



**Waterloo West Side Employment Lands,
Waterloo ON**

Environmental Impact Study

August 13, 2018

Prepared for:

City of Waterloo
City Hall, 2nd Floor
100 Regina Street South
Waterloo ON N2J 4P9

Prepared by:

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4

161413446

Sign-off Sheet

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Prepared by 
(signature)

Janice Ball, B.Sc.

Reviewed by 
(signature)

Sean Spisani, B.Sc., ERGC

Table of Contents

1.0	INTRODUCTION.....	1.1
1.1	PROJECT OVERVIEW	1.1
1.2	STUDY AREA	1.1
1.3	AGENCY CONSULTATION	1.1
2.0	PLANNING CONTEXT	2.1
2.1	PROVINCIAL POLICY STATEMENT	2.1
2.2	CITY OF WATERLOO OFFICIAL PLAN	2.2
2.3	GRAND RIVER CONSERVATION AUTHORITY POLICIES	2.2
2.4	ENDANGERED SPECIES ACT	2.3
2.5	MIGRATORY BIRD CONVENTION ACT	2.3
3.0	METHODS	3.1
3.1	BACKGROUND REVIEW	3.1
3.2	FIELD INVESTIGATIONS	3.1
3.2.1	Vegetation Surveys	3.2
3.2.2	Wetland Delineation	3.3
3.2.3	Tree Inventory	3.3
3.2.4	Amphibian Surveys.....	3.3
3.2.5	Breeding Bird Surveys.....	3.4
3.2.6	Bat Maternity Colony Survey	3.5
3.3	EVALUATION OF SIGNIFICANCE	3.6
4.0	RESULTS	4.1
4.1	BACKGROUND REVIEW	4.1
4.1.1	Designated Natural Heritage Features	4.1
4.1.2	Species at Risk and Provincially Rare Species	4.1
4.2	OVERVIEW OF SITE CONDITIONS	4.1
4.3	LANDSCAPE CONTEXT	4.2
4.3.1	Landscape Ecology	4.2
4.3.2	Physiography and Drainage	4.2
4.3.1	Geology and Hydrogeology	4.2
4.4	SURFACE WATER FEATURES	4.3
4.5	TERRESTRIAL RESOURCES.....	4.3
4.5.1	Vegetation Communities	4.3
4.5.2	Vascular Plant Species.....	4.5
4.5.3	Amphibians.....	4.5
4.5.4	Breeding Birds	4.6
4.5.5	Bat Maternity Colony Survey	4.7
5.0	SIGNIFICANT NATRUAL HERITAGE FEATURE ASSESSMENT.....	5.1
5.1	WETLANDS	5.1
5.2	HABITAT OF ENDANGERED AND THREATENED SPECIES	5.2
5.2.1	Barn Swallow	5.3



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

5.2.2	Bank Swallow	5.3
5.2.3	Eastern Meadowlark	5.4
5.2.4	Bobolink	5.4
5.3	SIGNIFICANT WILDLIFE HABITAT	5.4
5.3.1	Seasonal Concentration Areas	5.4
5.3.2	Rare or Specialized Habitat	5.5
5.3.3	Species of Conservation Concern	5.5
5.3.4	Animal Movement Corridors	5.6
5.4	SIGNIFICANT NATURAL HERITAGE FEATURES SUMMARY	5.6
6.0	PROPOSED DEVELOPMENT	6.1
7.0	POTENTIAL IMPACTS OF DEVELOPMENT AND MITIGATION	
	RECOMMENDATIONS	7.1
7.1	DIRECT IMPACTS	7.1
7.1.1	Wetland Removal	7.1
7.1.2	Pond Removal	7.1
7.1.3	Candidate Snake Hibernacula	7.1
7.1.4	Confirmed Eastern Meadowlark Habitat	7.1
7.1.5	Vegetation Removal	7.2
7.1.6	Hydrologic Impacts	7.2
7.2	RECOMMENDED MITIGATION MEASURES	7.2
7.2.1	Construction Site Delineation	7.3
7.2.2	Stormwater Management	7.3
7.2.3	Erosion and Sediment Control	7.3
7.2.4	Wetland/Pond Removal	7.5
7.2.5	Construction Timing	7.5
7.3	NET ENVIRONMENTAL ASSESSMENT	7.5
8.0	MONITORING	8.1
8.1	PRE-CONSTRUCTION MONITORING	8.1
8.1.1	Groundwater Monitoring	8.1
8.1.2	Terrestrial Monitoring	8.1
8.2	DURING CONSTRUCTION MONITORING	8.1
8.2.1	Erosion and Sediment Control Monitoring	8.1
8.2.2	During Construction SWM Monitoring	8.2
8.3	POST-CONSTRUCTION MONITORING	8.2
8.3.1	Post-Construction SWM Monitoring	8.3
9.0	CONCLUSION AND RECOMMENDATIONS	9.1
9.1	CONCLUSIONS	9.1
9.2	RECOMMENDATIONS	9.1
10.0	REFERENCES	10.1



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

LIST OF TABLES

Table 3-1:	Field Investigation Summary	3.2
Table 3-2:	Amphibian Survey Dates, Times, and Weather Conditions.....	3.4
Table 3-3:	Breeding Bird Survey Dates, Times, and Weather Conditions	3.5
Table 3-4:	Survey Dates, Times, and Weather – Bat Maternity Colony Survey	3.6
Table 4-1:	Ecological Land Classification (ELC) Vegetation Types.....	4.4
Table 4-2:	Amphibian Survey Results	4.5
Table 4-3:	Candidate Bat Maternity Roost Trees	4.7
Table 4-4:	Candidate Bat Maternity Roost Tree Suitability	4.8
Table 5-1:	GRCA Wetland Removal Criteria	5.1

LIST OF APPENDICES

APPENDIX A: FIGURES

Figure 1: Location of Study Area

Figure 2: Site Plan

Figure 3: Designated Natural Heritage Features

Figure 4: Ecological Land Classification and Survey Results

Figure DP-100: Conceptual Draft Plan of Subdivision

APPENDIX B: AGENCY CORRESPONDENCE

APPENDIX C: SPECIES AT RISK HABITAT ASSESSMENT

APPENDIX D: PLANT SPECIES LIST

APPENDIX E: BUTTERNUT HEALTH ASSESSMENT

APPENDIX F: WILDLIFE SPECIES LIST

APPENDIX G: WILDLIFE HABITAT ASSESSMENT



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Introduction
August 13, 2018

1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

Stantec Consulting Ltd. was retained by the City of Waterloo to complete an Environmental Impact Study (EIS) in support of a Zoning By-Law Amendment, Official Plan Amendment and a Draft Plan of Subdivision Application to develop the West Side Employment Lands (Subject Property) for commercial and employment use. The Subject Property is located in the northeast corner of the intersection of Erb Street West and Wilmot Line in Waterloo, Ontario (**Figure 1, Appendix A**), and includes 928, 960 and 980 Erb Street West, and 100 Wilmot Line (former Golf Academy Lands). The EIS is also intended to satisfy permit requirements for the Grand River Conservation Authority (GRCA).

This report characterizes the significance and sensitivity of the natural features in the Study Area, identifies potential impacts of the project on these natural features, and recommends appropriate measures to avoid or reduce potential negative impacts.

1.2 STUDY AREA

The Subject Property is approximately 43.6 ha, bound by Columbia Street West to the north, Wilmot Line to the West, Erb Street West to the south, and the Hydro One Networks Inc. (HONI) Transmission Corridor to the east. The Subject Property is currently comprised of a former golf course, active agricultural and fallow fields, a former cider mill, and a temporary stormwater management facility that serves the Costco site. There are two small wetlands on the Subject Property that are identified on GRCA Regulation Area Mapping (GRCA 2016). These wetlands are designated Open Space in the City of Waterloo Official Plan. The remainder of the Subject Property is designated Business Employment in the City of Waterloo Official Plan and Zoned Agricultural (A) in the City's Zoning By-Law. The Study Area is defined as the Subject Property plus 120 m, as shown on **Figure 2, Appendix A**.

1.3 AGENCY CONSULTATION

The Terms of Reference (TOR) for the EIS were submitted to John Brum at the GRCA on May 10, 2017 but were never approved. The TOR were not submitted to the City of Waterloo for review at that time. Stantec staff proceeded with the field program in 2017, to meet the appropriate timing windows for the field work outlined in the TOR. The TOR were resubmitted to Kaitlyn Rosebrugh at the GRCA and Robyn McMullen at the City of Waterloo on January 4, 2018 for review. The TOR were approved by the GRCA on January 8, 2018, and by the City of Waterloo on February 2, 2018, with no further field studies required.

A natural heritage information request was submitted to the MNRF on August 24, 2017 to inquire about potential species at risk present in the Study Area. A response from the MNRF was received on September 21, 2017, which indicated that there were no records of species at risk for the Study Area.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Introduction
August 13, 2018

All agency correspondence, including the TOR, is in **Appendix B**.



2.0 PLANNING CONTEXT

The natural heritage features and functions within the Study Area were assessed in accordance with the policy and guidance documents described below.

2.1 PROVINCIAL POLICY STATEMENT

The Provincial Policy Statement (PPS) was issued by the Ontario Ministry of Municipal Affairs and Housing under Section 3 of the *Planning Act* and came into effect on May 22, 1996. It was revised in 2005 and in 2014. Decisions made by Planning Authorities shall be consistent with the policy statements issued under the *Planning Act*, such as the PPS, which includes policies on development and land use patterns, resources and public health and safety. Section 2.1 of the PPS deals with Natural Heritage and requires natural heritage systems to be identified.

According to Section 2.1.4 of the PPS, development and site alteration shall not be permitted in the following features:

- a) significant wetlands
- b) significant coastal wetlands

According to Section 2.1.5 of the PPS, development and site alteration shall not be permitted in the following features, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions:

- a) significant woodlands
- b) significant valleylands
- c) significant wildlife habitat
- d) significant areas of natural and scientific interest
- e) coastal wetlands that are not subject to policy 2.1.4(b)

Development and site alteration shall not be permitted in the following features, except in accordance with provincial and federal requirements:

- a) significant portions of the habitat of endangered or threatened species
- b) fish habitat



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Planning Context
August 13, 2018

2.2 CITY OF WATERLOO OFFICIAL PLAN

The *City of Waterloo Official Plan* (OP) was adopted by Regional Council in November 2012, in part, with modifications. However, since its adoption, parts of the OP were appealed and forwarded to the Ontario Municipal Board (OMB). Portions of the OP that were not under appeal came into effect on December 21, 2012. The 2016 Office Consolidation includes Regional Council modifications and portions of the OP that are not in effect as a result of a deferral of the Regional decision and/or appeal to the OMB.

The OP establishes a Natural System that consists of Landscape Level Systems, Core Natural Features, Supporting Natural Features, Fish Habitat, Restoration Areas and Linkages. The policies pertaining to the Natural System are intended to maintain, enhance, or restore the diversity, connectivity, and ecological functions of the City's natural features.

There are two small wetlands on the Subject property that are designated as Supporting Natural Features on Schedule A4 of the OP. They are considered as Supporting B Natural Features – Other Wetlands based on size (< 0.5 ha). According to Policy 8.2.5(19) of the OP, development or site alteration may only be permitted within Supporting B Natural Features - Other Wetlands where it is demonstrated through an Environmental Impact Statement or other appropriate study accepted by the City and the Grand River Conservation Authority that the wetland is not:

- a) located within a riparian community
- b) part of a Landscape Level System, Core Natural Feature, or other Supporting Natural Feature
- c) a hazardous land or hazardous site
- d) a bog or fen
- e) fish habitat
- f) part of a functional Linkage between larger wetlands or natural features

2.3 GRAND RIVER CONSERVATION AUTHORITY POLICIES

Pursuant to Ontario Regulation 150/06, prior permission is required from the GRCA for any development within a floodplain, valleyland, wetland, or other hazardous land, any alteration to a river, creek, stream or watercourse or any interference with a wetland. The decision-making policies for such Permits are contained within the Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (GRCA 2015).

Development is generally not permitted within a wetland. However, development may be permitted in a natural wetland that is less than 0.5 ha or a man-made wetland that is less than 2 ha provided that the wetland is not:

- a) part of a PSW, located within a floodplain or riparian community



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Planning Context
August 13, 2018

- b) part of a designated natural heritage feature (significant woodland or hazard land)
- c) fish habitat
- d) significant wildlife habitat
- e) confirmed habitat for a significant species
- f) part of an ecologically functional corridor or linkage between larger wetlands or natural areas
- g) part of a groundwater recharge area, or a groundwater discharge area associated with any of the above (GRCA Policy 8.4.2 and 8.4.3)

There are two small wetlands identified on GRCA Regulation Mapping (GRCA 2017).

2.4 ENDANGERED SPECIES ACT

The *Endangered Species Act* (ESA) protects habitat and individuals of wildlife species designated as threatened, endangered, or extirpated in Ontario. Provincial species at risk are identified and assessed by the Committee on the Status of Species at Risk in Ontario (COSSARO).

The ESA protects species that are listed as threatened, endangered or extirpated on the Species at Risk in Ontario Lists by prohibiting anyone from killing, harming, harassing or possessing protected species, and prohibiting any damage or destruction to the habitat of the listed species. All listed species are provided with general habitat protection under the ESA, which is aimed at protecting areas that species depend on to carry out their life processes, such as reproduction, rearing, hibernation, migration or feeding. Some species have detailed habitat regulations that go beyond the general habitat protection to define specifically the extent and character of protected habitats.

Activities that may impact a protected species or its habitat require the prior issuance of a Permit from the Ministry of Natural Resources and Forestry (MNRF), unless the activities are exempted under Regulation. Ontario Regulation 242/08 identifies activities that are exempt from the permitting requirements of the Act subject to rigorous controls outside the permit process including registration of the activity and preparation of mitigation. Activities that are not exempted under O. Reg. 242/08 require a complete permit application process.

Consultation with the MNRF, background review of species occurrences and targeted habitat assessments for species at risk will determine whether species at risk have the potential to occur in the Study Area. Threatened and endangered species with potential to occur in the Study Area may be subject to protection and approval requirements of the ESA.

2.5 MIGRATORY BIRD CONVENTION ACT

Removal of vegetation required as part of the rehabilitation project will need to consider the policies of the federal *Migratory Birds Convention Act*. The Migratory Bird Convention Act is intended to conserve and



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Planning Context
August 13, 2018

protect migratory birds and their nests (S.4). Section 6 of the Migratory Bird Regulations (C.R.C., c. 1035) prohibits the disturbance, destruction or taking of a nest, egg, or nest shelter of a migratory bird. Nest disturbance during vegetation clearing may be considered as “incidental take” and could be seen as a contravention of the act.

No authorizations are available to permit incidental take. Instead, mitigation measures and best management practices must be applied to manage and reduce the risk of incidental take. Environment and Climate Change Canada (ECCC) provides information on the “general nesting periods” for migratory birds for Canada (ECCC 2017). The nesting periods vary depending on nesting zone and habitat type (i.e., forest, open, wetlands). Clearing activities should be conducted outside these nesting periods, but if this is not possible mitigations measures such as preclearing nest searches and identification of appropriate setbacks from confirmed or suspected nests should be applied.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Methods
August 13, 2018

3.0 METHODS

3.1 BACKGROUND REVIEW

Natural heritage background data for the Study Area were obtained through review of the following resources:

- Land Information Ontario (LIO) Mapping (MNRF 2017)
- Grand River Conservation Authority Regulation and Hazards Mapping (GRCA 2017)
- City of Waterloo Official Plan (City of Waterloo 2016)
- Natural Heritage Information Centre (MNRF 2017)
- Ontario Breeding Bird Atlas (Cadman et al. 2007)
- Ontario Mammal Atlas (Dobbyn 1994)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2016)

Stantec reviewed LIO mapping (accessed on August 23, 2017), GRCA Mapping (GRCA 2017) and City of Waterloo OP Mapping (City of Waterloo 2016) to determine the extent of the designated natural heritage features located within the Study Area.

The Ontario Reptile and Amphibian Atlas (Ontario Nature 2016), Ontario Breeding Bird Atlas (Cadman et al, 2007) and the Atlas of the Mammals of Ontario (Dobbyn 1994) were reviewed on August 24, 2017 to identify species with known ranges that overlap with the Study Area. The review included species at risk and provincially rare species.

The wildlife atlas range maps do not have precise locations or information on concentrations/densities of records (e.g., the Ontario Breeding Bird Atlas records are provided in 10 km by 10 km square grids). The MNRF Natural Heritage Information Centre (NHIC) database provides more precise mapping for species at risk and provincially rare species (1 km by 1 km squares) and is a better indicator of occurrence of significant species, particularly when used in combination with MNRF consultation. The NHIC database was reviewed on August 23, 2017 to identify records of species at risk and provincially rare species in the vicinity of the Study Area. The MNRF was contacted on August 24, 2017 to request any supplemental information to this NHIC database search.

3.2 FIELD INVESTIGATIONS

Field investigations were undertaken by Stantec in 2017 to document existing conditions in the Study Area. Surveys were completed in accordance with established agency protocols (e.g., timing, extent). Vegetation surveys included a vegetation community assessment, a three-season botanical inventory and



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Methods
August 13, 2018

a wetland delineation. Wildlife surveys consisted of three rounds of amphibian surveys, two rounds of breeding bird surveys and a wildlife habitat assessment.

Table 3-1: Field Investigation Summary

Type of Field Work	Date(s) of Field Work	Personnel
Vegetation Surveys		
Botanical Inventory & ELC	May 23, 2017	J. Ball
	July 25, 2017	J. Ball
Wetland Delineation	June 13, 2017	J. Ball
Wildlife Surveys		
Amphibian Surveys	April 19, 2017	J. Ball K. Easterling
	May 16, 2017	J. Ball K. Easterling
	June 14, 2017	J. Ball B. Holden
Breeding Bird Surveys	June 7, 2017	J. Ball
	June 21, 2017	J. Ball
Wildlife Habitat Assessment	May 23, 2017	J. Ball
Incidental Wildlife Observations	During all field visits	All Staff

3.2.1 Vegetation Surveys

The purpose of the vegetation surveys was to identify natural and anthropogenic vegetation and wildlife habitat features, and to collect information required to assess their significance. The work included Ecological Land Classification (ELC) of vegetation communities using the ELC system for Southern Ontario (Lee et al. 1998) and, where appropriate the updated ELC Catalogue (2008); a floristic survey of the Study Area; and identification of wildlife habitat features including hibernacula, bat roosts, stick nests, seeps, and vernal pools.

ELC mapping was completed to the finest level of resolution (Vegetation Type) where possible. Vegetation communities were first identified on aerial imagery and then checked in the field. Provincial significance of vegetation communities was based on the rankings assigned by the Natural Heritage Information Centre (MNRF 2015).

Provincial significance of vegetation communities was based on the rankings assigned by the NHIC (MNRF 2015). Flora nomenclature was based primarily on the Database of Vascular Plants of Canada



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Methods

August 13, 2018

(VASCAN) (Brouillet et al. 2010+) with updates to genera, specific epithets and family names as necessary to reflect recent taxonomic revisions. The primary source of revised nomenclature was VASCAN (2016).

The provincial status of all plant species was based on NHIC (MNRF 2015). Identification of potentially sensitive native plant species was based on their assigned coefficient of conservatism (CC) value, as determined by Oldham et al. (1995). This CC value, 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.

3.2.2 Wetland Delineation

Wetland communities were delineated in the field, to allow precise mapping of the wetland communities on the Subject Property. Delineation methods were based on the protocols outlined in the Ontario Wetland Evaluation System (MNR 2014). In general, where greater than 50% of the tree canopy consists of species known to commonly inhabit wet areas, the community is considered wetland. Where a tree canopy does not exist, or is inconclusive, the shrub or herbaceous layer is then evaluated using the same principle. Where plant species do not indicate a clear boundary, additional evidence, such as the nature of the underlying substrate may also be considered (MNR 2014).

The boundary of the unevaluated wetland was flagged by Stantec staff and confirmed with GRCA in the field on June 13, 2017. The confirmed wetland boundary was then recorded using an AshTech hand-held GPS (Global Positioning System) Unit.

3.2.3 Tree Inventory

A detailed inventory was conducted for trees 10 cm diameter at breast height (DBH) or greater, and <10 cm in DBH. Inventory data included tree species, general health condition, DBH, and dripline radius. Isolated trees that were located along Wilmot Line and Columbia Street were tagged with a numbered steel tree tag (i.e., trees #1, #2, and #3 etc.). The remaining trees located within the Subject Property were grouped into Units, (i.e., Unit 1, Unit 2 etc.). The legal survey locations of tagged trees and approximate locations of vegetation Units have been identified on Drawings L-900 to L-904 of the Tree Management Plan (Stantec 2018a). The tree data has been compiled in the Detailed Tree Inventory table located on Drawings L-905 and L-906 of the Tree Management Plan (Stantec 2018a).

3.2.4 Amphibian Surveys

Amphibian surveys were conducted by Stantec in spring of 2017 following guidance provided in the Marsh Monitoring Program (MMP) Manual (Bird Studies Canada and Environment Canada, 2008). Three rounds of amphibian call count surveys were conducted; one in April, one in May and one in June. All surveys were conducted at least one half hour after sunset in conditions with calm winds (Beaufort scale of 0-3) and no precipitation (although light rain, fog or damp conditions provide suitable conditions for surveying). Surveys met the night-time temperature requirements as follows:

- April: > 5°C



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Methods

August 13, 2018

- May: > 10°C
- June: > 17°C

Three survey stations were established to target potential amphibian breeding habitat in the Study Area. Survey locations are shown on **Figure 4, Appendix A**. Each survey station consisted of a 100 m radius semicircle. The surveyor stood at the edge of the station and listened for three minutes for all calling toads and frogs within and outside of the survey station boundary. Call levels were described using values of 1, 2, or 3. Level 1 indicates that individuals can be counted, and calls are not simultaneous, Level 2 indicates that calls are distinguishable with some simultaneous calling and Level 3 indicates a full chorus where calls are continuous and overlapping.

Survey times, weather conditions, and observers are provided below in **Table 3-2**.

Table 3-2: Amphibian Survey Dates, Times, and Weather Conditions

SURVEY	DATE/TIME	WEATHER				SURVEYORS
		Temp. (°C)	Wind (Beaufort Scale)	Cloud (%)	Precipitation	
1	Apr 19, 2017 20:31 – 20:54	13	2	-	None	J. Ball K. Easterling
2	May 16, 2017 21:10-21:26	20	1	10	None	J. Ball K. Easterling
3	June 14, 2017 21:26 – 21:40	19	2	10	None	J. Ball B. Holden

3.2.5 Breeding Bird Surveys

Breeding bird surveys were conducted by Stantec on June 7 and 21, 2017. Surveys consisted of walking systematically through the Study Area, recording all species of birds that were seen or heard within each of the different vegetation communities. A highest breeding evidence code was assigned to each of the species based on the field observation. All birds seen or heard in suitable habitat during the breeding season were assumed to be breeding.

Surveys were conducted between a half an hour before sunrise and 10:00 a.m. Weather conditions (i.e., precipitation and visibility) were within the parameters required by monitoring programs such as Environment Canada's Breeding Bird Survey (Environment Canada 2016).

A point count station was established in the center of the large cultural meadow to target potential grassland breeding birds in the feature. During the point count survey, a tally of each bird species was recorded during a 10-minute period that included an approximation of the location and direction of each bird observation within or just beyond a 100 m radius 10-minute period. A highest breeding evidence code was assigned to each of the species observed.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Methods
August 13, 2018

Golf course maintenance activity ceased after 2017 breeding bird surveys were complete; therefore, an additional breeding bird point count survey was conducted on the golf course lands on June 28, 2018 to determine whether habitat for Eastern Meadowlark or Bobolink had become available when maintenance activities were no longer taking place.

Survey times, weather conditions, and observers are provided below in **Table 3-3**.

Table 3-3: Breeding Bird Survey Dates, Times, and Weather Conditions

SURVEY	DATE/TIME	WEATHER				SURVEYORS
		Temp. (°C)	Wind (Beaufort Scale)	Cloud (%)	Precipitation	
1	June 7, 2017 06:04 – 08:16	8-10	2	0	None	J. Ball
2	June 21, 2017 07:00 – 08:40	14	1	90	None	J. Ball
3	June 28, 2018 08:10 – 09:00	16	2	20	None	A. Taylor

3.2.6 Bat Maternity Colony Survey

Bat maternity colony surveys were conducted by Stantec on April 24, 2017 during leaf-off. The survey protocol followed the recommended methods in the MNRF Guelph District *Bat and Bat Habitat Surveys of Treed Habitats* (MNRF 2016) which was based in part on the *Bat and Bat Habitat Guidelines* (MNRF 2011). Although the protocol was developed for treed communities, Stantec took a conservative approach and also applied the protocol to isolated trees and hedgerows on the Subject Property that are proposed for removal.

According to the MNRF Guelph District protocol, the best candidate trees for maternity colonies are likely to contain several characteristics (to be considered a potential treed roost habitat, not all habitat characteristics listed below needed to be present), which include:

- Height – where trees are tallest in the stand
- Diameter – where trees have a large DBH
- Loose/peeling bark – where trees have a large amount of peeling/loose bark
- Cavity height – where cavity height is high on the tree (>10m high)
- Open canopy – located in an area of open canopy for accessibility in and out of tree
- Decay – where the tree exhibits early stages of decay

Surveys focused on all trees that were > 10 cm in dbh on the Subject Property.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Methods
August 13, 2018

The following data were also recorded for any trees over 10 cm dbh that had cavities or a large amount of peeling bark:

- GPS location
- tree species
- dbh
- tree height
- cavity height

Survey times, weather conditions, and observers are provided below in **Table 3-4**.

