ELC Vegetation Types
  - Table 4. Proposed Montrose Pit Amphibian Count Results
  - Table 5. Endangered and Threatened Species in the General Area
-



## 1.0 Introduction

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### 1.1 BACKGROUND

Capital Paving Inc. retained Stantec Consulting in May 2006, to complete a Level II Natural Environment Technical report as required under the Ontario Aggregate Resources Act (ARA) for aggregate license applications. This Level II Natural Environment Technical Report for the proposed Capital Paving Montrose Pit aggregate license application is designed to meet ARA requirements.

The *Subject Property* is located in the Regional Municipality of Waterloo, Woolwich Township, Concession Broken Front, east of the Grand River, Part of Lots 71, 74 and 75 G.C.T., and is shown on **Figure 1** (Appendix A). The *Study Area* includes a 120 metre investigation zone around the Subject Property, and is depicted on **Figure 2** (Appendix A). A regional review of natural heritage attributes and their potential interconnection was completed within a 5 kilometre radius around the Subject Property, herein referred to as the *Regional Study Area*, and is depicted on **Figure 3** (Appendix A). This area of focus was selected to ensure awareness of the important features and functions in the general vicinity of the Subject Property.

The Region of Waterloo 'Regional Official Policies Plan' identifies two planning designations on the Subject Property – Agricultural Resource Area and Mineral Aggregate Resource Area.

Regionally, the land use in the Township of Woolwich is primarily agriculture with good to moderate quality farmland. Quality aggregate resources are found in various locations in the Township and aggregate extraction is present in the rural landscape.

### 1.2 APPLICABLE LEGISLATION

Capital Paving is preparing a Category 1 Class 'A' license under the ARA. Category 1 Class 'A' licenses are for an aggregate operation with extraction occurring below the established water table. The provincial standards of the ARA require a Level I Natural Environment Technical Report to determine whether any of the following natural heritage features as designated in Section 2.0 of the Provincial Policy Statement (2005) exist on or within 120 metres of the site (formerly Section 2.0 of the Provincial Policy Statement, 1997):

- Significant wetlands;
- Significant habitat of Endangered or Threatened species;
- Fish habitat;
- Significant woodlands;
- Significant valleylands;

**CAPITAL PAVING INC. PROPOSED MONTROSE PIT - PART OF LOTS 71, 74 & 75 G.C.T.,  
TOWNSHIP OF WOOLWICH, REGION OF WATERLOO  
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT**

Introduction  
April 7, 2008

---

- Significant wildlife habitat; and
- Significant Areas of Natural and Scientific Interest (ANSI).

If any of the seven natural heritage features are present, then a Level II Natural Environment Technical Report is required to:

- Determine the degree of impact on the natural features or ecological functions; and
- Propose any preventative, mitigative or remedial measures that may be necessary.

At least one of the seven PPS natural heritage features has been identified on the site and, as such, this Level II Natural Environment Technical Report/Environmental Impact Study has been prepared. In addition to the Aggregate Resources Act, this report addresses the Provincial Policy Statement and issues that would be addressed under municipal planning processes.

**Municipal Requirements**

The Region and Township Official Plan recognize and identify the area as a mineral aggregate resource area. No Official Plan amendment is required.

## 2.0 Approach

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The purpose of this Level II Natural Environment Technical Report is to identify environmental features and functions on the Subject Property and within the Study Area, and to evaluate the potential impacts of the proposed aggregate operation on these features. The preparation of this report involved a review of relevant background documents, a series of site visits to complete an inventory of natural features on and adjacent to the Subject Property, and communications with agencies having regulatory authority over the environmental features within the Study Area.

### 2.1 BACKGROUND RESOURCES

Background data were collected and reviewed to identify designated significant natural areas, significant species occurrences and landscape context. These data were used to supplement and guide the field surveys completed for the site. Documents reviewed and agencies contacted included:

- Cadman, M.D., *et al.* 1987. Atlas of the Breeding Birds of Ontario. Federation of Ontario Naturalists, Long Point Bird Observatory. 617pp.;
- Chapman, L.J. and D.F. Putnam. 1984. The Physiography of Southern Ontario, Third Edition. Ontario Geological Survey Special Volume 2, Ministry of Natural Resources. 270 pp.;
- Dobbyn, J. 1994. Atlas of the Mammals of Ontario. Federation of Ontario Naturalists;
- Grand River Fisheries Management Plan (1998);
- Grand River Conservation Authority. Resource Mapping;
- Groundwater Science Corp. 2008. Hydrogeologic Assessment, Capital Paving Inc., Proposed Montrose Pit Part Lots 74 & 75, Concession GCT Township of Woolwich. March 2008;
- Natural Heritage Information Centre (NHIC). February 2007. Provincial status of plants, wildlife and vegetation communities database. <http://www.OMNR.gov.on.ca/OMNR/nhic/nhic.html>. OMNR, Peterborough.;
- Oldham, M.J. and W.F. Weller. 2001. Ontario Herpetofaunal Atlas internet database. Natural Heritage Information Centre, Ministry of Natural Resources. <http://www.OMNR.gov.on.ca/OMNR/nhic/herps/ohs.html>;
- Ontario Ministry of Natural Resources, Historical Fisheries Data collection, 2006.;
- Personal Communication with OMNR Guelph District Natural Heritage Ecologist (Art Timmermann and Donald Kirk);
- Ontario Odonata Atlas. 2005. Natural Heritage Information Centre, Ontario Ministry of Natural Resources. <http://www.OMNR.gov.on.ca/OMNR/nhic/odonates/ohs.html> (updated 15-02-2005);

## **2.2 REGIONAL REVIEW**

The preliminary stage of an environmental evaluation is to conduct a literature and map review of the regional environmental features. This review focused on identifying ecological links to environments surrounding the Subject Property (5 kilometre radius Regional Study Area). These links are important to understand the regional environmental features that could be impacted by on-site operations. Understanding the linkages also assisted in scoping the extent of the field investigation program (i.e., fisheries assessment in nearby watercourses).

The Regional Context is detailed in **Section 3** of this report. **Figure 3** (Appendix A) illustrates the major natural heritage features that occur in the Regional Study Area.

## **2.3 SITE RECONNAISSANCE AND DETAILED FIELD SURVEYS**

Field investigations for the assessment were completed over a period of one year, commencing in April of 2006. The studies involved classifying the vegetation communities and associated wetlands, wildlife monitoring surveys (mammals, amphibians, reptiles and breeding birds), and an aquatic habitat assessment of the permanent and intermittent watercourses on and adjacent to the Subject Property. The investigations conducted for this study are listed in **Table 1** (Appendix B).

## **2.4 METHODS**

### **2.4.1 Vegetation Community Assessment**

Field investigations for this project included Ecological Land Classification (ELC) of vegetation communities and a floristic survey of the Subject Property and Study Area. Botanical surveys were conducted on May 31 and August 24, 2006. Vegetation communities were delineated on aerial photographs and confirmed in the field; community characterizations (ecosites and ecotypes) were then based on the Ecological Land Classification (ELC) system (Lee *et al.*, 1998). Common and Latin nomenclature of plant species generally follows Newmaster *et al.* (1998).

Vegetation community and plant species information collected for the Subject Property has been evaluated to determine potential significance at a number of different levels. Provincial significance of vegetation communities are based on the draft rankings assigned by the Natural Heritage Information Centre (NHIC) (Bakowsky, 1996). The provincial status of all plant species is based on Newmaster *et al.* (1998), with updates from the database of the NHIC (2005). Identification of potentially sensitive plant species is based on assignment of a coefficient of conservatism value (CC) to each native species in southern Ontario (Oldham *et al.*, 1995). The value of CC, ranging from 0 (low) to 10 (high), is based on a species' tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters.

## **2.4.2 Herpetofaunal Survey (Amphibians and Reptiles)**

The Study Area contains a wetland habitat in a moist cedar forest west of the Subject Property, as well as a small, meadow marsh area in a shallow valley connected to a watercourse on the east side of the property. There is also a marsh meadow associated with the floodplain of the Grand River, immediately south of the Study Area, contiguous with the moist cedar forest. These habitats, along with all other areas with standing water, were surveyed to determine the presence of breeding amphibians.

The surveys followed the protocol for the Marsh Monitoring Program [Bird Studies Canada (BSC), 1994]. Each survey was conducted within the recommended timing window, between a half hour after sunset and midnight, under appropriate weather conditions. This protocol involved the surveyor standing at each selected station and listening for 3 minutes. Frogs are recorded as within the station if they are heard within 100 metres. All other species are recorded as outside the station. All calling activity was ranked using one of the following three abundance code categories: (1) calls not simultaneous – number of individuals can be accurately counted; (2) some calls simultaneous – number of individuals can be reliably estimated; and (3) full chorus – calls continuous and overlapping, so number of individuals cannot be reliably estimated.

Frog surveys were conducted on April 28, May 24, and June 14, 2006. During the first frog survey, four stations were identified based on appropriate habitat. Also taken into account was the need for a representative sample of the entire Study Area.

Reptile surveys were conducted to determine which species utilize the Subject Property for breeding, foraging or overwintering. Significance of species was determined using provincial rankings. These studies were conducted on June 12 and June 29 (2006).

During the summer surveys, rock piles, fences and hedgerows were searched, and rocks and logs were overturned to search for snakes and other wildlife. The margins of a dug pond located in the Study Area, and watercourse edges, were also searched for snake species that prefer wetland habitats. In addition, the on-site rail-tie piles were also searched for snakes. The Ontario Herpetofaunal Summary (Oldham and Weller, 2001) was consulted to see if any significant reptile species had been documented in the vicinity of the Subject Property.

## **2.4.3 Breeding Birds**

Two breeding bird surveys were conducted in June of 2006. The surveys began at, or shortly after dawn, and were completed by 10:30 hrs. The first survey on June 12 was from 06:00 hrs to 07:45 hrs, and the second survey was on June 29, from 06:30 hrs to 10:15 hrs.

All habitat types were covered on foot and a conservative approach was taken to assess the status of breeding birds on the subject lands. All birds observed or heard singing in suitable

**CAPITAL PAVING INC. PROPOSED MONTROSE PIT - PART OF LOTS 71, 74 & 75 G.C.T.,  
TOWNSHIP OF WOOLWICH, REGION OF WATERLOO  
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT**

Approach

April 7, 2008

---

habitat, within their normal breeding season were assumed to be breeding and nesting on-site. Weather conditions were appropriate for bird surveys, according to the Forest Bird Monitoring Program protocols (Environment Canada, 2004). During the first survey, it was overcast with a wind factor of 1 [Beaufort Scale (BF)], and air temperature of 13°C. During the second survey, the temperature was 17°C and the skies were overcast with a wind factor of 1 (BF). The entire property was walked slowly and all birds seen or heard were documented. Notes were also made on early breeding bird species and migrant species.

An owl survey using Bird Studies Canada (BSC) methods and broadcast recording of owl calls was conducted on portions of the Subject Property between 21:07 hrs and 21:27 hrs on April 28, 2006. Considerations when choosing owl stations include: suitable owl habitat, size of the property, and, ensuring a representative sample for the entire area is chosen. Only one station was identified on this property. The survey was completed using a protocol similar to the Nocturnal Owl Surveys in Central Ontario: A Citizen Scientists Guide (BSC, 1995). This involved playing a call-back audio CD of the following owl species known to be found in southern Ontario:

- Great Horned Owl (*Bubo virginianus*);
- Eastern Screech-Owl (*Otus asio*);
- Northern Saw-whet Owl (*Aegolius acadicus*);
- Barred Owl (*Strix varia*); and,
- Long-eared Owl (*Asio otus*).

