Environmental Impact Study: Madison Group Cambridge Lands Subdivision, City of Cambridge Ontario

FINAL REPORT

July 25, 2024

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ENVIRONMENTAL IMPACT STUDY: MADISON GROUP CAMBRIDGE LANDS SUBDIVISION, CITY OF CAMBRIDGE ONTARIO

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Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by Madison Group to complete an Environmental Impact Study (EIS) to support a Zoning By-law Amendment and Draft Plan of Subdivision for a proposed residential development located within the North Cambridge, East Side Lands Phase 2 Planning Area of the City of Cambridge. The proposal incorporates a residential subdivision that includes single family homes, townhomes fronting onto proposed municipal roads with rear lanes, three Multiple-Family Residential Blocks (~13.68 ha), one elementary school, and a Park Block. The stormwater management (SWM) facility that will support this development is outside of the limits of the Draft Plan and located west of Riverbank Drive. The Subject Property and SWM Block lands are within the Randall Drain and Riverbank/Allendale Creek subwatersheds of the Grand River Watershed.

The objectives of this EIS are to:

- Evaluate features on the Subject Property and in the Study Area and identify sensitive locations to be considered during design
- Identify the potential impacts of the proposed development on natural heritage features and their ecological functions
- Identify mitigation measures to address adverse affects of the proposed development on natural heritage features and their ecological functions, including avoidance where feasible and opportunities for ecological restoration
- Demonstrate no net negative impacts on the identified and assessed natural features of the proposed development with the implementation of appropriate mitigation measures.

This EIS was prepared in consideration of various policies at federal, provincial and municipal levels as well as guidance provided in Official Plans at the Region and City levels. A review of the Region of Waterloo Greenlands Network Implementation Guide also provided guidance to the EIS study and report.

A review of various background information sources and natural heritage databases informed the development of a field program to characterize the natural features in the Study Area. Field studies included: headwater drainage feature assessments, aquatic habitat assessments, breeding amphibian surveys, breeding bird surveys, Ecological Land Classification and botanical surveys, and SAR bat surveys. Natural features were delineated and walked jointly with Grand River Conservation Authority (GRCA), Region and City staff to obtain consensus on feature boundaries and buffer limits.

The proposed development will result in the removal of some vegetation associated primarily with hedgerows on the Subject Property. Elements of the Region's proposed Greenlands Network will be preserved and provided with buffers to development. Stormwater management approaches are designed to maintain the contribution of surface and groundwater flow primarily towards the Grand River. Surface water quality will be addressed through the design of stormwater management to achieve an Enhanced level of quality.

Mitigation recommendations have been provided and should be incorporated into the final detail design plans to reduce the level of impact of the development during construction and in the long-term.

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1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by Madison Group ("the Client") to complete an Environmental Impact Study (EIS) for a proposed residential subdivision (the Cambridge Lands Subdivision, "Subject Property"), located within the North Cambridge, East Side Lands Phase 2 Planning Area of the City of Cambridge (City). The Subject Property is shown on **Figure 1, Appendix A.**

The Subject Property is located within the Regional Municipality of Waterloo (Region) and within the administrative jurisdiction of the Grand River Conservation Authority (GRCA). The Subject Property is located directly adjacent (south and east) of the provincial Natural Heritage System (Growth Plan, 2020; Land Information Ontario, 2021) and east of the Region's designation of Core Environmental Feature and Significant Valleylands surrounding the Grand River. Wetlands, woodlands, watercourses and GRCA regulated areas have been mapped on portions of the Subject Property and are shown on **Figure 1**, **Appendix A**. The Subject Property and stormwater management (SWM) Block lands are within the Randall Drain and Riverbank/Allendale Creek subwatersheds of the Grand River Watershed.

Madison Group is proposing to develop a residential subdivision which includes single family homes, townhomes fronting onto proposed municipal roads with rear lanes, three Multiple-Family Residential Blocks (~13.68 ha), one elementary school, and a Park Block. The SWM facility that will support this development is outside of the limits of the Draft Plan and located west of Riverbank Drive ("SWM Block lands").

The Client is seeking a Zoning By-law Amendment and Draft Plan of Subdivision for the proposed development on the Subject Property.

1.1 STUDY AREA

The Subject Property is comprised of two (2) parcels of land. The Draft Plan of Subdivision will be developed on the approximately 53.2 ha Subject Property that is bounded by Fountain Street North (Region Road No. 17) to the east, Middle Block Road to the south, Riverbank Drive to the west and future residential development lands to the north. The SWM facility infrastructure will be developed on the SWM Block lands, bounded by the Grand River to the west, Riverbank Drive to the East, natural area to the north, and an existing residence to the south. The SWM Block lands are comprised of the 4.15 ha SWM Block as well as the Proposed SWM outlet to the Grand River.

The Study Area for the EIS is defined as the Subject Property and Adjacent Lands, which encompass 120 meters surrounding both the Subject Property and SWM Block lands. The Subject Property, SWM Block lands, and Study Area are shown on **Figure 1, Appendix A**.

1.2 APPROACH

The objectives of this EIS are to:

- Evaluate features on the Subject Property and in the Study Area and identify sensitive locations to be considered during design
- Identify the potential impacts of the proposed development on natural heritage features and their ecological functions
- Identify mitigation measures to address adverse affects of the proposed development on natural heritage features and their ecological functions, including avoidance where feasible and opportunities for ecological restoration
- Demonstrate no net negative impacts on the identified and assessed natural features of the proposed development with the implementation of appropriate mitigation measures.

This EIS was prepared in consideration of the policies outlined in **Section 2.0** and included a review of the Region of Waterloo Greenlands Network Implementation Guide.

1.3 REGULATORY AND ADVISORY AGENCY CONSULTATION

A Terms of Reference (ToR) to guide the EIS was submitted to the City of Cambridge, Region of Waterloo, and GRCA on May 31, 2022. Comments were provided by all circulated parties. Comments received were incorporated into an updated TOR, which is provided in **Appendix B**.

A site visit was completed on the Subject Property and SWM Block lands on July 6, 2022. The purpose of the site walk was to delineate feature boundaries (e.g., woodland, wetland) as well as discuss the proposed development, the draft secondary plan, and applicable policies. Representatives from the City of Cambridge, Region of Waterloo, GRCA, Stantec, and Madison Group were in attendance. Feature limits (woodland driplines, wetland edges) were reviewed with representative staff, agreed to in the field, and surveyed for use in mapping and Draft Plan design.