Table 3-4: Survey Dates, Times, and Weather – Bat Maternity Colony Survey

SURVEY	DATE/TIME	WEATHER				SURVEYORS
		Temp. (°C)	Wind (Beaufort Scale)	Cloud (%)	PPT / PPT last 24 hours	
1	April 24, 2016 13:20-14:40	14	2	0	None/None	J. Ball

3.3 EVALUATION OF SIGNIFICANCE

Biological field data were evaluated to establish the significance of the observed natural heritage features. The provincial status of flora and fauna was provided by the NHIC (NHIC 2015). Status rankings (SRANKs) for plants, vegetation communities and wildlife are based on the number of occurrences in Ontario and have the following meanings:

- S1: critically imperiled; often fewer than 5 occurrences
- S2: imperiled; often fewer than 20 occurrences
- S3: vulnerable; often fewer than 80 occurrences
- S4: apparently secure
- S5: secure
- S?: unranked, or, if following a ranking, rank uncertain (e.g. S3?)

Identification of potentially sensitive plant species was based on the coefficient of conservatism value (C) assigned to each native species in southern Ontario (Oldham *et al.* 1995). The value of C, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance. Species with a C value of 9 or 10 generally exhibit a high degree of dependence to a narrow range of habitat parameters and undisturbed environments.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Methods
August 13, 2018

Species at risk are classified provincially by COSSARO and federally by COSEWIC. Classifications include:

- Extirpated – no longer occurs in the wild
- Endangered – facing imminent danger of becoming extinct or extirpated
- Threatened – has the potential to become endangered

Species at risk protected under the provincial *Endangered Species Act (ESA)*, 2007 include species listed as threatened and endangered on the current Species at Risk in Ontario (SARO) list (O. Reg. 230/08). Federally protected species include those listed as threatened and endangered on current Schedules under the federal Species at Risk Act (SARA).

COSSARO and COSEWIC also identify special concern species. Special concern species have the potential to become threatened, however they are not protected under the provincial ESA, 2007, or SARA. Special concern species are grouped together with provincially ranked S1-S3 species as species of conservation concern in Section 5.7.3.

The potential for natural heritage features to provide significant habitat for wildlife was evaluated in accordance with the following provincial and municipal guideline documents:

- *Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005* (MNR 2010) to determine Provincially Significant natural heritage features and associated ecological functions;
- *Significant Wildlife Habitat: Technical Guide* (MNR 2000) to determine the significance of identified wildlife habitat features and functions; and

Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF 2015) to determine the updated significance criteria for identified habitat features and functions.



4.0 RESULTS

4.1 BACKGROUND REVIEW

4.1.1 Designated Natural Heritage Features

The MNRF LIO website was accessed on August 23, 2017 to identify sensitive natural environment features within the Study Area, including; areas of natural and scientific interest (ANSIs), provincially significant wetlands (PSWs), environmentally significant areas (ESAs), provincial or national parks, or conservation areas. According to LIO mapping, there are no provincially significant natural features in the Study Area, however there is one unevaluated wetland approximately 120 m east of the Waterloo Golf Academy Lands.

There are two small wetlands identified on the Subject Property on GRCA Regulation Mapping (GRCA 2017). These wetlands are consistent with the wetlands identified as Supporting Natural Features on Schedule A4 of the City of Waterloo Official Plan.

The above natural heritage features are shown on **Figure 3, Appendix A**.

4.1.2 Species at Risk and Provincially Rare Species

For the purpose of this assessment, species at risk are species classified as Threatened or Endangered by the Committee on the Status of Species at Risk in Ontario (COSSARO) and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and provincially rare species are species classified as Special Concern by COSSARO or COSEWIC and/or ranked S1-S3 by the Natural Heritage Information Centre (NHIC).

The wildlife atlas search identified 23 birds, six reptiles, two amphibians, five mammals and two insects with ranges that have the potential to occur in the Study Area, including 21 species at risk. The NHIC database had no recent records (within the past 30 years) of species at risk or provincially rare species.

A habitat assessment for all terrestrial species at risk and provincially rare species identified through the atlas searches is included in **Appendix C**.

4.2 OVERVIEW OF SITE CONDITIONS

The Study Area is comprised mainly of a former golf course and active agriculture lands. Homes have been removed on two old homesteads, and former agricultural fields have been left fallow in the center of the Study Area. In addition to the two unevaluated wetlands identified in the Study Area during the background review, three additional small wetlands were identified during field investigations in low lying areas throughout the northern section of the Study Area. Two dug ponds are located on the Waterloo Golf Academy Lands. Lands to the north and east are comprised of residential properties, land to the south of



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Results

August 13, 2018

the Study Area are comprised of commercial development and an active landfill site, and lands to the west are comprised of active agriculture.

4.3 LANDSCAPE CONTEXT

4.3.1 Landscape Ecology

The Study Area is located within the Huron-Ontario section of the Great Lakes-St. Lawrence Forest Region (Rowe, 1972). The Huron-Ontario Section is dominated by sugar maple, beech, basswood, white and red ash, yellow birch, red maple, red oak, white oak, and bur oak. Frequently, eastern hemlock, eastern white pine, and balsam fir occur, along with the occasional large tooth aspen, butternut, bitternut hickory, hop-hornbeam, black cherry, and black oak, in this forest region. Other associated species, usually found in river bottoms and swampy areas include: blue-beech, silver maple, slippery and rock elm, black ash, and eastern white cedar.

According to the *Watershed Forest Plan for the Grand River* (GRCA 2004), forest cover within the City of Waterloo is 12.21%, compared to 19.3% for the entire watershed.

4.3.2 Physiography and Drainage

The Study Area is in the physiographic region classified by Chapman and Putnam (1984) as the Waterloo Hills, also commonly referred to as the Waterloo Moraine. The Waterloo Moraine occupies a large portion of the Regional Municipality of Waterloo, with the surface of this physiographic feature consisting of sandy hills, ridges of sandy till, kames or kame moraines and intervening hollows of outwash sand and gravel, which all can be capped by glacial till. In the section of the Waterloo Moraine containing the Subject Property, the regional surface topography tends to slope to the northeast from St. Agatha towards the City of Waterloo (Terraqua 1995).

The Study Area is divided by a topographic ridge that runs in a north-south direction starting from Erb Street West towards the northwest property boundary. This topographic ridge represents a drainage divide, with surface water runoff to the east of the divide flowing to Clair Creek and west of the divide flowing to Monastery Creek (Stantec 2014). Total topographic relief across the Site is approximately 22 m from a high point of 407 m above mean sea level (AMSL) at the top of the ridge to a low point of 385 m AMSL along the eastern limits of the Study Area.

4.3.1 Geology and Hydrogeology

According to the Ontario Geological Society (OGS 2003), the surficial geology of the Study Area consists of glaciolacustrine-derived deposits of clay to silt-textured till, which is interpreted to represent the Upper Maryhill Till of Aquitard 1. Although the Upper Maryhill Till is present at ground surface, onsite drilling results indicate that the subsurface also consists of topsoil, which can overlay silty sand, sandy silt and/or clay fill material up to a depth of 2.3 m below ground surface (BGS). This fill material in turn is often underlain by native deposits of silt and/or silty clay at depths ranging from 0.8 m to 1.5 m BGS, which is then followed by the Upper Maryhill Till (i.e., sandy to silty clay till). The upper Maryhill Till is found to



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Results

August 13, 2018

extend to the termination depth of onsite boreholes, which are completed at depths ranging from 3.7 m to 12.8 m BGS (i.e., 399.6 to 379.8 m AMSL). Sand to silty sand layers ranging from 0.7 m to 2.7 m in thickness are found to be occasionally interspersed within the Upper Maryhill Till. Underlying Aquitard 1 are the medium to fine sand and silty sand deposits of Aquifer 1, which are confirmed to extend to an elevation of 342 m AMSL beneath the Study Area.

Beneath the Study Area, the groundwater table is encountered within the clayey silt to silt deposits of the Upper Maryhill Till (Aquitard 1) and likely represents a perched groundwater system, given that the saturated portion of Aquifer 1 occurs at depths ranging from 21 to 50 m BGS, or an elevation of approximately 354 m AMSL. In general, the groundwater table is closest to ground surface in the topographic low areas of the Study Area, and deepest in the topographic high areas of the property (up to 10.4 m BGS). Overall, the seasonal fluctuation in the groundwater table ranges from 0.9 m to 3.2 m across the Site.

The horizontal movement of groundwater through Aquitard 1 is interpreted to flow to the northeast and southwest from a subwatershed divide that bisects the Study Area. Groundwater is calculated to flow through the deposits of Aquitard 1 at a velocity of 0.8 m/year.

Regional studies together with groundwater level data collected from the onsite drive-point piezometers indicate that vertical groundwater flow at the Study Area is downward, with onsite surface water features (i.e., two golf course ponds and five small wetland areas) recharging the underlying perched groundwater system. However, infiltration will be limited by the low permeability deposits of sandy to silty clay till (Upper Maryhill Till) that characterize the subsurface of the Study Area, with infiltration rate estimates ranging from 9 to 23 mm/hour. Annual groundwater recharge for the Study Area is reported to range from a rate of 50 mm to 100 mm/year.

4.4 SURFACE WATER FEATURES

There are no provincially significant natural features in the LIO mapping; however, there is one unevaluated wetland approximately 120 m east of the Waterloo Golf Academy Lands. Three additional wetlands were identified in the Study Area during the ELC vegetation assessment and summarized in **Section 4.5.1**.

Surface water in the Study Area is limited to two dug golf course ponds on the Waterloo Golf Academy Lands. There are no watercourse features in the Study Area.

4.5 TERRESTRIAL RESOURCES

4.5.1 Vegetation Communities

The vegetation communities identified in the Study Area are illustrated on **Figure 4, Appendix A**, and described in **Table 4-1** below.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Results
August 13, 2018

Table 4-1: Ecological Land Classification (ELC) Vegetation Types

ELC Type	Community Description
Cultural (CU)	
Cultural Meadow (CUM)	
CUM1-1 Dry-Moist Old Field Meadow Type	There were two large CUM1 meadow features in the center of the Study Area. The larger of the two meadows was dominated by alfalfa and grasses with an abundance of field thistle, Canada goldenrod and panicked aster. The smaller CUM1 meadow was dominated by grasses, alfalfa, field and globe thistles, teasel and Canada goldenrod. Smaller areas of cultural meadow occurred within the two old homesteads and scattered meadows were present within the golf course lands.
HR Hedgerow	The HR community is a naturalized hedgerow dominated by Manitoba maple and sweet cherry in the canopy.
Swamp (SW)	
Thicket Swamp (SWT)	
SWT2 Mineral Thicket Swamp	The SWT2 thicket swamp was a very small inclusion of willow and red-osier dogwood adjacent to the smaller golf course pond. The features also contained an abundance of common reed, sedges and rushes.
SWT2-2 Willow Mineral Thicket Swamp	There were two small SWT2-2 swamp thickets in the Study Area. One SWT2-2 feature was in the northwest corner of the Subject Property, surrounded by manicured golf course lands on all sides. It was dominated by willow shrubs around the exterior of the feature. A cattail marsh dominated the center of the feature, which contained standing water in the spring. Water was being pumped out of the adjacent golf course pond into the SWT2-2 feature in the spring to help control water levels, which attributed to the standing water. This feature is identified on GRCA regulation mapping. The second SWT2-2 feature was in the northeast corner of the large CUM1 meadow. It was dominated by willow shrubs, with an abundance of narrow-leaved cattails, hairy willowherb, common reed and panicked aster.
SWT2-5 Red-osier Dogwood Mineral Thicket Swamp	The SWT2-5 swamp thicket was dominated by red-osier dogwood, with occasional willow trees and shrubs. There was an abundance of reed canary grass in the center of the feature, along with beggarticks and smartweed.
Marsh (MA)	
Meadow Marsh (MAM)	
MAM2 Mineral Meadow Marsh	The MAM2 marsh was a small, narrow wetland located along a fence-line between the large CUM1 meadow and an agricultural field. It was dominated by common reed with occasional willow shrubs and trees. The MAM2 marsh was identified on GRCA regulation mapping as a much larger feature, however, the agricultural field appears to have altered the boundary.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Results
August 13, 2018

Table 4-1: Ecological Land Classification (ELC) Vegetation Types

ELC Type	Community Description
Open Aquatic (OA)	
OA Open Aquatic	Open aquatic features consisted of two dug golf course ponds with sparse in-water vegetation (i.e. cattails, soft-stemmed rush, common reed). There was an abundance of submerged aquatic pondweed in both features. The northwest edge of the large OA feature was naturalized with willow and dogwood shrubs along a berm. There was an abundance of common reed along the southwest edge of the feature. The southeast edge of the smaller pond was naturalized with a willow thicket. All other edges of the ponds were manicured right up to the edge of the features, and in-water vegetation was also trimmed.

4.5.2 Vascular Plant Species

A complete list of all vascular plant species recorded during field investigations is included in **Appendix D**. A total of 117 species of vascular plants was recorded from the Study Area, of which 45% were native. Forty-six (96%) of these native plants have a rank of S5, indicating they are common and secure within Ontario. One of the native species (2%) has a rank of S4, indicating that it is apparently secure. No nationally or provincially endangered, threatened, or special concern species were observed.

Nine potential butternut trees (nationally and provincially endangered) were observed in the Study Area in a hedgerow during the tree inventory; however, a Butternut Health Assessment conducted by Jen Koskinen on June 19, 2017 indicated that the species were hybrids and not afforded protection under the ESA (**Appendix E**).

4.5.3 Amphibians

Three amphibian species of amphibians were observed in the Study Area (Spring Peeper, American Toad and Green Frog) in low abundance during amphibian surveys. Survey results are presented in **Table 4-2**. Survey Stations are shown on **Figure 4, Appendix A** and described below.

Table 4-2: Amphibian Survey Results

Station ID	Round	Date Surveyed	Species Present (Highest Call Code)
A	1	April 19, 2017	American Toad (1-1) Spring Peeper chorus heard from woodlot northwest of Station A outside of the Study Area
	2	May 16, 2017	American Toad (1-1) Spring Peeper (1-2)
	3	June 14, 2017	Green Frog (1-3)
B	1	April 19, 2017	None observed



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Results
August 13, 2018

Table 4-2: Amphibian Survey Results

Station ID	Round	Date Surveyed	Species Present (Highest Call Code)
C	2	May 16, 2017	None observed
	3	June 14, 2017	None observed
	1	April 19, 2017	Spring Peeper Chorus heard calling from wetland northeast of Station C outside of the study Area
	2	May 16, 2017	None observed
	3	June 14, 2017	Green Frog (1-3)

Station A

This feature consisted of a dug golf course pond up to approximately 2 m deep and surrounded by manicured lawn on the southern edge, common reed on the western edge and willow shrubs on the northern edge. Emergent vegetation was sparse along the pond edges, consisting of common reed, broad-leaved cattail and soft-stemmed rush. Submerged aquatic pondweed was abundant in the pond. One American Toad was heard calling in the feature during the April survey, one American Toad and two Spring Peepers were heard calling during the May survey, and three Green Frogs were heard calling during the June survey.

Station B

This feature consisted of a cattail marsh surrounded by a willow swamp thicket community. There was water present in the feature during each of the survey dates, however this feature was dry by mid-July. No amphibians were heard calling in the wetland.

Station C

This feature consisted of a dug golf course pond up to approximately 2 m deep and surrounded by manicured lawn on the northern, eastern and western edges and willow shrubs on the southern edge. Emergent vegetation was relatively sparse along the pond edges, consisting of broad-leaved cattail and soft-stemmed rush. Submerged aquatic pondweed was abundant in the pond. Four Green Frogs were heard calling in the feature during the June survey.

In summary, none of the Stations supported high levels of calling amphibians (Level 2 or 3 for more than two species).

4.5.4 Breeding Birds

A total of 30 bird species were observed during the breeding bird surveys conducted by Stantec in 2017 (**Appendix F**). Great Blue Heron, Turkey Vulture and Ring-billed Gull were excluded from the list of potential breeders due to the absence of suitable nesting habitat in the Study Area.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Results

August 13, 2018

Barn Swallow, a provincially threatened species, was excluded from the list of potential breeders due to the absence of suitable nesting habitat in the Study Area. Bank Swallow, a provincially threatened species, was also excluded from the list of potential breeders due to the absence of confirmed nesting habitat in the Study Area. Habitat requirements for both species are discussed in **Section 5.2**.

Area-sensitive birds are defined as those species that prefer to breed in habitat patches greater than 20 ha in size. No area-sensitive birds were observed in the Study Area.

On June 28, 2018 three Eastern Meadowlarks and one Bobolink were observed on the former golf course lands. Habitat requirements for both of these provincially and federally threatened species are discussed in **Section 5.2**.

4.5.5 Bat Maternity Colony Survey

Three candidate bat maternity colony trees were observed in the Study Area during the bat maternity colony survey (see **Table 4-3** below). Although each of the trees had a large diameter (DBH) and open canopy that is preferred by bats, the two apple trees were short, and cavities were very low in the trees, which is not preferred by bats due to the increased chance of predation that occurs with roosts located close to the ground (**Table 4-4** below). The poplar snag likely provides the best candidate habitat of all three trees observed due to the height of the peeling bark, open canopy and large DBH of the snag, however bats prefer trees in the early stages of decay as opposed to late stages of decay.

Table 4-3: Candidate Bat Maternity Roost Trees

Tree #	Species	Approximate DBH (cm)	Estimated Tree Height (m)	Estimated Cavity Height (m)
1	Apple	60	6	2
2	Apple	50, 50	8	1
3	Poplar Snag	70	15	3, 10



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Results
August 13, 2018

Table 4-4: Candidate Bat Maternity Roost Tree Suitability

Tree #	One of tallest trees in community	Exhibits cavities/ crevices/ scars/ woodpecker holes	Largest DBH in community	Cavity or crevice is high up in tree (>10m)	Within highest density or cluster of cavity trees	Large amount of loose, peeling bark	Open canopy	Early stages of decay (class 1-3)
1		X	X				X	X
2		X					X	X
3			X			X	X	

Due to the very low occurrence of candidate trees, and the low suitability of the candidate trees observed, acoustic surveys were not conducted in conjunction with the bat maternity colony assessment.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Significant Natural Heritage Feature Assessment
August 13, 2018

5.0 SIGNIFICANT NATURAL HERITAGE FEATURE ASSESSMENT

5.1 WETLANDS

The province determines significance of wetlands according to standardized evaluation procedures. Additionally, the planning authority may designate other wetlands significant if they have limited representation within the planning area or are of high quality within the context of the municipality.

According to LIO mapping there are no provincially significant natural features in the Study Area; however, there is one unevaluated wetland located approximately 120 m east of the Waterloo Golf Academy Lands.

As per to GRCA mapping (GRCA, 2017), there are two unevaluated wetlands identified on the Subject Property (**Figure 3, Appendix A**). These wetlands are identified as Supporting Natural Features on Schedule A4 of the 2016 City of Waterloo Official Plan and considered as Supporting B Natural Features – Other Wetlands based on size (< 0.5 ha). Three additional wetlands were identified in the Study Area during the ELC vegetation assessment. None of the five wetlands observed in the Study Area have been considered as candidates for evaluating for significance due to their small size and low diversity of species.

Development within a naturally-occurring wetland may be permitted where the wetland is less than 0.5 hectares, and it can be demonstrated that the wetland does not meet the following GRCA Removal criteria as outlined in **Table 5-1** below.

Two golf course ponds are proposed for removal to accommodate the proposed development. Golf course ponds are not considered to be wetlands according to GRCA, and the GRCA Criteria for removal was not applied.

Table 5-1: GRCA Wetland Removal Criteria

GRCA Removal Criteria	Does the Criteria Apply to wetlands in the Study Area?
Feature is not part of a Provincially Significant Wetland	Yes - None of the wetlands were considered significant due to their small size and low diversity of species. (Section 5.1). There are no nearby PSWs to consider the wetlands for complexing (LIO, 2017).
Feature is not located within a floodplain or riparian community.	Yes - GRCA mapping (GRCA, 2017) does not identify the Study Area as floodplain.
Feature is not part of a Provincially or municipally designated natural heritage feature, a significant woodland, or hazard land.	Yes - None of the wetlands were provincially or municipally designated as significant natural heritage features (Section 4.1.1)
Feature is not a bog or a fen.	Yes - None of the wetlands were classified the community as bog or fen communities (Section 4.5.1)



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Significant Natural Heritage Feature Assessment
August 13, 2018

Table 5-1: GRCA Wetland Removal Criteria

GRCA Removal Criteria	Does the Criteria Apply to wetlands in the Study Area?
Feature does not provide fish habitat.	Yes - There was no fish habitat present in the Study Area.
Feature does not provide significant wildlife habitat.	Yes - No significant wildlife habitat features were identified in the wetlands during field investigations (Section 5.3).
Feature is not confirmed habitat for a provincially or regionally significant species as determined by the Ministry of Natural Resources and Forestry or as determined by the municipality.	Yes - The wetlands do not provide habitat for any of the species identified by the MNRF as potentially occurring in the Study Area (Section 5.2).
Feature is not part of an ecologically functional corridor or linkage between larger wetlands or natural areas.	Yes - The wetlands are all isolated natural heritage features located within culturally influenced lands (golf course lands, agricultural lands, old homestead, cultural meadow). They do not form part of an ecologically functional corridor between larger wetlands or natural areas.
Feature is not part of a groundwater recharge area.	No - However, the five onsite wetlands range from 0.03 ha to 0.13 ha in size, for a total combined area of 0.39 ha, which represents 1% of the total Subject Property. Consequently, it is reasonable to assume that the loss of recharge function associated with these wetland areas will not detrimentally impact the overall groundwater recharge function of the Study Area. The sandy to silty clay till that covers the Study Area is characterized by low groundwater recharge potential.
Feature is not a groundwater discharge area associated with any of the above.	Yes - Subsurface soil and groundwater conditions observed near each of the onsite wetlands suggests that the seasonally high groundwater table does not intercept these features, indicating that the form and function of these wetlands are not sustained by groundwater inputs (i.e., are not groundwater discharge features).

Although the wetlands provide a very small groundwater recharge function (1% of the total Subject Property), removal of these features is not expected to have a large impact on the overall function of the Study Area and the wetlands have therefore been considered to meet the criteria for removal for the purposes of this application. The wetlands meet each of the other GRCA criteria for removal listed above. A GRCA permit will be required prior to removal.

5.2 HABITAT OF ENDANGERED AND THREATENED SPECIES

The following provincially and federally threatened and endangered species and/or potential habitat for these species were observed in the Study Area during field investigations.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Significant Natural Heritage Feature Assessment
August 13, 2018

5.2.1 Barn Swallow

Barn Swallow (*Hirundo rustica*) is a provincially and federally threatened species, and afforded general habitat protection under the ESA (2007). As their name suggests, Barn Swallow nests on walls or ledges of barns as well as on other human-made structures such as bridges, culverts or other buildings (Cadman et al. 2007). Where suitable nesting structures occur, Barn Swallow often form small colonies, sometimes mixed with Cliff Swallows. Barn Swallows feed on aerial insects while foraging in open habitat (COSEWIC 2011). Barn Swallows are generally considered grassland species, foraging over meadows, hay, pasture or even mown lawn. They will also frequently forage in woodland clearings, over wetland habitats or open water where insect prey are abundant.

Barn Swallow was observed foraging over the golf course and cultural meadow during the breeding bird surveys. No Barn Swallow nests were observed on any of the buildings during field investigations, and no other potential suitable structures were observed in the Study Area. Barn Swallow is therefore not considered to be breeding in the Study Area. Foraging habitat for Barn Swallow is present in the cultural meadow, old homesteads and golf course lands.

5.2.2 Bank Swallow

Bank Swallow (*Riparia riparia*) is a provincially and federally threatened species and afforded general habitat protection under the ESA (2007). Bank Swallows excavate nests in exposed earth banks along watercourses and lakeshores, roadsides, stockpiles of soil and the sides of sand and gravel pits. Single nests may occur, although colonies are typical and range from two to several thousand. Adjacent grasslands and watercourses are used for foraging habitat (Cadman et al. 2007).

Bank Swallow was observed foraging over the golf course and the golf course pond in the northwest corner of the Study Area during the first breeding bird survey. Exposed banks were observed in the soil piles surrounding the temporary stormwater management pond; however, there were no Bank Swallows observed in this area during the breeding bird survey, and no nesting cavities were observed around the exterior of the banks that faced the cultural meadow and old homestead property. Bank Swallow is therefore not considered to be breeding in the Study Area. Foraging habitat for Bank Swallow is present in the cultural meadow, old homesteads and golf course lands.

The exposed banks appeared to be properly sloped (70 degrees or less) to discourage Bank Swallows from establishing nests as outlined in the *Best Management Practices (BMP) for the Protection, Creation and Maintenance of Bank Swallow Habitat in Ontario* (MNRF 2017). Stantec recommends that the banks continue to be maintained according to the BMP during construction to continue to discourage Bank Swallows from nesting. If Bank Swallows are observed entering/exiting cavities in the banks during active construction, all construction activities must cease in the area until the young birds have successfully fledged from the nest.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Significant Natural Heritage Feature Assessment
August 13, 2018

5.2.3 Eastern Meadowlark

Eastern Meadowlark (*Sturnella magna*) is a provincially and federally threatened species and afforded general habitat protection under the ESA (2007). Meadowlarks are ground nesting birds (Harrison 1975), which are often associated with human-modified habitats where they sing from prominent perches such as roadside wires, trees, and fenceposts. As a grassland species the Eastern Meadowlark typically occurs in meadows, hayfields and pastures. However, meadowlarks will utilize a wider range of habitat than most grassland species, including mown lawn (e.g. golf course, parks), wooded city ravines, young conifer plantations and orchards (Peck and James 1983).

Three Eastern Meadowlarks were observed in June 2018 on the former golf course lands that were no longer maintained. Discussions with Graham Buck at the Guelph District MNRF confirmed that the golf course lands are to be considered suitable habitat for Eastern Meadowlark (**Figure 4, Appendix A**), and authorization will be required under the ESA to remove this feature, including development of a habitat compensation plan.