Each species call was played for 5 minutes with short breaks during the species call to listen for a response. The survey lasted for approximately 30 minutes while the surveyor sat quietly, watching and listening for any avian response to the audio tape.

#### **2.4.4 Invertebrates**

Butterfly and odonata (i.e., dragonflies and damselflies) surveys were conducted on May 28, 2006, between 13:30 hrs and 16:00 hrs, to compile a list of species breeding or foraging on-site. Area searches occurred through all major habitat types to incorporate features where butterflies are likely to concentrate (i.e., a shrub in bloom for foraging or wet areas for puddling) and where odonata are likely to concentrate (i.e., ponds and open wetlands or in grassy fields and meadows where they would forage). Significance of species was determined using provincial rankings. The GPS locations of species sightings, and notes on habitat and behaviour were recorded.

The butterfly survey was conducted to detect presence of early flying butterflies, such as West Virginia White or Elfin species. Selecting ideal weather conditions is critical for butterfly surveys as they are likely to be less active on cool, cloudy or windy days. To the extent possible,

surveys in May should be conducted on days with winds of 2 or less (Beaufort scale), with cloud cover less than 40%, and a daytime temperature above 15°C.

One of the purposes of this visit was to check for the presence of the West Virginia White butterfly. The West Virginia White is designated as Special Concern in Ontario and, has no special status nationally. During this visit, the on-site forested habitats were checked for the presence of the butterfly and its larval food plants, the common and Cutleaf Toothworts.

Most butterfly species were identified in the field, either with the naked eye or through binoculars. When species identification was not possible using these techniques, individuals were captured in a net, identified on-site and released. Densities of butterfly species within a specified area are often difficult to accurately determine as they depend on many variables, such as temperature, cloud cover, or yearly fluctuations in species abundance. However, to provide an approximate comparison of abundance between species, a tally of individual butterfly observations was made.

The Odonata survey was conducted to detect such species as Baskettails and Whitefaces, when they are at their most abundant. Surveys in May should be conducted under ideal weather conditions with winds of 2 or less (Beaufort scale), cloud cover less than 40%, and a daytime temperature above 15°C. The survey should be conducted at times of the day when odonata are expected to be most active - from late morning into the late afternoon.

Most species of odonata were identified in the field, either with the naked eye or through binoculars. When species identification was not possible using these techniques, individuals were captured in a net, identified on-site and released. Where required, a hand lens and technical key was used to confirm the identification.

It is often very difficult to accurately assess the abundance of odonata, particularly damselflies, as they can be locally abundant in some communities and are undetectable when they seek refuge in long grass. Notes were taken regarding general impressions of abundance, however, estimates of species densities were not conducted.

#### **2.4.5 Terrestrial Wildlife**

Terrestrial wildlife investigations were conducted on the property in combination with the assessment of vegetation, aquatic features, and terrestrial-specific surveys such as breeding bird, reptile and amphibian surveys. Mammal observations and special features review (i.e., wildlife trails, animal concentrations, etc.) were recorded. A comprehensive inventory of wildlife is provided in Appendix D, which has been compiled from sightings as well as distinctive sounds and signs.

Data regarding terrestrial wildlife and habitat were obtained from the following sources:

- The Atlas of the Breeding Birds of Ontario (1987);
- The Atlas of the Mammals of Ontario (1994);
- Areas of Natural and Scientific Interest (ANSI) data files;
- Ontario Ministry of Natural Resources – Natural Heritage Information Centre (2006); and
- Resource mapping - Grand River Conservation Authority.

#### **2.4.6 Mammals**

A winter wildlife survey was completed on February 16, 2007. Transects were walked through the open agricultural and wooded portions of the site, following a fresh snowfall which provided adequate tracking opportunities. The following details were noted on each of the transects: (1) direct wildlife observations; (2) evidence of tracks and movement trails (focus on Wild Turkey); (3) scat evidence; (4) presence of deer beds; (5) severity of browse (deciduous); and (6) availability of cover (coniferous).

#### **2.4.7 Endangered, Threatened and Species of Conservation Concern**

Endangered and threatened species that may occur on or in the vicinity of the Subject Property were noted during the review of background information. These species were identified in various reports for the region or in the regional vicinity of the site, such as Environmentally Sensitive Area reports, wetland evaluations, fisheries records, and through personal communication with persons having knowledge of species in the region, as well as an NHIC database search. Where appropriate, these species were searched for on-site, including such species as Red-shouldered Hawk (June 12, 2006) and Butternut (May 31, 2006, August 24, 2006 and February 16, 2007).

#### **2.4.8 Aquatic Resource Assessment**

Historic data regarding the extent of the range of Brook Trout in the Grand River was obtained through consultation with GRCA and OMNR. Rare species and Species of Conservation Concern, including Black Redhorse, Silver Shiner, Wavy-rayed Lampmussel and Greater Redhorse were also investigated through background research.

A field survey of the Subject Property was completed on September 22, 2006 to characterize aquatic habitat features and existing conditions along the river's edge, as well as the channel leading from the pond at the west end of the Subject Property, and a tributary found near the northeast corner of the Subject Property.

In general, habitat assessment and characterization included observations of the following stream corridor attributes:

**CAPITAL PAVING INC. PROPOSED MONTROSE PIT - PART OF LOTS 71, 74 & 75 G.C.T.,  
TOWNSHIP OF WOOLWICH, REGION OF WATERLOO  
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT**

Approach

April 7, 2008

---

- In-stream Cover;
- Bank Stability;
- Bankfull Width;
- Wetted Width;
- Substrate;
- Stream Dimensions and Morphology;
- Aquatic Vegetation; and,
- Riparian Vegetation.



### **3.0 Regional Context Overview of Natural Features**

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#### **3.1 REGIONAL DESCRIPTION**

The Regional context is illustrated on **Figure 3** (Appendix A).

The Subject Property lies within the Guelph Drumlin Field Physiographic Region. The Guelph Drumlin Field Physiographic Region is characterized as being mainly composed of stony loamy glacial till that is drumlinized. In the vicinity of the Subject Property, the Grand River and its associated valley traverse the Guelph Drumlin Field. The dissecting and washing of the glacial till by the Grand River has resulted in deposits of outwash sand and gravel within the Grand River basin and along the terraces. Deposits of this nature have been identified on the Subject Property.

Bedrock forms the floor of the Grand River to the north in the Towns of Fergus and Elora. Bedrock has been identified to be more than 15 metres below the surface in the vicinity of the Subject Property in West Montrose. Two types of bedrock have been identified beneath the Subject Property. They are the Guelph Formation and the Salina Formation, both Paleozoic rock of the Silurian Period.

There are three urban areas in the Regional Study Area surrounding the Subject Property. Zubers Corners is located northeast of the Subject Property, at the junction of Highway 86 and Regional Road 23. West Montrose is located south of Highway 86, and north of the Subject Property. Winterbourne is located south of the Subject Property on Regional Road 23. These urban areas support the local rural community. Land use varies from intensive to passive agriculture.

The Regional Study Area is located within the Huron-Ontario section of the Great Lakes Forest Region (Rowe, 1972). Natural upland forest in this region is generally dominated by sugar maple, American beech, basswood, white ash, white oak, bur oak, eastern hemlock and eastern white pine. Forests of silver maple, white elm, red elm, black ash and eastern white cedar generally develop in lowland areas. Large-tooth aspen and white birch often form secondary communities. Forest cover in the Regional Municipality of Waterloo is approximately 14.8% (Riley and Mohr, 1994). Forest cover in the Township of Woolwich is approximately 14.01% (GRCA, 2002).

#### **3.2 DESIGNATED FEATURES – WATERCOURSES, WETLANDS, ANSIS AND ESAS**

This section discusses the natural features in the vicinity of the Subject Property as designated by the provincial and municipal authorities.

The Subject Property occurs in the Grand River watershed, within the Middle Grand River Reach Management area. The Grand River is situated immediately to the west of the site and within the 120 metre zone of investigation. The entire Subject Property is situated in the drainage area of the Grand River Valley and includes lands draining into a small, unnamed tributary and an intermittent swale. Details of the watercourse features, including the Grand River, are further described in **Section 4.0**.

### **3.2.1 Watercourses**

In the Regional Study Area (5 kilometre radius) there are three main subwatershed areas, as follows:

**Canagagigue Creek** is designated by the Ministry of Natural Resources as a warm water creek. It flows east, entering the Grand River just south of the Town of West Montrose.

**Conestogo River** flows north into the town of Conestogo, and then east into the Grand River, north of the Conestogo Crown Game Preserve. The Conestogo River is designated by the Ontario Ministry of Natural Resources (OMNR) as a warm water river and a mixed water tributary, according to the GRCA Fish Management Plan.

**Cox Creek** is designated as a warm water creek by OMNR, and flows southwest through the town of Winterbourne, where it joins the Grand River.

### **3.2.2 Wetlands**

There are no Provincially Significant Wetlands (PSW) within the Regional Study Area, however there are two non-provincially significant wetlands in this area; the North Woolwich Swamp-Wetland, found along Cananigue Creek and its tributaries to the west of the Subject Property and the Maryhill Swamp, located in the vicinity of tributaries to Cox Creek to the east of the Subject Property. Both are approximately 1 kilometre or greater from the Subject Property. An unevaluated wetland is also found within the Study Area, along the shoreline of the Grand River. The unevaluated wetland is further described in **Section 4.4.3** of this report.

The North Woolwich Swamp-Wetland is located north of Highway 86, approximately 4 kilometres northwest of the Subject Property. It is an unbroken swamp forest on a spillway. This site is the headwaters of several streams, and is located near several other natural areas. Special features include a deer yard, and rare plant species. The Maryhill Swamp is located approximately 5 kilometres southeast of the Subject Property, and exhibits 100% swamp representation.

The general boundary of wetland complexes in the regional study area are provided by both the Ministry of Natural Resources and the GRCA, and are depicted on **Figure 3** (Appendix A).

### **3.2.3 Areas of Natural and Scientific Interest (ANSIs) and Environmentally Sensitive Areas (ESAs)**

There are two regional Life Science ANSIs and one Earth Science ANSI within a 5 kilometre radius of the Subject Property. As well, two Environmentally Sensitive Policy Areas (ESAs) can be found within a 5 kilometre radius of the Subject Property. There are no provincially designated ANSIs in the Regional Study Area.

The North Woolwich Swamp regional ANSI has multiple designations; it is designated as a non-provincial wetland area, as described above, as well as an ESA, as designated by the municipality. It is predominantly composed of swamp, with some marsh representation. This area is located approximately four kilometres northwest of the Subject Property.

The West Montrose River Valley Life ANSI is located approximately 5 kilometres north of the Subject Property. It is considered a Regional Life Science ANSI due to its diverse features, which include floodplain wetland, upland hardwoods and old fields. The community types include islands of cedar, hemlock-balsam stands, Manitoba maple-slippery elm stands, and black maple-white ash-elm stands. It also supports conservation species, such as the Red-backed Salamander, Twinleaf and Nodding Trillium.

Guelph Esker is approximately 1 kilometre east of the site and is designated as a Regionally Significant Earth Science ANSI. It belongs to the Guelph-Eramosa-Ariss esker complex, which was created by wasting Wentworth ice during the Port Bruce Stadial (NHIC, 2005).

Valge River Bank ESA is located northeast of Highway 86 on the west riverbank. It is designated as an ESA because of its remarkable concentration of rare plants for such a small area. It has very steep slopes and a weeping, or springy, calcareous bank.

The Regional Municipality of Waterloo includes locally significant wetlands and ESAs as Natural Environment areas, and has developed policies to direct land use planning in and around these areas.