2.0 NATURAL HERITAGE POLICY CONTEXT

The following sections discuss legislation and polices that establish the natural heritage context for the Study Area. These, along with other background information and data, were used to identify natural features that require consideration through the planning and design process, and which may pose constraints to development. Legislation and policy are presented under separate headers for the federal, provincial and municipal planning context.

2.1 FEDERAL CONTEXT

2.1.1 Fisheries Act, 1985

The *Fisheries Act*, 1985 (amended on August 28, 2019) is the main federal law governing fisheries in Canada and is administered by Fisheries and Oceans Canada (DFO). The *Fisheries Act* provides for the management and control of fisheries, the conservation and protection of fish, the protection of fish habitat and pollution prevention. Projects that may impact fish, fish habitat, aquatic species at risk (SAR) and aquatic invasive species may be subject to DFO review. The *Fisheries Act* prohibits causing the death of fish and the harmful alteration, disruption or destruction (HADD) of fish habitat, unless authorized by the Minister of Fisheries, Oceans and the Canadian Coast Guard. Conditions and circumstances for projects to be exempt from review are listed on DFO's Fish and Fish Habitat Protection Program web pages. Following guidance and criteria provided on DFO's website regarding mitigation, waterbody types and codes of practice, proponents determine whether their projects in or near water will require review by DFO. DFO review is requested through the submission of a 'Request for Review' (RfR) form. Following completion of their review, DFO can proceed in two ways: 1) issue a Letter of Advice indicating that the proposed work complies with the *Fisheries Act* or, 2) refer the project to the Regulatory Review Unit for site specific review. If the project can avoid impacts to fish and fish habitat, project approval is not required. If impacts that cause a HADD cannot be avoided, proponents must apply for a *Fisheries Act* Authorization, and may be required to develop a habitat offsetting or compensation plan.

The Grand River and Riverbank Creek are located in the Study Area and support fish habitat.

2.1.2 Species at Risk Act, 2002

The *Species at Risk Act* (SARA) provides a framework across Canada to prevent the extinction of wildlife species and to support actions for their recovery.

General SARA prohibitions include Section 32(1), which states that "no person shall kill, harm, harass, capture, or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species", and Section 33, which states that "no person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species, or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada." In addition, critical habitat, defined as the habitat that is necessary for the survival or recovery of a listed wildlife species, may be defined and protected under Section 58. Only those species currently listed in Schedule 1 of SARA (i.e., those listed as extirpated, endangered, or threatened) are protected by the prohibitions of Sections 32 to 36 and 58 of SARA, and then only on federal lands, except for aquatic species and migratory birds, which are rotected throughout Canada. With respect to aquatic species, SARA is administered by DFO.

2.1.3 Migratory Birds Convention Act, 1994 and Migratory Birds Regulation, 2022

The *Migratory Birds Convention Act*, 1994 (MBCA) prohibits the killing or capturing of migratory birds, as well as the damage, destruction, removal, or disturbance of their nests. The *Migratory Birds Regulation*, 2022 (MBR), further defines when nests of migratory bird species are protected, with special provisions in place for certain species of birds where their nests may be reused (e.g., Pileated Woodpecker, Great Blue Heron).

Most species of birds in Canada are protected under the MBCA, as defined by Article I, which names the families and subfamilies of birds protected, and provides clarification of which species are included. In Ontario, migratory birds generally nest between April 1 and August 31.

Environment and Climate Change Canada (ECCC) can issue permits allowing the destruction of nests for scientific, agricultural, or health and safety purposes. New development and site alterations would not qualify as a permitted activity under the MBCA and failure to comply with the MBCA/MBR could result in a charge initiated from a complaint by the public or a violation observed by an enforcement official.

2.2 PROVINCIAL CONTEXT

2.2.1 The Planning Act / Provincial Policy Statement

The Provincial Policy Statement (PPS; MMAH 2020) was issued under Section 3 of the *Planning Act*, 1990 (PA) and came into effect in 1996, with the most recent revision coming into effect on May 1, 2020. *The Planning Act* requires that decisions made by planning authorities are consistent with the policy statements of 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 that natural heritage systems are identified in certain ecoregions. This includes Ecoregion 6E, where the Subject Property is located.

Section 2.1.4 of the PPS (2020) indicates that development and site alteration shall not be permitted in the following features in Ecoregion 6E:

a) Significant Wetlands

b) Significant Coastal Wetlands

According to Section 2.1.5 of the PPS, development and site alteration are not 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)

Sections 2.1.6 and 2.1.7 state that development and site alteration are not permitted in the following features, except in accordance with provincial and federal requirements:

a) Habitat of endangered or threatened species
b) Fish habitat

Development and site alteration are not permitted on lands that are adjacent to the natural heritage features and areas identified above unless the ecological function of the Adjacent Lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

2.2.2 A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2020)

A Place to Grow: Growth Plan for the Greater Golden Horseshoe (the "Growth Plan") came into effect on May 16, 2019, and Amendment 1 to the Plan was approved by the Lieutenant Governor in Council and took effect on August 28, 2020. The Growth Plan seeks to implement the Ontario government initiative to plan for growth and development in the province through to the year 2051. The Subject Property and SWM Block lands are located within the Greater Golden Horseshoe, which encompasses the area located at the western end of Lake Ontario, stretching generally from Wellington County/Waterloo Region in the west, east to the counties of Peterborough and Northumberland, and north to Georgian Bay.

As detailed in the Planning Justification Report (PJR:KLM Planning Partners Inc. 2023) under separate cover, the Subject Property is located within the "Designated Greenfield" Area as identified on 'Schedule 2 – A Place to Grow Concept' of the Growth Plan. The Growth Plan defines this area as follows: *Lands within settlement areas (not including rural settlements) but outside of delineated built-up areas that have been designated in an official plan for development and are required to accommodate forecasted growth to the horizon of this Plan. Designated greenfield areas do not include excess lands.* The SWM Block lands also appear to fall within this designation as well.