5.2.4 Bobolink

Bobolink (*Dolichonyx oryzivorus*) is a provincially and federally threatened species and afforded general habitat protection under the ESA (2007). Bobolink nest primarily in forage crops with a mixture of grasses and broad-leaved forbs, predominantly hayfields and pastures. Preferred ground cover species include grasses such as timothy and Kentucky bluegrass and forbs such as clover and dandelion (COSEWIC 2010).

One male Bobolink was observed in June 2018 on the former golf course lands that were no longer maintained. Discussions with Graham Buck at the Guelph District MNRF confirmed that the golf course lands are not be considered suitable habitat for Bobolink, because the presence of one single male on the Subject Property does not confirm breeding.

5.3 SIGNIFICANT WILDLIFE HABITAT

There are four general types of significant wildlife habitat: seasonal concentration areas, rare or specialized habitat, habitat for species of conservation concern, and wildlife movement corridors. These are discussed in more detail below. MNRF's Significant Wildlife Habitat Technical Guide (MNRF 2000) and SWH Criteria Schedules for Ecoregion 6E (MNRF 2015) were applied to identify candidate and confirmed Significant Wildlife Habitat using ELC, habitat and wildlife observations. Details of the significant wildlife assessment for the Study Area are provided in **Appendix G** and summarized below.

5.3.1 Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a species gather at one time of the year, or where several species congregate. The following is a partial list of numerous potential examples: bird migratory stopover areas, raptor wintering areas, bat hibernacula or maternity colonies, reptile



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Significant Natural Heritage Feature Assessment
August 13, 2018

overwintering areas, colonially-nesting bird breeding habitat, and deer yarding areas. Only the best examples of these concentration areas are usually designated as significant wildlife habitat.

Snake Hibernacula

Remnants of an old smokehouse foundation/retaining wall located on the old homestead site at the northeast end of the Study Area may provide candidate habitat for snake hibernacula (shown on **Figure 4, Appendix A**).

No other candidate seasonal concentration areas were identified in the Study Area. The golf course ponds provide suitable habitat for turtles; however, no turtles were observed during the field investigations, and the ponds do not qualify as SWH since they are man-made (as per the SWH Criteria Schedules).

5.3.2 Rare or Specialized Habitat

Rare or specialized habitats are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. It is assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant. Specialized habitats are microhabitats that are critical to some wildlife species. Potential examples include Bald Eagle and Osprey nesting habitat, turtle nesting areas, and groundwater seeps for Wild Turkeys.

No rare or specialized habitat for wildlife was identified in the Study Area.

5.3.3 Species of Conservation Concern

The group of species of conservation concern includes three types of species: those that are ranked special concern provincially, those that have no ranking provincially but are ranked threatened or endangered federally, and those that have an S-rank of S1-S3 in Ontario. Regionally rare species can also be considered here.

Thirteen provincially rare and special concern species were identified as potentially occurring in the Study Area (**Appendix C**). Of the 13 species, only Monarch was observed during field investigations in 2017. Monarch was observed in the cultural meadow communities during the botanical inventory, but there were no locations within the Study Area with an abundance of milkweed, the Monarch's larval host plant. Available breeding habitat for this species is therefore considered to be limited.

Eastern Milksnake was the only species for which candidate habitat may be present in the Study Area. There is a low probability that candidate habitat is present for the other 12 species. As noted in **Section 5.3.1**, remnants of an old smokehouse foundation/retaining wall located on the old homestead site at the northeast end of the Study Area may provide candidate habitat for snake hibernacula, including Eastern Milksnake.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Significant Natural Heritage Feature Assessment
August 13, 2018

5.3.4 Animal Movement 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. There are two types of animal movement corridors in Ecoregion 6E, amphibian and deer movement corridors, neither of which were identified in the Study Area.

No animal movement corridors were identified in the Study Area.

5.4 SIGNIFICANT NATURAL HERITAGE FEATURES SUMMARY

In summary, the following significant natural heritage features were identified in the Study Area:

- Confirmed species at risk habitat for Eastern Meadowlark on the former golf course lands.
- Candidate Significant Wildlife Habitat for snake hibernacula (remnant of an old smokehouse foundation and retaining wall within the old homestead in the center of the Study Area).



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Proposed Development
August 13, 2018

6.0 PROPOSED DEVELOPMENT

The City of Waterloo has developed a conceptual Draft Plan of Subdivision (**Drawing DP-100, Appendix A**). The Plan includes 24 blocks including 11 industrial blocks (Blocks 1-11), two commercial blocks (Blocks 12 and 13), a park block (Block 14), four walkway blocks (Blocks 15-18) and six reserve blocks (19-24).

A temporary stormwater management (SWM) pond is proposed for Blocks 1 and 14 during construction. The ultimate post-development SWM pond will be located immediately northeast of the Subject Property within the Hydro One transmission corridor. This facility will be owned and operated/maintained by the City of Waterloo. The City has already completed the relevant studies and secured the purchase of the lands from Hydro One for the SWM facility. They have also secured easements in favour of the City for the storm sewer inlets and outlets to/from this future pond. Once this facility is built and operational, the temporary facility currently within the Subject Property will be decommissioned.

A portion of Platinum Drive (300m) and Copper Street were constructed as part of the Rice Commercial Development and Costco projects in 2014/15. Platinum Drive is/will be a City of Waterloo Collector Road and the Draft Plan of Subdivision intends to extend from its current terminus at Copper Street, northerly to Columbia Street West. Two additional local municipal roads are also planned within the Draft Plan; Street B and Street C.



7.0 POTENTIAL IMPACTS OF DEVELOPMENT AND MITIGATION RECOMMENDATIONS

The environmental effects that may occur from the proposed development are discussed in this section. Potential direct and indirect impacts, associated with the proposed development have been considered and mitigation measures are recommended. An assessment of overall net environmental impacts is also provided based on the implementation of appropriate mitigation measures, as feasible.

7.1 DIRECT IMPACTS

7.1.1 Wetland Removal

Five wetlands meet the GRCA Criteria for removal to accommodate the proposed development (**Section 5.1**). Mitigation measures to reduce impacts to wildlife during the removal of the wetlands are discussed in **Section 7.2.4**.

7.1.2 Pond Removal

Two golf course ponds are proposed to be removed to accommodate the proposed development. Golf course ponds are not considered to be wetlands according to GRCA, and the GRCA Criteria for removal was not applied. Additionally, neither of the ponds qualified as candidate significant wildlife habitat features in the significant wildlife habitat assessment (**Section 5.3**). Mitigation measures to reduce impacts to wildlife during the removal of the ponds are discussed in **Section 7.2.4**.

7.1.3 Candidate Snake Hibernacula

Grading/removal of the remaining smokehouse foundation and retaining wall at the old homestead in the center of the Subject Property will remove candidate snake hibernacula. Construction activities should occur outside of the hibernation window for snakes in this area (between October 1 and May 30) unless pre-construction surveys confirm that snakes are not using the feature, as discussed in **Section 7.2.5**.

7.1.4 Confirmed Eastern Meadowlark Habitat

Eastern Meadowlark and its habitat (former golf course lands) are protected from harm or harassment under general habitat regulations of the ESA 2007. A timing restriction for vegetation clearing of the former golf course lands will be implemented to reduce the likelihood of construction phase impacts to Eastern Meadowlark. Vegetation clearing will be restricted between May 1 and July 31, as per O. Reg. 242/08 of the ESA.

As outlined in **Section 2.4**, O. Reg. 242/08 of the ESA provides a regulatory framework for the species at risk registry process, which exempts activities that meet a defined set of criteria from the ESA permit process. Registration and compensation requirements are outlined within O. Reg. 242/08 (Section 23.6) for the removal of the habitat of Eastern Meadowlark that is equal or less to 30 ha. The project proposes



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Potential Impacts of Development and Mitigation Recommendations
August 13, 2018

the removal of approximately 17.2 ha of habitat, and therefore qualifies for registration/compensation. The compensation requirements include:

- Create or enhance habitat, and manage that habitat for 5 years
- Prepare a habitat management plan that describes the area of new or enhanced habitat and is consistent with other requirements that are outlined in Ontario Regulation 242/08
- Monitor and report annually for five years on the effectiveness of the habitat management plan
- The new or enhanced habitat must be larger than the area of the habitat that is removed, be at least 200 m in width and must meet the vegetation requirements described in the regulation

Species at risk habitat compensation requirements for Eastern Meadowlark under O. Reg. 242/08 will be determined in consultation with the MNRF under a separate cover.

7.1.5 Vegetation Removal

In addition to the removal of the wetlands and golf course ponds as discussed above, the CUM1 meadows, Manitoba maple hedgerow and scattered trees across the Subject Property are also proposed for removal to accommodate the development. Vegetation removal is recommended to occur outside of the breeding bird window between April 1 and August 30, as discussed in **Section 7.2.5**.

7.1.6 Hydrologic Impacts

The proposed development introduces impervious ground surfaces, which may result in an increase in overland flow for any given storm event and a reduction in infiltration rates. However, it should be noted that the sandy to silty clay till that covers the Study Area is already characterized by low infiltration potential (refer to **Section 4.3.3**). As well, the quality of this storm runoff is impacted by urban land uses and activities, which if left uncontrolled, may impact downstream water quality. Stormwater management and groundwater recharge augmentation measures are therefore proposed and designed to control and treat runoff as outlined in **Section 7.2.2**.

7.2 RECOMMENDED MITIGATION MEASURES

Mitigation measures are implemented to reduce the likelihood of potential negative effects of the proposed development. Such measures include the implementation of construction controls (i.e. construction timing windows and stormwater management) and the incorporation of compensation measures (as appropriate) to offset any residual impacts that may occur. These management and mitigation measures are discussed below.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Potential Impacts of Development and Mitigation Recommendations
August 13, 2018

7.2.1 Construction Site Delineation

A construction fence (or heavy-duty silt fence) must be installed prior to any onsite work and maintained during all phases of construction to control potential sediment transport from erosion and to function as a visual boundary to mark the limits of the work site and assist in controlling encroachment into adjacent properties during construction and grading activities.

7.2.2 Stormwater Management

Urban development is typically associated with an increase in the water quantity and a decrease in the water quality of post-development flows. Appropriate quantity and quality controls must be proposed in accordance with the *Stormwater Management Practices Planning and Design Guidelines* (Ontario Ministry of the Environment 2003).

As part of the *West Waterloo Commercial Centre Final Stormwater Management Report* (Stantec 2014), a centralized wet pond SWM facility was approved and meets all necessary SWM criteria for the Laurel Creek Watershed Study, Ontario Ministry of the Environment Conservation and Parks, City of Waterloo, and GRCA. The facility has not been constructed; however, upon the initiation of site grading, it will be constructed in the Hydro One corridor at the northeast corner of the subject lands. The facility provides normal water quality control (70% removal of the average annual TSS loading) and provides peak flow attenuation for all rainfall events up to and including the Regional storm (Hurricane Hazel). In addition to the stormwater quantity and quality control strategy for the Subject Property, infiltration targets are provided for each block to maintain a post-development groundwater recharge balance. Given the uncertainty of the final design of each block, these targets are based on a rooftop coverage of 25% of the lot and infiltration of all rainfall events up to and including the 10 mm event.

The details of the SWM strategy and the water balance analysis are presented under separate cover in the *Waterloo West Side Employment Lands Preliminary Stormwater Management Report* (Stantec 2018c).

7.2.3 Erosion and Sediment Control

Prior to any grading or servicing works commencing onsite, erosion and sedimentation control measures shall be implemented as detailed on the Pre-grading, Erosion and Sedimentation Control Plans that will be prepared as part of the detailed design. Appropriate erosion and sediment controls must be employed during all phases of construction to reduce the potential deposition of silt and sediment into the adjacent properties due to site grading works. Measures to restore any disturbed areas as soon as possible must be combined with appropriately designed erosion control measures to reduce erosion potential and capture any eroded materials prior to being discharged into the adjacent properties.

A more detailed Erosion and Sediment Control Plan complete with design drawings will be prepared for the overall site during detailed design as well as for each individual site plan; however, at this preliminary stage, the following measures are recommended:



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Potential Impacts of Development and Mitigation Recommendations
August 13, 2018

- Erect light duty silt fence in down-gradient areas around the perimeter of the property prior to commencing construction activity to protect adjacent lands, in particular along the length of the HONI corridor and adjacent to private property and Region lands along Wilmot Line.
- Erect heavy-duty silt fence prior to grading or construction in areas adjacent to existing road right-of-way that are down gradient along the perimeter of the Subject Property to protect adjacent and downstream areas from migration of sediment in any overland flow.
- Erect tree protection fencing prior to grading or construction where applicable in consultation with the environmental consultant.
- Provide construction entrance features ('mud mat') at all entrances to minimize the offsite transport of sediment from construction vehicles.
- Install erosion control mats on steep slopes and stabilize as soon as possible.
- Install temporary rock check dams in swales, where appropriate, to help attenuate flows and encourage sediment deposition.
- Install temporary sediment traps for drainage areas under 2 ha.
- Install temporary sedimentation basins.
- Stabilize all disturbed areas according to OPSS 804.
- Seal all catchbasins during construction until roads are paved to prevent sediment deposition in the catchbasin sumps and conveyance of silt to the downstream storm sewer system.

An appropriate inspection and maintenance program is needed to monitor the effectiveness of the erosion and sediment control measures. The inspection activities will include:

- Inspections of the erosion and sediment controls weekly or after each significant rainfall event (>13 mm), whichever is shorter, during periods of active construction. Monthly inspections during periods of inactivity until full buildout.
- Inspections to include all silt fence installation, construction entrance(s), storm sewer outlets and vegetation during periods of active construction.
- Submission of weekly inspection reports to the City of Waterloo and GRCA during periods of active construction.

It is recommended that the above erosion and sediment control plan be revisited at detailed design and modified, if required, based on the site layout and construction phasing. The plan can then be illustrated on design drawings. For full details, please refer to the *Waterloo West Side Employment Lands Final Stormwater Management Report* (Stantec 2018c).



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Potential Impacts of Development and Mitigation Recommendations
August 13, 2018

7.2.4 Wetland/Pond Removal

A qualified biologist must be on site to supervise the wetland/pond removal so that any wildlife species that may be using the features (i.e. amphibians) are safely relocated to alternate habitat. A Wildlife Scientific Collector's Authorization (WSCA) will be required from the MNRF prior to relocating wildlife.

Removal of the wetlands is recommended to occur outside of the breeding bird window (April 1 to August 30), to avoid accidental harm to breeding birds or their nests.

Removal of the golf course ponds must occur after May 1 and prior to October 1st so that hibernating amphibians are not harmed and relocated amphibians have time to adjust to the alternate habitat, to successfully hibernate.

If grading occurs around the golf course ponds or wetlands prior to their removal, a sediment/exclusion fence is to be installed a minimum five meters from the pond/wetland boundaries prior to the commencement of grading to protect any wildlife using the features from entering the construction area.

7.2.5 Construction Timing

Timing of various construction activities (i.e. tree removal) must occur outside of the critical breeding periods of bird species. Given the presence of breeding birds on, and adjacent to, the Subject Property, tree and vegetation removal (i.e. disturbance to nests) should avoid the breeding bird window between April 10 and August 9 in accordance with the *Migratory Birds Convention Act*, and Environment Canada's guidance on general nesting periods (ECCC 2017). In the event a nest is found in the construction footprint outside of the breeding bird window, it is still protected under the *Migratory Birds Convention Act*, and must be protected from harm.

Pre-construction surveys are recommended in early fall of 2018 to determine if the old smokehouse foundation/retaining wall provides habitat for hibernating snakes. If habitat is confirmed, removal of the old smokehouse foundation/retaining wall must occur outside of the hibernation period of snakes (October 1 to May 30).

7.3 NET ENVIRONMENTAL ASSESSMENT

Methods employed in the design of the site plan to reduce potential environmental impacts include:

Mitigation – Measures to mitigate impacts to wildlife have been proposed. This includes removal of vegetation outside of the breeding bird window, pre-construction surveys to confirm the presence of snake habitat on the Subject Property, securing a Wildlife Scientific Collection Authorization under an approved Animal Care Protocol for the removal of the wetlands and golf course ponds, and consultation with MNRF to compensate for the loss of Eastern Meadowlark habitat.

Appropriate stormwater, erosion and sediment controls will also be implemented to manage surface runoff during construction and following development to maintain pre-development surface water quality and quantity.



Monitoring
August 13, 2018

8.0 MONITORING

The City of Waterloo Development Monitoring Protocol (City of Waterloo 1999) was used as a guideline to determine the pre-, during and post-construction monitoring requirements for the proposed development.

8.1 PRE-CONSTRUCTION MONITORING

Pre-construction groundwater and terrestrial monitoring was conducted in the Study Area to document baseline conditions as per Stage 1 of the Development Monitoring Protocol (City of Waterloo 1999).

8.1.1 Groundwater Monitoring

The pre-development groundwater monitoring network established within the Study Area consists of 14 wells constructed into the perched groundwater system (i.e., groundwater within ATB1) and one well screened in the deeper regional aquifer system (i.e., AFB1). The continuous recording of groundwater levels across the Study Area using Levelloggers began in May 2017 and continues at the issuing of this report. As presented in the Hydrogeological Investigation (Stantec 2018) report for the period from May 2017 to July 2018, groundwater levels within the perched groundwater system have ranged from being present at ground surface to 10.4 m BGS, with annual fluctuations ranging from 0.9 m to 3.2 m. Beneath the Study Area, the saturated portion of AFB1 is found at a depth of 50 m BGS.

Groundwater in the perched groundwater system is calcium-bicarbonate type water. No tested parameters exceeded health-related criteria as per the Ontario Drinking Water Quality Standards outlined in O. Reg. 169/03 under the Safe Drinking Water Act, 2002, S.O. 2002, c. 32.

8.1.2 Terrestrial Monitoring

The terrestrial field investigations conducted in support of this EIS provide a detailed description of the natural heritage features in the Study Area. Features are summarized in **Sections 4.0 and 5.0** of this report based on a background review of available information, a vegetation community assessment, a botanical inventory, amphibian and breeding bird surveys, a bat habitat assessment and a significant wildlife habitat assessment.

The tree inventory (Stantec 2018a) included a health assessment of all trees/vegetation Units on the Subject Property.

8.2 DURING CONSTRUCTION MONITORING

8.2.1 Erosion and Sediment Control Monitoring

As per Stage 2 of the Development Monitoring Protocol, and **Section 7.3.3** of this EIS, erosion and sediment control measures are to be implemented prior to and during construction activities in



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Monitoring
August 13, 2018

accordance with the Erosion Control Plan to be prepared during detailed design. The location and installation of these control measures are to be confirmed in the field by City of Waterloo staff prior to the start of construction. Inspection of these controls will be conducted throughout the duration of construction activities, and the developer will implement corrective actions immediately, as necessary.

8.2.2 During Construction SWM Monitoring

The surface water monitoring program will commence following construction of the SWM facility in the Hydro One corridor and follow the requirements of the Laurel Creek Watershed Study (LCWS) and the Subwatershed #314 Management Plan. This will consist of monthly monitoring of the following surface water parameters at both the inlet and outlet of the SWM facility from March to November for the duration of the active construction period:

- Total Suspended Solids (TSS): discharge quality (from the SWM facility) should be less than 25 mg/L suspended solids; based on event mean concentrations and flow proportional sampling
- Dissolved Oxygen (DO): Minimum concentration should be no less than 5 mg/L
- Total Phosphorus (TP): Phosphorus levels should be 0.03 mg/L or less
- Temperature: Maximum temperature should be no greater than 29°C from August 1 to October 31 and no greater than 26°C from June 1 to August 1
- Bacteria (*E. coli*): Bacterial levels should meet a level of 200 counts/100 mL of *E. coli*

Monitoring will continue until buildout and stabilization of 90% of the lands within the subdivision. An annual report summarizing the year's findings will be submitted to the City and GRCA following completion of the monitoring year.

In addition, the following general maintenance is recommended for the site in perpetuity:

- Annual inspection and maintenance of the site storm system including catchbasins and manholes for sediment deposition and clogging; cleanout should occur on an as-needed basis (at least once a year).
- Annual inspection of sediment accumulation in the forebay of the SWM facility.

The proponent will be responsible for the monitoring and inspection for the duration of the monitoring program as well as the long-term operation and maintenance of the stormwater management system and all of its components. It is recommended the City of Waterloo and the GRCA consult to confirm a Terms of Reference document for the long-term monitoring and maintenance plan for the Subject Property.

8.3 POST-CONSTRUCTION MONITORING

All terrestrial features are proposed for removal as part of the Draft Plan of Subdivision, and therefore no post-construction monitoring is required. Stage 3 of the Development Monitoring Protocol is limited to SWM monitoring.



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Monitoring
August 13, 2018

8.3.1 Post-Construction SWM Monitoring

The post-construction SWM monitoring program will commence following acceptance by the City that 90% of the site is built out and stabilized. This program will continue for two years and will follow the same protocol and methodology as the During-Construction Program.

Following two years of post-construction monitoring, a final report will be submitted to the City for review and acceptance. An Operations and Maintenance Manual report and schedule is recommended for the long-term monitoring and maintenance of the SWM facility continues in perpetuity.

Given the anticipated long-term build out of the Subject Property and the potential for periods of construction inactivity and under the provision that the Subject Property has been stabilized per OPSS 804, a less frequent interim monitoring program (i.e., seasonal) may be developed in consultation with the City and/or GRCA and other agencies as appropriate.

Details of the proposed monitoring program are provided under separate cover in the Waterloo West Side Employment Lands Final Stormwater Management Report (Stantec 2018c)



9.0 CONCLUSION AND RECOMMENDATIONS

9.1 CONCLUSIONS

The following conclusions result from the review of applicable policies and background information, and field investigations completed as part of this EIS:

- Based on the evaluation in **Section 5.1**, five wetlands on Subject Property meet the GRCA criteria for removal, including two wetlands identified on GRCA mapping (GRCA 2016). A GRCA permit will be required prior to removal of all identified wetlands.
- The golf course ponds are not considered as wetlands by the GRCA, they do not provide significant habitat for wildlife, and therefore they qualify for removal (**Section 7.1.2**).
- Habitat for Eastern Meadowlark (threatened provincially and federally) occurs in the Study Area as outlined in **Section 5.2**.
- Species at risk habitat compensation requirements for Eastern Meadowlark under O. Reg. 242/08 will be addressed in consultation with the MNRF under a separate cover (**Section 7.1.4**).
- Candidate Significant Wildlife Habitat for snake hibernacula (remnant of an old smokehouse foundation/retaining wall within the old homestead in the center of the Study Area) (**Section 5.3.1**).

9.2 RECOMMENDATIONS

- Impacts to wildlife and adjacent properties arising from the proposed development are expected to be minor, and can be reduced through the use of the following mitigation measures:
- A biologist must be on site during the removal of the wetlands and golf course ponds to relocate any wildlife that may be using the feature. Wetland/pond removal will require a Wildlife Scientific Collection Authorization from the MNRF to relocate wildlife. Pond removal must occur between May 1 and before September 30 to reduce impacts to hibernating amphibians (**Section 7.2.4**).
- The wetlands and golf course ponds must be protected from sedimentation with the installation of erosion control fencing 5 m from the wetland boundary if construction is initiated around the feature prior to their removal (**Section 7.2.4**).
- Disturbance to nesting birds covered under the *Migratory Birds Convention Act* can be avoided through restriction of vegetation clearing activities between April 10 and August 9 (**Section 7.2.5**).
- Pre-construction surveys are recommended in the fall of 2018 to determine if the old smokehouse foundation/retaining wall provide habitat for hibernating snakes. If habitat is confirmed, grading/removal of the features must occur outside of the hibernation window for snakes (October 1 to May 30) (**Section 7.2.5**).
- Prior to the start of any construction activities, the limits of construction must be clearly delineated with construction fencing (**Section 7.2.1**).



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

Conclusion and Recommendations
August 13, 2018

- An approved Pre-grading, Erosion and Sedimentation Control Plan is recommended as part of the detailed design (**Section 7.2.3**).
- Implement proposed Stormwater management and groundwater recharge augmentation to control and treat runoff (**Section 7.2.2**)
- Pre-, during and post-construction monitoring is recommended as per the City of Waterloo Development Monitoring Protocol (**Section 8.0**).



WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

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August 13, 2018

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WATERLOO WEST SIDE EMPLOYMENT LANDS, WATERLOO ON ENVIRONMENTAL IMPACT STUDY

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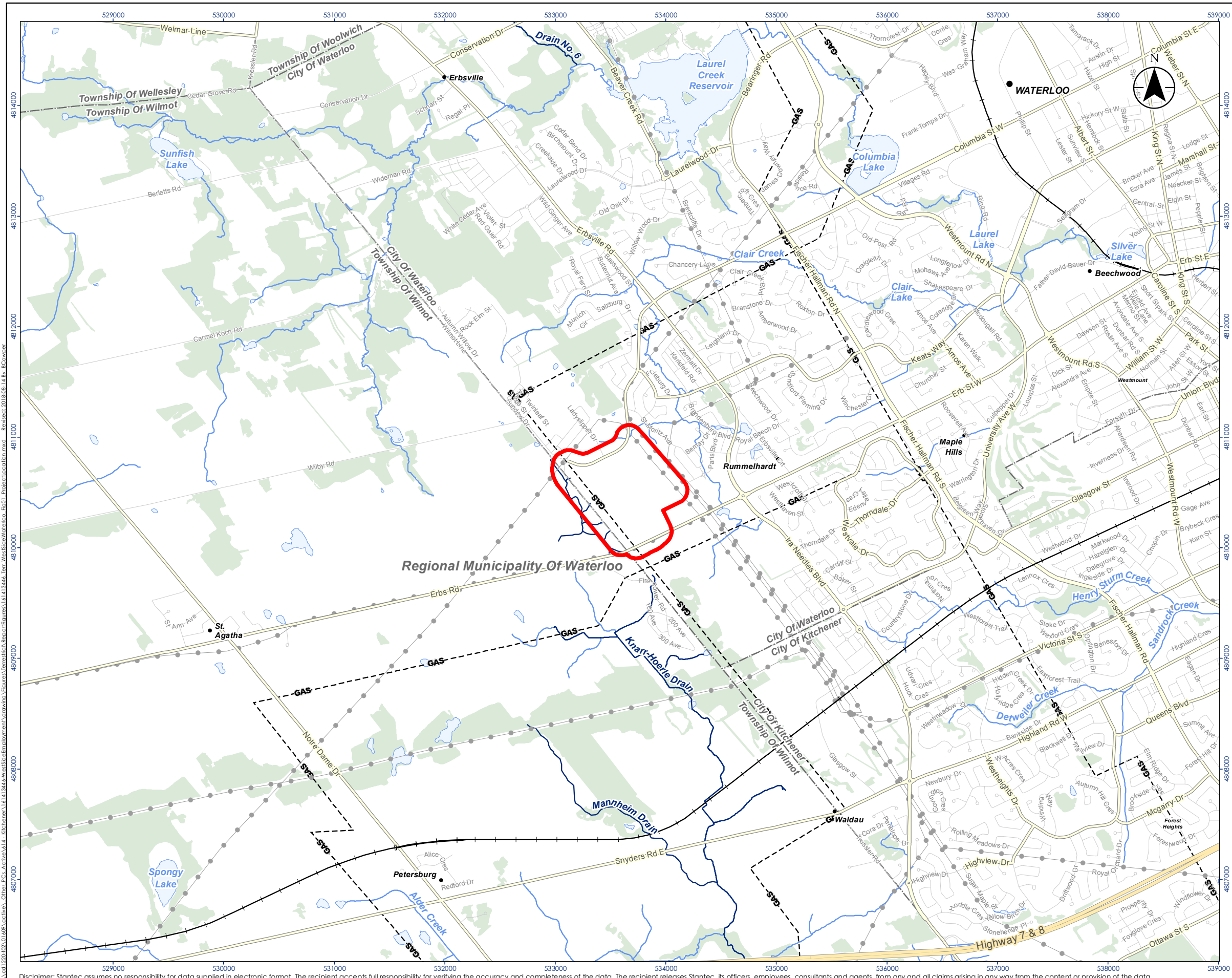
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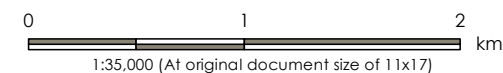
APPENDIX A:

Figures



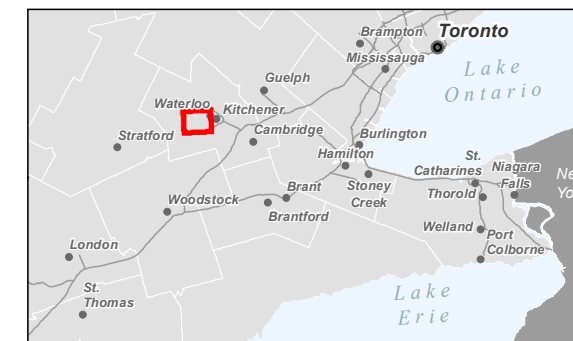
Legend

- Study Area
- Existing Features**
 - Constructed Drain
 - Expressway / Highway
 - Major Road
 - Minor Road
 - Gas Pipeline
 - Hydro Line
 - Railway - Operational
 - Watercourse
 - Municipal Boundary - Lower Tier
 - Municipal Boundary - Upper Tier
 - Waterbody
 - Wooded Area



Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017.
3. Site Plan provided by Stantec 2018-07-18, 161413446_R-DP.dwg



Project Location: City of Waterloo
161413446 REVA
Prepared by MDK on 2018-08-14
Technical Review by PW on 2017-04-20

Client/Project:
WEST SIDE EMPLOYMENT LANDS
CITY OF WATERLOO

Figure No.

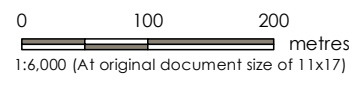
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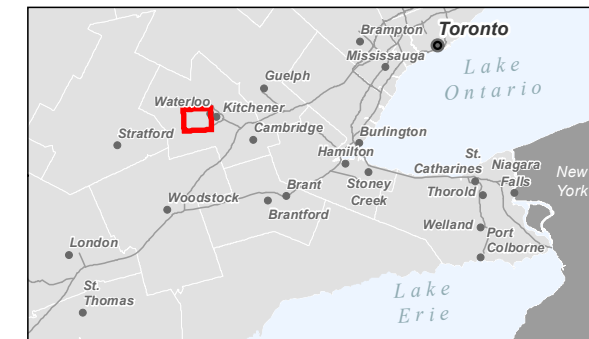
Location of Study Area



- Legend
- Study Area
 - Property Boundary
 - Subdivision Boundary
 - Constructed Drain
 - Watercourse



- Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
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 3. Site Plan provided by Stantec 2018-07-18, 161413446_R-DP.dwg
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Project Location
City of Waterloo

161413446 REVA
Prepared by MDW on 2018-08-14
Technical Review by CMC on 2018-02-20

Client/Project
WEST SIDE EMPLOYMENT LANDS
CITY OF WATERLOO

Figure No.
2

Title
Site Plan

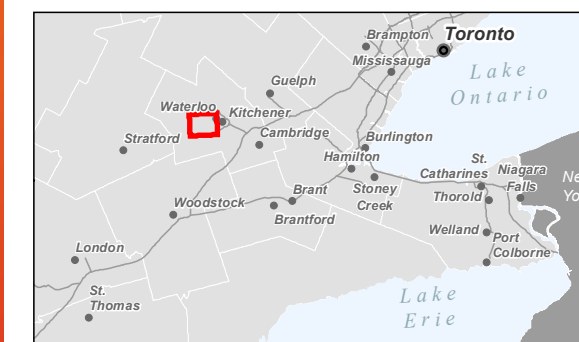


Legend

- Study Area
- Property Boundary
- Subdivision Boundary
- Constructed Drain
- Watercourse
- Regulation Limit (GRCA, 2016)
- Wetland (GRCA, 2016)

0 100 200 metres
1:6,000 (At original document size of 11x17)

- Notes**
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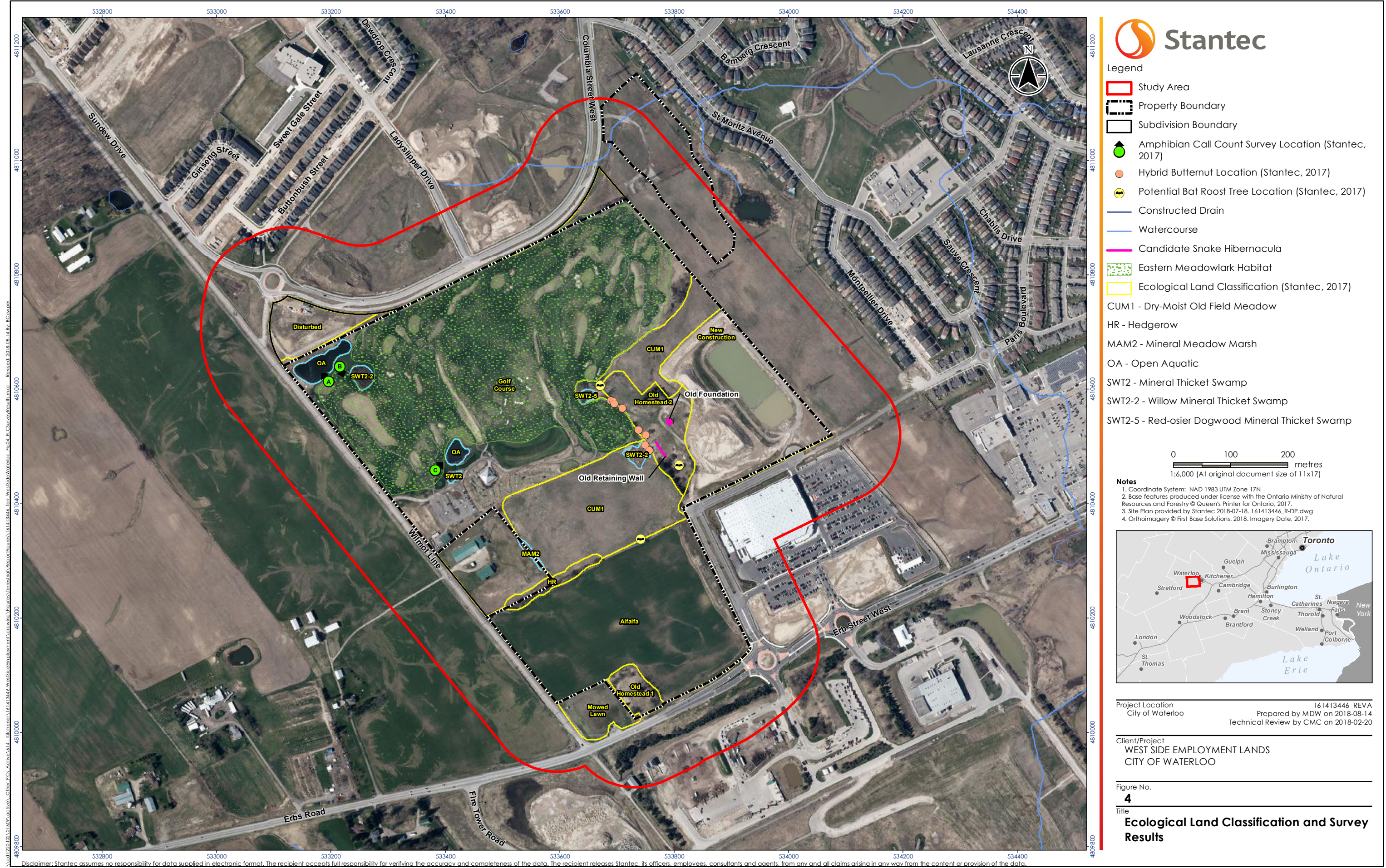
Project Location 161413446 REVA
City of Waterloo Prepared by MDW on 2018-08-14
Technical Review by CMC on 2018-02-20

Client/Project
WEST SIDE EMPLOYMENT LANDS
CITY OF WATERLOO

Figure No.
3
Title
Designated Natural Heritage Features

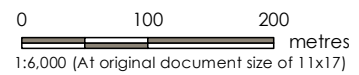
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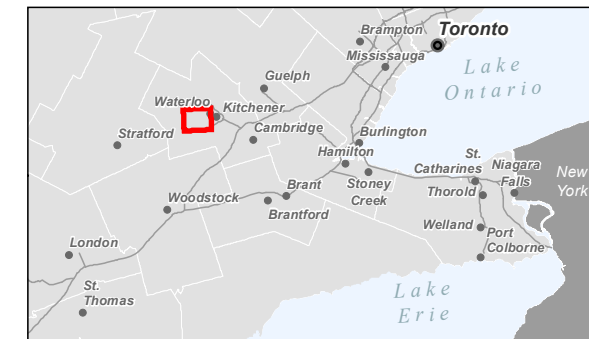


Legend

- Study Area
- Property Boundary
- Subdivision Boundary
- Amphibian Call Count Survey Location (Stantec, 2017)
- Hybrid Butternut Location (Stantec, 2017)
- Potential Bat Roost Tree Location (Stantec, 2017)
- Constructed Drain
- Watercourse
- Candidate Snake Hibernacula
- Eastern Meadowlark Habitat
- Ecological Land Classification (Stantec, 2017)
 - CUM1 - Dry-Moist Old Field Meadow
 - HR - Hedgerow
 - MAM2 - Mineral Meadow Marsh
 - OA - Open Aquatic
 - SWT2 - Mineral Thicket Swamp
 - SWT2-2 - Willow Mineral Thicket Swamp
 - SWT2-5 - Red-osier Dogwood Mineral Thicket Swamp



- Notes**
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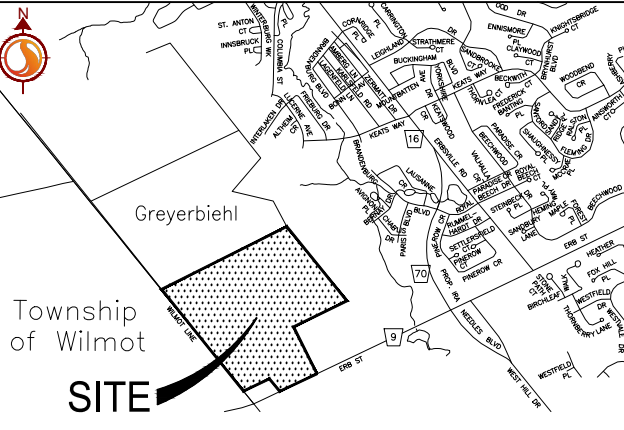
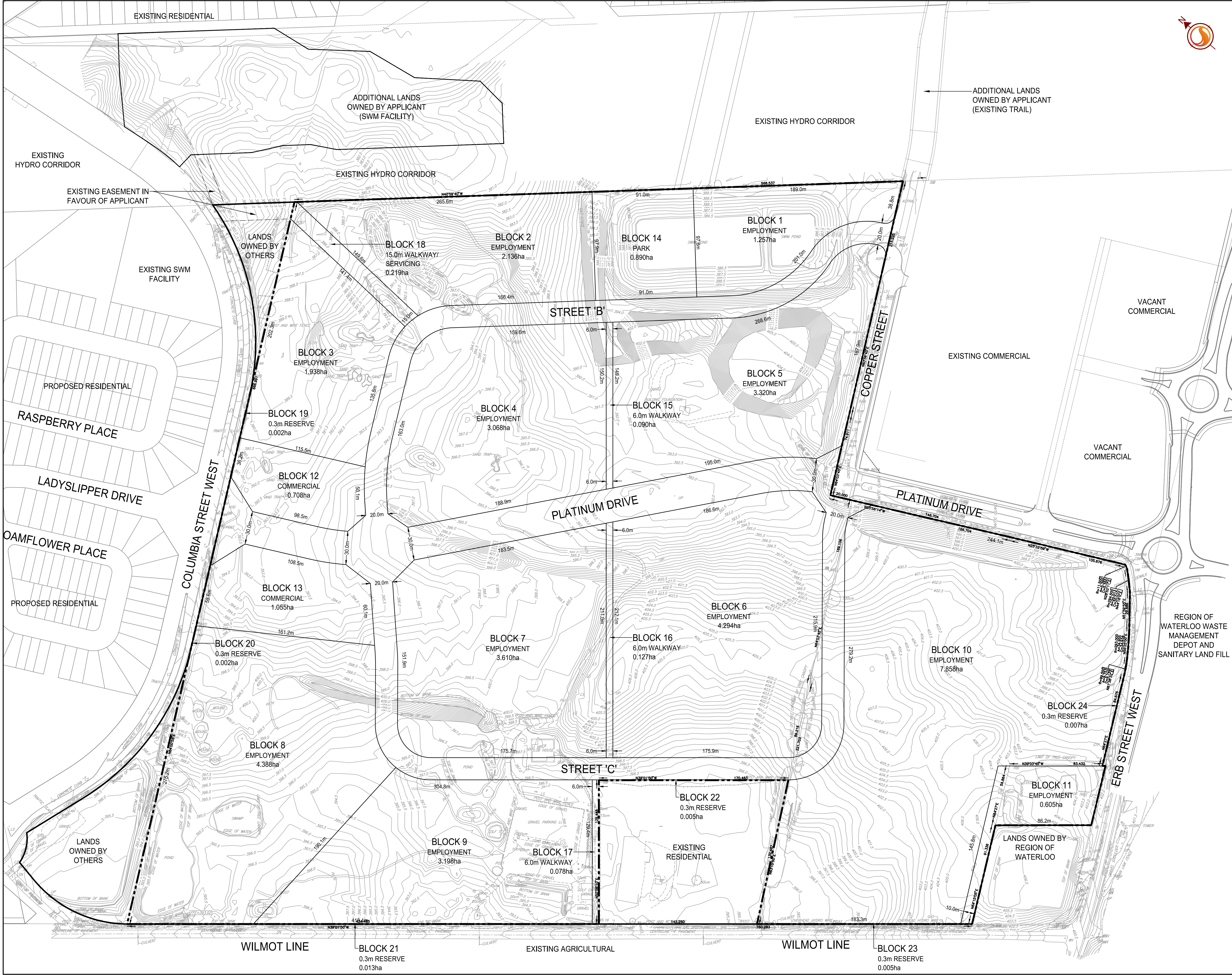
Project Location
City of Waterloo

161413446 REVA
Prepared by MDW on 2018-08-14
Technical Review by CMC on 2018-02-20

Client/Project
WEST SIDE EMPLOYMENT LANDS
CITY OF WATERLOO

Figure No.
4

Title
Ecological Land Classification and Survey Results



- a) - As Shown
- b) - As Shown
- c) - As Shown
- d) - As Listed Below
- e) - As Shown
- f) - As Shown
- g) - As Shown
- h) - Municipal Water Supply
- i) - Glacial Till
- j) - Municipal Sanitary and Storm Sewers
- k) - None
- l) - As Shown

I hereby certify the boundaries of the subject land to be subdivided on this plan and their relationship to the adjoining lands have been accurately and correctly shown.

Signed _____
O.L.S.
Company

Date _____

I hereby authorize Stantec Consulting Ltd. to submit this Draft Plan of Subdivision on my behalf.

Signed _____
Owner's Name
Company

Date _____

Lots/Blocks	Land Use	Area (ha)	Potential # of Units
BLOCKS 1-11	EMPLOYMENT	35.672	
BLOCKS 12-13	COMMERCIAL	1.763	
BLOCK 14	PARK	0.890	
BLOCKS 15-17	6.0m WALKWAY	0.295	
BLOCK 18	15.0m WALKWAY/SERVICING	0.219	
BLOCKS 19-24	0.3m RESERVE	0.034	
ROADS		4.737	
TOTAL		43.610	

Revision	By	Appd.	YY.MM.DD
File Name: 161413446_R-DP.dwg	JJ	KW	JJ 18.07.11
	Dwn.	Chkd.	Dgn.

APPROVED: _____ DATE: _____
I hereby certify that the plan was prepared under the supervision of a registered professional planner, within the meaning of the Ontario Professional Planners Institute Act, 1994.

CITY OF WATERLOO

WATERLOO WEST SIDE
EMPLOYMENT LANDS
WATERLOO, ON

DRAFT PLAN OF SUBDIVISION

Project No. 161413446	Scale 1:1500
Drawing No.	Sheet Revision

APPENDIX B:

Agency Correspondence

West Side Employment Lands

Environmental Impact Study Terms
of Reference



Prepared for:
City of Waterloo
Economic Development

Prepared by:
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4

File No. 1614
May 2, 2017

Table of Contents

1	Introduction	1
	1.1 Proposed Development	1
	1.2 Natural Heritage Features	1
2	Planning Context	1
3	Background Review	2
	3.1 Background Data Collection	2
4	Characterizing the Natural Environment – Approach and Methodology	2
	4.1 Physiography, Soils, Hydrology and Natural Hazards	2
	4.2 Field Inventory Program.....	3
	4.2.1 Vegetation communities	3
	4.2.2 Vascular Plants	3
	4.2.3 Tree inventory and preservation Plan	4
	4.2.4 Amphibian Surveys	4
	4.2.5 Breeding Bird.....	4
	4.2.6 Species at Risk	4
	4.2.7 Significant Wildlife Habitat	4
5	Data Analysis	7
	5.1 Evaluation of Significance.....	7
	5.2 Impact Assessment	7
	5.3 Mitigation	7
6	Policy Conformity.....	8
7	Monitoring	8
8	Conclusion and Recommendations	9

List of Tables

Table 1: Significant Wildlife Habitat Screening Table.....	5
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List of Appendices

Appendix A	Figures
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1 Introduction

The West Side Employment Lands represent 43 hectares of greenfield land located north of Erb Street West, east of Wilmot Line, south of the Columbia Street West extension and west of a hydro transmission corridor (**Figure 1 and 2 Appendix A**). The subject lands, which are all planned for employment uses, are the following:

- 928 Erb St. West (former Hergott farm and cider mill);
- 930 Erb St. West (existing agriculture, crop farming);
- 980 Erb St. West (former single detached dwelling); and
- 100 The Wilmot Line (currently leased to the Waterloo Golf Academy until end of 2017).

The lands are designated Business Employment in the City of Waterloo Official Plan and are zoned Agricultural. The City of Waterloo proposes to submit a Draft Plan of Subdivision and Zone Change application in support of the proposed development.

An Environmental Impact Study (EIS) will be prepared in accordance with the criteria as set out in Section 8.2.11 of the City of Waterloo Official Plan (OP).

1.1 Proposed Development

While at this time the development proposal is being refined, the proposed development will consist of Business Employment Lands which includes offices, clean light assembly/light manufacturing uses relating to the production of high-valued, high technology products and complementary businesses (restaurant, commercial recreation, etc.).

1.2 Natural Heritage Features

Schedule A4 (Natural System) of the Official Plan identifies two areas of the property as Supporting Natural Features. Supporting Natural Features are natural features that do not meet the criteria for provincial or regional significance but are locally significant. There are two separate categories within this designation, Supporting "A" Natural Features or Supporting "B" Natural Features. An Environmental Impact Study may be required to determine which category the natural features on the subject lands fit within.

The Grand River Conservation Authority (GRCA) mapping indicates that one wetland is present on the subject lands, as well as a portion of a wetland that is on "private lands" owned by others. Both wetlands are regulated by the Grand River Conservation Authority pursuant to O.Reg 150/06.

2 Planning Context

The subject lands are currently zoned Agricultural (A) in Zoning By-law 1418. A zone change is required to implement the Official Plan. Plans and policies relating to natural heritage that will be considered include the following:

- Provincial Policy Statement (2014)
- City of Waterloo Official Plan (consolidated 2014)

- Laurel Creek Subwatershed Study
- Subwatershed 314 Management Plan (1996)
- Scoped Subwatershed Study – Portion of Subwatersheds 307 and 314 (2004)
- Ontario Regulation 150/06 (Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation)
- Natural Heritage Reference Manual (OMNR 2010)
- Significant Wildlife Habitat Technical Guide (MNRF, 2000)
- Significant Wildlife Habitat EcoRegion Criteria 6E (MNRF, 2015)

3 Background Review

3.1 Background Data Collection

A background review of the following sources will be completed including, but not limited to, the following:

- Current and historical air photos
- Natural Heritage Information Centre (NHIC) database
- GRCA mapping and additional background information
- West Waterloo Commercial Centre Scoped Environmental Impact Study (2013)
- Ministry of Natural Resources and Forestry (MNRF) will be contacted to obtain additional information (where available), including possible records of species at risk (SAR) and Fish Collection Records
- Atlas of Breeding Birds of Ontario (Cadman et al., 2007)
- The Physiography of Southern Ontario, 3rd Ed. (Chapman and Putnam, 1984)

4 Characterizing the Natural Environment – Approach and Methodology

This section will describe the study area in terms biological and physical features and functions based on background review, secondary sources, consultation with agencies, and field investigations.

4.1 Physiography, Soils, Hydrology and Natural Hazards

A geotechnical study report, preliminary stormwater management report and hydrogeology report with supporting water balance will be completed to support the proposed development.

The following physical and hydrological features of the study area will be briefly described:

- identification of physiographic region, overburden, and bedrock geology
- topography
- soil types and drainage characteristics
- areas of groundwater recharge and discharge

- surface water features
- catchment areas
- seasonal high groundwater level

4.2 Field Inventory Program

The following site-specific field investigations are proposed to characterize the extent and function of the natural heritage features within the study area:

1. Two (2) botanical inventories of the vegetation communities within the study area (Spring and Summer 2017);
2. Classification of the vegetation communities (ecosites and ecotypes) based on the Ecological Land Classification (ELC) System (Lee et al., 1998) (during summer botanical survey);
3. General wildlife habitat assessment including habitat assessment for Species at Risk (during each field investigation);
4. Three (3) rounds of Amphibian Surveys as per the Marsh Monitoring Protocol (April, May and June);
5. Wetland boundary delineation with GRCA (June 2017);
6. Two (2) rounds of Breeding bird surveys; (June 2017); and
7. Incidental wildlife observations to document wildlife species presence within the study area (during each field investigation).

Preliminary field studies were completed on the subject lands in 2013 and have been used to scope the field studies.

Field surveys will be conducted within the study area where access has been granted. Where access is not available, alternate site investigations will be conducted using observations recorded from the property boundary. The field information collected from review and approval agencies will be used to characterize the natural features and ecological functions on, and adjacent to the subject site.

4.2.1 VEGETATION COMMUNITIES

Vegetation community classification will be completed as per the Ecological Land Classification system (ELC) for southern Ontario (Lee et al., 1998; updated with 2008 codes where required).

Provincial significance of vegetation communities will be based on rankings assigned by the NHIC, 2010.

Boundary delineations of the wetland will be undertaken with GRCA in June 2017. The agreed upon boundaries will be surveyed in the field using a sub-meter GPS.

4.2.2 VASCULAR PLANTS

Two botanical inventories will be conducted in early May 2017 (Spring) and late June 2017 (summer).

Flora nomenclature is based primarily on the Database of Vascular Plants of Canada (VASCAN) (Brouillet et al. 2010+) with updates to genera, specific epithets and family names as necessary

to reflect recent taxonomic revisions. The primary source of revised nomenclature is VASCAN (2016).

The provincial status of all plant species is based on Natural Heritage Information Centre (OMNRF 2015). Identification of potentially sensitive native plant species will be based on their assigned coefficient of conservatism (CC) value, as determined by Oldham et al. (1995). This CC value, 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.

4.2.3 TREE INVENTORY AND PRESERVATION PLAN

A detailed tree inventory and preservation plan will be completed as a separate report and will identify trees to be removed and retained, including their species, DBH and health. The inventory will inform the impact assessment.