### **3.2.4 Regional Summary – Linkage and Corridors**

The Subject Property and associated natural features (on-site and on adjacent lands) are not linked to the natural features described above that are found in the Regional Study Area. The most direct linkage is found along the wooded and grassed meadows associated with the shoreline of the Grand River, which include the west portion of the Subject Property. The linkage is relatively weak immediately south of the Subject Property and further south, near Winterbourne, as a result of agricultural land clearing. To the north of the Subject Property, the link is also weak, given the presence of residential yards in West Montrose and along River's Edge Road. The lands associated with the Subject Property and the Study Area are not considered to be critical or significant to the function of both the provincially designated and

other notable natural heritage features found within the Regional Study Area. The wooded area found along the flood plain of the Grand River, adjacent to the site, will not be affected by the development proposal and as such will not compromise any wildlife linkages associated with the riparian zone along the Grand River.

## **4.0 Site Conditions**

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### **4.1 TOPOGRAPHY**

The majority of the Subject Property is agricultural land. The western portion of the property lies along the eastern bank of the Grand River, and consists of a cedar swamp strip surrounded by a wooded area of varying density. A small pond exists on the west side of the Subject Property with an intermittent downstream swale. This swale has no obvious confluence with the Grand River and water flowing along it appears to be absorbed into the ground prior to reaching the river. Along the north edge of the site and on the east side of Letson Drive, a westward running cool water stream flows toward the Grand River. The stream crosses a small portion of the northeast corner of the site. Just north of the site, the stream flows into a constructed, concrete-lined pond. A concrete diversion channel has been constructed around the pond to support overflow water. The water from the concrete channels around the pond converges with the outflow from the pond where it continues onward, joining the Grand River.

Overall, the terrain generally slopes down from the east-southeast portions of the site, westward toward the Grand River. In the central part of the property, the terrain gently slopes from east to west through the agricultural fields. A steep bank leading to the floodplain of the river is located in the wooded area on the northern portion of the Study Area. The westernmost portion of the Study Area is considered a floodplain zone.

The topographic elevation of the Subject Property ranges from 340 metres above sea level (masl) at the southeast corner to 325 masl at the western limit of the property.

### **4.2 SOILS AND AGRICULTURE**

The soils found on the Subject Property are predominantly Burford soils and St. Jacobs soils. The Burford soils are well drained and consist of 30 cm or less, of sandy loam or loam soil overlying outwash gravel. The St. Jacobs soils are also well drained and consist of 30 to 90 centimetres of loam or silt loam soil overlying outwash gravel. The soils on the Subject Property are described in the **Table 2** (Appendix B). The surface soil and parent materials are considered to be low to moderately erodible.

The Subject Property occurs in the rural portion of Woolwich Township in the Regional Municipality of Waterloo. Agricultural crop land is the predominant land use in this township (estimated at 80% to 85%). Woodland and unimproved land account for the remainder of the land use.

### **4.3 SURFACE DRAINAGE AND AQUATIC RESOURCES**

There are no permanent watercourses located within the Subject Property boundaries; however, the Subject Property lies within the Middle Grand River Reach of the Grand River watershed.

**CAPITAL PAVING INC. PROPOSED MONTROSE PIT - PART OF LOTS 71, 74 & 75 G.C.T.,  
TOWNSHIP OF WOOLWICH, REGION OF WATERLOO  
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT**

Site Conditions

April 7, 2008

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The main watercourse in the area is the Grand River. As described in **Section 3.0** of this report, there are three smaller, permanent watercourses in the Regional Study Area (Cananigue Creek, Conestogo River and Cox Creek), as seen in **Figure 3** (Appendix A). There is one seasonal tributary located on the Subject Property (east of Letson Drive, associated with the constructed concrete pond), as well as a swale and on-site pond (at the western edge of the site), as shown on **Figure 4** (Appendix A).

The Grand River watershed is the largest inland system in Southern Ontario, covering some 6,500 km<sup>2</sup>, and extending from its headwaters north of Dundalk to its mouth on Lake Erie in Port Maitland, Ontario. Fish resources are diverse, with more than 80 fish species, including species identified as Special Concern and Threatened in Ontario.

North of the West Montrose bridge, north of the Subject Property, the Grand River is managed as a coldwater fishery. An aggressive management strategy has been adopted to artificially support a resident Brown Trout population. Other species in this reach include Pike, Carp, Smallmouth Bass, Rainbow Trout and Yellow Perch. The nutrient-rich water and coarse riverbed material result in a high diversity of insect life.

Downstream of the West Montrose bridge, including the portion of the Grand River adjacent to the Subject Property, the Grand River offers a diverse warmwater fish community, dominated by top predators such as Walleye, Smallmouth Bass and Pike. The entire Grand River Valley and River support an abundance of associated wildlife species (i.e., mammals, birds, reptiles, etc.).

### **Tributary East of Letson Drive**

The tributary east of Letson Drive is located north of the Subject Property, flowing generally from east to west. The tributary turns northward just north of the Martin family farmstead, where it continues parallel to Letson Drive through an online, constructed pond, made of concrete. It eventually passes beneath River's Edge Road and discharges into the Grand River (see **Figure 3**, Appendix A). The tributary begins in a woodlot wetland area east of Regional Road 23.

There was a preliminary survey of this tributary on April 19, 2006, and a fisheries habitat assessment was conducted on September 22, 2006 from approximately 100 metres upstream of the large off-site pond (east of Letson Drive) to 120 metres into the woodlot (i.e., east of the 120 metre Study Area boundary). This reach contained water from the off-site pond to approximately mid-way through the small block of cedar trees near the northeast corner of the Subject Property. Upstream of this area, the stream bed was completely dry. Downstream of the culvert, situated beneath the farm laneway along the north edge of the Subject Property, most of the watercourse has poorly defined banks and flow is diffuse at the bottom of a shallow valley which is used as cattle pasture and contains dense growth of jewelweed. Bottom substrate is predominantly organic, with occasional areas of sand. Watercress was present at some locations along the creek length, particularly downstream of the laneway. The watercourse is generally very shallow, diffuse, with limited overhead and in-stream cover and has no pools or

refuge areas. The watercourse is described as intermittent, with the majority of its annual flow resulting from surface water and a small contribution of groundwater occurring primarily downstream of the laneway (GWS, 2007). The majority of the watercourse found on the Subject Property between the east woodland and the farm laneway is accessible to cattle, and stream banks are poorly defined.

This intermittent tributary continues downstream where it enters a concrete constructed pond (**Figure 7**). A dam structure at the outlet at the northern end of the pond restricts fish passage upstream. The watercourse below the constructed pond is also considered intermittent but likely offers habitat to fish species from the Grand River who can seasonal enter into the lower portion of the tributary. The tributary upstream of the constructed pond is not considered fish habitat given that it is isolated from a colonization source and has attributes that are not conducive to fish populations.

#### **Livestock Pond and Surface Water Swale**

The livestock pond and surface water swale are located in the northwestern corner of the Subject Property. The swale commences in a small, dug pond (approximately 12 metres x 25 metres), that was constructed to support livestock watering. The pond has steep regular sides, is approximately 1.25 to 2.0 metres deep and has a slightly raised perimeter that limits input from overland flow. The pond is primarily supported by subsurface preferential flow from the uppermost portion of the overburden with some overland flow. The pond and downstream swale were surveyed on April 19, 2006, and a fisheries habitat assessment was conducted on September 22, 2006. The rectangular shaped pond has limited plant growth and has some overhead cover. During some periods of the year, when the pond level is high enough, water flows out of the the northwest corner of the pond via a constructed outlet and into the surface swale. The pond is not considered to be fish habitat.

The swale was observed as a perceptible channel immediately downstream, and at the west end of the pond. The channel becomes diffuse as it continues toward the Grand River. The channel is accessible to, and is well-used by cattle as it meanders through a cedar-lowland for most of its length toward the Grand River. There is no obvious confluence with the Grand River and it appears that all water is absorbed into the ground prior to reaching the river. No fish were observed during the September 22, 2006 fisheries habitat assessment. The water temperatures may be appropriate for coolwater species; however, it has a very shallow depth, it conveys only small volumes of water, its channel is diffuse or undefined, it is highly disturbed by cattle activity, it does not directly link to the Grand River, and it tends to be intermittent in nature. The characteristics suggest that the swale provides little or no habitat for species and, as such, precludes the presence of a viable fish population.

#### **4.3.1 Endangered, Threatened and Species of Concern**

There are four aquatic species of provincial and local significance that occurs in the Grand River that may be found near the Study Area.

##### **Black Redhorse**

The Black Redhorse (*Moxostoma Duquesnei*) is a freshwater fish with a very small, highly fragmented distribution and restricted spawning habitat preferences (i.e., water depth and substrate). Native populations are found in only five Ontario watersheds. The population is fragmented by areas heavily impacted by urbanization, agriculture and dams, which adversely affect flow regimes. The Black Redhorse is at risk of habitat loss and degradation as a result of increased siltation and turbidity. In southwestern Ontario it is known from tributaries to lakes Erie, Huron, Ontario and St. Clair.

The habitat of the Black Redhorse is limited to moderate- to fast-flowing areas in medium-sized, warmwater streams and rivers. It prefers substrates of rubble, gravel, sand, boulders and silt and is rarely associated with submerged aquatic vegetation. In the summer, the species generally prefers pools and overwinters in deeper pools.

Age at maturity typically ranges from 2 to 6 years. Black Redhorse migrate to spawning habitat in spring. They are benthic feeders of crustaceans and insects, and they play an important role as a nutrient cyclers in aquatic ecosystems.

In the Grand River, Young-of-the-Year (YOY) are most commonly observed among beds of Swamp Loosestrife (*Decodon verticullatus*) in relatively quiet waters. During the summer, large juveniles (approximately 150 mm) have historically been observed to feed alone along the bottom of sandy pools, and immature Black Redhorse have been captured in shallow pools below riffles (Parker and Kott, 1988). In the Grand River, approximately 35% of Black Redhorse collection sites contained both juveniles and adults; juveniles are typically captured in pools and run habitats downstream of riffles during the summer.

The Black Redhorse and its habitat are protected by the federal Fisheries Act. In Canada, it is currently listed as Threatened by both COSEWIC and the Province of Ontario, and as S2 by the Natural Heritage Information Centre.

##### **Wavy-rayed Lampmussel**

The Wavy-rayed Lampmussel (*Lampsilis fasciola*) is a medium-sized freshwater mussel that inhabits riffle areas with gravel or sand bottoms in large creeks and rivers. It has a thick, rounded yellow-green shell with numerous thin wavy green rays. It can live as long as 20 years and grows to a size of 100 mm. All unionid mussels are parasitic on the gills or fins of fish during their larval stage. The known fish hosts are the smallmouth and largemouth bass, both of which are common in southern Ontario. It is likely that the smallmouth bass is more important as a

host in the gravelly and rocky streams in which the mussel occurs in Ontario. When the larvae are ready to be released by a brooding female, a minnow shaped lure (part of the mussel's mantle) is waved to attract fish hosts. When a fish touches the mantle flaps, they are withdrawn and the shell is closed resulting in the release of the glochidia larvae.