Policy 4.2.2.3 states:

a) new development or site alteration will demonstrate that:

> i. *there are no negative impacts on key natural heritage features or key hydrologic features or their functions;*
>
> ii. *connectivity along the system and between key natural heritage features and keyhydrologic features located within 240 metres of each other will be maintained or, where possible, enhanced for the movement of native plants and animals across the landscape;*

The North Cambridge Secondary Plan (discussed in **Section 2.3.1)** will serve as an amendment to the City of Cambridge Official Plan to establish general land use patterns and conceptual layout of schools, parks, collector roads, trails and their associated policies to guide the future development of the area. This is intended to develop the area as a complete community that offers convenient access to most of the necessities for daily living (e.g., jobs, local stores, and services, a range of housing, transportation options, public service facilities and greenspaces). The Official Plan Amendment arising from the Secondary Plan will bring the Subject Property and SWM Block lands into the settlement area.

2.2.3 Conservation Authorities Act, 1990

The Conservation Authorities Act, 1990, was updated in late 2022 with the purpose to provide for the organization and delivery of programs and services that further the conservation, restoration, development and management of natural resources in watersheds in Ontario.

Under this act, Ontario Regulation 150/06 (Development, Interference with Wetlands and Alterations to Shorelines and Watercourses) is administered by the GRCA.

Pursuant to Ontario Regulation 150/06, prior permission is required from the GRCA for development within a river or stream valley, wetland, shoreline, or other hazardous land, and any alteration to a river, creek, stream, 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).

Generally, any development, interference or other alteration that may negatively impact the control of flooding, erosion, dynamic beaches, pollution, or the conservation of land are not permitted. However, development may be permitted where technical studies demonstrate no adverse impact.

Under Policy 8.1.14 (GRCA 2015), stormwater management facilities may be permitted within the riverine flooding hazard, but outside the riparian zone or effective flow area (whichever is greater) if there are no feasible alternatives, and it can be demonstrated that:

a) *there is no loss of flood storage,*

b) *natural erosion and sedimentation processes within the receiving watercourse are not impacted,*

c) *where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions,*

d) *facilities are excavated with minimal berming, special policy areas and floodplain flow regimes for a range of rainfall events including the Regional Storm are maintained, and all excavated material is removed from the Riverine Flooding Hazard, and*

e) *design and maintenance performance requirements as determined by the GRCA for the receiving watercourse are met and the effect of the floodplain flow regime on the intended function of the facility is incorporated into the siting and design.*

The SWM Block lands occur within the GRCA Regulation Limit, primarily associated with the floodplain of the Grand River, as shown on **Figure 1**, **Appendix A**.

2.2.4 Endangered Species Act, 2007

The *Endangered Species Act*, 2007 (ESA) protects species listed by the Committee on the Status of Species at Risk in Ontario (COSSARO) as threatened, endangered, or extirpated in Ontario and their habitats by prohibiting anyone from killing, harming, harassing or possessing protected species, as well as prohibiting any damage or destruction to the habitat of the listed species. Listed species are referred to as Species at Risk (SAR) and are provided with general habitat protection under the ESA aimed at protecting areas that species depend on to carry out their life processes, such as reproduction, rearing, hibernation, migration or feeding. For some species there are 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 the Environment, Conservation and Parks (MECP), unless the activities are exempted under O. Reg. 242/08, O. Reg. 830/21, and O. Reg. 829/21. These regulations identify activities which are exempt from the permitting requirements of the ESA and is subject to rigorous controls outside the permit process, including registration of the activity and preparation of a mitigation plan. Activities that are not exempt under these regulations require a complete permit application process.

2.2.5 Fish and Wildlife Conservation Act, 1997

The provincial *Fish and Wildlife Conservation Act,* 1997 (FWCA) provides protection of wildlife in Ontario including fish, furbearing mammals, game wildlife and specially protected wildlife through regulations for hunting, trapping, and fishing practices. Game and specially protected mammals, birds, reptiles, amphibians and invertebrates are listed on Schedules 1-11 of the FWCA. Definitions provided for hunting include capturing or harassing wildlife (**Section 5.0**) and would include activities that collect or handle wildlife for inventories or other scientific purposes, or to relocate wildlife out of harm's way (e.g., during construction activities), including individuals and eggs. **Sections 7.0** and **9.0** also provide protection for nest and eggs of specified bird species including raptors, and dens of furbearing animals, and beaver dams. Under the FWCA, the Minister has the authority to authorize activities that would otherwise be prohibited such as the safe capture of wildlife and removal of nests, dens and dams, and also to impose conditions on an authorization.

2.3 MUNICIPAL PLANNING CONTEXT

2.3.1 Region of Waterloo Official Plan

The Region of Waterloo Official Plan (ROP; Region of Waterloo 2015) was approved by the Ontario Municipal Board (OMB) on June 18, 2015. The ROP identifies Landscape Level Systems and Core Environmental Features as components of the Greenlands Network, which is shown on Map 4 *Greenlands Network* of the ROP.

Map 4 identifies along the Grand River as a Significant Valley and Core Environmental Feature, both associated with the SWM Block lands. Significant natural features are not identified on the Subject Property, but additional Core Environmental Features occur on adjacent lands south of Middle Block Road.

The Core Environmental Features Policies of the ROP state that development and site alteration will not be permitted within Core Environmental Features (Policy 7.C.9) and that development or site alteration will only be permitted on lands contiguous to a Core Environmental Feature where an EIS, or similar study, has determined that approval of the proposed development will not result in adverse environmental impacts on the features and ecological functions of the Core Environmental features (Policy 7.C.10). Where an EIS is required, appropriate buffers must be identified (minimum 10 m buffer) to protect Core Environmental Features from adverse impacts.

The Randall and Breslau Drain Subwatershed (WSP 2018) is discussed further in **Section 2.3.1**, but it is important to note that natural heritage mapping was derived from that study and is being adopted by the Region of Waterloo to expand upon and update their Greenlands Network. Updated mapping depicting the Recommended Greenlands Network on the Subject Property was obtained from the Region and is shown on **Figure 1, Appendix A.**

Map 1 currently does not identify the Subject Property and SWM Block lands as Urban Growth Centres or Urban Designated Greenfield Areas. However, as detailed in the PJR (KLM 2023) the ROP was subsequently appealed to the Ontario Municipal Board, now referred to as the Ontario Land Tribunal (OLT). Waterloo Regional Council adopted Regional Official Plan Amendment 2 (ROPA 2) to expand the Urban Area boundary to include the Subject Property and initiate the development of a Secondary Plan in the City of Cambridge in June 2018. As a result, ROPA 2 added the North Cambridge Secondary Plan (NCSP) lands into the Urban Area and designated them Urban Designated Greenfield Areas on Map 3a **–** Urban Area in the ROP. ROPA 2 was appealed by the Client and through the scoping and withdrawal of appeals ROPA 2 has been partially approved under the orders of the Tribunal dated June 9, 2021 and March 3, 2022.