4.2.4 AMPHIBIAN SURVEYS

Three amphibian surveys will be undertaken in 2017, once in each April, May, and June. Study design incorporated guidelines provided by the Marsh Monitoring Program Participant's Handbook where appropriate (Bird Studies Canada, 2009). A survey station area is a 100 m radius semicircle. The surveyor(s) will stand at the edge of the station and listen from left to right and at each survey and station, all calling toads and frogs are identified and recorded over a three-minute time period. Call levels are described using values of 1, 2, or 3. Level 1 indicates that individuals can be counted and calls are not simultaneous. Level 2 indicates that calls are distinguishable with some simultaneous calling. Level 3 indicates a full chorus where calls are continuous and overlapping (Bird Studies Canada, 2009). Calling toad or frog species from outside of the survey station, or those heard off property, are also recorded.

Station locations will target the adjacent Torrance Creek PSW, and are shown in **Appendix B**.

4.2.5 BREEDING BIRD

Breeding bird surveys in 2017 will be comprised of wandering transects by habitat type (e.g., open and forested) while recording all species identified by sound and sight. Surveys will be conducted between sunrise and 10:00 am twice between May 29 and July 7 with a minimum 10-day separation. This period corresponds to the peak breeding season.

Methods will generally be consistent with those detailed in the Breeding Bird Atlas (Cadman et al. 2007)

4.2.6 SPECIES AT RISK

A desktop screening for species at risk will be conducted in consultation with the Guelph District MNRF, City of Guelph, Significant Wildlife Habitat Technical Guide and Eco-Region 6E Criteria Schedule. Results of the background records review will be compared to the habitat assessment conducted during surveys in 2017.

4.2.7 SIGNIFICANT WILDLIFE HABITAT

Incidental wildlife observations will be recorded during every site visit and field investigation.

Where there is a potential for other wildlife habitat, determined through species at risk habitat screening, information provided by MNRF, and data collected from incidental wildlife surveys, targeted surveys will be completed following acceptable protocol.

The following table is the completed Significant Wildlife Habitat Screening Table.

Table 1: Significant Wildlife Habitat Screening Table

Significant Wildlife Habitat Type	Known Candidate SWH present within or adjacent to the subject property?	Rationale (habitat presence or absence)	Field Studies Required?
Seasonal Concentration Areas			
Deer Yarding Areas (as identified by MNRF)	None identified by MNRF	Absent, none identified by MNRF	No
Deer Winter Concentration Areas (as identified by MNRF)	None identified by MNRF	Absent, none identified by MNRF	No
Colonial Bird Nesting Habitat (tree/shrub, cliff/bank, ground)	None	No woodland, banks, pits, wetlands, rocky islands or other suitable habitat present	No
Waterfowl Stopover and Staging Areas (Aquatic, Terrestrial)	None	No fields with standing water in spring or wetlands suitable for waterfowl	No
Waterfowl Overwintering Areas (as identified by MNRF)	None identified by MNRF	No, large waterbody absent	No
Raptor Wintering (Feeding and Roosting) Areas	None	Insufficient meadow habitat present (<15 ha) on adjacent habitat to the north	No
Turtle Wintering Areas	Yes	Possible habitat present in golf course ponds	habitat assessment required
Reptile (Snake) Hibernacula	Unknown	Possible habitat present	habitat assessment required
Bat Hibernacula	None	No caves, mine shafts, underground formations or Karsts.	No
Bat Maternity Colonies	Unknown	Property maintained as an active golf course. Possible habitat in trees	habitat assessment required
Rare Vegetation Communities			
Alvar	None	Habitat not present	ELC survey completed in 2013
Prairie			
Savannah			

Table 1: Significant Wildlife Habitat Screening Table

Significant Wildlife Habitat Type	Known Candidate SWH present within or adjacent to the subject property?	Rationale (habitat presence or absence)	Field Studies Required?
Rare Forest Types			
Cliff/Talus			
Rock Barrens			
Sand Barrens			
Other Rare Vegetation Types			
Specialized Habitats for Wildlife			
Waterfowl Nesting Area	None	Habitat not present	No
Bald Eagle and Osprey nesting, foraging and Perching Habitat	None	Habitat not present	No
Woodland Raptor Nesting Habitat	None	No Forested habitat present	No
Amphibian Breeding Habitat (Woodland, Wetland)	Yes	Swamp habitat present	Yes – amphibian surveys
Turtle Nesting Habitat	Yes	Suitable substrate in golf course sand traps	Yes – habitat assessment
Bald Eagle Wintering Areas	None	Habitat not present	No
Seeps and Springs	Unknown	Unknown	Yes – habitat assessment
Wildlife Movement Corridors			
Animal Movement Corridors (including ecological linkages)	None	Habitat present north of development	No
Habitats of Species of Conservation Concern			
Marsh Bird Breeding Habitat	None	Habitat not present	No
Woodland Area-Sensitive Breeding Habitat	None	Habitat not present	No
Open Country Bird Breeding Habitat	Unknown	Unknown	Yes – breeding bird studies
Shrub/Early Successional Breeding Bird Habitat	Unknown	Unknown	Yes – breeding bird studies
Terrestrial Crayfish Habitat	Unknown	Edges of wetlands	Yes – incidental wildlife observations

Table 1: Significant Wildlife Habitat Screening Table

Significant Wildlife Habitat Type	Known Candidate SWH present within or adjacent to the subject property?	Rationale (habitat presence or absence)	Field Studies Required?
Global Species of Conservation Concern as identified by the NHIC	None	Habitat not present	No
Federal Species of Conservation Concern	To be confirmed with MNRF/NHIC records, GRCA and DFO	Unknown	Yes - habitat assessment for SAR
Provincial Species of Conservation Concern	To be confirmed with MNRF/NHIC records, GRCA and DFO	Unknown	Yes - habitat assessment

This section will evaluate identified natural heritage features and areas, and associated ecological functions within the study area. The areas/features identified will be screened against applicable policies and guidelines to confirm their significance in the City of Waterloo.

5 Data Analysis

5.1 Evaluation of Significance

The data obtained from the field investigations and review of background studies will be evaluated to determine sensitivity of features and functions. The criteria for determining significant features and functions will be evaluated according to the following documents:

- Natural Heritage Reference Manual
- Significant Wildlife Habitat Technical Guide
- Significant Wildlife Habitat EcoRegion 6E Schedule
- City of Waterloo Official Plan

5.2 Impact Assessment

The significant natural features identified in the evaluation will need to be protected from the proposed development. These features will include, but are not limited to potential habitat for SAR and significant wildlife habitat. They will be evaluated for potential impacts from construction and grading including the trail, stormwater management, erosion and sediment control, noise, and other development related impacts.

The primary management approach to avoid impacts on significant and sensitive natural features is to identify and avoid site-specific constraints to the extent possible.

5.3 Mitigation

Avoiding negative impacts is preferred over mitigation. Where impacts are unavoidable, mitigation measures to reduce or reduce impacts on features will be recommended.

This section will include an analysis of buffers and setback, description of proposed compensation for impacts that cannot be mitigated (if applicable); restoration plans for disturbed areas; and measures proposed to reduce or eliminate and off-set impacts.

Where possible, processes for the restoration and enhancement of natural features will be recommended to encourage a net benefit. Mitigation measures considered for the subject will include, but are not limited to:

- sediment and erosion controls
- location of fill piles, construction access, machinery storage
- tree protection fencing and signage
- timing windows for vegetation removal (if applicable)
- implementation of appropriate buffers and setback distances from natural hazards and heritage features
- naturalization and tree planting in areas on the subject site

6 Policy Conformity

The relevant natural heritage provincial, regional, municipal and conservation authority policies and regulations will be reviewed. The proposed development plan will adhere to and respect the relevant natural heritage and floodplain policies.

7 Monitoring

This section will describe the appropriate monitoring procedure to determine if the recommended mitigation measures have been implemented in accordance with approved development plans.

Monitoring plans may include a combination of compliance monitoring, performance monitoring and/or effectiveness monitoring. Monitoring protocols will be established to standardize the procedures to ensure findings can be compared over a set time.

Monitoring will track the proposed mitigation measures to determine compliance with the approved development plans and recommend corrective actions if necessary, including:

- Monitoring during all phases of construction for compliance with grading, erosion and sediment controls, and controls to prevent encroachment outside the limits of the proposed development;

8 Conclusion and Recommendations

The conclusion will include a summary of recommendations emerging from the EIS, as well as an evaluation of net effects if the recommendations are implemented, and if the proposed development conforms to the relevant environmental policies.

Regards,

STANTEC CONSULTING LTD.



Shari Muscat, B.A., BES

Project Manager/Environmental Planner

Phone: (519) 575-4116

Cell: (226) 339-7900

shari.muscat@stantec.com



Sean Spisani, B. Sc., ERGC

Senior Ecologist

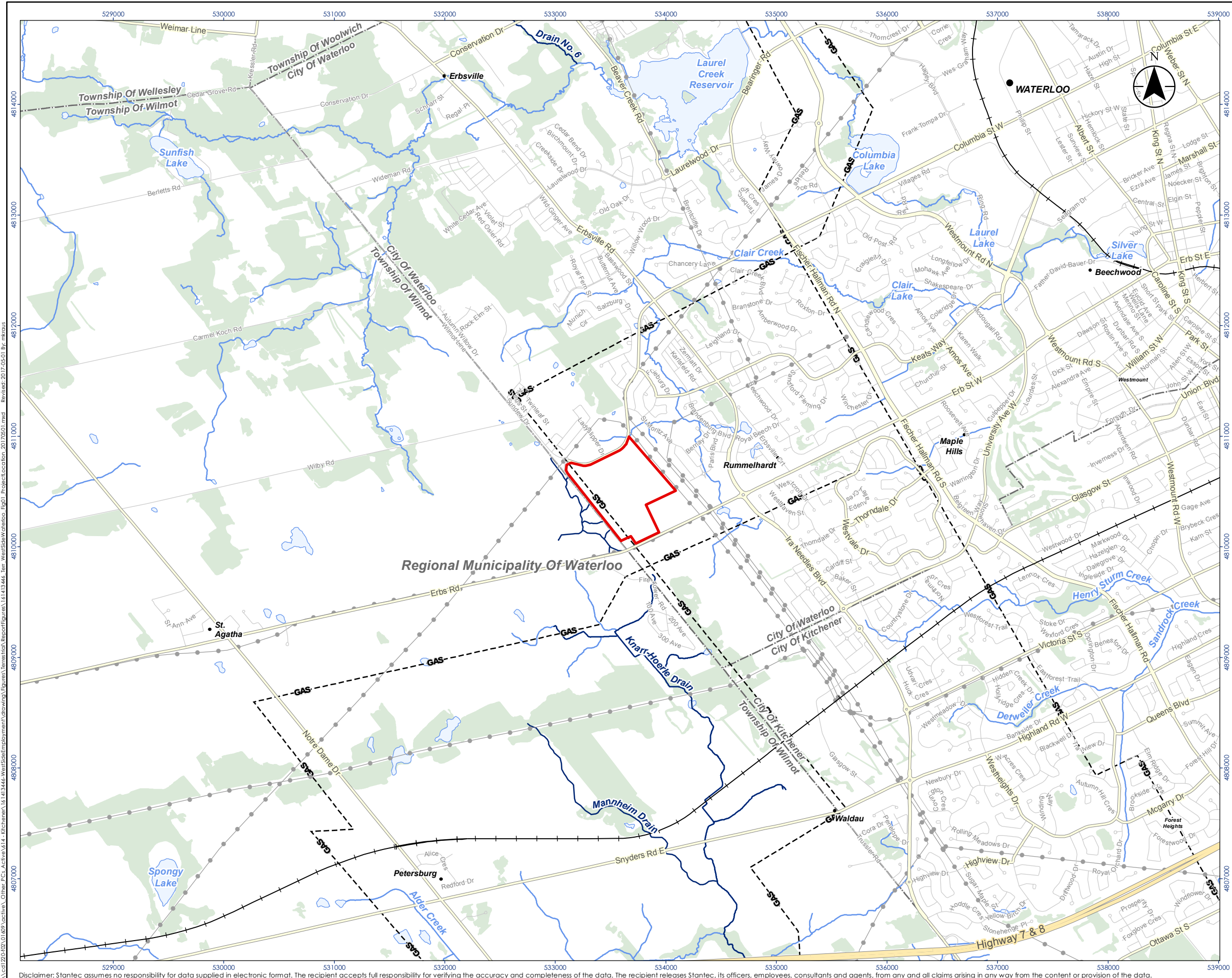
Phone: (905) 381-3223

Cell: (289) 208-6934

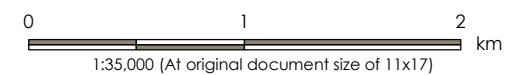
sean.spisani@stantec.com

APPENDIX A

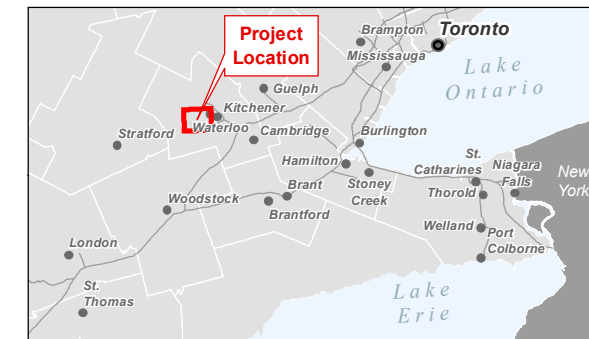
Figures



- Legend
- Study Area
 - Existing Features
 - Constructed Drain
 - Expressway / Highway
 - Major Road
 - Minor Road
 - Gas Pipeline
 - Hydro Line
 - Railway - Operational
 - Watercourse
 - Municipal Boundary - Lower Tier
 - Municipal Boundary - Upper Tier
 - Waterbody
 - Wooded Area



- Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.



Project Location
City of Waterloo

161413446 REVA
Prepared by MDK on 2017-05-01
Technical Review by PW on 2017-04-20

Client/Project
WEST SIDE EMPLOYMENT LANDS
CITY OF WATERLOO

Figure No.
1
Title
Location of Study Area



Stantec Consulting Ltd.
100-300 Hagey Blvd., Waterloo, ON N2L 0A4

August 24, 2017
File: 161413446

Attention: Species at Risk Biologist

Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West
Guelph, ON N1G 4Y2
Via email: esa.guelph@ontario.ca

Reference: Waterloo Westside Employment Lands Environmental Impact Study

Stantec Consulting Ltd. (Stantec) has been retained by the City of Waterloo to prepare an Environmental Impact Study (EIS) in support of a Zoning By-Law Amendment and Official Plan Amendment to develop the Westside Employment Lands (Subject Property) for commercial and employment use. The Subject Property is located at the northeast corner of the intersection of Erb Street West and Wilmot Line in Waterloo, Ontario (refer to the attached Study Area figures).

The purpose of this letter is to introduce the project, to seek your input on the existing conditions within the Study Area, and to identify any issues, concerns or approval requirements that the MNRF may have. We would like to request the following natural heritage information from your office for the Study Area as identified. This information is required to complete our natural heritage review and inform field investigations associated with the project.

TERRESTRIAL RESOURCES

A review of the existing policies and background information was undertaken during the preparation of this letter. No Areas of Natural and Scientific Interest, Provincially Significant Wetlands, designated Significant Wildlife Habitat or other designated natural areas were identified in the Study Area. No recent records (1987+) of species at risk or species or provincially rare species were identified for the 1 km NHIC squares overlapping the Study Area boundary.

Field investigations identified nine butternuts in the Study Area, however all trees were identified as planted hybrids during the Butternut Health Assessment. Large areas of cultural meadow on site had the potential to provide habitat for Eastern Meadowlark and/or Bobolink, however neither species was observed during field investigations. Additionally, there was no evidence of Barn Swallow nesting observed on any of the buildings on the Subject Property.



August 24, 2017
Guelph District MNRF
Page 2 of 2

Reference: Waterloo Westside Employment Lands Environmental Impact Study

SUMMARY

Stantec respectfully requests any additional information you may have for the Study Area as identified on the attached figure, including information regarding species at risk, significant wildlife habitat and designated natural heritage features.

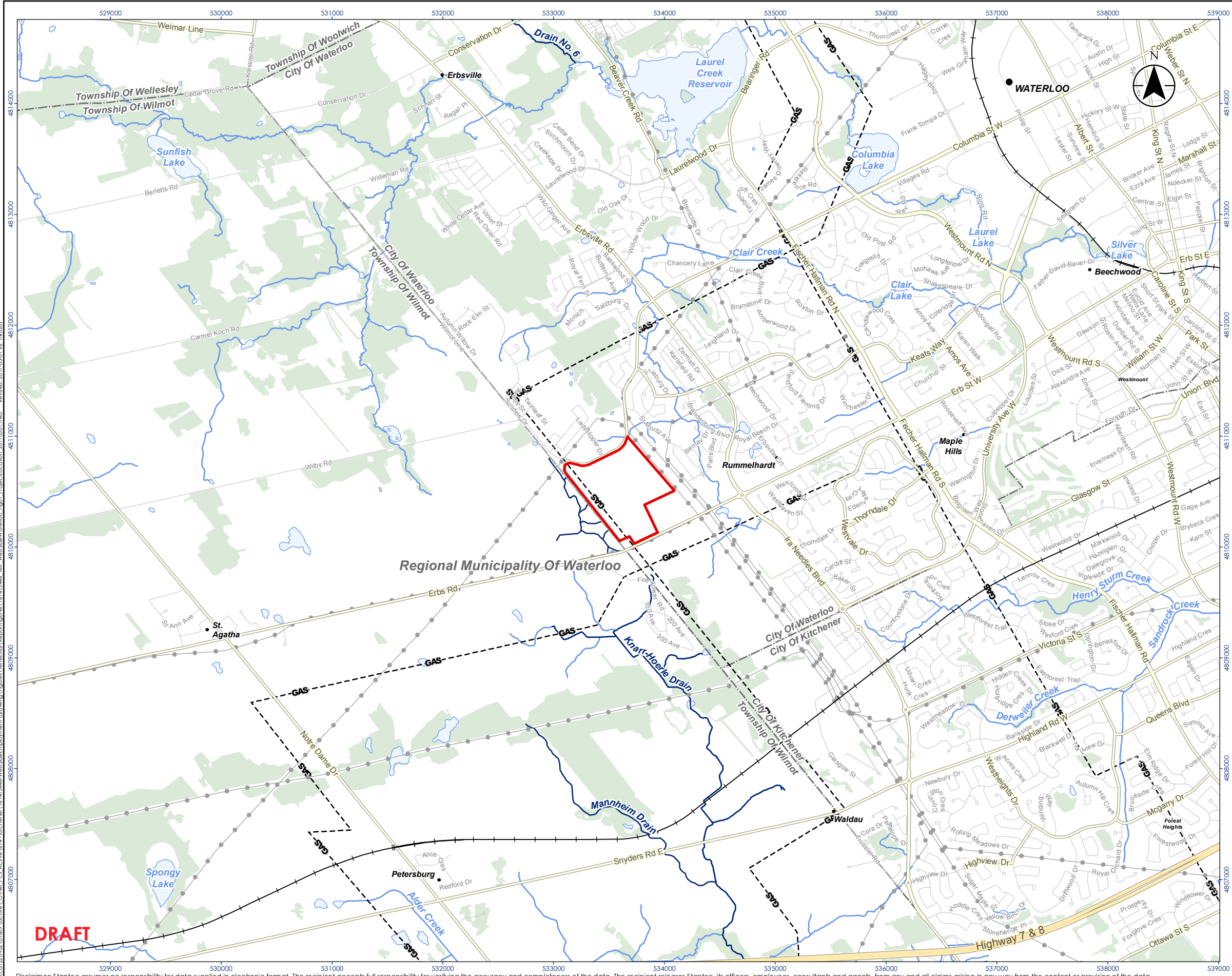
Please do not hesitate to contact me should you require further information.

Regards,

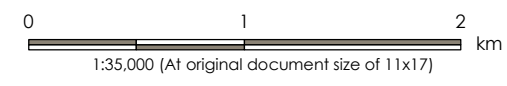
STANTEC CONSULTING LTD.

Janice Ball
Terrestrial Ecologist
Phone: (519) 585-7287
janice.ball@stantec.com

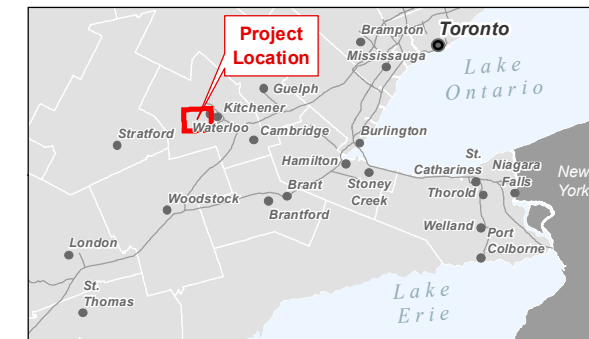
Attachments: Study Area Figures
Guelph District MNRF Information Request Form



- Legend
- Study Area
 - Existing Features
 - Constructed Drain
 - Expressway / Highway
 - Major Road
 - Minor Road
 - Gas Pipeline
 - Hydro Line
 - Railway - Operational
 - Watercourse
 - Municipal Boundary - Lower Tier
 - Municipal Boundary - Upper Tier
 - Waterbody
 - Wooded Area



- Notes
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Project Location
City of Waterloo

161413446 REVA
Prepared by MDK on 2017-05-01
Technical Review by PW on 2017-04-20

Client/Project
WEST SIDE EMPLOYMENT LANDS
CITY OF WATERLOO

Figure No.
1

Title
Location of Study Area

DRAFT

Guelph District MNRF Information Request Form



Consultant Name:	Janice Ball		
Company Name:	Stantec Consulting Ltd		
Email Address:	janice.ball@stantec.com		
Phone Number:	(519) 585-7287		
Proponent Name:	City of Waterloo		
Project Name:	Waterloo Westside Employment Lands		
Property Address:	see attached letter and figure for locations		
Township/Municipality:	Region of Waterloo		
Lot & Concession:	see attached letter and map		
UTM Coordinates: (NAD83)			
	Easting (X)		Northing (Y)
Brief Description of Undertaking:	See attached letter		

Have you previously contacted someone at MNRF for information on this site? Yes ☐ No ☒

If yes, when and who?

Provide a map of accurate scale to illustrate footprint/study area of the proposed activity in relation to the surrounding landscape (e.g. property boundaries, roads, waterbodies, natural features, towns, and other human landmarks). Use of aerial photography is strongly encouraged. Include scale, north arrow and legend.

ATTACHMENTS – I have attached a:

☐ Picture

☒ Map

☐ Other

REQUEST - I would like to request the following information for the property identified above:

**Requires an appointment and remittance of fees.*

☐ Wetland evaluation and data record *
(please provide name of wetland if known)

☐ ANSI Checksheet *
(please provide name of ANSI if known)

☐ Fish Dot Information *
(fish and other aquatic species found in a particular area of a watercourse)

☒ Provincially Tracked Species/Species at Risk

☒ Other

see attached letter

Please forward the completed form to: esa.guelph@ontario.ca

Or send by mail:

Guelph District, Ministry of Natural Resources and Forestry
1 Stone Road West Guelph, ON N1G 4Y2

From: [Buck, Graham \(MNRF\)](#)
To: [Ball, Janice](#)
Subject: RE: Waterloo Westside Employment Lands Information Request
Date: Thursday, September 21, 2017 10:32:13 AM

The Ministry has not identified any ANSIs, wetlands, or habitat of endangered or threatened species on these lands.

There is an unconfirmed observation of a Grey fox from this area, but the habitats on the area in question do not appear suitable for this species.

If the species is residing in the area it would be using the wooded areas to the north and south and perhaps was observed moving through the area.

In addition the observation was not validated with any tracks, scat or photographs so there is some question on the validity of the observation, from October 2015.

Graham

*Graham Buck
Management Biologist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West Guelph ON
N1G 4Y2
519 826 4505
graham.buck@ontario.ca*

From: ESA Guelph (MNRF)
Sent: September-08-17 9:19 AM
To: Buck, Graham (MNRF)
Subject: FW: Waterloo Westside Employment Lands Information Request

From: Ball, Janice [<mailto:Janice.Ball@stantec.com>]
Sent: August-24-17 11:54 AM
To: ESA Guelph (MNRF)
Subject: Waterloo Westside Employment Lands Information Request

Hello,

Please refer to the attached Info Request for the Waterloo Westside Employment Lands Environmental Impact Study.