Although it is not a common species, the Wavy-rayed Lampmussel can be found throughout much of the lower Great Lakes and their tributaries. The population has declined significantly in recent years, particularly in the northern part of its range. Its status is Endangered, both provincially and nationally. In Ontario, the Wavy-rayed Lampmussel was formerly found in western Lake Erie, the Detroit River, Lake St. Clair, and several southwestern Ontario rivers. It persists in some of these rivers, although its range and abundance has been reduced. The invasion of the exotic zebra mussel (*Dreissena polymorpha*) may have been responsible for the extirpation of the Wavy-rayed Lampmussel from Lake Erie, Lake St. Clair and the Detroit River. Siltation is the most immediate threat to the remaining populations, but eutrophication and pesticide inputs may also be significant factors. Water clarity may be particularly important for this species as it uses a visual lure to attract fish hosts to its glochidia larvae. Dams on the Grand and Thames Rivers have also negatively affected the population and now pose an additional threat if zebra mussels are introduced into their reservoirs. Disruption of the bottom sediments by recreational canoe traffic in heavily used areas has also been noted as a potential threat to this species.

The Wavy-rayed Lampmussel is provided protection under the Fisheries Act and Species at Risk Act. This species is designated as Endangered in Ontario.

### **Silver Shiner**

The Silver Shiner (*Notropis photogenis*) is a relatively large minnow and can grow to about 14 centimetres long. It lives in schools and feeds on crustaceans and adult flies at the surface of the water. The Silver Shiner prefers moderately-flowing sections of larger streams. Its status is that of Special Concern Provincially and Nationally. In Ontario, it is found in the Thames and Grand Rivers, and it has been recently reported in Bronte Creek and Sixteen Mile Creek which flow into Lake Ontario. Dam construction and channelization of streams, and pollution may have caused historic declines in Ontario, but in the last 20 years the species seems to have become more common here. Temperature may be the most important limiting factor, as southern Ontario probably represents the northern limits for the species. This species is afforded the general protection given by habitat sections of the Fisheries Act. It is given a status of Special Concern by COSSARO and is considered a species of Conservation Concern.

### **Greater Redhorse**

The Grand River supports a large population of Greater Redhorse (*Moxostoma valenciennesi*), which are typically found in clear, relatively fast-moving, medium to large rivers as well as in lakes. They tolerate both shallow and deep waters. Spawning occurs along edges and

midstream areas of riffles, on pebble, cobble, and gravel substrates after migrating upstream in the spring. After spawning they can travel up to 15 kilometres downstream, where they maintain summer home ranges with a preferred water depth of approximately 46 centimetres and water velocities of no more than 5 cm/s. This species is a bottom-feeder, and feeds on microcrustaceans, aquatic insects, detritus, and algae. The Greater Redhorse is the largest fish in its genus, averaging around 46 centimetres (max. of 80 centimetres) and two kilograms (max. of 5.9 kilograms). For both males and females, sides are yellow-gold, dorsal surfaces are olive, and caudal fins are bright red on the outside and becoming orange at the center. This species is not designated as Threatened, Endangered or Special Concern in Ontario, but is ranked by the OMNR as S3, suggesting it is a species of Conservation Concern.

The four above-noted species could be found in the reach of the Grand River adjacent to the Study Area. They are not expected to occur in the two small and intermittent tributaries found on the perimeter of the Subject Property.

#### **4.4 VEGETATION COMMUNITIES AND VASCULAR PLANTS**

##### **4.4.1 Vegetation Communities**

The vegetation communities documented on the site, based on the Ecological Land Classification (ELC) system, are shown on **Figure 5** (Appendix A). The Subject Property generally consists of agricultural lands with rural residences located along country roads. In the area adjacent to the Grand River, meadow marsh swamps and fresh moist cedar forests occur on the river floodplains, with cultural meadows and deciduous forests located on higher ground.

The vegetation community types are described in **Table 3** (Appendix B). Vegetation communities outside the Subject Property were observed without entering the properties and characterizations are based on roadside observations, aerial photographs and background data.

##### **4.4.2 Vascular Plant Species**

Botanical surveys were completed on May 31 and August 24, 2006. 235 species of vascular plants were recorded from the Subject Property and adjacent lands during the inventories (listed in **Appendix C**). Of that number, 140 species or 60% are native, and 95 species or 40% are exotic. The high proportion of the exotic species testifies to the highly anthropogenic character of the Subject Property, where agricultural fields, roadsides, thickets, hedgerows and human residences contribute to the proliferation of the non-native species.

Of the native flora, 137 species or 99% are classified S5 (very common in Ontario). Only two species are S4 (uncommon to locally common in Ontario). These are:

- Black Maple (*Acer saccharum* ssp. *nigrum*) – common in deciduous woodlots, especially the grazed woodlot at the western end; and

- Black Walnut (*Juglans nigra*) – planted near farm buildings as a roadside tree.

#### **4.4.3 Unevaluated Wetland Area**

The single, unevaluated wetland in the Study Area has been described as a wetland by the GRCA and covers a total area of approximately 8.59 hectares (21.2 acres). This wetland runs adjacent to the eastern shore of the Grand River. This wetland area occurs outside the proposed license area, but within the Study Area boundary. The groundwater assessment has indicated that the seasonal high water table is likely at or near surface within some of the wetland, however no direct evidence of discharge was observed. The proximity of the water table to surface in this area may help maintain moist conditions through the year. It is, however, situated on the floodplain of the Grand River and its water regime is likely to be primarily associated with spring flooding during early snowmelt and ice break-up.

The area is a complex of coniferous and mixed swamps, including vegetation types; conifer swamp (SWC1-1), and white cedar-hardwood mineral mixed swamp (SWM1-1). Adjacent communities further from the Grand River include more upland communities; fresh-moist white cedar-hardwood forest (FOM7-2), fresh-moist white cedar coniferous forest (FOC4-1), and white cedar-black cherry cultural savannah (CUS1-4). The tree cover is primarily composed of white cedar and various hardwoods, such as green ash, white elm trembling aspen, white birch and red maple. For a more detailed description of ELC community types, see **Table 3** (Appendix B).

In addition to the wetland that has been mapped by the GRCA, there is also a very small pocket of marsh meadow (0.73 hectares) east of Letson Drive, which is outside the proposed license area, but within the Study Area (120 metre area of investigation).

#### **4.4.4 Butternut Tree Survey**

Butternut trees are identified as Threatened in Ontario. They are found on properties throughout rural Ontario, in most cases along hedgerows or woodlot edges. No Butternuts were found during searches conducted on May 31, 2006, August 24, 2006 and February 16, 2007.

#### **4.4.5 Threatened, Endangered and Species of Conservation Concern**

No provincially or nationally rare, threatened or endangered plant species were found. Although Butternuts were not identified as a species of conservation concern on-site, they were searched for during the May 31, 2006 and August 24, 2006 botanical investigations, as well as during the February 16, 2007 winter wildlife survey. No incidental observations were made.

### **4.5 WILDLIFE**

**Appendix D** includes a list of the 78 wildlife species observed on the site during site investigations. They include four butterfly species, three dragonfly species, five amphibian

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species, 59 bird species and six mammal species. **Figure 6** (Appendix A) illustrates the wildlife study area and locations of survey stations.

No reptiles were observed during any of the site visits. This does not, however, mean that reptiles are absent from the site; rather, they are difficult to detect, and simply were not observed during various field investigations. Certainly common species such as eastern garter snake and brown snake would be expected to be present.

Turtles were not expected to be abundant as there is little appropriate habitat. It is possible that some species may utilize the on-site livestock pond at amphibian survey station C (see **Figure 6**, Appendix A), or the off-site pond at the residence on the east side of Letson Drive.

The six mammal species that were observed are all common provincially and locally and are typical of agricultural landscapes that are interspersed with small woodlands.

#### **4.5.1 Butterflies and Odonata**

Four butterfly and three dragonfly species were observed on the Subject Property. All species are ranked S5 (very common and demonstrably secure in Ontario), except for the cabbage white which is ranked SE (exotic and not native to Ontario), and the Monarch, which is ranked S4 (common in Ontario: apparently secure). Monarch is also designated federally as a Special Concern species. Further details regarding its significance are provided in **Section 4.5.4** of this report. The survey was conducted by area searches along a predetermined route. The route was designed to pass through all habitat types where butterflies or odonata were expected to occur. Emphasis was placed on woodland clearings and edges where butterflies and odonata are most likely to concentrate. The route was altered during the survey to incorporate observed features where odonata or butterflies may concentrate (i.e., a shrub in bloom). Density of insects within a set area is difficult to determine accurately, however, tallies of butterfly and odonata species were recorded for a rough estimation of abundance.

Uncommon or rare butterfly species would not be expected on this site, as it supports no rare communities or populations of rare plant species. Butterflies have specific habitat and host plant species requirements and rare butterflies are typically those species that are dependent upon rare habitats or plants. All observations of butterflies occurred in the agricultural lands, except for the mourning cloak, which was observed in the woodland in the northern portion of the site. Butterflies were not considered abundant, with one to two observations per species, with the exception of nine observations of the cabbage white.

Odonate species that were observed were concentrated along the woodland edge in the northwestern portion of the Subject Property. No odonata were found next to the river, or in the southern portion of the site. Odonata were not considered abundant, with two observations made of each species.

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#### **4.5.2 Amphibians**

Four amphibian stations (i.e., frog call stations) were chosen on the Subject Property to determine the potential amphibian abundance. These stations were chosen based on the presence of appropriate amphibian habitat.

Station A was located southwest of the Subject Property on the eastern edge of a marsh. Station B was located to the north of Station A, in a predominantly cedar swamp area (SWC1-1 / SWM1-1), adjacent to the FOM7-2 fresh-moist white cedar-hardwood mixed forest community. Station C was also located in the same SWC1-1 / SWM1-1 community, at the livestock pond next to the pastures. Station D was located on the east side of Letson Drive, in the low lying marsh meadow (MAM2-11) community. See **Figure 6** (Appendix A), for amphibian survey station locations.

Three amphibian call surveys were completed in the spring of 2006, which revealed a moderate diversity of amphibian species. Five frog species were found to be present on the Subject Property. The results of the surveys are presented in **Table 4** (Appendix B). Station A had the greatest diversity of species, with four species observed over the course of the three surveys. The Spring Peeper, Northern Leopard frog, Grey Tree frog and Green frog were all observed at this station. Station B had only the Grey Tree frog within the calling radius, however, two other species were heard near that station (i.e., Spring Peeper and American Toad). Station C had only a Green frog within the calling radius, but four other species could be heard calling near the station (i.e., Spring Peeper, Northern Leopard frog, American Toad and Grey Tree frog). Station D was silent throughout all three surveys, but had three species calling nearby (i.e., Green Frog, Gray Tree Frog and American Toad).

#### **4.5.3 Breeding Birds**

A total of 59 species of birds were recorded onsite throughout field investigations, 55 of which are considered to be breeding in the 120 metre investigation zone.

The owl survey completed on April 28, 2006 involving the broadcast of owl calls did not elicit any responses. A great horned owl was observed near Amphibian Station D on June 14, 2006 during a frog survey (see **Figure 6**, Appendix A).

No species of provincial or federal concern were observed on the Subject Property. One area sensitive species requiring at least 20 hectares of suitable habitat for breeding was recorded. Mourning warbler requires 30 hectares of suitable forest habitat for breeding. Mourning warblers prefer disturbed second growth, clearings and mixed woods stands (Pitocchelli, 1993). The Subject Property contains suitable habitat for mourning warbler, but not in a sufficient amount as required by the species.

All species observed on the Subject Property are ranked S5 (very common in Ontario, demonstrably secure), or S4 (common in Ontario: apparently secure), except for the rock pigeon, European starling, house finch and house sparrow which are ranked SE (exotic; not believed to be a native component of Ontario's fauna), the Eastern bluebird which is ranked S4S5 (common to very common in Ontario) and the orchard oriole which is ranked SZB (a breeding vagrant in Ontario). The orchard oriole, seen in the southwest corner of the Subject Lands, is generally considered a southern species found in the Carolinian eco-zone however efforts from the recent Ontario Breeding Bird Atlas (2005) show the species is increasing its range northward. Orchard Orioles were observed in a number of Breeding Bird Atlas squares in the vicinity of the Subject Property. The Subject Property is not noted to be a significant area for migrating birds.