2.3.2 City of Cambridge Official Plan

The Cambridge Official Plan (OP) (consolidated September 2018) recognizes natural heritage features and their associated ecological functions as part of a Natural Heritage System. These features have been identified at the federal, provincial, regional and local levels and are categorized as Landscape Level Systems, Core Environmental Features, Locally Significant Natural Areas, Fish Habitat, the natural features linkages between them and lands that may be suitable or required for restoration.

Map 9 *Regional Environmental Features* of the Cambridge OP replicates the mapping from the Waterloo ROP with respect to the Study Area, including identifying Significant Valleys and Core Environmental Features associated with the SWM Block lands, none on the Subject Property, and additional Core Environmental Features in the Study Area south of Middle Block Road.

Policies related to Core Environmental Features reinforce those of the ROP, stating that development and site alteration will not be permitted within Core Environmental Features (Policy 3.A.3.4) and that development or site alteration will only be permitted on lands contiguous to a Core Environmental Feature where an EIS, or similar study, has determined that approval of the proposed development will not result in adverse environmental impacts on the features and ecological functions of the Core Environmental features (Policy 3.A.3.6). Where an EIS is required, appropriate buffers must be identified (minimum 10 m buffer) to protect Core Environmental Features from adverse impacts (Policy 3.A.3.7-9).

The Cambridge OP also identifies Locally Significant Natural Areas (LSNAs) under Policy 3.A.4. LSNAs are those natural features not meeting the criteria for recognition as being provincially or regionally significant. To qualify for recognition as a LSNA, a natural feature must be:

a) a wetland which is regulated by the GRCA but which does not qualify as a Core Environmental Feature
b) a wooded area identified by the Ministry of Natural Resources but which does not qualify as a Core Environmental Feature
c) significant wildlife habitat generally consisting of one or more of the following: i) seasonal concentration areas; ii) rare vegetation communities or specialized habitats for wildlife; iii) habitats of species of conservation concern; or iv) wildlife movement corridors
d) perennial or intermittent watercourse(s)
e) Environmentally Significant Groundwater Discharge and Recharge Areas

While there are no Core Environmental Features on the Subject Property, areas identified by the Region as part of the recommended Greenlands Network are also considered LSNAs by the Cambridge OP. Hedgerows on the Subject Property are also to be assessed as LSNAs.

2.3.3 North Cambridge Secondary Plan

At the time of writing of this report, the City of Cambridge had re-initiated the North Cambridge Secondary Plan (Secondary Plan) within the Stage 2 Master Environmental Servicing Plan area (MESP; referred to as the East Side Lands). This Secondary Plan is part of a larger servicing plan being undertaken by the Region of Waterloo. The Secondary Plan area is approximately 115 ha of agricultural, rural and natural open space areas, generally bounded by Middle Block Road to the south, Riverbank Drive to the west, Fairway Road to the north and just beyond Fountain Street North to the east. The Subject Property falls within this Secondary Plan boundary.

As detailed in the PJR (KLM 2023), the Secondary Plan will serve as an amendment to the City of Cambridge Official Plan to establish general land use patterns and conceptual layout of schools, parks, collector roads, trails and their associated policies to guide the future development of the area. This is intended to develop the area as a complete community that offers convenient access to most of the necessities for daily living (e.g., jobs, local stores, and services, a range of housing, transportation options, public service facilities and greenspaces).

Draft Schedule B of the Secondary Plan identifies components of the City's "Natural Open Space System" and their associated "Natural Open Space System Buffer" on the Subject Property. These are associated with the two (2) wooded areas on the Subject Property, located along Riverbank Drive (stretching south to Middle Block Road) and the small wetland and surrounding forest triangle along Middle Block Road.

As outlined in the Functional Servicing Report (FSR; Stantec 2023b, under separate cover), it is understood that the Secondary Plan is not finalized, and this draft plan submission is being prepared in advance. It was noted in the meeting minutes of settlement that an application could be submitted in advance of the Secondary Plan being prepared so long that the application not be submitted prior to March 1, 2022. Based on information available to date, including information detailed in the Public Open House presentation dated November 25, 2021, the preliminary design information presented aligns with the proposed land use schedule (with some minor deviations to optimize the land use configuration).

2.3.4 Randall and Breslau Drain Subwatershed Study

In May 2018, WSP released a Technical Appendix as part of the Master Environmental Servicing Plan (MESP) and Secondary Plan Study (discussed in **Section 2.3.1**) titled: *Subwatershed Study for the Randall and Breslau Drains (December 2017)* **–** *Addendum to the Subwatershed Study*. The Randall and Breslau Drains subwatershed study is one of several technical studies required as part of the overall environmental servicing plan process. The purpose of the Subwatershed study is to identify the natural heritage system for the subwatershed and inform key natural feature and function constraints so that management strategies and recommendations can be developed to guide future land development processes. These may include, but are not limited to, considerations such as buffers and monitoring (WSP 2018).

Figure A3-19 of the Randall and Breslau Drain Subwatershed Study (WSP 2018) identifies “Supporting Environmental Features (Freeport Creek SWS)” and “MNRF Wooded Areas (LSNA – City of Cambridge)” on the Subject Property, while Significant Valleys, Core Environmental Features, MNRF Wooded Areas (LSNA – City of Cambridge), Animal Movement Corridor, Waterbody, and Regulated Watercourse are identified on the SWM Block lands. The LSNAs are being updated through the North Cambridge Secondary Plan, discussed in **Section 2.3.3**.

3.0 METHODS

Natural features that may pose a constraint to development in the Study Area are identified in this report using the relevant provincial and municipal policies and guidance documents described above. Adjacent Lands are those within 120-m of the Subject Property and are included in a review of background information and to the extent possible, field examination. The Subject Property and Adjacent Lands are collectively referred to as the Study Area. The analysis included a review of background information and site investigations which are described below.