Regards,

Janice Ball, B.Sc.
Terrestrial Ecologist
Stantec
100-300 Hagey Boulevard, Waterloo ON N2L 0A4
Phone: (519) 585-7287
Cell: (519) 546-9132
Janice.Ball@stantec.com

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APPENDIX C:

Species at Risk Habitat Assessment

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Amphibians	Jefferson Salamander	Ambystoma jeffersonianum	END	END-END	S2	MNRF 2017	Adult Jefferson Salamanders are found underground in rodent burrows or under rocks and logs in moist deciduous forest (MNRF 2016). Eggs are laid on the underside of vegetation in woodland ponds, where larvae spend the first few months after hatching (MNRF 2016).	Recent Ontario Nature records exist for Jefferson/Blue-spotted Hybrid Salamanders. No deciduous forest with vernal pools in the Study Area to support this species.	Low
Amphibians	Western Chorus Frog (GLSL Pop.)	Pseudacris triseriata	NAR	THR-THR	S3	Ontario Nature 2017	The Western Chorus Frog prefers small, ephemeral wetlands disconnected from other water sources for breeding (Environment Canada 2015; COSEWIC 2008d). The temporary nature of these wetlands leads to a reduction in predation pressure, but also makes entire populations susceptible to seasonal events such as premature drying due to climate conditions (Environment Canada 2015). The vegetation composition in breeding ponds is typically herbaceous with the presence of occasional shrubs or partially submerged trees forming a discontinuous or open canopy (Environment Canada 2015). Some populations may breed at the edges of closed-canopy habitats (Environment Canada 2015).	Recent Ontario Nature records exist. Potential habitat was present in the SWT2-2 community. Amphibian surveys failed to detect this species.	Low
Birds	Acadian Flycatcher	Empidonax virescens	END	END-END	S2S3B	MNRF 2017, OBBA 2017	The Acadian Flycatcher typically breeds in mature deciduous forest with a dense canopy closure and ravines, or in forested swamps with maple and beech trees (MNRF 2016). This species is sensitive to disturbance and is generally found in large, undisturbed forest tracts (COSEWIC 2010a).	OBBA records exist for the Waterloo area. No forested communities present in the Study Area. Breeding bird surveys failed to detect this species.	Low
Birds	Bank Swallow	Riparia riparia	THR	THR-NS	S4B	OBBA 2017	The Bank Swallow breeds on a variety of sites with vertical banks, including riverbanks, bluffs, aggregate pits and stock piles of sand and soil (COSEWIC 2013a). Sand-silt substrates are preferred (COSEWIC 2013a). Nesting sites are often near open habitats used for aerial foraging (COSEWIC 2013a). Large wetlands are used as communal roosts during post-breeding, migration, and wintering periods (COSEWIC 2013a).	OBBA records exist for the Waterloo area. Exposed sandy banks were present in the new construction area on the east side of the Study Area. Bank Swallow was observed during the breeding bird survey foraging above the northernmost golf course pond in low numbers. Bank Swallow was not observed in the vicinity of the new construction.	Confirmed. Potential breeding habitat observed in the interior exposed banks facing the stormwater management pond.
Birds	Barn Swallow	Hirundo rustica	THR	THR-NS	S4B	OBBA 2017	The Barn Swallow commonly nests on walls or ledges of barns, bridges, culverts or other man-made structures (Cadman et al. 2007). Where suitable nesting structures occur, Barn Swallow often form small colonies, sometimes mixed with other swallow species (COSEWIC 2011a). The Barn Swallow feeds on aerial insects while foraging over a variety of open habitats such as pastures, lawns, meadows and fields (COSEWIC 2011a). It will also frequently forage in woodland clearings, over wetland habitats or open water where insect prey are abundant (Cadman et al. 2007).	OBBA records exist for the Waterloo area. Barn swallows were observed foraging over golf course and large cultural meadow, however no nests were identified on any of the buildings in the Study Area.	Confirmed, however no breeding habitat present in the Study Area.

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Birds	Black Tern	Chlidonias niger	SC	NAR-NAR	S3B	MNRF 2016, OBBA 2017	The Black Tern prefers cattail marshes for breeding, where it builds its floating nests in loose colonies (MNRF 2016). It is primarily an aerial insectivore, but will dive to feed on fish (Cornell Lab of Ornithology 2015).	OBBA records exist for the Waterloo area, however this species prefers large areas of emergent aquatic vegetation adjacent to large bodies of water which are not present in the Study Area. Breeding bird surveys failed to detect this species.	Low
Birds	Bobolink	Dolichonyx oryzivorus	THR	THR-NS	S4B	MNRF 2016, OBBA 2017	The Bobolink is generally referred to as a “grassland species”. It nests primarily in forage crops with a mixture of grasses and broad-leaved forbs, predominantly hayfields and pastures. Preferred ground cover species include grasses such as Timothy and Kentucky bluegrass and forbs such as clover and dandelion (COSEWIC 2010b). Bobolink is an area-sensitive species, with reported lower reproductive success in small habitat fragments (COSEWIC 2010b).	OBBA records exist for the Waterloo area. Suitable tallgrass fields or grasslands became available once maintenance activities ceased on the golf course lands.	Confirmed one male Bobolink on the former golf course lands in 2018.
Birds	Canada Warbler	Cardellina canadensis	SC	THR-THR	S4B	OBBA 2017	The Canada Warbler is found in wet deciduous, coniferous and mixed forests with a dense shrub layer and complex forest floor (MNRF 2016; COSEWIC 2008a), in riparian shrub forests, regenerating stands and in old-growth forest (COSEWIC 2008a). It nests on the ground or on mossy logs or roots near stream banks or on hummocks (MNRF 2016).	OBBA records exist for the Waterloo area. No forested communities present in the Study Area. Breeding bird surveys failed to detect this species.	Low
Birds	Cerulean Warbler	Dendroica cerulea	THR	END-SC	S3B	MNRF 2017, OBBA 2017	The Cerulean Warbler is found in mature deciduous forest with large trees and an open understory (MNRF 2016; COSEWIC 2010c). They can be found in moist lowland forest or drier upland forest (COSEWIC 2010c).	OBBA records exist for the Waterloo area. No forested communities present in the Study Area. Breeding bird surveys failed to detect this species.	Low
Birds	Chimney Swift	Chaetura pelagica	THR	THR-THR	S4B, S4N	OBBA 2017	Chimney Swift uses chimneys for roosting and breeding, and less commonly, nest in large hollow trees (Cadman et al. 2007). Nesting sites typically have a constant ambient temperature (COSEWIC 2007). It is an aerial insectivore, and often forages near water (COSEWIC 2007).	OBBA records exist for the Waterloo area. No suitable nesting structures were observed and breeding habitat was not present. Breeding bird surveys failed to detect this species.	Low
Birds	Common Nighthawk	Chordeiles minor	SC	THR-THR	S4B	OBBA 2017	The Common Nighthawk is an aerial insectivore and forages at dawn and dusk. This species nests on the ground in open habitats with rocky or graveled substrate, and will even nest on gravel roofs in the city (Cadman et al. 2007). The regeneration or succession of forest clearings and the destruction of grassland habitats appear to play a major role in this species’ decline along with the non-selective spraying for mosquitoes (Cadman et al. 2007).	OBBA records exist for the Waterloo area. Suitable open habitat with gravelly substrate occurred on the old homestead lands. No evidence of Common Nighthawk nesting observed during any of the field investigations.	Low
Birds	Eastern Meadowlark	Sturnella magna	THR	THR-NS	S4B	MNRF 2017, OBBA 2017	The Eastern Meadowlark is typically found in fields, meadows, golf courses, pastures, alfalfa fields, roadsides and other open areas (MNRF 2016). Older sites with moderately tall grass, a substantial litter layer, low forb and shrub cover and dense grass are preferred (COSEWIC 2011b). Larger patch sizes (>5 ha) are also generally preferred (COSEWIC 2011b).	OBBA records exist for the Waterloo area. Potentially suitable habitat was present in the meadow communities in the Study Area. Suitable tallgrass fields or grasslands also became available once maintenance activities ceased on the golf course lands. Breeding bird surveys in 2018 confirmed three Meadowlarks on the former golf course lands.	Confirmed three Eastern Meadowlarks on the former golf course lands in 2018.

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Birds	Eastern Whip-poor-will	Antrostomus vociferus	THR	THR-THR	S4B	MNRF 2017	The Eastern Whip-poor-will is typically found in areas with a mixture of open and forested habitats such as savannahs, open woodlands or openings in mature forests (MNRF 2016). Common tree associations are pine and oak (COSEWIC 2009a). Semi-open and patchy forests are preferred, as are areas with little ground cover such as rock barrens (COSEWIC 2009a). Nests are usually found on the ground in forested areas (MNRF 2016).	No nearby recent records. No forest communities present in the Study Area.	Low
Birds	Eastern Wood-Pewee	Contopus virens	SC	SC-NS	S4B	OBBA 2017	The Eastern Wood-Pewee is found in the mid-canopy layer of deciduous and mixedwood forests with open understories, and is commonly associated with edges and clearings (MNRF 2016).	OBBA records exist for the Waterloo area. No forest communities present in the Study Area. Breeding bird surveys failed to detect this species.	Low
Birds	Golden-winged Warbler	Vermivora chrysoptera	SC	THR-THR	S4B	OBBA 2017	The Golden-winged Warbler is found in early-successional shrubby areas surrounded by mature forest, including field edges, hydro or utility Right-of-Ways or logged areas (MNRF 2016; COSEWIC 2006a). It can also be found in dry uplands, swamp forests and marshes (COSEWIC 2006a).	OBBA records exist for the Waterloo area. No early successional habitats were present on site. Breeding bird surveys failed to detect this species.	Low
Birds	Grasshopper Sparrow	Ammodramus savannarum	SC	SC-NS	S4B	OBBA 2017	The Grasshopper Sparrow is found in large (>5 ha) sparsely vegetated grasslands, hay fields, pastures, prairies and alvars with well-drained, sandy soil (MNRF 2016; COSEWIC 2013b). The nests are typically well hidden in grasses (MNRF 2016).	OBBA records exist for the Waterloo area. No tallgrass communities such as pastures, grasslands or prairies were present on site. Breeding bird surveys failed to detect this species.	Low
Birds	Least Bittern	Ixobrychus exilis	THR	THR-THR	S4B	MNRF 2017, OBBA 2017	The Least Bittern prefers cattail marshes, but may be found in a variety of wetland habitats with stable water levels and dense vegetation interspersed with open water areas (MNRF 2016; COSEWIC 2009b). Nests are built in dense vegetation near open water for foraging (MNRF 2016).	OBBA records exist for the Waterloo area. Wetland communities identified in the Study Area were too small and lacked stable water levels required for this species.	Low
Birds	Loggerhead Shrike	Lanius ludovicianus	END	NS-END (migrans spp.)/END-NS (ssp.)	S2B	MNRF 2017	Loggerhead Shrike prefers open fields, pastures, prairies, savannahs, alvars and grasslands with an abundance of low trees and shrubs for perching (COSEWIC 2014; MNRF 2016). Nests are typically built in low trees and shrubs with dense branches (COSEWIC 2014).	No nearby recent records. Open fields with an abundance of low trees and shrubs were present within the larger old homestead, however breeding bird surveys failed to detect this species.	Low
Birds	Louisiana Waterthrush	Seiurus motacilla	SC	THR-SC	S3B	MNRF 2017	The Louisiana Waterthrush prefers headwater streams and wetlands in large tracts of mature forest (COSEWIC 2015), but but may also be found in deciduous swamps with open water (MNRF 2016). It nests under fallen logs, in root masses or in niches in stream banks (MNRF 2016; COSEWIC 2015).	No nearby recent records. No headwater streams or large continuous tracts of mature forest were present on site. Breeding bird surveys failed to detect this species.	Low
Birds	Northern Bobwhite	Colinus virginianus	END	END-END	S1	OBBA 2017	The Northern Bobwhite breeds in a variety of habitat early successional habitat types, including grasslands, croplands and brushy areas (COSEWIC 2003). Nesting occurs in grasslands in the summer (COSEWIC 2003). Croplands are required in summer and fall for feeding, dusting, loafing and roosting, and brushy habitat is required for roosting, feeding and escape during the fall and winter (COSEWIC 2003).	OBBA records exist for the Waterloo area. No early successional habitats were present on site. Breeding bird surveys failed to detect this species.	Low

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Birds	Peregrine Falcon	Falco peregrinus	SC	SC-SC	S3B	MNRF 2017, OBBA 2017	The Peregrine Falcon traditionally prefers rock cliffs, particularly those adjacent to water (MNRF 2016). More recently, this species has been released in various urban centres in Ontario where it successfully nests on tall buildings (Cadman et al. 2007; MNRF 2016).	OBBA records exist for the Waterloo area. No cliffs or tall structures to support nesting were present on site.	Low
Birds	Red-headed Woodpecker	Melanerpes erythrocephalus	SC	THR-THR	S4B	OBBA 2017	The Red-headed Woodpecker prefers open woodlands and forest edges, and is often found in disturbed areas such as cemeteries, parks and golf courses (MNRF 2016). This species shows a preference for dead or dying trees and at least a few snags or large dead limbs are necessary for its presence in more open habitats (Cadman et al. 2007).	OBBA records exist for the Waterloo area. Suitable habitat was present in the old homestead properties. Breeding bird surveys failed to detect this species.	Low
Birds	Short-eared Owl	Asio flammeus	SC	SC-SC	S2N, S4B	OBBA 2017	The Short-eared Owl is typically found in a variety of unforested habitats such as grasslands, fallow pastures, marshes and tundra where it nests on the ground (MNRF 2016; COSEWIC 2008c). The primary factor influencing habitat selection appears to be abundance of small mammals, especially voles (MNRF 2016; COSEWIC 2008c).	OBBA records exist for the Waterloo area. The cultural meadow communities in the Study Area may provide suitable habitat for this species. Breeding bird surveys failed to detect this species.	Low
Birds	Wood Thrush	Hylocichla mustelina	SC	THR-NS	S4B	OBBA 2017	The Wood Thrush is found in deciduous and mixed forests with a developed understory and tall trees (MNRF 2016). While it prefers large forest tracts, it will utilize smaller forest fragments (MNRF 2016). Nests are constructed in shrubs or saplings, typically Sugar Maple or American Beech (MNRF 2016).	OBBA records exist for the Waterloo area. No forest communities present in the Study Area. Breeding bird surveys failed to detect this species.	Low
Birds	Yellow-breasted Chat	Icteria virens	END	END-END	S2B	MNRF 2017	The Yellow-breasted Chat requires dense, low shrubby vegetation and is usually associated with early successional shrub thickets (MNRF 2016; COSEWIC 2011d). It is typically found in abandoned agricultural fields, hydro lines, Right-of-ways, wetlands and pond edges (COSEWIC 2011d).	No nearby recent records. No early successional habitats were present on site. Breeding bird surveys failed to detect this species.	Low
Invertebrates	Rusty-patched Bumble Bee	Bombus affinis	END	END-END	S1	MNRF 2017	The Rusty-patched Bumble Bee is found in a variety of open habitats with flowers from which pollen and nectar can be collected (MNRF 2016; COSEWIC 2010e). Most recently, observations of this species have been made in oak savannah (MNRF 2016). Nests are made in underground rodent burrows (COSEWIC 2010e).	No nearby recent records. Cultural meadow communities may provide habitat for this species.	Medium
Invertebrates	Monarch	Danaus plexippus	SC	SC	S4B, S2N	OBA 2017	Found primarily wherever milkweed and wildflowers (including goldenrods, asters and purple loosestrife) exist (COSEWIC, 2010f). The Larvae occur only where milkweed exists; adults are more generalized, feeding on a variety of wildflower nectar (MNR, 2014). This includes abandoned farmland, along roadsides, and other open spaces where these plants grow (COSEWIC, 2010f)	OBA records exist for the Waterloo Area. Monarch was observed in the cultural meadow communities during the summer botanical inventory. Milkweed is present in low abundance in the Study Area.	Confirmed in the cultural meadow communities in the Study Area.

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Mammals	American Badger	Taxidea taxus jacksoni	END	END-END	S2	MNRF 2017	American Badger prefers non-forested grasslands and shrublands with coherent soils that can be easily burrowed into (COSEWIC 2012). They are found in wetlands, alpine areas, and in agircultural areas where there is sufficient hedgerows, fencerows and edges to support prey species (COSEWIC 2012). Preferred prey are fossorial rodents, but its diet can be highly varied (COSEWIC 2012).	No nearby recent records. No potential badger dens were observed during field investigations.	Low
Mammals	Eastern Small-footed Myotis	Myotis leibii	END	Not listed	S2S3	Dobbyn 1994	The Eastern Small-footed Myotis roosts in a variety of habitats, including hollow trees, under rocks or in rock outcrops, in buildings, caves, mines and under bridges (MNRF 2016). Different roosting sites may be selected each day (MNRF 2016). Hibernation occurs in abandoned mines and caves (MNRF 2016).	No nearby recent records. No suitable forest or swamp communities on site.	Low
Mammals	Little Brown Myotis	Myotis lucifugus	END	END-END	S4	Dobbyn 1994	The Little Brown Myotis roosts in tree cavities and abandoned buildings, and often forms roosting colonies in barns, attics and abandoned buildings (MNRF 2016; COSEWIC 2013c). They have been found in a wide variety of deciduous and coniferous tree stands (COSEWIC 2013c). Hibernation typically occurs in caves and mines (MNRF 2016).	No nearby recent records. No suitable forest or swamp communities on site.	Low
Mammals	Northern Myotis	Myotis septentrionalis	END	END-END	S3?	Dobbyn 1994	The Northern Myotis roosts in colonies in tree cavities (COSEWIC 2013c) in a wide variety of deciduous and coniferous forest stands. Little is known about the effect of tree density on maternity roost selection for this species, but bats tend to avoid large open areas (COSEWIC 2013c). Small forest gaps, such as over streams or ponds, are used for foraging (COSEWIC 2013c).	No nearby recent records. No suitable forest or swamp communities on site.	Low
Mammals	Tri-colored Bat	Perimyotis subflavus	END	END-END	S3?	Dobbyn 1994	The Tri-coloured Bat roosts in colonies in tree cavities (COSEWIC 2013c) in a wide variety of deciduous and coniferous forest stands. Little is known about the effect of stand composition on maternity roost selection for this species, but it is strongly associated with forest watercourses and streamside vegetation (COSEWIC 2013c).	No nearby recent records. No suitable forest or swamp communities on site.	Low
Plants	American Chestnut	Castanea dentata	END	END-END	S2	MNRF 2016	The American Chestnut prefers dry upland deciduous forest with sandy, acidic to neutral soils and is often associated with Red Oak, Black Cherry, Sugar Maple and American Beech (MNRF 2016). It is only found in the Carolinian zone within Ontario (MNRF 2016).	No nearby recent records. No forest communities present in the Study Area. Botanical surveys failed to detect this species.	Low
Plants	American Columbo	Frasera caroliniensis	END	END-END	S2	MNRF 2016	The American Columbo is primarily found on dry, upland, open deciduous forest slopes, but may also be found in thickets, forest edges, pine and cedar forest, grasslands, moist woods and swamps (MNRF 2016; COSEWIC 2006b). Although it will grow on a variety of soils, it is found on rocky slopes throughout its range (COSEWIC 2006b).	No nearby recent records. No forest communities present in the Study Area. Botanical surveys failed to detect this species.	Low
Plants	False Hop Sedge	Carex lupuliformis	END	END-END	S1	MNRF 2016	False Hop Sedge grows around temporary forest ponds or near riverine swamps and marshes in Ontario (MNRF 2016; COSEWIC 2011c). It prefers to grow under canopy openings with lots of sunlight (MNRF 2016).	No nearby recent records. No temporary forest ponds or riverine swamps and marshes present in the Study Area. Botanical surveys failed to detect this species.	Low

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Plants	Green Dragon	Arisaema dracontium	SC	SC-SC	S3	MNRF 2017	Green Dragon grows along streams in moist to wet forests dominated by maple, Green Ash and White Elm (MNRF 2016).	No nearby recent records. No forest communities present in the Study Area. Botanical surveys failed to detect this species.	Low
Plants	Pygmy Pocket Moss	Fissidens exilis	NAR	NAR-SC	S2	MNRF 2017	The Pygmy Pocket Moss is typically found on bare, moist clay-based soil or loam in partial or full shade (COSEWIC 2016). While habitat patches are transient and unpredictable, it has been collected on forested banks of streams and rivers, floodplains, bluffs, beaches, roadsides and trails (COSEWIC 2016).	No nearby recent records. As habitat patches are transient and predictable, potential habitat for this species occurs throughout the Study Area. Botanical surveys failed to detect this species.	Low
Reptiles	Blanding's Turtle	Emydoidea blandingi	THR	THR-THR	S3	MNRF 2017, Ontario Nature 2017	The Blanding's Turtle prefers shallow water in heavily vegetated, large wetlands and lakes (MNRF 2016). However, in Ontario it also commonly uses clear watered habitats such as streams, rivers and ponds (COSEWIC 2005). Nests occur in a variety of loose substrates such as sand, gravel and cobblestone (COSEWIC 2005). Blanding's Turtles can often be found hundreds of metres from the nearest aquatic habitat during the active season, as they search for mates or nest sites (MNRF 2016). Overwintering sites are permanent pools approximately 1 m in depth (COSEWIC 2005).	Recent Ontario Nature records exist. Blanding's Turtle has been confirmed approximately 2.6km away from the Study Area in the Laurel Creek Reservoir. The Study Area is disconnected from the Reservoir by extensive residential development, and it is therefore unlikely that Blanding's Turtle could access the Study Area.	Low
Reptiles	Eastern Milksnake	Lampropeltis triangulum	NAR	SC	S3	Ontario Nature, 2017	Frequently reported in and around buildings, especially old structures. However, it is found in a variety of habitats, including prairies, pastures, hayfields, rocky hillsides and a wide variety of forest types. Two important features of ideal habitat are proximity to water, and suitable locations for basking and egg-laying, nesting sites may include compost or manure piles, stumps, under boards, or in loose soil (COSEWIC, 2002a).	Recent Ontario Nature records exist. Suitable habitat occurs throughout the Study Area, especially near open aquatic features and an old foundation at a former homestead. Species was not observed during any of the field investigations.	Moderate
Reptiles	Eastern Ribbonsnake	Thamnophis sauritus	SC	SC-SC	S3	MNRF 2017, Ontario Nature 2017	The Eastern Ribbonsnake is usually found close to water and is particularly characteristic of wetlands that have an abundance of small fish and frogs (MNRF 2016). It hibernates in communal underground burrows over winter (MNRF 2016).	Recent Ontario Nature records exist. Wetlands do not have an abundance of prey required by the species. Eastern ribbonsnake was not observed during any of the field investigations.	Low
Reptiles	Northern Map Turtle	Graptemys geographica	SC	SC-SC	S3	MNRF 2017, Ontario Nature 2017	The Northern Map Turtle inhabits rivers and lakes with suitable basking sites such as deadheads, rocks and emergent vegetation (MNRF 2016; COSEWIC 2002). It requires high-quality water with abundant mollusc populations, which are the preferred prey source (MNRF 2016). The map turtle overwinters in slow-moving, deep sections of river (COSEWIC 2002b).	Recent Ontario Nature records exist for the area, likely for the Grand River which provides suitable water quality requirements and an abundance of prey. Habitat is not present in the Study Area.	Low
Reptiles	Queensnake	Regina septemvittata	END	END-END	S2	MNRF 2017, Ontario Nature 2017	The Queensnake is an aquatic snake that is seldom found more than 3 m from streams, rivers and lakes with gravelly/rocky bottoms and an abundance of crayfish (COSEWIC 2010d; MNRF 2016). Hibernacula are generally found in bridge abutments and bedrock crevices (MNRF 2016).	Recent Ontario Nature records exist for the area, likely for the Grand River which provides suitable water quality requirements and an abundance of prey. Habitat is not present in the Study Area.	Low

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Reptiles	Snapping Turtle	Chelydra serpentina	SC	SC-SC	S3	MNRF 2017, Ontario Nature 2017, MNRF 2017	The Snapping Turtle inhabits ponds, sloughs, streams, rivers, and shallow bays that are characterized by slow moving water, aquatic vegetation, and soft bottoms (COSEWIC 2008b). It prefers to stay in shallow water, where it buries itself into mud and leaf litter and has easy access to the surface for air (MNRF 2016). Females nest in sand or gravel, frequently using manmade surfaces such as road shoulders and aggregate pits, in May and early June (MNRF 2016; COSEWIC 2008b).	Recent Ontario Nature records exist, however Snapping Turtle was not observed in either of the golf course ponds.	Low

Species at Risk and Species of Conservation Concern Assessment

SAR and SOCC were assigned a category (low, moderate, high or confirmed) based on their potential to occur in the Study Area. The criteria for each category are outlined below:

Confirmed – The species was identified in the Study Area during the 2017 assessment.

High – Suitable habitat is present in the Study Area, there are known nearby recent (1997+) records and no targeted surveys were performed to confirm presence.

Moderate – Suitable habitat is present, the species is listed as present in Waterloo Region by MNRF (2017), there are no known nearby recent records and targeted surveys were not performed to confirm presence.

Low – No suitable habitat or known nearby recent records were identified but the species is listed as present in Waterloo Region by MNRF (2017) or targeted surveys failed to detect species presence.