#### **4.5.4 Threatened, Endangered and Species of Conservation Concern**

Threatened and Endangered species included species as cited on the OMNR Species at Risk in Ontario (SARO) list. Threatened and Endangered wildlife species (i.e., mammal, reptile, amphibians, butterflies and odonata, and bird species) that may occur in the general vicinity of the Subject Property, within the Regional Study Area, were noted during the review of background information (i.e., Breeding Bird Atlas), and are listed in **Table 5** (Appendix B). No threatened or endangered species, or their corresponding habitats, were identified on the Subject Property during field investigations. Fish species are discussed in **Section 4.3** of this report.

Monarch butterflies were found on the Subject Property. While they are ranked G4 (common and usually not susceptible to immediate threats) and S4 provincially (common in Ontario: apparently secure), they are assigned a Special Concern status with COSEWIC and the OMNR. Much of the concern regarding the status of the eastern populations of monarchs is a result of the loss of habitat in their Mexican wintering grounds (Species at Risk website, 2005). In the area, it is considered to be a locally common immigrant. Populations of monarchs can vary greatly from year to year. Observations on various sites in southern Ontario suggest that Monarch butterflies were particularly abundant in the summer of 2006. The presence of the Monarch on-site is not considered to be significant.

Species of Conservation Concern recorded in the vicinity of the site include the Red-shouldered Hawk. During the breeding bird survey of June 12, 2006, Red-shouldered hawk habitat was searched for and no suitable habitat was found.

## **5.0 Analysis of Natural Heritage Features**

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The seven natural heritage features to be considered under the ARA are in accord with Policy 2.1 of the PPS (2005), and are identified in **Section 1.0** of this report. With regard to the Subject Property, these features are discussed in the following.

### **5.1 SIGNIFICANT WETLANDS**

The Subject Property features no provincially significant wetlands, however, one unevaluated wetland has been identified within the 120 metre Study Area, that is mapped by GRCA.

The wetland in the Study Area is described as an unevaluated wetland by the GRCA and covers a total area of approximately 8.59 hectares (21.2 acres) along the western edge of the site. The wetland is described as mixed swamp, moist forest including predominantly cedar and hardwood, such as ash, elm, aspen, birch and maple. The surrounding area is comprised primarily of active agricultural land and heavily grazed, sparsely wooded areas. OMNR mapping of the wetland provides general delineation of the boundary. The ELC community assessment further delineated and confirmed the area by community description. The wetland area was also delineated based on the presence of wetland species and soil moisture regime. This delineated was recorded using GPS and is shown on **Figure 7** (Appendix A). This unevaluated wetland is not within close proximity to an evaluated Provincially Significant Wetland found in the region and, as such, would not be considered in a complexing exercise. The wetland also does not exhibit features and attributes that would indicate its possible classification as a Provincially Significant Wetland (i.e., size, hydrology, etc.).

### **5.2 SIGNIFICANT HABITAT OF ENDANGERED AND THREATENED SPECIES**

Endangered and Threatened species are identified by the OMNR using procedures established by COSSARO. There are no Endangered or Threatened species known to occur on the Subject Property. The east shore of the Grand River occurs within the 120 metre investigation zone. Two aquatic species listed as Endangered or Threatened were noted to occur in the Grand River in the vicinity of the Subject Property: the Black Redhorse and the Wavy-rayed Lampmussel. These species could potentially be found in the Grand River adjacent to the Subject Property. In this case, the river would be considered to be habitat of Endangered and Threatened species.

Butternut surveys were also conducted on the Subject Property, and no Butternut specimens were observed.

### **5.3 FISH HABITAT**

Fish habitat is defined as the spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life

processes (OMNR, 1999). The Grand River, situated at the limit of the 120 metre Study Area, is fish habitat. The tributary located at the northeast portion of the Subject Property, East of Letson Drive, is not considered to be fish habitat. No fish were observed in this tributary. Several barriers that occur between the Grand River (i.e., colonization sources) and the upper portion of this tributary restrict potential fish migration upstream. The lower reaches of this tributary, between the outlet of the online, constructed, concrete-lined pond and the Grand River, may be considered as fish habitat.

The livestock pond and surface swale situated on the northwest side of the property is an intermittent shallow water swale with a very poorly defined channel. During the September 22, 2006 fisheries survey, only shallow pools <0.02 metres deep were found downstream of the dug pond. The pond and swale are not considered to be fish habitat.

#### **5.4 SIGNIFICANT WOODLANDS**

The Region of Waterloo (or Woolwich Township) has not designated significant woodland areas within their jurisdiction; however, they refer to the MNR's Natural Heritage Reference Manual (OMNR, June 1999) to assist in the determination of Significant Woodlands.

General guidelines for determining significance of woodlands are presented in the Natural Heritage Reference Manual (NHRM) (OMNR, 1999), for Policy 2.1 of the Provincial Policy Statement. Criteria suggested by the NHRM for designating significant woodlands include woodland size, ecological function, uncommon woodland characteristics and woodland economic and social value. The local planning authority is responsible for designating significant woodlands. In the case of woodland size, the suggested criteria changes depending on the amount of forest cover in the planning area. For instance, where there is less than 5% forest cover, it is suggested that woodlands 2 hectares in area or larger should be evaluated for significance compared to 4 hectare woodlots in areas with 5 to 15% forest cover, and 40 hectare woodlots for areas with 15 to 30% forest cover.

Provincial guidelines were used, as the township and municipality have yet to develop a definition of significant woodlands and define their boundaries (Waterloo Official Plan, 1998 and pers. comm., A. Horvinga, 2007). The GRCA report entitled: "A Watershed Forest Plan for the Grand River" (GRCA, June 2004), documents forest cover for Woolwich Township to be 14.01%. Based on this forest cover percentage, it was determined that woodlands greater than four hectares in size in Woolwich Township, could potentially be considered as Significant Woodlands. In addition to woodland size and ecological function, uncommon characteristics and economic and social value also need to be considered.

The woodland area found along the east shore of the Grand River provide a very limited linkage to other natural heritage features, however, it has a diversity of vegetation communities. The woodland is long and narrow and exhibits no interior forest habitat. Its ecological function is important to the local area, but is not necessarily significant in the regional area.

The woodland area is not uncommon. It does not support rare tree species or rare communities and it is not dominated by old-growth. The economic and social value of the woodland is also low, as it is not used for syrup production, forestry or extensive recreational use. The woodland is, however, comprised of a large percentage of wetland that is locally important in the immediate vicinity of the Subject Property. This wetland area is a component of the overall natural heritage system associated with the Grand River Valley. The woodland's importance can be directly associated with its wetland component and, as such, this portion of the woodland is critical in maintaining its ecological function.

Overall, the woodlot on the western portion of the property does not likely warrant a designation as a provincially significant woodland feature, however the size of the woodlot parcel (11 hectares) suggests that within the Township of Woolwich, this parcel is locally important. As such, it is important to maintain the size of this woodland in the future and, where possible, to enhance its ecological function and linkage to other woodlands and natural heritage features in the local setting.

## **5.5 SIGNIFICANT VALLEYLANDS**

The local municipality and the Conservation Authority (i.e., GRCA) are responsible for designating Significant Valleylands. Recommended criteria for designating Significant Valleylands include prominence as a distinctive landform, degree of naturalness, importance of its ecological functions, restoration potential, and historical and cultural values. The GRCA has indicated that the Grand River valley in the vicinity of the Subject Property has not been designated as a Significant Valleyland.

## **5.6 SIGNIFICANT WILDLIFE HABITAT**

The Significant Wildlife Habitat Technical Guide may be used to help decide what areas and features should be considered significant wildlife habitat (OMNR, 2000).

The categories that require consideration in order for areas to be identified as significant wildlife habitat are as follows:

- Seasonal concentration areas;
- Migration corridors;
- Rare or specialized habitat; and,
- Species of conservation concern.

### **5.6.1 Seasonal Concentration Areas**

Seasonal concentration areas are those sites where large numbers of a species gather together at one time of the year, or where several species congregate. The Significant Wildlife Habitat Technical Guide identifies 14 potential types of seasonal concentration areas. Only the best examples of these concentration areas are usually designated as significant wildlife habitat. Areas that support a species at risk, or if a large proportion of the population may be lost if the habitat is destroyed, are examples of seasonal concentration areas which should be designated as significant.

The 14 types of seasonal concentrations are:

1. winter deer yards;
2. moose late winter habitat;
3. colonial bird nesting sites;
4. waterfowl stopover and staging areas;
5. waterfowl nesting sites;
6. shorebird migratory stopover areas;
7. landbird migratory stopover areas;
8. raptor winter feeding and roosting areas;
9. Wild Turkey winter range;
10. Turkey Vulture summer roosting areas;
11. reptile hibernacula;
12. bat hibernacula;
13. bullfrog concentration areas; and
14. migratory butterfly stopover areas.

None of these features are present on the Subject Property. Those of the above features that are present within the 5 kilometre Regional Study Area boundaries are: deer wintering area and unidentified hawk/owl nesting site.

North of Highway 86, and east of Winterbourne (south of Cox Creek) are two unidentified raptor nesting sites (NRVIS mapping, 2007). The sites are far removed from the Subject Property.

A deer wintering area exists at the very eastern edge of the 5 kilometre Regional Study Area boundary. Although there are wintering populations of deer in this location, concentrations here

are not exceptional compared to the general landscape. Studies and background review conducted for this study did not identify any seasonal concentration areas on the Subject Property.

### **5.6.2 Migration Corridors**

Migration corridors are areas that are traditionally used by wildlife to move to one habitat from another. This is usually in response to different seasonal habitat requirements. Some examples are trails used by deer to move to wintering areas, and areas used by amphibians between breeding and summering habitat.

No migration corridors were identified on the Subject Property, however 'game trails' were observed during the winter wildlife survey, predominantly along the well defined path in eastern perimeter of the Subject Property, adjacent to the agricultural lands. These local game trails are not considered to be migratory corridors. As noted in **Section 3.0** of this report, the Subject Property and its associated natural heritage features are not linked to the other designated and notable environmental features identified in the Regional Study Area.

### **5.6.3 Rare or Specialized Habitat**

Rare or specialized habitat, are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. SRANKS are rarity rankings applied to species at the provincial level (or in the U.S at the state level), and are part of a system developed under the auspices of the Nature Conservancy (Arlington, VA). Generally, community types with SRANKS of S1 to S3 (extremely rare to rare-uncommon in Ontario), as defined by the Natural Heritage Information Centre (NHIC), could qualify. It is assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant. No rare habitat occurs on the Subject Property.

Specialized habitats are microhabitats that are critical to some wildlife species. The Significant Wildlife Habitat Technical Guide identifies the following potential specialized habitats:

1. habitat for area-sensitive species;
2. forests providing a high diversity of habitats;
3. old-growth or mature forest stands;
4. foraging areas with abundant mast;
5. amphibian woodland breeding ponds;
6. turtle nesting habitat;
7. specialized raptor nesting habitat;
8. moose calving areas;

9. moose aquatic feeding areas;
10. mineral licks;
11. mink, otter, marten, and fisher denning sites;
12. highly diverse sites;
13. cliffs; and
14. seeps and springs.