3.1 BACKGROUND DATA COLLECTION AND REVIEW

The following background documents and information sources were consulted during the preparation of this report, including the following:

- Fisheries and Oceans Canada's (DFO) online Aquatic Species at Risk mapping tool (DFO 2023)
- Natural Heritage Information Centre (NHIC) Biodiversity Explorer and database (MNRF 2023a)
- Land Information Ontario (LIO) database (MNRF 2023b)
- Species at Risk in Ontario List (MECP 2023)
- Grand River Conservation Authority (GRCA) online regulated areas mapping
- Region of Waterloo Official Plan (2015)
- City of Cambridge Official Plan (2018)
- North Cambridge Secondary Plan (Draft)
- Subwatershed Study for the Randall and Breslau Drains (WSP 2018)
- Ontario Breeding Bird Atlas (Cadman et. al. 2007)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2022)
- eBird Database (eBird 2022)
- iNaturalist Database (iNaturalist 2022)
- Ontario Butterfly Atlas (TEA 2022)

The results of the background review, detailed in **Section 4.2**, were used to guide the field program detailed in **Section 3.2**, below.

3.2 FIELD INVESTIGATIONS

Field investigations were conducted in 2021 and 2022 to document natural heritage features within the Study Area. Studies consisted of vegetation surveys, ecological land classification surveys (ELC), amphibian surveys, breeding bird surveys, wildlife habitat assessments, incidental observations of wildlife, and drainage feature and aquatic habitat assessments. Vegetation surveys were completed by others (NRSI) on the SWM Block lands and reviewed by Stantec in the field while the remaining surveys assessed both the Subject Property and SWM Block lands. Dates of field investigations are provided in Table 1 with incidental observations of wildlife recorded during each visit.

Table 1: Summary of Field Investigations

Date	Investigation Type	Personnel
December 3, 2021	Initial site visit and preliminary candidate bat tree assessment	L. Marshall
April 6, 2022	Headwater Drainage Feature Assessment (HDFA) #1	J. Brooks
April 22, 2022	Amphibian Survey #1	M. Straus, J. Ball
May 18, 2022	Amphibian Survey #2	M. Straus, J. Randall
May 18, 2022	HDFA #2	J. Brooks
May 23, 2022	Spring flora survey (Subject Property) / ELC review (SWM Block lands) and assessment (Subject Property), candidate bat tree assessment	M. Straus
May 24, 2022	Breeding Bird Survey #1	L. Marshall
June 10, 2022	Amphibian Survey #3, ELC (Subject Property), and HDF examination	M. Straus, S. Geddes
June 13, 2022	Breeding Bird Survey #2	L. Marshall
June 17, 2022	HDF#3, ELC (Subject Property), preliminary delineation of features	M. Straus, S. Geddes
July 10, 2022	Feature boundary delineation, staking and surveying (wetland/woodland)	M. Straus, S. Geddes, K. Gonnsen, M. Mort (Stantec) T. Brenton (NRSI) R. Messier (GRCA) K. Padgett (City of Cambridge) J. Gurney (Region of Waterloo) R. Chin, C. Lamanna (Madison)
July 15, 2022	Summer flora survey / ELC (Subject Property)	B. Miller
September 23, 2022	Fall flora survey (Subject Property)	M. Straus
November 10, 2022	Offsite wetland evaluation, woodlot assessment	M. Straus
June 1 to 15, 2023	Bat ARU surveys	J. Randall

3.2.1 Vegetation Surveys

3.2.1.1 Ecological Land Classification

Vegetation communities on the Subject Property were delineated and classified in the field using protocols outlined in the Ecological Land Classification (ELC) System for Southern Ontario (Lee et al.

1998) and the 2008 ELC code updates. Vegetation assessments documented a list of the dominant species in the canopy, sub-canopy, shrub and ground layers, and a detailed plant species list for each polygon. Flora nomenclature the provincial vascular plant list provided by the Ontario Natural Heritage Information Centre (NHIC; MNRF 2023a).

Vegetation surveys on the SWM Block lands were completed by Natural Resources Solutions Inc. (NRSI) in 2021 using ELC and the results were provided to and reviewed by Stantec Consulting Ltd. in the field in 2022.

Vegetation communities and plant species were reviewed to determine whether any of the communities were rare in the province, contained any provincially significant plant species or had the potential to provide significant habitat for wildlife. Provincial significance of vegetation communities was based on the rankings assigned by the NHIC (MNRF 2023a).

3.2.1.2 Botanical Inventory

A three- season botanical inventory of the Subject Property was completed in spring, summer, and fall. Identification of potentially sensitive native plant species was based on their assigned coefficient of conservatism (CC) value provided 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 8, 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters and are usually typical of high-quality plant communities.

As prescribed in the *Region of Waterloo Greenlands Network Implementation Guide*, local significance was determined using the Region's "Significant Vascular Plant List." The list is currently being updated; however, the existing list was used for this report.

3.2.1.3 Tree Inventory

A tree management plan was prepared by Stantec in March 2023 (under separate cover). A tree inventory and assessment of trees was completed by a certified arborist on the Subject Property and SWM Block lands on January 11th, 12th & 14th, February 14-15th, and 25th, July 12th, 2022 and March 16th, 2023. The purpose of the tree inventory and assessment was to locate and tag trees within the Project footprint.

Trees 10 cm in diameter or greater located within the Subject Property and SWM Block Lands were tagged and recorded in a Detailed Tree Inventory (DTI) and large groupings of stands were recorded in a General Tree Inventory (GTI). Data collected for each tree includes tree genus, specific epithet (where possible to accurately determine), trunk integrity, crown structure, crown vigour, general health condition, DBH, and dripline radius. The tree locations were recorded with an ESRI R1 GPS Unit or Trimble Catalyst.

The condition of inventoried trees was assessed using the following three categories:

Trunk Integrity (TI) - Assessment of the trunk for any defects;

Canopy Structure (CS) - Assessment of the scaffold branches and canopy of the tree;

Canopy Vigour (CV) - Assessment of the amount of deadwood versus live growth in the tree crown, also considers size, color and amount of foliage.

Outlined below are the detailed guidelines utilized for the condition classification:

Good: Defects if present are minor (e.g., twig dieback, small wounds), defective tree part is small (e.g., 5-8 cm diameter limb) providing little if any risk.

Fair: Defects are numerous or significant (e.g., dead scaffold limbs), defective parts are moderate in size (e.g., limb greater than 5-8 cm in diameter).

Poor: Defects are severe (trunk cavity in excess of 50%), defective parts are large (e.g., majority of crown).

Dead: Tree exhibits no signs of life.

A Tree Management Plan (Stantec 2023a) was developed under separate cover by Stantec and provides details on the trees that were inventoried, identifies those proposed for removal and reviews option for compensation.