APPENDIX D:

Plant Species List

Family ¹	Scientific Name ¹	Common Name ¹	Species Code ^{3,4}	Establishment Means ¹	Coefficient of Conservatism ³	Wetness Index ³	Wetland Plant Species ³	Weediness Index ³	Provincial Status ^{2,4}	SARO Status ²	COSEWIC Status ³	LOCAL STATUS WATERLOO ³
Dennstaedtiaceae	<i>Pteridium aquilinum latiusculum</i>	eastern bracken fern	PTEAQUI	native	2	3			S5			X
Equisetaceae	<i>Equisetum arvense</i>	field horsetail	EQUARVE	native	0	0	T		S5			X
Cupressaceae	<i>Thuja occidentalis</i>	eastern white cedar	THUOCCI	native	4	-3	T		S5			X
Pinaceae	<i>Picea abies</i>	Norway spruce	PICABIE	introduced		5		-1	SE3			I
Pinaceae	<i>Pinus strobus</i>	eastern white pine	PINSTRO	native	4	3	T		S5			X
Pinaceae	<i>Pinus sylvestris sylvestris</i>	Scotch pine	PINSYLV	introduced		5		-3	SE5			I
Anacardiaceae	<i>Rhus typhina</i>	staghorn sumac	RHUTYPH	native	1	5			S5			X
Apiaceae	<i>Daucus carota</i>	wild carrot	DAUCARO	introduced		5		-2	SE5			I
Apocynaceae	<i>Asclepias syriaca</i>	common milkweed	ASCSYRI	native	0	5			S5			X
Asteraceae	<i>Ambrosia artemisiifolia</i>	common ragweed	AMBARTE	native	0	3			S5			X
Asteraceae	<i>Arctium minus</i>	common burdock	ARCMINU	introduced		5		-2	SE5			I
Asteraceae	<i>Bidens frondosa</i>	devil's beggarticks	BIDFRON	native	3	-3	I		S5			X
Asteraceae	<i>Centaurea stoebe micranthos</i>	spotted knapweed	CENBIEB	introduced		5		-3	SE5			I
Asteraceae	<i>Cichorium intybus</i>	wild chicory	CICINTY	introduced		5		-1	SE5			I
Asteraceae	<i>Cirsium arvense</i>	Canada thistle	CIRARVE	introduced		3		-1	SE5			I
Asteraceae	<i>Cirsium vulgare</i>	bull thistle	CIRVULG	introduced		4		-1	SE5			I
Asteraceae	<i>Echinops sp.</i>											
Asteraceae	<i>Erigeron annuus</i>	annual fleabane	ERIANNU	native	0	1			S5			
Asteraceae	<i>Euthamia graminifolia</i>	grass-leaved goldenrod	EUTGRAM	native	2	-2			S5			X
Asteraceae	<i>Matricaria chamomilla</i>	wild chamomile	MATRREC	introduced		-?	-?	-?	SE		?	-?
Asteraceae	<i>Solidago canadensis canadensis</i>	Canada goldenrod	SOLCANA	native	1	3			S5	-?		X
Asteraceae	<i>Solidago gigantea</i>	giant goldenrod	SOLGIGA	native	4	-3	T		S5			X
Asteraceae	<i>Sonchus sp.</i>											
Asteraceae	<i>Symphyotrichum lanceolatum lanceolatum</i>	white paniced aster	SYMLANC	native	3	-3	I		S5	-?		
Asteraceae	<i>Symphyotrichum novae-angliae</i>	New England aster	SYMNOVA	native	2	-3			S5			X
Asteraceae	<i>Tanacetum vulgare</i>	common tansy	TANVULG	introduced		5		-1	SE5			I
Asteraceae	<i>Taraxacum officinale</i>	common dandelion	TAROFFI	introduced		3		-2	SE5			I
Asteraceae	<i>Tragopogon pratensis</i>	meadow goatsbeard	TRAPRAT	introduced		5		-1	SE5			I
Asteraceae	<i>Tussilago farfara</i>	coltsfoot	TUSFARF	introduced		3	T	-2	SE5			I
Boraginaceae	<i>Hydrophyllum virginianum virginianum</i>	Virginia waterleaf	HYDVIRG	native	6	-2			S5			X
Brassicaceae	<i>Alliaria petiolata</i>	garlic mustard	ALLPETI	introduced		0		-3	SE5			I
Campanulaceae	<i>Campanula rapunculoides</i>	creeping bellflower	CAMRAPU	introduced		5		-2	SE5			
Caprifoliaceae	<i>Dipsacus fullonum</i>	common teasel	DIPFULL	introduced		5		-1	SE5			I
Caprifoliaceae	<i>Lonicera tatarica</i>	Tartarian honeysuckle	LONTATA	introduced		3		-3	SE5			I
Caryophyllaceae	<i>Cerastium fontanum vulgare</i>	common mouse-ear chickweed	CERFONT	introduced		3		-1	SE5			I
Caryophyllaceae	<i>Saponaria officinalis</i>	bouncing-bet	SAPOFFI	introduced		3		-3	SE5			I
Caryophyllaceae	<i>Silene latifolia</i>	white campion	SILLATI	introduced		-?			SE5			
Convolvulaceae	<i>Convolvulus arvensis</i>	field bindweed	CONARVE	introduced		5		-1	SE5			I
Cornaceae	<i>Cornus stolonifera</i>	red-osier dogwood	CORSERI	native	2	-3	I*		S5			X
Cucurbitaceae	<i>Echinocystis lobata</i>	wild cucumber	ECHLOBA	native	3	-2	T		S5			X
Fabaceae	<i>Lotus corniculatus</i>	garden bird's-foot trefoil	LOTcorn	introduced		1		-2	SE5			I
Fabaceae	<i>Medicago sativa sativa</i>	alfalfa	MEDSASA	introduced		5		-1	SE5			I
Fabaceae	<i>Melilotus albus</i>	white sweet-clover	MELALBA	introduced		3		-3	SE5			I

Family ¹	Scientific Name ¹	Common Name ¹	Species Code ^{3,4}	Establishment Means ¹	Coefficient of Conservatism ³	Wetness Index ³	Wetland Plant Species ³	Weediness Index ³	Provincial Status ^{2,4}	SARO Status ²	COSEWIC Status ³	LOCAL STATUS WATERLOO ³
Fabaceae	<i>Melilotus officinalis</i>	yellow sweet-clover	MELOFFI	introduced		3		-1	SE5			I
Fabaceae	<i>Trifolium hybridum</i>	alsike clover	TRIHYBR	introduced		1		-1	SE5			I
Fabaceae	<i>Trifolium pratense</i>	red clover	TRIPRAT	introduced		2		-2	SE5			I
Fabaceae	<i>Vicia cracca</i>	tufted vetch	VICCRAC	introduced		5		-1	SE5			I
Grossulariaceae	<i>Ribes hirtellum</i>	swamp gooseberry	RIBHIRT	native	6	-3	I		S5			X
Juglandaceae	<i>Juglans cinerea</i>	butternut	JUGCINE	native	6	2			S3?	END	END	X
Juglandaceae	<i>Juglans nigra</i>	black walnut	JUGNIGR	native	5	3			S4			X
Lamiaceae	<i>Glechoma hederacea</i>	ground-ivy	GALSPEC	introduced		5		-2	SE5			I
Lamiaceae	<i>Leonurus cardiaca cardiaca</i>	common motherwort	LEOCARD	introduced		5		-2	SE5			I
Lamiaceae	<i>Nepeta cataria</i>	catnip	NEPCATA	introduced		1		-2	SE5			I
Lamiaceae	<i>Prunella vulgaris vulgaris</i>	common self-heal	PRUVUVU	introduced		0		-1	-?	-?		I
Lythraceae	<i>Lythrum salicaria</i>	purple loosestrife	LYTSALI	introduced		-5	I	-3	SE5			X
Malvaceae	<i>Malva moschata</i>	musk mallow	MALMOSC	introduced		5		-1	SE5			I
Moraceae	<i>Morus alba</i>	white mulberry	MORALBA	introduced		0		-3	SE5			
Oleaceae	<i>Syringa vulgaris</i>	common lilac	SYRVULG	introduced		5		-2	SE5			I
Onagraceae	<i>Circaea canadensis canadensis</i>	Canada enchanter's nightshade	CIRCANA	native	3	3			S5			X
Onagraceae	<i>Epilobium hirsutum</i>	hairy willowherb	EPIHIRS	introduced		-4	I	-2	SE5			I
Onagraceae	<i>Oenothera biennis</i>	common evening primrose	OENBIEN	native	0	3			S5			X
Papaveraceae	<i>Chelidonium majus</i>	greater celandine	CHEMAJU	introduced		5		-3	SE5			I
Plantaginaceae	<i>Plantago lanceolata</i>	English plantain	PLALANC	introduced		0		-1	SE5			I
Plantaginaceae	<i>Veronica sp.</i>											
Polygonaceae	<i>Persicaria sp.</i>											
Polygonaceae	<i>Rumex crispus</i>	curled dock	RUMECRI	introduced		-?	-?	-?	SE5		?	-?
Ranunculaceae	<i>Aquilegia canadensis</i>	red columbine	AQUCANA	native	5	1			S5			X
Ranunculaceae	<i>Ranunculus acris</i>	common buttercup	RANACRI	introduced		-?	T	-2	SE5			I
Rhamnaceae	<i>Rhamnus cathartica</i>	European buckthorn	RHACATH	introduced		3	T	-3	SE5			I
Rosaceae	<i>Fragaria virginiana virginiana</i>	wild strawberry	FRAVIRG	native	2	1			S5			X
Rosaceae	<i>Geum aleppicum</i>	yellow avens	GEUALEP	native	2	-1	T		S5			X
Rosaceae	<i>Malus sp.</i>											
Rosaceae	<i>Potentilla reptans</i>	creeping cinquefoil	POTREPT	introduced		-?	T		SE2			
Rosaceae	<i>Prunus avium</i>	sweet cherry	PRUAVIU	introduced		5		-2	SE4			I
Rosaceae	<i>Prunus serotina serotina</i>	black cherry	PRUSERO	native	3	3			S5			X
Rosaceae	<i>Prunus virginiana virginiana</i>	chokecherry	PRUVIRG	native	2	1			S5			X
Rosaceae	<i>Pyrus communis</i>	common pear	PYRCOMM	introduced		5		-1	SE4			I
Rosaceae	<i>Rubus idaeus strigosus</i>	American red raspberry	RUBUIDI	native	-?	-?	-?	-?	S5	-?	-?	-?
Rubiaceae	<i>Galium mollugo</i>	smooth bedstraw	GALMOLL	introduced		5		-2	SE5			I
Salicaceae	<i>Populus deltoides deltoides</i>	eastern cottonwood	POPDEDE	native	4	-1	T		S5	-?		X
Salicaceae	<i>Salix alba</i>	white willow	SALALBA	introduced		-?	T	-2	SE4			X
Salicaceae	<i>Salix amygdaloides</i>	peach-leaved willow	SALAMYG	native	6	-3	T		S5			X
Salicaceae	<i>Salix babylonica</i>	weeping willow	-?	introduced		-?	-?	-?	-?	-?	-?	-?
Salicaceae	<i>Salix discolor</i>	pussy willow	SALDISC	native	3	-3	I		S5			X
Salicaceae	<i>Salix eriocephala</i>	cottony willow	SALIERI	native	-?	-?	-?	-?	S5		-?	-?
Salicaceae	<i>Salix interior</i>	sandbar willow	SALINTE	native	3	-5	T		S5			X

Family ¹	Scientific Name ¹	Common Name ¹	Species Code ^{3,4}	Establishment Means ¹	Coefficient of Conservatism ³	Wetness Index ³	Wetland Plant Species ³	Weediness Index ³	Provincial Status ^{2,4}	SARO Status ²	COSEWIC Status ³	LOCAL STATUS WATERLOO ³
Salicaceae	<i>Salix sp.</i>											
Sapindaceae	<i>Acer negundo</i>	Manitoba maple	ACENEGU	native	0	-2	T		S5			X
Sapindaceae	<i>Acer platanoides</i>	Norway maple	ACEPLAT	introduced		5		-3	SE5			I
Sapindaceae	<i>Acer saccharum</i>	sugar maple	ACESACC	native	4	3			S5			X
Scrophulariaceae	<i>Verbascum thapsus thapsus</i>	-?	VERTHAP	introduced		5		-2	SE5			I
Solanaceae	<i>Solanum dulcamara</i>	bittersweet nightshade	SOLDULC	introduced		0	T	-2	SE5			I
Verbenaceae	<i>Verbena urticifolia</i>	white vervain	VERURTI	native	4	-1	T		S5			X
Violaceae	<i>Viola sp.</i>											
Vitaceae	<i>Vitis riparia</i>	riverbank grape	VITRIPA	native	0	-2			S5			X
Araceae	<i>Lemna minor</i>	small duckweed	LEMMINO	native	2	-5	I		S5			X
Cyperaceae	<i>Carex bebbii</i>	Bebb's sedge	CARBEBB	native	3	-5	I		S5			X
Cyperaceae	<i>Carex retrorsa</i>	retrorse sedge	CARRETR	native	5	-5	I		S5			X
Cyperaceae	<i>Carex sp.</i>											
Cyperaceae	<i>Carex vulpinoidea</i>	fox sedge	CARVULP	native	3	-5	I		S5			X
Cyperaceae	<i>Eleocharis sp.</i>											
Cyperaceae	<i>Schoenoplectus tabernaemontani</i>	soft-stemmed bulrush	SCHTABE	native	5	-5	I		S5			X
Cyperaceae	<i>Scirpus atrovirens</i>	dark-green bulrush	SCIATRV	native	3	-5	T		S5			X
Cyperaceae	<i>Scirpus cyperinus</i>	common woolly bulrush	SCICYPE	native	4	-5	I		S5			X
Cyperaceae	<i>Scirpus sp.</i>											
Liliaceae	<i>Erythronium americanum americanum</i>	yellow trout lily	ERYAMER	native	5	5			S5			X
Melanthiaceae	<i>Trillium erectum</i>	red trillium	TRIEREC	native	6	1			S5			X
Poaceae	<i>Bromus inermis</i>	smooth brome	BROINER	introduced		5		-3	SE5			I
Poaceae	<i>Dactylis glomerata</i>	orchard grass	DACGLOM	introduced		3		-1	SE5			I
Poaceae	<i>Phalaris arundinacea arundinacea</i>	reed canarygrass	PHAARUN	native	0	-4	T		S5			X
Poaceae	<i>Phleum pratense pratense</i>	common timothy	PHLPRAT	introduced		3		-1	SE5			I
Poaceae	<i>Phragmites australis australis</i>	European reed	PHRAUAU	introduced		0	T	0	-?	-?		
Poaceae	<i>Poa pratensis pratensis</i>	Kentucky bluegrass	POAPRPR	introduced		1			-?	-?		X
Typhaceae	<i>Typha angustifolia</i>	narrow-leaved cattail	TYPANGU	introduced	3	-5	I		SE5			X
Typhaceae	<i>Typha latifolia</i>	broad-leaved cattail	TYPLATI	native	3	-5	I		S5			X
Xanthorrhoeaceae	<i>Hemerocallis fulva</i>	orange daylily	HEMFULV	introduced		5		-3	SE5			I

Species Diversity			
Vascular Plants Listed:		116	
Identified to species or ssp/var		106	
Identified to Genus (not included in calculations below)		10	
Means of Establishment			
Native Species:		48	45%
Introduced Species:		58	55%
Provincial Status (native species only)		Total Number	Percentage
S1-S3 Species:	rare in Ontario	1	2%
S4 Species:	uncommon in Ontario	1	2%
S5 Species:	common in Ontario	46	96%
Co-efficient of Conservatism (C) and Floristic Quality Index(FQI) (native species only)			
C 0 to 3	lowest sensitivity	29	60%
C 4 to 6	moderate sensitivity	17	35%
C 7 to 8	high sensitivity	0	0%
C 9 to 10	highest sensitivity	0	0%
Not defined:		2	4%
Average C		2.8	
FQI		32.7	
Presence of Weedy & Invasive Species			
weediness = 0	Not invasive	1	1%
weediness = -1	low potential invasiveness	19	18%
weediness = -2	moderate potential invasiveness	18	17%
weediness = -3	high potential invasiveness	13	12%
Not defined:		55	52%
Average weediness		-1.8	
Wetness Index			
upland	W of 5	28	26%
facultative upland	W of 4, 3 or 2	23	22%
facultative	W of 1, 0 or -1	19	18%
facultative wetland	W of -2, -3 or -4	16	15%
obligate wetland	W of -5	11	10%
Not defined:		9	8%
Average wetness value		1.2	
Presence of Wetland (W) Species			
Total Wetland Tolerant (T) Plant Species as identified in OWES Manual		20	19%
Total Wetland Indicator (I) Plant Species as identified in OWES Manual		15	14%
Not defined:		71	67%

APPENDIX E:

Butternut Health Assessment

Jennifer Koskinen, BHA #234
Stantec Consulting Ltd.
49 Frederick Street
Kitchener, ON
N2H 6M7
519-585-7442
Jennifer.koskinen@stantec.com

Justin McFadden, Executive Director, Economic Development
City of Waterloo
100 Regina Street South
Waterloo, ON
N2J 4A8
519-747-8539
Justin.mcfadden@waterloo.ca

August 29th, 2017

RE: Westside Employment Lands, property 928 Erb Street, Waterloo, ON
BHA Report Number: 1
Date(s) of Butternut health assessment: June 19th, 2017

Dear Mr. McFadden,

This letter is in regard to my assessment of the Butternut trees on your property. Please read this letter carefully as it contains important information about the Endangered Species Act, 2007 (ESA).

Butternut is listed as an endangered species on the Species at Risk in Ontario List, and as such, it is protected under the ESA from being killed, harmed, or removed. If you are planning to undertake an activity that may affect Butternut, you may be eligible to follow the requirements set out in section 23.7 of Ontario Regulation 242/08 under the ESA, or you may need to seek an authorization under the ESA (e.g., a permit).

Please visit e-laws at the link provided below for the legal requirements of eligible activities under section 23.7 of Ontario Regulation 242/08 and conditions that must be fulfilled. Information about Butternut is also available at: <http://www.ontario.ca/environment-and-energy/butternut-trees-your-property>.

If you are eligible to kill, harm or take Butternut under section 23.7 of the regulation, your first step is to submit the BHA Report and the original data forms enclosed in this package to the local MNR District Manager. Note that the MNR will not accept photocopies. The BHA Report must be submitted at least 30 days prior to registering to kill, harm, or remove a Butternut tree. During this 30 day

Links:

Endangered Species Act, 2007:

http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_07e06_e.htm

Ontario Regulation 242/08 (refer to section 23.7):

http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_080242_e.htm

Summary of changes related to Butternut:

<http://www.ontario.ca/environment-and-energy/butternut-trees-your-property>

MNR office locations:

http://www.mnr.gov.on.ca/en/ContactUs/2ColumnSubPage/STEL02_179002.html

period, no Butternut trees (of any category) may be killed, harmed, or removed, and MNR may contact you for an opportunity to examine the trees.

If MNR chooses to examine the trees, a representative of the MNR will contact you using the information you supplied when you submitted the BHA Report. After the examination has been completed, MNR will notify you if the examination results change whether you are eligible for the regulation.

If you are eligible to follow the rules in regulation under section 23.7, you may register your activity using the "Notice of Butternut Impact" form on the [MNR Registry](#) **after** the 30 day period has elapsed.

If you are **not** eligible to follow the rules in regulation under section 23.7, please contact the local Ministry of Natural Resources (MNR) office to determine whether you will need to seek a permit. A link to the directory of MNR offices is provided in the text box on the previous page.

As a designated Butternut Health Assessor (BHA), I am providing the following Butternut Health Assessor's Report for the trees located at the above noted property, for which I completed an assessment during the site visit on the above noted date. If there are other Butternut trees at the site that may be affected by the activity and they are not identified in this report, they too must be assessed by a BHA.

Note that municipal by-laws and legislation other than the ESA may also be applicable to the removal or harming of trees.

Please retain this letter and a copy of the BHA Report for your records, along with any other documentation you may receive from the MNR should an examination of the trees occur. If you have any questions, please do not hesitate to contact me or your [local MNR district office](#).

Sincerely,



Jennifer Koskinen, HBESfcon
ISA Certified Arborist, BHA

Enclosures:

1. Butternut Health Assessor's Report
2. Tree Locations, Google Map
3. Original data forms
4. Photo page, butternut hybrid photos

Butternut Health Assessor's Report

Jennifer Koskinen, BHA #234
Stantec Consulting Ltd.
49 Frederick Street
Kitchener, ON
N2H 6M7
519-585-7442
Jennifer.koskinen@stantec.com

Justin McFadden, Executive Director, Economic Development
City of Waterloo
100 Regina Street South
Waterloo, ON
N2J 4A8
519-747-8539
Justin.mcfadden@waterloo.ca

Property description: Westside Employment Lands, property 928 Erb Street, Waterloo, ON

BHA Report Number: 1

Date(s) of Butternut health assessment: June 19th, 2017.

Date BHA Report prepared: August 29th, 2017.

Map datum used: ☒ NAD83 ☐ WGS84

Total number of trees assessed in this BHA Report: 9

The assessed trees were numbered on site using number marked on flagging tape.

The numbers at the site correspond to the tree numbers used in this report.

This BHA Report includes the following tables:

- Table 1: Butternut trees proposed to be killed, harmed, or taken
- Table 2: Butternut trees that are **not** proposed to be killed, harmed or taken
- Table 3: Trees determined to be hybrid Butternuts
- Table 4: Summary of Assessment Results

Table 1: Butternut trees proposed to be killed, harmed, or taken

Tree #	UTM coordinates	Category ¹ (1, 2, or 3 ²)	dbh ³ (cm)	Cultivated? (Y/N)	Proposed to be: (enter one: killed, harmed or taken)	Reason tree is proposed to be killed, harmed or taken:

¹ The extent to which the tree is affected by Butternut Canker is presented in the Excel document titled, "BHA Tree Analysis" that accompanies this BHA Report.

² The rules in regulation under section 23.7 of O. Reg. 242/08 are not applicable to Category 3 trees.

³ dbh: diameter at breast height, rounded to nearest cm (if tree is shorter than breast height, enter zero)

Table 2: Butternut trees that are **not** proposed to be killed, harmed or taken

Tree #	UTM coordinates	Category (1, 2, or 3)	dbh ⁴ (cm)	Cultivated? (Y/N)

Table 3: Trees determined to be hybrid Butternuts

Tree #	UTM coordinates
1	17536904810580
2	175336944810578
3	175336964810574
4	175337104810566
5	175337104810566
6	175337384810528
7	175337514810519
8	175337504810502
9	175337574810492

Table 4: Summary of Assessment Results

Result:	Total #:	Important information for persons planning activities that may affect Butternut:
Category 1	0	- A Category 1 tree is one that is affected by butternut canker to such an advanced degree that retaining the tree would not support the protection or recovery of butternut in the area in which the tree is located; and is considered “non-retainable”. - During the 30 day period that follows your submission of this BHA Report to the MNR District Manager, no Butternut trees (of Category 1, 2, or 3) may be killed, harmed, or taken, and MNR may contact you for an opportunity to examine the trees. - Category 1 trees may be killed, harmed or taken after the 30 day period that follows submission of this BHA Report to the MNR District Manager, unless the results of an MNR examination indicate that the assessment has not been conducted in accordance with the document entitled “Butternut Assessment Guidelines: Assessment of Butternut Tree Health for the Purposes of the <i>Endangered Species Act, 2007</i>”.
Category 2	0	- A Category 2 tree is one that is not affected by Butternut Canker, or is affected by Butternut Canker but the degree to which it is affected is not too advanced and retaining the tree could support the protection or recovery of butternut in the area in which the tree is located, and is considered “retainable”. - During the 30 day period that follows your submission of this BHA Report to the MNR District

⁴ dbh: diameter at breast height, rounded to nearest cm (if tree is shorter than breast height, enter zero)

Result:	Total #:	Important information for persons planning activities that may affect Butternut:
		Manager, no Butternut trees (of Category 1, 2, or 3) may be killed, harmed, or taken, and MNR may contact you for an opportunity to examine the trees. - Activities that may kill, harm or take up to a maximum of ten (10) Category 2 trees may be eligible to follow the rules in section 23.7 of Ontario Regulation 242/08, in accordance with the conditions and requirements set out in the regulation. - Refer to e-Laws for the legal requirements of eligible activities under section 23.7 of Ontario Regulation 242/08 and conditions that must be fulfilled: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_080242_e.htm
Category 3	0	- A Category 3 tree is one that may be useful in determining sources of resistance to Butternut Canker, and is considered “archivable”. - Category 3 trees are not eligible to be killed, harmed or taken under section 23.7 of Ontario Regulation 242/08. - Visit the MNR website using the link below for information on how to seek an ESA authorization, or consider an alternative that will avoid killing, harming or taking any Category 3 trees: http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_HOW_DO_GET_PER_EN.html
Cultivated	0	- An activity that involves killing, harming, or taking a cultivated Butternut tree that was not required to be planted to fulfill a condition of an ESA permit or a condition of a regulation, may be eligible for the exemption provided by subsection 23.7 (11) of O. Reg. 242/08. - Prior to undertaking the activity, the owner or occupier of the land on which the Butternut is located (or person acting on their behalf) will need to determine whether the exemption for cultivated trees is applicable by determining whether or not the tree was cultivated as a result of the requirements for an exemption under O. Reg. 242/08 or a condition of a permit issued under the ESA. This information can be accessed by contacting the local MNR district office: http://www.mnr.gov.on.ca/en/ContactUs/2ColumnSubPage/STEL02_179002.html - The owner or occupier of the land on which the Butternut is located (or person acting on their behalf) is encouraged to append the details regarding whether the tree was planted to satisfy a requirement (e.g., the permit number or registration number) to this BHA Report for their records.
Hybrid	9	Hybrid Butternut trees are not protected under the ESA, but their removal may be subject to municipal by-laws and other legislation.

NOTE: This concludes the summary of the BHA Report. A complete BHA Report must include the original (hard copy) data forms (i.e., all completed sets of Form 1 and Form 2), an electronic copy of the Excel data analysis spreadsheet, and one printed copy of the Excel data analysis spreadsheet.

Google Maps 928 Erb St W



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49731

Butternut Data Collection FORM 2 (2010 Edition)

(PLEASE USE
BLOCK LETTERS)

Shaded fields are mandatory for Butternut Health Assessments

Fill when Form 1 indicates canker is well established. The information on Form 2 must be filled out for all trees when doing a Butternut Health Assessment.

WAT Site Code(A,B,...Z, AA...)