Two of the above-specialized habitats occur to some degree on-site: habitat for area-sensitive species and amphibian woodland breeding ponds.

As mentioned earlier, one area-sensitive species, the Mourning Warbler, was documented on the site in the breeding season. This species requires 30 hectares of suitable forest habitat for breeding; consequently, the Study Area does not qualify as significant wildlife habitat for this area-sensitive species.

The amphibian breeding survey detected four species breeding at specific stations, and five species in the general area, within the 120 metre Study Area. The richest diversity of frogs calling (five species) was detected at the small pond on the property. The most numerous species was the spring peeper, with more than 70 individuals calling on one survey date, followed by the grey tree frog with approximately ten individuals calling. Due to the relatively low numbers of species and individual amphibians, this area is not considered as significant wildlife habitat.

No potential specialized habitats were identified on the Subject Property.

#### **5.6.4 Species of Conservation Concern**

One principal criterion for the determination of significant wildlife habitat is evidence of species of conservation concern. This includes four types of species: those that are rare, those whose populations are significantly declining, those that have been identified as being at risk to certain common activities, and those with relatively large populations in Ontario compared to the remainder of the globe.

Rare species are considered at five levels: globally rare, nationally rare (with designations by COSEWIC), provincially rare, regionally rare (at the Site Region level), and locally rare (in the municipality or Site District). This is also the order or priority that should be attached to the importance of maintaining species. Some species have been identified as being susceptible to certain practices, and their presence may result in an area being designated significant wildlife habitat. Examples include species vulnerable to forest fragmentation and species such as woodland raptors that may be vulnerable to forest management or human disturbance. The final

group of species of conservation concern includes species that have a high proportion of their global population in Ontario. Although they may be common in Ontario, they are found in low numbers in other jurisdictions.

Species of conservation concern do occur in the Study Area, [120 metre investigation zone (e.g. fish species in the Grand River)], but none are identified to have habitat that is found on the Subject Property (licensed area), as such, no portion of the Subject Property is considered to be Significant Wildlife Habitat.

## **5.7 SIGNIFICANT AREAS OF NATURAL AND SCIENTIFIC INTEREST (ANSIS)**

The province, according to standardized evaluation procedures, determines the significance of ANSIs. There are no ANSIs of provincial significance either on the Subject Property or within the 120 metre Study Area.

## **5.8 SUMMARY OF ENVIRONMENTAL FEATURES**

The important environmental features that are found in the Study Area include the aquatic resources, the Grand River and the lower reaches of the tributary east of Letson Drive. Portions of the tributary are important, as they provide direct or indirect fish habitat. In addition, the Grand River provides habitat for Threatened and Endangered fish species. As such, these areas are fish habitat.

The woodlands that occur within the Study Area are also important. They are of a size that is important in the Township, based on the lack of available forest, and they exhibit some aspects that are relatively poorly represented in the immediate vicinity of the Subject Property. The woodland lacks linkage opportunities, and does not offer uncommon characteristics. Careful consideration should be given to potential impacts to the woodland, and these should be minimized to the extent possible.

Based on the assessment of importance, the wetland in the Study Area along the northwest edge of the site is not provincially significant, however it is ecologically important to the Grand Valley ecosystems. This unevaluated wetland adjacent to the Subject Property and along the Grand River should be afforded protection to the extent practicable.



## 6.0 Project Description

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Harrington and Hoyle has prepared the site plans for the proposed Capitol Paving – Montrose Pit. The site plans and license will control the aggregate extraction process. Following are key elements of the license application:

- Extraction will occur both above and below water table (see **Figures 8 and 9**, Appendix A) in the areas shown on the site plans.
- Currently, the majority of areas to be extracted are primarily in agricultural use, including pasture lands with a very low density of trees. Two protrusions of the wooded area occur in the extraction footprint, along the northwest perimeter.
- Total estimated reserves based on the proposed extraction limits and setbacks shown on the site plans are about 2,000,000 tonnes.
- Proposed annual maximum tonnage limit of 500,000 tonnes.
- There will be a central processing plant set up in Area 1 with an internal private haul road crossing Letson Drive, continuing east to Regional Road 23 [as shown on-site Plan drawings 3 of 6 (Harrington and Hoyle, 2007) and **Figure 8** (Appendix A)]. Materials from Areas 2 through 8 will be transported by conveyors, or trucks using the internal roads to the processing area (Area 1) for crushing, screening and washing of aggregates.
- In Phase A, two shallow ponds will be created in area 1b as drawn in the Site Plans. The ponds include a clear water pond with dimensions of approximately 120 metres x 60 metres, depth of  $\pm 1.7$  metres, to remain in place as part of the final rehabilitation, and a temporary silt pond 180 metres x 50 metres, depth to be filled and rehabilitated to agricultural post-extraction.
- The existing cattle pond (12 X 25 metres) in the northwest corner of the property will be filled with an appropriate granular substrate to allow for continued subsurface flow to the existing pond outlet point at the swale and top graded with topsoil for plant regeneration.
- Aggregate will be trucked off-site via a private haul road that will exit onto Regional Road 23 east of the Subject Property. The internal haul roads will be constructed along existing farm lanes, with the exception of the haul road east of Letson Drive. This route will be constructed across the Tributary east of Letson Drive. A fill permit will be required from the Grand River Conservation Authority (GRCA).
- Rehabilitation plans include creation of a pond (120 metres X 60 metres) in the southwest corner of the extraction zone, vegetation of side-slope to the southwest, and replanting of 0.8 hectares of woodland, offset removal of 0.4 hectares of woodland protrusions found in the west portion of the Subject Property. All other areas will be returned to agriculture (see site plan, Harrington and Hoyle, 2007).
- The total extraction area will encompass an area of 38.3 hectares.
- It is proposed that Letson Drive be lower and regarded to facilitate the proposed extraction plan and create level landscape that is consistent to the existing road and adjacent land topography.

**CAPITAL PAVING INC. PROPOSED MONTROSE PIT - PART OF LOTS 71, 74 & 75 G.C.T.,  
TOWNSHIP OF WOOLWICH, REGION OF WATERLOO  
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT**

Project Description

April 7, 2008

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- Relocation of livestock pond to facilitate livestock watering in a more open area and at greater distance from the wetland zone within the 120 metre study zone.
- Post closure fencing of west boundary of the site to restrict cattle access into unevaluated wetland areas and moist forest found along the Grand River.

## **7.0 Potential Impacts and Mitigation**

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The analysis of the seven natural heritage features to be considered under the ARA has identified the following provincially significant environmental elements on, or adjacent to the area to be licensed:

- Habitat of Endangered and Threatened species; and
- Fish Habitat.

These significant features are all associated with the Grand River adjacent to the Subject Property and Tributary East of Letson Drive (note: the portion of this tributary where viable fish habitat occurs is beyond the 120 metre investigation zone limit). The potential impacts on these features as a result of the proposed pit development, operations, and rehabilitation are discussed in the following sections; where applicable, mitigation recommendations are provided.

The proposed application is for below water table extraction in Area 1b. All other extraction areas (areas 1a and areas 2 - 8) will be above the final water table. Details of the extraction limits, phasing of extraction and site design are provided on the site plans (Harrington and Hoyle, 2007). None of the significant natural heritage features will be directly impacted by extraction. However, the extraction of aggregate resources from a site has the potential to impact aquatic resources indirectly in two primary ways:

1. Potential changes in contributing surface waters due to changes to catchment and ground surface elevation during and post extraction; and,
2. Potential alterations to the ground water table in the area of Letson Drive and the eastern portion of the site due to lowering of groundwater levels associated with extraction and post rehabilitation plans.

In addition to these provincially significant features, the woodland and unevaluated wetland area situated adjacent to the Grand River are of local importance. These natural heritage features should be considered in the analysis of potential impacts and development of a design that will provide the most protection and potential opportunities for enhancement.

### **7.1 POTENTIAL SURFACE WATER AND GROUNDWATER IMPACTS**

#### **West of Letson Drive**

Surface water contributions on the Subject Property will remain similar to existing conditions for the area west of Letson Drive, given the final rehabilitated land contour and the known infiltration rates. The wetland to the west of the Subject Property and the floodplain water regime are associated with spring melt water and ice break-up in the Grand River, and the

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associated spring and late fall high water table. Surface water inputs to these areas will not be affected by the pit design or operation.

Groundwater shifts in the area west of Letson Drive are expected to be minor and will not have a negative impact on the unevaluated wetland, the Grand River or the intermittent swale. As noted, groundwater shifts can result from the creation of ponds or lakes. The creation of a small pond in the southwest corner of the property is anticipated to have a small, local effect on the groundwater; however, based on the size of the proposed pond and the low gradient of the water table, no significant change is expected in overall flow volumes, groundwater levels and distribution of flow in the area of the unevaluated wetland. The new pond creation is not expected to affect the Grand River or the unevaluated wetland adjacent to the Grand River. There will be no effect from the creation of the pond that would change discharge or recharge conditions and, subsequently, there are no anticipated effects to natural heritage features found downgradient. The pond may create additional habitat and breeding areas for amphibians, odonates and birds, and may be a source of food for avian fauna and mammals that feed on lower order species.

The proposed removal of the small cattle pond on the northwest corner of the property will not have an impact on surface water contribution to the swale to which the pond outlets. The pond receives water from groundwater flow. The pond will be filled with a porous, granular material that will allow any subsurface flow that reaches the ground surface to continue to be expressed at the outlet of the pond where the swale is located. As such, the intermittent swale will continue to exist and continue to provide water to areas downgradient.

### **East of Letson Drive**

East of Letson Drive, the surface catchment area on the Subject Property will be slightly changed by the new contour elevations. Surface contributions to the tributary east of Letson Drive, however, will remain very similar to present conditions. Reaches downstream of the constructed concrete pond where fish habitat may occur at the confluence of the Grand River and the Tributary east of Letson Drive will not be negatively affected (GSC, 2008).

The groundwater east of Letson Drive will be lower by the proposed design of the extraction. This shift in groundwater will not affect the intermittent tributary, as the majority of its seasonal flow is from surface water. In addition, the water table decline at the tributary is anticipated to be small in scale and to occur primarily in upstream areas of the tributary that are dry throughout the summer (and groundwater discharge potential is low). The seasonal surface flow will be maintained and the seasonal contribution to the lower reaches of this tributary will be maintained. There are no natural heritage features of importance, or that are dependent on groundwater found in the area where a groundwater lowering will occur east of Letson Drive.

## **7.2 FISH HABITAT**

Below water table extraction has the potential to affect both the surface water and groundwater and, as such, to potentially affect contribution to fish habitat and aquatic resources.

The fisheries resources available on the Subject Lands and on adjacent lands, and their potential to be impacted are discussed below. Fish habitat is associated the Grand River and with portions of the tributary East of Letson Drive, downstream of the concrete constructed pond.

### **Tributary East of Letson Drive**

The tributary east of Letson Drive is an intermittent watercourse, the flow of which is supported by primarily of surface flow. As noted in previous sections, the change in catchment area for this watercourse will have a minimal effect on the flow in this watercourse, especially in the reaches of the tributary where potential fish habitat occurs (i.e., near the mouth of the tributary near River's Edge Road). This section of the creek is afforded the maximum surface area of its total catchment during spring melt, storm events and periods of high groundwater table. As such, small changes in surface water catchment in the upper reaches of the tributary have a diminished effect on the overall potential flow change in the lower reaches of this tributary.