3.2.2 Amphibian Surveys

Amphibian call counts were conducted in accordance with the Marsh Monitoring Program (Bird Studies Canada 2009). Surveys were conducted at eight stations on the Subject Property as shown on **Figure 2, Appendix A** to target potentially suitable breeding pools. Surveys were conducted in April, May, and June 2022. Station locations were chosen to assess amphibian activity in potentially suitable breeding habitat, including wetlands associated with the Grand River (AMP01, AMP02, AMP03), watercourses (AMP04, AMP05) and offsite areas that may contain potentially suitable wetland or vernal pooling habitat (AMP06, AMP07 and AMP08).

Each survey station included a 100-m radius semicircle with the observer located at the center and listening for a three-minute period. At each station for each survey, all calling toads and frogs identified over the three-minute time period were recorded. Call levels were described using values of 1, 2, or 3, and, where possible, an estimate of the number of individuals calling. Level 1 indicates that individuals could be counted, and calls were not simultaneous. Level 2 indicates that individual calls were distinguishable with some simultaneous calling, and a reasonable estimate of the number of calling individuals was made. Level 3 indicates a full chorus with continuous and overlapping calls and no estimate of the number of individuals was possible. Toads and frogs calling from outside of the survey station were also noted.

3.2.3 Breeding Bird Surveys

Breeding bird surveys were conducted in 2022 during early morning hours using point counts in accordance with the Ontario Breeding Bird Atlas (Cadman et al. 2017), and by traversing the Subject Property on foot and recording all species of birds that were heard or seen by vegetation community. The highest level of breeding evidence was recorded for each species using the codes in the Ontario Breeding Bird Atlas (Cadman *et al.* 2007) codes. Point counts were conducted at six stations in the Subject Property and SWM Block lands as shown on **Figure 2, Appendix A.**

3.2.4 Bat Habitat and Acoustic Surveys

Bat maternity roost surveys were conducted when Stantec staff were on site on December 3, 2021 and May 23, 2022. According to MNRF guidelines, any tree with a diameter breast height (DBH) of 10 cm or greater is considered potential bat maternity roost habitat (MNRF 2017). High potential bat maternity roost trees have a DBH of 25 cm or greater, with a large amount of loose, peeling bark, cavities, or crevices at least 10 metres (m) high, with an open canopy, and exhibiting the early stages of decay (MNRF 2017).

Five bat autonomous recording units (ARUs) were deployed within the Study Area on June 1, 2023. Song MeterSM4Bat FS recorders (Wildlife Acoustics) were used and were programmed to record from 30 minutes prior to sunrise until 30 minutes after sunset. ARUs were deployed to capture a minimum of 10 warm/mild nights (i.e., ambient temperature >10°C) with low wind and no precipitation, as required by MNRF (2017) protocols.

Data were analyzed using Kaleidoscope Pro software by Wildlife Acoustics. The data processing through Kaleidoscope Pro involves running the software's automatic identification, which screens out noise files and provides a suggested species for each bat call file. For calls identified by Kaleidoscope Pro as non-SAR bats, the automatic species IDs were used and were not reviewed in detail. For high-frequency calls that were identified as a potential SAR bat, each call was reviewed by a qualified biologist to confirm the identification by visually assessing the call file spectrographs to identify if the frequency range and shape were consistent with the species assigned by the software. In addition, calls that were identified as 'No ID' by Kaleidoscope Pro with a minimum frequency of 35 kHz or above were reviewed, as they have the potential to be made by SAR bats. Where calls were not of sufficient quality to identify to species, they were classified as high frequency unknown (where the minimum frequency was 35 kHz or above) or low frequency unknown (where minimum frequency is less than 35 kHz). All calls with under five pulses were classified as high frequency unknown, low frequency unknown, or No ID, as a short call can not be reliably identified.

Candidate maternity roost tree locations and ARU monitoring station locations are shown in the 2023 Bat Survey Results report contained in **Appendix F**.

3.2.5 Incidental Wildlife

Observations of wildlife and signs of wildlife were recorded during field investigations, including species that were detected by sight and sound, dens, nests, burrows, browse, tracks, and scat.

3.2.6 Significant Wildlife Habitat

Wildlife habitat is defined as an area where plants, animals and other organisms live, including areas where species concentrate at a vulnerable point in their life cycle and that are important to migratory and non-migratory species. The Significant Wildlife Habitat Ecoregion 6E Criterion Schedule (the Ecoregion Criteria; MNRF 2015) groups wildlife habitat into four categories:

- Seasonal concentration areas of animals
- Rare vegetation communities or specialized habitat for wildlife
- Habitat for species of conservation concern
- Animal movement corridors

Prior to field investigations, MNRF's LIO database was reviewed to identify records of significant wildlife habitat within the Study Area. Wildlife habitat assessments were conducted during vegetation surveys to identify presence or absence of wildlife habitat features detailed in the Ecoregion Criteria Schedule. Where applicable, a description of the attributes and location of each feature identified was recorded.

Seasonal concentration areas are sites where large numbers of a species gather together at one time of the year, or where several species congregate. Only the best examples of these concentration areas are typically designated as SWH.

Rare or specialized habitats are defined as separate components of SWH. Rare habitats are habitats with vegetation communities that are considered rare (S1-S3) in the province. These habitats are generally at risk and may support wildlife species that are considered significant. Specialized habitats are microhabitats that are critical to some wildlife species, and this includes SWH for Species of Conservation Concern (SOCC), which are Special Concern and Provincially Rare (S1-S3, SH) plant and animal species (MNRF 2023a). Lists of these species are tracked by the Natural Heritage Information Centre (NHIC). Habitat for SOCC includes four types of species: those that are rare, those whose populations are significantly declining, those that have been identified as being at risk to certain common activities, and those with relatively large populations in Ontario compared to the remainder of the globe.

As per the Significant Wildlife Habitat Technical Guide (MNR 2000) and the Ecoregion Criteria, targeted species-use surveys for plants, amphibians, and breeding birds were used to confirm the presence of SWH.

3.2.7 Headwater Drainage Feature Assessments

Headwater Drainage Features within the Subject Lands were assessed using the document entitled *Evaluation, Classification, and Management of Headwater Drainage Features Guidelines* (CVC and TRCA, 2014), hereafter referred to as *the guidelines*.