Surveyor ID
or BHA # 234

Date (dd/mm/yyyy)

Surveyor Last Name KOSKINEN

19-06-2017

Tree ID Numbering: 1,2,3,... Starting from 1 for each site

Tree # Zone Easting Northing
1 17 533690 4810580

Crown Class 1 Live Crown % 35 Main Stem Length(m) 1
#Stems 6 DBH(cm) 6
Butternut Origin Natural Planted Unknown
Signs Male Flowers Female Flowers Seed Set None
Twig Dieback Branch Dieback Defoliation Discolouration

Assess below live crown
#Epic-Live 6 #Epic-Dead 2 Bark Type S #Callused Wounds 0
#Open #Sooty Root =<2m >2m

Metres from badly cankered tree
□ < 40 □ > 40 □ None Found

Competing Species
JUGLXB1

HYBRID TREE

Tree # Zone Easting Northing
2 17 533694 4810978

Crown Class 1 Live Crown % 80 Main Stem Length(m) 1
#Stems 3 DBH(cm) 6
Butternut Origin Natural Planted Unknown
Signs Male Flowers Female Flowers Seed Set None
Twig Dieback Branch Dieback Defoliation Discolouration

Assess below live crown
#Epic-Live 3 #Epic-Dead 0 Bark Type S #Callused Wounds 0
#Open #Sooty Root =<2m >2m

Metres from badly cankered tree
□ < 40 □ > 40 □ None Found

Competing Species
JUGLXB1

HYBRID TREE

Tree # Zone Easting Northing
3 17 533696 4810574

Crown Class 1 Live Crown % 65 Main Stem Length(m) 2
#Stems 1 DBH(cm) 22
Butternut Origin Natural Planted Unknown
Signs Male Flowers Female Flowers Seed Set None
Twig Dieback Branch Dieback Defoliation Discolouration

Assess below live crown
#Epic-Live 10 #Epic-Dead 4 Bark Type S #Callused Wounds 0
#Open #Sooty Root =<2m >2m

Metres from badly cankered tree
□ < 40 □ > 40 □ None Found

Competing Species
JUGLXB1

HYBRID TREE

Tree # Zone Easting Northing
4 17 533710 4810566

Crown Class 1 Live Crown % 85 Main Stem Length(m) 2
#Stems 3 DBH(cm) 16
Butternut Origin Natural Planted Unknown
Signs Male Flowers Female Flowers Seed Set None
Twig Dieback Branch Dieback Defoliation Discolouration

Assess below live crown
#Epic-Live 11 #Epic-Dead 1 Bark Type S #Callused Wounds 0
#Open #Sooty Root =<2m >2m

Metres from badly cankered tree
□ < 40 □ > 40 □ None Found

Competing Species
JUGLXB1

HYBRID TREE DBH = 16, 10, 13

Tree # Zone Easting Northing
5 17 533710 4810566

Crown Class 1 Live Crown % 80 Main Stem Length(m) 2
#Stems 6 DBH(cm) 15
Butternut Origin Natural Planted Unknown
Signs Male Flowers Female Flowers Seed Set None
Twig Dieback Branch Dieback Defoliation Discolouration

Assess below live crown
#Epic-Live 0 #Epic-Dead 0 Bark Type S #Callused Wounds 0
#Open #Sooty Root =<2m >2m

Metres from badly cankered tree
□ < 40 □ > 40 □ None Found

Competing Species
JUGLXB1

HYBRID TREE DBH = 15, 7, 13, 7, 9, 10

Please enter matching page link code on forms 1 and 2

Page Link

533690

(Contact Information follows all applicable privacy policies and guidelines)

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Forest Gene Conservation Association
Suite 233, 286 Charlotte St.
Peterborough, ON, K9J 2V4
www.fgca.net

49731



Butternut Data Collection FORM 2 (2010 Edition)

(PLEASE USE
BLOCK LETTERS)Fill when Form 1 indicates canker is well
established. The information on Form 2
must be filled out for all trees when doing a
Butternut Health Assessment.**Shaded fields are mandatory for Butternut Health Assessments**

WAT Site Code(A,B,...Z, AA...)

Surveyor ID
or BHA # 234

Date (dd/mm/yyyy)

19 - 06 - 2017

Surveyor Last Name KOSKINEN

Tree ID Numbering: 1,2,3,...Starting from 1 for each site

Tree # Zone Easting Northing
6 1 7 5 3 3 7 3 8 4 8 1 0 5 2 8Crown Class 85 Live Crown % 1 Main Stem Length(m)
Below crown Seed Signs
Butternut Origin Male Flowers
Natural Female Flowers
Planted Seed Set
Unknown None
Twig Dieback 2 #Stems
Branch Dieback
Defoliation
Discolouration 27 DBH(cm)Assess below live crown
#Epic-Live 3
#Epic-Dead 7
Bark Type S
Callused Wounds 0
Root = < 2m
#Open #Sooty
> 2mMetres from badly cankered tree
☐ < 40 ☐ > 40 ☐ None Found

Competing Species

HYBRID TREE . DBH = 27, 7

Tree # Zone Easting Northing
7 1 7 5 3 3 7 5 1 4 8 1 0 5 1 9Crown Class 100 Live Crown % < 1 Main Stem Length(m)
Below crown Seed Signs
Butternut Origin Male Flowers
Natural Female Flowers
Planted Seed Set
Unknown None
Twig Dieback 1 #Stems
Branch Dieback
Defoliation
Discolouration 1 DBH(cm)Assess below live crown
#Epic-Live 0
#Epic-Dead 0
Bark Type S
Callused Wounds 0
Root = < 2m
#Open #Sooty
> 2mMetres from badly cankered tree
☐ < 40 ☐ > 40 ☐ None FoundCompeting Species
MALUS AP
JUGLX B/
JUGL NIG

HYBRID TREE

Tree # Zone Easting Northing
8 1 7 5 3 3 7 5 0 4 8 1 0 5 0 2Crown Class 95 Live Crown % 3 Main Stem Length(m)
Below crown Seed Signs
Butternut Origin Male Flowers
Natural Female Flowers
Planted Seed Set
Unknown None
Twig Dieback 3 #Stems
Branch Dieback
Defoliation
Discolouration 18 DBH(cm)Assess below live crown
#Epic-Live
#Epic-Dead
Bark Type S
Callused Wounds C
Root = < 2m
#Open #Sooty
> 2mMetres from badly cankered tree
☐ < 40 ☐ > 40 ☐ None FoundCompeting Species
PICEGLA
MALUS AP

HYBRID TREE DBH = 18, 15, 10

Tree # Zone Easting Northing
9 1 7 5 3 3 7 5 7 4 8 1 0 4 9 2Crown Class 70 Live Crown % 2 Main Stem Length(m)
Below crown Seed Signs
Butternut Origin Male Flowers
Natural Female Flowers
Planted Seed Set
Unknown None
Twig Dieback 2 #Stems
Branch Dieback
Defoliation
Discolouration 14 DBH(cm)Assess below live crown
#Epic-Live
#Epic-Dead
Bark Type S
Callused Wounds C
Root = < 2m
#Open #Sooty
> 2mMetres from badly cankered tree
☐ < 40 ☐ > 40 ☐ None FoundCompeting Species
PICEGLA

HYBRID TREE DBH = 14, 13

Tree # Zone Easting Northing
1Crown Class Live Crown % Main Stem Length(m)
Below crown Seed Signs
Butternut Origin Male Flowers
Natural Female Flowers
Planted Seed Set
Unknown None
Twig Dieback #Stems
Branch Dieback
Defoliation
Discolouration DBH(cm)Assess below live crown
#Epic-Live
#Epic-Dead
Bark Type
Callused Wounds
Root = < 2m
#Open #Sooty
> 2mMetres from badly cankered tree
☐ < 40 ☐ > 40 ☐ None Found

Competing Species

Please enter matching page link code on forms 1 and 2

Page Link

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www.fgca.net

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Tree 1



Tree 2



Tree 3



Tree 4



Tree 5



Tree 6



Tree 7



Tree 8



Tree 9

APPENDIX F:

Wildlife Species List

Appendix E: 161413446 Wildlife Species List

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	COSSARO	COSEWIC
BUTTERFLIES				
Cabbage White	<i>Pieris rapae</i>	SNA		
Mourning Cloak	<i>Nymphalis antiopa</i>	S5		
Monarch	<i>Danaus plexippus</i>	S4B, S2N	SC	SC
AMPHIBIANS				
American Toad	<i>Anaxyrus americanus</i>	S5		
Spring Peeper	<i>Pseudacris crucifer</i>	S5		
Northern Green Frog	<i>Lithobates clamitans</i>	S5		
Northern Leopard Frog	<i>Lithobates pipiens</i>	S5	NAR	NAR
BIRDS				
Canada Goose	<i>Branta canadensis</i>	S5		
Mallard	<i>Anas platyrhynchos</i>	S5		
Wild Turkey	<i>Meleagris gallopavo</i>	S5		
Rock Pigeon	<i>Columba livia</i>	SNA		
Mourning Dove	<i>Zenaidura macroura</i>	S5		
Killdeer	<i>Charadrius vociferus</i>	S5B, S5N		
Spotted Sandpiper	<i>Actitis macularia</i>	S5		
Ring-billed Gull	<i>Larus delawarensis</i>	S5B, S4N		
Great Blue Heron	<i>Ardea herodias</i>	S5		
Turkey Vulture	<i>Cathartes aura</i>	S5B		
Willow Flycatcher	<i>Empidonax traillii</i>	S5B		
Eastern Kingbird	<i>Tyrannus tyrannus</i>	S4B		
American Crow	<i>Corvus brachyrhynchos</i>	S5B		
Bank Swallow	<i>Riparia riparia</i>	S4B	THR	THR-NS
Barn Swallow	<i>Hirundo rustica</i>	S4B	THR	THR-NS
Black-capped Chickadee	<i>Poecile atricapillus</i>	S5		
American Robin	<i>Turdus migratorius</i>	S5B		
Gray Catbird	<i>Dumetella carolinensis</i>	S4B		
European Starling	<i>Sturnus vulgaris</i>	SNA		
Cedar Waxwing	<i>Bombycilla cedrorum</i>	S5B		
American Goldfinch	<i>Spinus tristis</i>	S5B		
Savannah Sparrow	<i>Passerculus sandwichensis</i>	S4B		
Song Sparrow	<i>Melospiza melodia</i>	S5B		
Bobolink	<i>Dolichonyx oryzivorus</i>	S4B	THR	THR
Eastern Meadowlark	<i>Sturnella magna</i>	S4B	THR	THR
Baltimore Oriole	<i>Icterus galbula</i>	S4B		
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	S4		
Brown-headed Cowbird	<i>Molothrus ater</i>	S4B		
Common Grackle	<i>Quiscalus quiscula</i>	S5B		

Appendix E: 161413446 Wildlife Species List

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	COSSARO	COSEWIC
Yellow Warbler	<i>Setophaga petechia</i>	S5B		
Northern Cardinal	<i>Cardinalis cardinalis</i>	S5		
Dickcissel	<i>Spiza americana</i>	SNA		
MAMMALS				
Eastern Cottontail	<i>Sylvilagus floridanus</i>	S5		
Woodchuck	<i>Marmota monax</i>	S5		
Muskrat	<i>Ondatra zibethicus</i>	S5		

SUMMARY

Total Butterflies: 3

Total Amphibians: 4

Total Birds: 32

Total Breeding Birds: 27

Total Mammals: 3

SIGNIFICANT SPECIES

National: 3

Provincial: 3

Explanation of Status and Acronyms

S1: Critically Imperiled - Critically imperiled in the province (often 5 or fewer occurrences)

S5: Secure - Common, widespread, and abundant in the province

SNA: Not applicable - A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

THR: Threatened

SC: Special Concern

APPENDIX G:

Wildlife Habitat Assessment

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNR Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Seasonal Concentration Areas		
Waterfowl Stopover and Staging Area (Terrestrial)	- Fields with sheet water or utilized by tundra swans during spring (mid-March to May), or annual spring melt water flooding found in any of the following Community Types: Meadow (CUM1), Thicket (CUT1). - Agricultural fields with waste grains are commonly used by waterfowl, and these are not considered SWH unless used by Tundra swans in the Long Point, Rondeau, Lake St. Clair, Grand Bend and Point Pelee Areas.	- There was no spring meltwater observed in any of the CUM1 communities during the early spring field investigations. - No candidate habitat for waterfowl stopover and staging areas (terrestrial) was observed in the Study Area.
Waterfowl Stopover and Staging Area (Aquatic)	- The following Community Types: Meadow Marsh (MAM), Shallow Marsh (MAS), Shallow Aquatic (SA), Deciduous Swamp (SWD). - Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. - The combined area of the ELC ecosites and a 100 m radius area is the SWH. - Sewage treatment ponds and storm water ponds do not qualify as a SWH; however, a reservoir managed as a large wetland or pond/lake does qualify.	- Due to their small size, wetlands within the Study Area are not likely to support an abundance of waterfowl during migration. - No candidate habitat for waterfowl stopover and staging areas (aquatic) was observed in the Study Area.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNR Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Shorebird Migratory Stopover Area	- Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. - Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. - Sewage treatment ponds and storm water ponds do not qualify as significant wildlife habitat. - The following community types: Meadow Marsh (MAM), Beach/Bar (BB), or Sand Dune (SD)	- Wetlands in the Study Area do not provide suitable exposed, muddy habitat for shorebirds. - No candidate habitat for shorebird migratory stopover areas was observed in the Study Area.
Raptor Wintering Area	- At least one of the following Forest Community Types: Deciduous Forest (FOD), Mixed Forest (FOM) or Coniferous Forest (FOC), in combination with one of the following Upland Community Types: Meadow (CUM), Thicket (CUT), Savannah (CUS), Woodland (CUW) (<60% cover) that are >20 ha and provide roosting, foraging and resting habitats for wintering raptors. - Upland habitat (CUM, CUT, CUS, CUW), must represent at least 15 ha of the 20 ha minimum size.	- Meadow communities are too small to qualify as candidate habitat for wintering raptors. - No candidate habitat for raptor wintering areas was observed in the Study Area.
Bat Hibernacula	- Hibernacula may be found in caves, mine shafts, underground foundations and karsts. - May be found in these Community Types: Crevice (CCR), Cave (CCA).	- No crevices, caves or abandoned mines were observed to accommodate hibernating bats. - No candidate habitat for bat hibernacula was observed in the Study Area.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNR Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Bat Maternity Colonies	• Maternity colonies considered significant wildlife habitat are found in forested ecosites. • Either of the following Community Types: Deciduous Forest (FOD) or Mixed Forest (FOM), that have >10/ha wildlife trees >25cm diameter at breast height (dbh). • Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. • Northern Myotis prefer contiguous tracts of older forest cover for foraging and roosting in snags and trees • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred.	• There were no forest communities identified in the Study Area. • No candidate habitat for bat maternity colonies was observed in the Study Area.
Turtle Wintering Areas	• Snapping and Midland Painted turtles utilize ELC community classes: Swamp (SW), Marsh (MA) and Open Water (OA). Shallow water (SA), Open Fen (FEO) and Open Bog (BOO). • Northern Map turtle- open water areas such as deeper rivers or streams and lakes can also be used as over-wintering habitat. • Water has to be deep enough not to freeze and have soft mud substrate. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen.	• No turtles were observed in the Study Area during any of the field investigations. • No candidate habitat for turtle wintering areas was observed in the Study Area.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNR Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Snake Hibernacula	- Hibernation occurs in sites located below frost lines in burrows, rock crevices, broken and fissured rock and other natural features. Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. Five-lined Skink prefer mixed forests with rock outcroppings. - Any ecosite in southern Ontario other than very wet ones may provide habitat. The following Community Types may be directly related to snake hibernacula: Talus (TA), Rock Barren (RB), Crevice (CCR), Cave (CCA), and Alvar (RBOA1, RBSA1, RBTA1).	- Remnants of an old foundation/wall that may provide potential snake hibernacula habitat was located on the old homestead site at the northeast end of the Study Area. Despite potential habitat, no snakes were observed during any of the field investigations. - Candidate habitat for snake hibernacula may occur in the Study Area.
Colonial-Nesting Bird Breeding Habitat (Bank and Cliff)	- Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, or barns found in any of the following Community Types: Meadow (CUM), Thicket (CUT), Bluff (BL), Cliff (CL). - Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. - Does not include a licensed/permitted Mineral Aggregate Operation.	- The new construction area adjacent to the Subject Property may provide habitat for nesting bank swallows. - No bank and cliff colonial-nesting bird breeding habitat was observed on the Subject Property.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNRF Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Colonial-Nesting Bird Breeding Habitat (Tree/Shrubs)	• Identification of stick nests in any of the following Community Types: Mixed Swamp (SWM), Deciduous Swamp (SWD), Treed Fen (FET). • The edge of the colony and a minimum 300 m area of habitat or extent of the Forest Ecosite containing the colony or any island <15.0 ha with a colony is the SWH. • Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used.	• No tree/shrub colonial-nesting bird breeding habitat was observed in the Study Area.
Colonial-Nesting Bird Breeding Habitat (Ground)	• Any rocky island or peninsula within a lake or large river. • For Brewer's Blackbird close proximity to watercourses in open fields or pastures with scattered trees or shrubs found in any of the following Community Types: Meadow Marsh (MAM1-6), Shallow Marsh (MAS1-3), Meadow (CUM), Thicket (CUT), Savannah (CUS).	• No ground colonial-nesting bird breeding habitat was identified in the Study Area.
Migratory Butterfly Stopover Areas	• Located within 5 km of Lake Ontario • A combination of ELC communities, one from each land class is required: Field (CUM, CUT, CUS) and Forest (FOC, FOM, FOD, CUP) • Minimum of 10 ha in size with a combination of field and forest habitat present	• The Study Area is not located within 5 km of Lake Ontario. • No habitat for migratory butterfly stopover areas occurs in the Study Area.
Landbird Migratory Stopover Areas	• The following community types: Forest (FOD, FOM, FOC) or Swamp (SWC, SWM, SWD) • Woodlots must be >10 ha in size and within 5 km of Lake Ontario – woodlands within 2 km of Lake Ontario are more significant	• The Study Area is not located within 5 km of Lake Ontario. • No habitat for landbird migratory stopover areas occurs in the Study Area.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNR Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Deer Winter Congregation Areas	- Woodlots typically > 100 ha in size unless determined by the MNR as significant. (If large woodlots are rare in a planning area >50ha) - All forested ecosites within Community Series: FOC, FOM, FOD, SWC, SWM, SWD - Conifer plantations much smaller than 50 ha may also be used	There are no woodlands >100 ha in the Study Area that provide habitat for deer winter congregation areas.
Rare Vegetation Communities		
Cliffs and Talus Slopes	- A Cliff is vertical to near vertical bedrock >3 m in height. - A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris - Any ELC Ecosite within Community Series: TAO, TAS, TAT, CLO, CLS, CLT - Most cliff and talus slopes occur along the Niagara Escarpment	No cliffs or talus slopes were identified in the Study Area.
Sand Barrens	- Sand barrens typically are exposed sand, generally sparsely vegetated and cause by lack of moisture, periodic fires and erosion. - Vegetation can vary from patchy and barren to tree covered but less than 60%. - Any of the following Community Types: SBO1 (Open Sand Barren Ecosite), SBS1 (Shrub Sand Barren Ecosite), SBT1 (Treed Sand Barren Ecosite).	No sand barrens were identified in the Study Area.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNR Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Alvars	• An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. • Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. • Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. • Vegetation cover varies from patchy to barren with a less than 60% tree cover. • Any of the following Community Types: ALO1 (Open Alvar Rock Barren Ecosite), ALS1 (Alvar Shrub Rock Barren Ecosite), ALT1 (Treed Alvar Rock Barren Ecosite), FOC1 (Dry-Fresh Pine Coniferous Forest), FOC2 (Dry-Fresh Cedar Coniferous Forest), CUM2 (Bedrock Cultural Meadow), CUS2 (Bedrock Cultural Savannah), CUT2-1 (Common Juniper Cultural Alvar Thicket), or CUW2 (Bedrock Cultural Woodland) • An Alvar site > 0.5 ha in size	• No alvars were identified in the Study Area.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNR Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Old-growth Forest	• Old-growth forests tend to be relatively undisturbed, structurally complex, and contain a wide variety of trees and shrubs in various age classes. These habitats usually support a high diversity of wildlife species. • No minimum size criteria in any of the following Community Types: FOD (Deciduous Forest), FOM (Mixed Forest), FOC (Coniferous Forest) • Forests greater than 120 years old and with no historical forestry management was the main criteria when surveying for old-growth forests.	• No old growth forests were identified in the Study Area.
Savannahs	• A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. • In Ecoregion 6E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario). • Any of the following Community Types: TPS1 (Dry-Fresh Tallgrass Mixed Savannah Ecosite), TPS2 (Fresh-Moist Tallgrass Deciduous Savannah Ecosite), TPW1 (Dry-Fresh Black Oak Tallgrass Deciduous Woodland Ecosite), TPW2 (Fresh-Moist Tallgrass Deciduous Woodland Ecosite), CUS2 (Bedrock Cultural Savannah Ecosite).	• No savannahs were identified in the Study Area.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNRF Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Tall-grass Prairies	- A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. - In Ecoregion 6E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario). - Any of the following Community Types: TPO1 (Dry Tallgrass Prairie Ecosite), TPO2 (Fresh-Moist Tallgrass Prairie Ecosite).	No tall grass prairies were identified in the Study Area.
Other Rare Vegetation Communities	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG	No rare vegetation communities were identified in the Study Area.
Specialized Habitat for Wildlife		
Waterfowl Nesting Area	- All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SWT1, SWT2, SWD1, SWD2, SWD3, SWD4 - Note: includes adjacency to Provincially Significant Wetlands	- Wetlands in the Study Area are too small to attract populations of breeding waterfowl. - No candidate habitat for waterfowl nesting areas was identified in the Study Area.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNR Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Bald Eagle and Osprey nesting, Foraging, and Perching Habitat	- Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. - Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). - ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	There was no candidate habitat for Bald Eagles or Osprey identified in the Study Area.
Woodland Raptor Nesting Habitat	- All natural or conifer plantation woodland/forest stands combined >30 ha and with >4 ha of interior habitat. Interior habitat determined with a 200 m buffer. - Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. - May be found in all forested ELC Ecosites. - May also be found in SWC, SWM, SWD and CUP3	There are no woodlands in the Study Area to provide candidate woodland raptor nesting habitat.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNR Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Turtle Nesting Areas	- Exposed mineral soil (sand or gravel) areas adjacent (<100 m) or within the following ELC Ecosites: MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, BOO1, FEO1 - Best nesting habitat for turtles is close to water, away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. - For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. - Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.	No natural areas of exposed mineral soil for turtle nesting areas was observed in the Study Area.
Seeps and Springs	- Seeps/Springs are areas where ground water comes to the surface. Often, they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs. - Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system	There was no candidate habitat for this seeps and springs identified in the Study Area.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNR Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Amphibian Breeding Habitat (Woodland)	- All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD - Presence of a wetland, lake, or pond within or adjacent (within 120 m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. - Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat	Wetlands in the Study Area are all more than 120m from the nearest woodland and were therefore assessed using the amphibian breeding habitat (wetlands) criteria below.
Amphibian Breeding Habitat (Wetland)	- ELC Community Classes SW, MA, FE, BO, OA and SA. - Wetland areas >120 m from woodland habitats. - Wetlands and pools (including vernal pools) >500 m² (about 25 m diameter) supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNR mapping and could be important amphibian breeding habitats. - Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. - Bullfrogs require permanent water bodies with abundant emergent vegetation.	- Amphibian surveys conducted in the spring of 2017 identified calling amphibians in low abundance in the both of the golf course ponds, and therefore did not qualify for significance based on the defining criteria. Species identified included American Toad, Spring Peeper and Green Frog. - No candidate amphibian breeding habitat (wetlands) was observed in the Study Area.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNR Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Species of Conservation Concern		
Marsh Bird Breeding Habitat	- All wetland habitats with shallow water and emergent aquatic vegetation. - May include any of the following Community Types: Meadow Marsh (MAM), Shallow Aquatic (SA), Open Bog (BOO), Open Fen (FEO), or for Green Heron: Swamp (SW), Marsh (MA) and Meadow (CUM) Community Types.	- Due to their small size, wetlands within the Study Area are not likely to support an abundance of marsh breeding birds. - No candidate habitat for waterfowl stopover and staging areas (aquatic) was observed in the Study Area.
Woodland Area-sensitive Bird Breeding Habitat	- Habitats >30ha where interior forest is present (at least 200 m from the forest edge); typically, >60 years old. - These include any of the following Community Types: Forest (FO), Treed Swamp (SW)	There are no woodlands in the Study Area that provide candidate woodland area-sensitive bird breeding habitat.
Open Country Bird Breeding Habitat	Grassland areas > 30 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or hay or livestock pasturing in the last 5 years, in the following Community Type: Meadow (CUM).	There are no grasslands >30ha in the Study Area that provide candidate open country bird breeding habitat.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNRF Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Habitat for Other Species of Conservation Concern (Includes species listed in Appendix C as either confirmed in the Study Area during field investigations, or identified as having a medium potential of occurring in the Study Area; Excludes species listed as endangered or threatened)	Habitats used by Species of Conservation Concern for all or part of their lifecycle.	- Monarch was observed in the Study Area during field investigations, however its larval host plant milkweed, was only a rare occurrence in the Study Area. - Potential habitat for Eastern Milksnake occurred throughout the Study Area. Remnants of an old foundation/wall that may provide potential snake hibernacula habitat was located on the old homestead site at the northeast end of the Study Area. Eastern Milksnake was not observed during field investigations, however targeted surveys for this species were not conducted. Pre-construction surveys are recommended for the fall of 2018 to confirm whether the old foundation/wall is used by hibernating snakes.
Shrub/Early Successional Bird Breeding Habitat	Oldfield areas succeeding to shrub and thicket habitats >10 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or intensive hay or livestock pasturing in the last 5 years, in the following Community Types: Thickets (CUT), Savannas (CUS), or Woodlands (CUW).	There are no successional habitats >10ha in the Study Area that provide shrub/early successional bird breeding habitat.
Terrestrial Crayfish	- Meadow marshes and edges of shallow marshes (no minimum size). Vegetation communities include MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3. - Construct burrows in marshes, mudflats, meadows - Can be found far from water	No terrestrial crayfish burrows were identified in the Study Area.

Appendix F: 161413446 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria (based on MNR Criteria Schedules for Ecoregion 6E, 2015)	Habitat Assessment of Features Based on EIS data (refer to ELC mapping)
Animal Movement Corridors		
Amphibian Movement Corridor	- Corridors may be found in all ecosites associated with water. - Determined based on identifying significant amphibian breeding habitat (wetland).	There was no significant amphibian breeding habitat (wetlands) identified in the Study Area, therefore there is no candidate habitat for amphibian movement corridors.
Deer Movement Corridor	Corridors may be found in all forested ecosites. Stratum II Deer Wintering Areas have the potential to contain corridors. Corridors typically follow riparian areas, woodlots, ravines and ridges. The corridor must be at least 200m wide with gaps.	There are no woodlands in the Study Area to provide candidate habitat for deer movement corridors.