As mentioned above, this tributary is considered to be indirect fish habitat in the lower reaches, given the intermittent nature of the watercourse. The watercourse flows during periods when surplus water is available from overland flow and the water table is at its highest during the year. It does not maintain a continuous baseflow. The availability of surplus water to create flow during runoff periods will not be affected by the proposed extraction plan during- or post-construction. As such, there are no potential effects to the fisheries function of the tributary, given that a similar and sufficient volume of runoff will be available during these periods of intermittent flow.

The haul route proposed for the gravel is to include the creation of a new crossing point of the tributary east of Letson Drive, as illustrated on **Figure 8** (Appendix A). The existing culvert and laneway will be removed. A new crossing will be constructed. The roadway will require the import of fill and installation of an appropriate culvert crossing. Ecologically this area is not significant and a crossing point constructed in consultation and through a designed approved by the GRCA would not compromise any natural resources at this location. The access road would be design and developed as required under the *Conservation Authorities Act* and the associated *Development Interference with Wetlands and Alterations to Shorelines and Watercourse Regulations* of the GRCA.

### **Surface Water Swale and On-site Livestock Pond**

The swale and on-site pond provide no fish habitat and is not directly connected to the Grand River. The swale area receives water from the pond from subsurface groundwater water and

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overland flow from surrounding lands primarily within the wooded zone of the floodplain. The swale will continue to realize surface runoff flow during spring snowmelt and other storm events with high precipitation and saturated infiltration potential.

The existing cattle pond is proposed to be filled, however, the component of groundwater that is currently seasonally discharged at the pond exit point will be maintained and subsequently any contribution of water from the swale to downstream aquatic resources will be maintained. There are no anticipated impacts to the function of the swale associated with the extraction proposal. Subsurface water formerly entering the pond will directly discharge in the swale area. The pond is also too small to offer significant storage capacity. Potential increases in coldwater contribution to the Grand River resulting from the removal of the pond are not anticipated given that the pond is too small to affect runoff temperatures during period when the swale is flowing.

### **The Grand River**

The Grand River supports a vibrant, diverse fishery with rare species, including Endangered and Threatened species, Black Redhorse, Wavy-rayed Lampmussel and other local species of Conservation Concern, such as the Greater Redhorse and Silver Shiner. Potential impacts to the Grand River are associated with the potential changes to the small tributary and swale that discharge into the river, and potential changes to the water table that may affect local gradients (i.e., discharge of cold groundwater) and/or the storage capacity of shoreline wetlands, as well as impacts caused by changes in water quality.

Based on the limited below water table extraction and creation of a small pond that will not effect the overall water required in area, coupled with the negligible effect on the tributary and swale and wetland in the Study Area, there are no anticipated effects to the Grand River System.

## **7.3 SIGNIFICANT HABITAT OF ENDANGERED AND THREATENED SPECIES**

No communities on the Subject Property have been identified as potential habitat for endangered or threatened species. The proposed aggregate extraction will have no direct impact on significant habitats.

As noted above, the proposed development will not affect the Grand River where Endangered and Threatened species may be found adjacent to the Subject Property. The Endangered and Threatened species are directly associated with the Grand River for all of their lifecycles. The species and their habitats will not be affected by the extraction process.

## **7.4 OTHER NATURAL HERITAGE FEATURES**

### **7.4.1 Woodlands**

Using a conservative approach, based on the Natural Heritage Reference Manual, the woodland area adjacent to the east shore of the Grand River is considered to be a locally important woodland in the Township of Woolwich. The 2005 PPS provides direction for provincially significant woodlands, stating that development and site alteration "...shall not be permitted in significant woodlands south and east of the Canadian Shield unless it has been demonstrated that there will be no negative impact on the natural features or their ecological functions." The proposed development will remove two small portions of this woodland in the northwest corner. These portions occupy less than 0.5 hectare of upland area. The most important components of this woodland tract have been identified as the wetland portions, along the shore of the Grand River. These areas will not be affected by the proposed development. In addition, the woodland has been noted to lack linkage with other nearby wooded resources. In order to avoid overall effects to the locally important woodland, the rehabilitation design provides replanting of 0.9 hectares. **Figure 9** (Appendix A) illustrates the woodland replanting proposed for areas of the site adjacent to the existing woodland. This will provide an overall increase in the wooded area within the Study Area.

### **7.4.2 Unevaluated Wetlands**

The unevaluated wetland areas near the shore of the Grand River have been delineated on-site. The proposed license area will be an approximate 50 metres from these local features. Presently, cattle graze in portion of the wetland and contiguous woodlands. It is proposed that a fence be erected along the license boundary and that the woodland edge that will restrict livestock access to this area. Water for livestock will be provided at the proposed pond, which will be situated in existing cattle pasture having sparse tree density.

There is no potential for negative impacts to the wetland environments found along the Grand River as a result of the proposed extraction plan.

## **7.5 MITIGATION STRATEGIES**

Dust will be mitigated on-site. Water or other provincially approved dust suppressant will be applied to the internal haul roads and internal processing areas as often as required to mitigate dust.

Processing equipment will be equipped with dust suppression or collection devices, where the equipment creates dust and is being operated within 300 metres of a sensitive receptor.

Any recommendations and/or recommended hydrological or hydrogeological monitoring program identified in the technical reports will be described in the site plan, and all records will be retained by the license and made available upon request by the MNR for audit purposes.

A spills contingency program will be developed prior to site preparation.

If required, a Certificate of Approval will be obtained for the discharge system, should water be discharged off site.

If required, a Certificate of Approval will be obtained for processing equipment to be used on-site.

If required, a Permit to Take Water will be obtained for utilizing ground and/or surface water.

The culvert crossing for the haul route east of Letson Drive, which crosses the intermittent tributary, will be designed in consultation with the GRCA as required under *Conservation Authorities Act* and the associated *Development Interference with Wetlands and Alterations to Shorelines and Watercourse Regulation*.

Fill material for the existing cattle pond will consist of granular fill substrate of a suitable hydraulic conductivity to allow for any groundwater discharge to be expressed at the swale as is currently occurring.

## **7.6 SEDIMENT AND EROSION CONTROL**

Certain construction and/or extraction-related impacts, such as dust generation, sedimentation and erosion, can be mitigated through the use of standard site control measures. Mitigation measures for sediment erosion and dust control should be implemented in the vicinity of the wetland communities, woodlots, and riparian buffers that are to be maintained adjacent to, or within, the boundaries of the site license to prevent sediment and dust from having a negative impact on the ecological functions of these areas during site preparation and operation.

- Extraction areas shall be isolated from creek flow via appropriate setbacks;
- Surface water flow from the operation shall be maintained within the confines of the berms and area of operation and directed into the excavated areas;
- All excavated materials requiring stockpiling shall be kept away from any sensitive natural features;
- The limits of activity adjacent to woodland wetlands shall be flagged and fenced prior to construction, and these limits monitored during construction (along with sediment and erosion control measures) to ensure the limits are respected with regard to vehicular traffic and soil or equipment stockpiling.

## **7.7 REHABILITATION**

The Montrose pit will include primary extraction above water table, and a relatively small portion of extraction below water table as shown on the Site Plans (Harrington and Hoyle, 2007). The significant vegetated features on the Subject Property will not be altered. The majority of areas to be extracted are currently in agricultural use.

The larger parcels of above water extraction areas will be rehabilitated to their original agricultural land use. Lands to be extracted below water will be rehabilitated to a pond. The Rehabilitation will be implemented progressively as operations proceed on the property. Details of the progressive rehabilitation are shown on Operations Plan Phases, Sheet 3 of 5 (Harrington and Hoyle, 2008). The overall rehabilitation design is illustrated on the Rehabilitation Plan, Sheet 6 (Harrington and Hoyle, 2008).

Key enhancement components of the rehabilitation plan for existing natural features and post-extraction environments include:

- Maintain the agricultural land use of the area;
- Maintain the forest area (i.e., reforestation of 0.9 hectares); and,
- Install fence along the west license boundary in order to keep livestock out of natural areas.

The addition of vegetated land around the existing features will involve the planting of native species that are presently found in the existing environments as well as native species that will provide food and shelter to the wildlife found in the area combined with natural regeneration processes from existing seed sources.



## 8.0 Conclusions and Recommendations

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This Level II Natural Environment study was undertaken to identify the natural features and their functions that occur on the Subject Property and in the surrounding area (up to 120 metres), and to assess the potential impacts of the proposed aggregate extraction plan. Features identified include:

- Habitat of Threatened and Endangered species in the Grand River; and
- Fish Habitat:
  - Warm water fisheries habitat (Grand River);
  - Fish habitat lower reaches of Tributary East of Letson Drive (located beyond 120 metre zone of investigation);

In addition, effects of the proposed development to non-provincial environmental features were considered, including woodlands and adjacent unevaluated wetlands. Potential impacts to these significant features were assessed by:

- Analyzing the predicted potential direct and indirect effects of the proposed aggregate operations, including changes to ground and surface water;
- Evaluating the significance of predicted effects on the form, function and long-term sustainability of the significant features.
- Assisting in the development of a monitoring program as addressed in the Hydrogeological Assessment (GSC, 2008) to compare predicted effects and impacts to those observed through monitoring so that adaptation in the operations can be implemented as necessary.

Based on the analysis the following conclusions have been reached:

- All environmental features of local and provincial significance are associated with the adjacent wetlands and woodlands, and the Grand River and its tributaries;
- There will be no direct negative impacts to these features as the final plan ensures the protection of the form, function and size of these features;
- Indirect impacts to significant features that could arise from changes in groundwater quantity and quality are not anticipated;
- Minor shifts in groundwater levels that are expected to occur on the Subject Property have been minimized through careful design of pond size and location, and will not have an impact on either the form or function of the Grand River or riparian wetland area found in the floodplain;
- Progressive site rehabilitation will, over time, increase the area and function of the wooded area compared to conditions in the existing agricultural landscape; and,

- Fencing proposed for the west license boundary of the site will be influential in protecting floodplain features adjacent to the Grand River from impacts realized through current cattle grazing activities.

These conclusions are based on implementation of the following protection initiatives and technical recommendations.

### **Protection Initiatives**

The following initiatives are provided to ensure the protection of the natural environment features identified on, and in the immediate vicinity of, the Subject Property. The protection initiatives for natural environment attributes are incorporated into the Site Plans, and the conclusions of this report are provided in consideration of the implementation of these initiatives. These include the following:

- Silt fencing for internal sediment and erosion control during stripping operations;
- All excavated material requiring stockpiling will be kept away from sensitive natural features;
- Refueling should be carried out in designated locations that are 75 metres or more from aquatic resources to avoid potential impacts in the event of an accidental spill; and
- Prior to stripping and operations in any phase, the wetland and woodland limits will be flagged by a qualified person. The Ministry of Natural Resources and Conservation Authority will be notified, should they wish to confirm the wetland boundaries.

Progressive rehabilitation will be implemented as specified in the Site Plans. The mitigation measures, initiatives and recommendations noted above, as well as Industry Standard Best Management Practices, will be included in the Site Plans and monitored and enforced under the provision of the Aggregate Resources Act.

### **Technical Recommendations**

The following technical recommendations are provided to ensure natural heritage features protection:

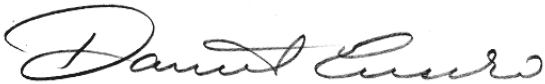
- A paige wire fence is to be installed on the western limit of the license area to restrict post operations livestock access to wooded lands and riparian wetlands found along the Grand River floodplain;
- A qualified biologist will stake the limits of the wetland along the Grand River floodplain, in consultation with the Ontario Ministry of Natural Resources and the Grand River Conservation Authority.