The guidelines employ a multiple survey approach to headwater drainage feature assessments (HDFA) to capture seasonal variability in hydroperiod and identify other potential ecological functions of these features on the landscape. In general, the need for additional surveys and the timing of each visit is dictated by the results of the previous survey, as follows:

- Site Visit 1: conducted during a window of approximately two weeks, immediately after the snowpack has dissipated and the frost is out of the ground (typically late March – early April). This visit determines if a defined feature is present and if additional surveys are required.
- Site Visit 2: conducted after the freshet has ended when the melt/thaw related interflow has ceased and, preferably, after a few days with no precipitation (typically late April through mid-May). This visit assesses flow condition and fish presence. If the feature is dry, a third visit is not required.
- Site Visit 3: conducted if water was present in the feature during Site Visit 2. The timing of the third visit is from July to mid-September, preferably after several days without a significant (i.e., flow generating) amount of rain. This visit assesses flow condition and fish presence. The primary purpose is to determine where the upstream limits of flow, permanent aquatic habitat (which would include standing water upstream from where flow ceases) and fish utilization occur. The presence of flow during this visit automatically results in classification as an “important” feature.

Information collected consisted of identifying and describing the drainage features, including water presence, morphology, riparian conditions, and potential for contributing to fish habitat. Fish community sampling was not conducted as a part of the field investigation.

3.2.8 Fish Habitat

Fish habitat within the Study Area is present in Riverbank Creek and the Grand River. Background information was used to assess the presence of fish habitat in both of these features. No formal fish habitat surveys were completed as part of this study.

4.0 RESULTS

4.1 PHYSICAL SETTING

The physical setting of the Subject Property, Study Area and general surroundings is summarized below. These elements are discussed in much greater detail in the FSR (Stantec 2023b) and the Hydrogeological Assessment report (Stantec 2023c), both of which are prepared under separate cover.

4.1.1 Physiography, Topography, and Drainage

The Subject Property is located within the physiographic region classified by Chapman and Putnam (1984, 2007) as the Guelph Drumlin Field; however, the Subject Property is also positioned adjacent to the eastern flank of the Waterloo Hills physiographic region. The Waterloo Hills, commonly referred to as 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, whereas the Guelph Drumlin Field consists of drumlinized till plains surrounded by coarse-grained spillways. Most of the Subject Property is intercepted by till plain and according to OGS (2010) mapping this area is covered by deposits of stone-poor, silty to sandy till. The remaining areas of the Subject Property are intercepted by spillways consisting of sandy to gravelly glaciofluvial deposits.

Regional topography over the lands of the Subject Property slopes from the northeast to southwest towards the Grand River. Topographic conditions on the Subject Property are classified as rolling with the property containing hollows and swales. Ground surface elevations across the Subject Property range from approximately 302 to 313 m AMSL. Surface water runoff generally flows from east-to-west across the property and generally directed toward the Grand River. Further details on existing drainage conditions throughout the Subject Property are provided in the FSR (Stantec 2023b).

4.1.2 Soils

The surficial geology in and surrounding the Subject Property is mapped by the OGS (2010) and indicates that most of the Subject Property is covered by deposits of stone-poor, silt to sandy silt till, which is interpreted to represent the Port Stanley Till and/or Upper Maryhill Till (clayey silt to silty clay till). Glaciofluvial deposits of sand and gravel are shown to occur in the western portion of the Subject Property and in the northeast corner of the property along Fountain Street North. Further details on soils and hydrostratigraphy are provided in the Hydrogeologic Assessment report (Stantec 2023c) under separate cover.

4.1.3 Regional Geology and Hydrogeology

The Subject Property is located along the eastern flank of the Waterloo Moraine, a kame moraine formed in an interlobate position between ice lobes extending from the Lake Ontario-Erie, Huron, and Georgian bay areas (Karrow, 1993). Numerous advances and retreats of the ice lobes during the Wisconsinan glaciation resulted in a complex deposit of ice-contact and glacial outwash sands and gravels separated by silt- and clay-rich tills. Regional water table mapping prepared by the Grand River Conservation Authority (2001) indicates that groundwater flow through the overburden deposits near the Subject Property is generally from southeast to northwest and moves towards the Grand River, which is reported to be a groundwater discharge area downgradient of the Subject Property.

Regionally, the lands containing the Subject Property are characterized by groundwater recharge conditions. Mapping created using the Grand River Information Network (GRIN) (GRCA, 2023) indicates that downward vertical hydraulic gradients are present beneath the Subject Property with annual groundwater recharge rates across the property ranging from 127 to 199 mm/year in those areas where deposits of sandy silt to silty sand till are exposed at ground surface. In the northwest and northeast corners of the Subject Property where glaciofluvial outwash deposits of coarse sand and gravel occur at ground surface, annual recharge rates are notably higher with values reported to range from 318 to 363 mm/year.

4.2 BACKGROUND REVIEW

The results of the background review and field surveys are summarized below.

4.2.1 Designated Natural Features

The following designated natural features are present with the Study Area, as shown on **Figure 1, Appendix A**.

- Provincially Significant Wetlands (Maple Grove Road Wetland Complex)
- Evaluated Wetlands (including the Linear Grand River Floodplain Wetland)
- Woodlands (LIO)
- Significant Valleyland (City of Cambridge and Region of Waterloo Official Plan; mapped as part of the Recommended Greenlands Network)
- Core Environmental Feature (City of Cambridge and Region of Waterloo Official Plan)
- Watercourses, both permanent (Grand River), drains, and intermittent watercourses
- Fish habitat (LIO)

Where open-source data were available during the background review, these features are mapped on **Figure 1** (**Appendix A**).

4.2.2 Species at Risk and Provincially Rare Species

A review of the NHIC database (MNRF 2023a), wildlife atlases and the 1-km NAD 83 grid squares that intersect within the Study Area identified records of SAR or provincially rare species (SOCC) within 1-km of the Subject Property.

The species at risk and provincially rare species have been identified as potentially occurring within these areas as listed below in **Table 2** and **Table 3,** respectively.