**Stantec**

**CAPITAL PAVING INC. PROPOSED MONTROSE PIT - PART OF LOTS 71, 74 & 75 G.C.T.,  
TOWNSHIP OF WOOLWICH, REGION OF WATERLOO  
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT**  
Conclusions and Recommendations  
April 7, 2008

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**STANTEC CONSULTING LTD.**



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Daniel Eusebi, BES  
Senior Environmental Planner



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TOWNSHIP OF WOOLWICH, REGION OF WATERLOO  
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT**

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TOWNSHIP OF WOOLWICH, REGION OF WATERLOO  
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## **Appendix A. Figures**



- Figure 1. Location of Subject Property*
- Figure 2. Study Area*
- Figure 3. Regional Study Area – Natural Heritage Features*
- Figure 4. Surface Drainage and Aquatic Resources*
- Figure 5. ELC Communities*
- Figure 6. Natural Heritage Areas – Survey Locations*
- Figure 7. Environmental Features*
- Figure 8. Proposed Extraction Footprint and Phases*
- Figure 9. Proposed Rehabilitation*



## **Appendix B. Tables**



**Table 1. Site Investigation Record Proposed Montrose Pit**

<b>Survey Date(s)</b>	<b>Survey Type</b>	<b>Staff</b>
<b>Vegetation Assessment</b>		
By air photo interpretation	Ecological Land Classification	G. Weeks
2006 – May 31, Aug 24 2007 – Mar 28, Jun 13	Botanical Surveys	D. Eusebi C. Zoladeski
2006 – April 17 2007 – Jun 13	General Wetlands Assessment and/or Delineation	D. Eusebi G. Weeks C. Zoladeski
2006 – April 17	Woodlot Survey	D. Eusebi G. Weeks
2007 – Feb 16	Butternut Survey	J. Crumb S. Tomlinson
<b>Wildlife Assessment</b>		
2006 - Jun 12, Jun 29	Breeding Birds / Reptiles Survey	K. Burrell A. Taylor
2006 - Apr 28	Owl Survey	A. Taylor G. Weeks
2006 - Apr 28, May 24, Jun 14	Amphibian Survey	J. Leslie G. Weeks
2007 – Feb 16	Winter Wildlife Assessment	J. Crumb S. Tomlinson
2006 – May 28	Butterflies and Odonata	A. Taylor
<b>Aquatic Resource Assessment</b>		
2007 – April 17	Initial Fisheries Review	D. Eusebi
2006 – Sep 22	Fisheries Habitat Assessment	J. Crumb N. Harttrup

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**Table 2.      Soils Types in the Study Area**

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<b>Soil Type</b>	<b>General Description</b>	<b>Surface Texture</b>
Burford Soils	Well drained.	Less than 30 cm of sandy loam or loam soil over outwash gravel.
St. Jacobs Soils	Well drained	30 to 90 cm of loam or silt loam soil over outwash gravel.

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**Table 3. ELC Vegetation Types**

ELC Type	Description	Provincial Significance (S-rank)
<b>CONIFEROUS FOREST (FOC)</b>		
FOC4-1 Fresh-Moist White Cedar-Coniferous Forest	This is a very homogeneous community composed virtually exclusively of white cedar in all woody strata. There is very little development of herbaceous stratum on the forest floor. This type occurs on the outside, highest locations of the forest and swamp complex along the Grand River valley slope.	S5
<b>MIXED FOREST (FOM)</b>		
FOM2-3* Dry-Fresh Sugar Maple-Pine Mixed Forest	A heterogeneous community of several hardwood and softwood tree species. The former include sugar maple, bur oak, basswood, black cherry and white ash, the latter are Scots pine, white pine, white spruce and Norway spruce.	N/A
FOM7-2 Fresh-Moist White Cedar-Hardwood Mixed Forest	This mature forest is dominated by Eastern white cedar. The associate species are sugar maple, white ash, trembling aspen, black cherry, white elm and green ash. The understorey is sparse and contains chokecherry, followed by common buckthorn and hawthorn.	S5
<b>DECIDUOUS FOREST (FOD)</b>		
FOD2 Dry-Fresh Oak-Maple-Hickory Deciduous Forest	Located on upper slopes along agricultural fields, this type is composed of several tree species. In addition to the dominant bur oak, also grow white elm, black cherry, white cedar, sugar maple, black cherry, ironwood and aspen. The community is shrub rich, with choke cherry and common buckthorn.	N/A
FOD2-4 Dry-Fresh Oak – Hardwood Deciduous Forest (grazed)	This is an open type, almost savannah-style, on a heavily cattle-grazed site. Bur oak trees are the most common, followed by black cherry, basswood, bitternut hickory and black maple.	N/A
FOD2-5* Dry-Fresh Black Cherry Deciduous Forest	A small unit at the edge of the forest complex on valley slope. In addition to the dominant black cherry, there are smaller amounts of basswood, bur oak, white cedar, sugar maple, ironwood and white ash. The shrub layer is well developed and composed of choke cherry and saplings of most of the tree species.	N/A
FOD5-7 Dry-Fresh Sugar Maple-Black Cherry Deciduous Forest	A quality woodlot along the banks of a tributary creek. The tree canopy is diverse and dominated by sugar maple and black cherry. Associate species include beech, white ash, ironwood and basswood. In the shrub layer grow choke cherry and saplings of several canopy species, mostly maple and ash.	S5

**Table 3. ELC Vegetation Types**

ELC Type	Description	Provincial Significance (S-rank)
<b>CULTURAL MEADOW (CUM)</b>		
CUM1-1 Dry-Moist Old Field Cultural Meadow	This is a herbaceous type on abandoned pastures along Grand River. It is composed of numerous exotic and native species, including tall goldenrod, awnless brome, tufted vetch, rough-fruited cinquefoil, Canada and bull thistle, Kentucky bluegrass, red clover and several others.	N/A
<b>CULTURAL SAVANNAH (CUS)</b>		
CUS1-4* White Cedar-Black Cherry Cultural Savannah	A small unit of scattered trees of white cedar and black cherry, likely created by selective logging. Because of canopy openness, the shrub layer of red raspberry is very well developed.	N/A
<b>CONIFEROUS SWAMP (SWC)</b>		
SWC1-1 White Cedar Mineral Coniferous Swamp	This is one of the several communities in the forested complex along the Grand River floodplain and on valley slopes. White cedar is almost a sole dominant in the woody strata. There is little development of the herb layer, due to shade and competition from the cedar.	S5
<b>MIXED SWAMP (SWM)</b>		
SWM1-1 White Cedar-Hardwood Mineral Mixed Swamp	This mature habitat is dominated by Eastern white cedar. Green ash and American elm are associates. The sub-canopy has a similar composition. The understorey is sparse and contains chokecherry and red-osier dogwood. Mosses, bulblet fern and sensitive fern are found in small amounts in the ground layer.	S5
<b>MEADOW MARSH (MAM)</b>		
MAM2-11* Forb-Graminoid Mineral Meadow Marsh	Located on creek floodplain, this is a diverse type composed of cattails, reed canary grass, tall white aster, tall goldenrod, teasel, and several sedges and grass species.	N/A

Explanation of S-ranks for Vegetation Communities:

S1 - Extremely rare in Ontario; usually 5 or fewer occurrences in the province of very few remaining individuals; often especially vulnerable to extirpation.

S2 - Very rare in Ontario; usually between 5-20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation.

S3 - Rare to uncommon in Ontario; usually between 20-100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.

S4 - Common and apparently secure in Ontario; usually with more than 100 occurrences in the province.

S5 - Very common and demonstrably secure.

N/A = No rankings are assigned to these units or to cultural associations.

\* Not listed in the ELC manual for southern Ontario (Lee *et al.*, 1998).

**Table 4. Proposed Montrose Pit Amphibian Count Results**

Station	Date	Abundance Codes and Species Numbers						
		Spring Peeper	Northern Leopard Frog	Chorus Frog	American Toad	Grey Tree Frog	Green Frog	Wood Frog
A	Apr 28	3-70	<sup>1</sup> 1-5	–	–	–	–	–
	May 24	outside	–	–	–	1-2	–	–
	Jun 14	–	outside	–	–	1-2	1-5	–
B	Apr 28	outside	–	–	–	–	–	–
	May 24	outside	–	–	outside	–	–	–
	Jun 14	–	–	–	–	1-6	–	–
C	Apr 28	–	–	–	–	–	–	–
	May 24	outside	outside	–	outside	–	–	–
	Jun 14	–	–	–	–	outside	1-2	–
D	Apr 28	–	–	–	–	–	–	–
	May 24	–	–	–	1-2	–	–	–
	Jun 14	–	–	–	–	outside	outside	–
<b>Seasonal Totals</b>		<b>&gt;70</b>	<b>&gt;5</b>	<b>0</b>	<b>&gt;2</b>	<b>&gt;10</b>	<b>&gt;7</b>	<b>0</b>

# - # = call level code-number of individuals calling.

\*call was heard outside of 100 m station.

<sup>1</sup> Frogs heard during daylight on April 16<sup>th</sup>, 2006 (during previous visit).

Calls in pale font = heard outside calling radius.

Abundance Codes

1. Calls not simultaneous, number of individuals can be accurately counted;
2. Some calls simultaneous, number of individuals can be reliably estimated;
3. Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated.



**Table 5. Endangered and Threatened Species in the General Area**

<b>Species</b>	<b>Present Day Significance</b>
Least Bittern	S3, G5, THR, THR
Ruddy Duck	S2, G5
Cerulean Warbler	S3, G4, SC, SC
Trumpeter Swan	S2S3, G4, NAR, NAR
Acadian Flycatcher	S2, G5, END, END
Spatterdock Darner	S1, G3G4
Swamp Darner	S2S3, G5
Slider	SE1, G5
Blanding's Turtle	S3?, G4, THR
Ribbon Snake	S3, G5, SC, SC
Queen Snake	S2, G5, THR, THR
Eastern Milksnake	S3, G5, SC, SC
Small-footed Bat	S2S3, G3
Northern Long-eared Bat	S3?, G4
Eastern Pipistrelle	S3?, G5
Southern Flying Squirrel	S3, G5, SC
Woodland Vole	S3?, G5, SC, SC
Badger	S2, G5, END, END
Grey Fox	SZB?, G5, THR, THR
Central stoneroller	S4, G5, NAR, NAR
Silver Shiner	S2S3, G5, SC, SC
Wavy-rayed lampmussel	S1, END, END
Greater Redhorse	S3
Black Redhorse	S2, THR, THR
Wild Licorice	S3, G5
Wood-vetch	S2, G5
Moss Phlox	S1?, G5
Sedge	S2, G5T4T5
Prairie Onion	S3, G5

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**Table 5. Endangered and Threatened Species in the General Area**

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<b>Species</b>	<b>Present Day Significance</b>
S1	Extremely rare in Ontario; usually fewer than 5 occurrences
S2	Very rare in Ontario; usually between 5-20 occurrences
S2S3	Very rare to uncommon in Ontario
S3	Rare to uncommon in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances. Most species with an S3 rank are assigned to the watch list, unless they have a relatively high global rank
?	Not yet ranked; or, following a ranking, rank inexact or uncertain
SE1	Exotic; not believed to be a native component of Ontario's fauna
SZB	No clearly definable occurrences of breeding
G3	Global Rank. Rare to uncommon globally; usually between 20-100 occurrences
G3G4	Rare to common globally
G4	Common globally; usually more than 100 occurrences in the overall range; usually not susceptible to immediate threats
G5	Very common; demonstrably secure under present conditions
END	Endangered
THR	Threatened
SC	Special Concern

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## **Appendix C. List of Vascular Plants**



## **Appendix D. List of Wildlife**



## **Appendix E. Curricula Vitae**