Table 2: Potential Species at Risk Occurring in the Study Area

Species	Status	
	Ontario ESA, SARO List	Federal SARA, Schedule 1
Plants		
Butternut (*Juglans cinerea*) [1, 6]	Endangered	Endangered
Black Ash (*Fraxinus nigra*) [6]	Endangered	No Status
Birds		
Bank Swallow (*Riparia riparia*) [2]	Threatened	Threatened
Bobolink (*Dolichonyx oryzivorus*)[1,2]	Threatened	Threatened
Chimney Swift (*Chaetura pelagica*) [2]	Threatened	Threatened
Yellow-breasted Chat (*Icteria virens*)[2]	Endangered	Endangered
Red-headed Woodpecker (*Melanerpes erythrocephalus)*[2]	Endangered	Endangered
Eastern Meadowlark (*Sturnella magna*)[1, 2, 5]	Threatened	Threatened
Mammals		
Eastern small-footed Myotis (*Myotis leibii*) [6]	Endangered	No Status
Little brown Myotis (*Myotis lucifungus*) [6]	Endangered	Endangered
Northern Myotis (*Myotis septentrionalis*) [6]	Endangered	Endangered
Tri-colored Bat (*Perimyotis subflavus*) [6]	Endangered	Endangered
Amphibians		
Jefferson Salamander (*Ambystoma jeffersonianum)* [3]	Endangered	Endangered
Reptiles		
Blanding's Turtle (*Emydoidea blandingi)* [3]	Threatened	Endangered
Fish		
Silver Shiner (*Notropis photogenis*)[1,7]	Threatened	Threatened
Black Redhorse (*Moxostoma duquesni*) [1,7]	Threatened	Threatened
Molluscs		
Wavy-rayed Lampmussel (*Lampsilis fasciola*) [1,7]	Threatened	Special Concern

[1] Ministry of Natural Resources (MNRF) Natural Heritage Information Centre (NHIC) Database
[2] Ontario Breeding Bird Atlas (Cadman et. al., 2007)
[3] Ontario Reptile and Amphibian Atlas (Ontario Nature, 2019)
[4] iNaturalist (2022)
[5] eBird Database (eBird 2022)
[6] Species at Risk in Ontario List (MECP 2020)
[7] DFO Species at Risk mapping (2023)

Table 3: Potential Provincially Rare Species Occurring in the Study Area

Species	Status	
	Ontario ESA or Provincial Rank	Federal SARA, Schedule 1
Birds		
Bald Eagle (*Haliaeetus leucocephalus*) [2, 5]	Special Concern	
Canada Warbler (*Cardellina canadensis*) [2]	Special Concern	Threatened
Barn Swallow (*Hirundo rustica*) [2,5]	Special Concern	Threatened
Common Nighthawk (*Chordeiles minor*) [5]	Special Concern	Threatened
Peregrine Falcon (*Falco peregrinus*)[2,5]	Special Concern	Special Concern
Eastern Wood-Pewee (*Contopus virens*) [2, 5]	Special Concern	Special Concern
Grasshopper Sparrow (*Ammodramus savannarum*)[2]	Special Concern	Special Concern
Wood Thrush (*Hylocichla mustelina*) [2, 5]	Special Concern	Threatened
Insects		
Black Dash (Euphyes conspicua) [7]	Provincial S3 Rank	
Monarch (*Danaus plexippus*) [7]	Special Concern	Special Concern
Tawny Emperor (*Asterocampa clyton*)[7]	Provincial S3 Rank	
Reptiles		
Eastern Milksnake (*Lampropeltis Triangulum*) [3]	Not at Risk	Special Concern
Eastern Ribbonsnake (*Thamnophis sauritus*) [3]	Special Concern	Special Concern
Midland Painted Turtle (*Chrysemys picta marginata*) [1,3]	Not at Risk	Special Concern
Snapping Turtle (*Chelydra serpentina*) [1,3]	Special Concern	Special Concern
Amphibians		
Western Chorus Frog - Great Lakes - St. Lawrence - Canadian Shield population (*Pseudacris maculata* pop. 1)[1]	Not at Risk	Threatened
Molluscs		
Rainbow (*Villosa iris*) [1,8]	Special Concern	Special Concern

[1] Ministry of Natural Resources (MNRF) Natural Heritage Information Centre (NHIC) Database

[2] Ontario Breeding Bird Atlas (Cadman et. al., 2007)

[3] Ontario Reptile and Amphibian Atlas (Ontario Nature, 2019)

[4] Species at Risk in Ontario List (MECP 2020)

[5] eBird Database (eBird 2022)

[6] iNaturalist Database (iNaturalist 2022)

[7] Ontario Butterfly Atlas (TEA 2022)

[8] DFO Species at Risk mapping (2023)

4.3 FIELD INVESTIGATIONS

Results of the targeted field investigations are summarized in the sections below.

4.3.1 Vegetation Surveys

4.3.1.1 Ecological Land Classification

The vegetation surveys identified wetlands, woodlands, hedgerows, thickets, meadows, agricultural lands, and residential and industrial development within the Study Area. Vegetation communities in the Study Area are mapped on **Figure 2, Appendix A** and described below in **Table 4**. Vegetation communities documented are common and widespread in Ontario.

The majority of the Study Area was mapped as agricultural (OAG, OAGM1, OAGM3). Woodlands (FO and WO community classes) and meadows (ME community classes) are relatively common within the Study Area.

Table 4: Vegetation Communities Documented in the Study Area

Type	Code	Title	Community Description
Woodland	CUT	Cultural Thicket	Rock pile in agricultural field with Manitoba maple growth on top.
Constructed	CV	Constructed	Trench
Constructed	CVC_2	Light Industry	Light Industry; transport truck storage
Constructed	CVI_1	Transportation	Roadways, including Middle Block Line and Riverbank Drive
Constructed	CVR_4	Rural Property	Rural property; abandoned farmstead
Constructed	IAGM1	Agricultural Buildings	Agricultural building
Hedgerow	H1	Hedgerow 1	Community described by NRSI
Hedgerow	FODM11	Naturalized Deciduous Hedgerow Ecosite	Treed hedgerows on the Subject Property.
Woodland	FOC2-2	Dry – Fresh White Cedar Coniferous Forest Type	Community described by NRSI
Woodland	FOD4	Fresh – Moist White Cedar Coniferous Forest Ecosite	Community described by NRSI
Woodland	FOD4-3	Dry – Fresh Hackberry Deciduous Forest Type	Community described by NRSI
Woodland	FODM4-5	Dry - Fresh Manitoba Maple Deciduous Forest Type	Rock pile in agricultural field with Manitoba maple growth on top.

Table 4: Vegetation Communities Documented in the Study Area

Type	Code	Title	Community Description
Woodland	FOD5	Dry – Fresh Sugar Maple Deciduous Forest Ecosite	Community described by NRSI.
Woodland	FODM5-1	Dry – Fresh Sugar Maple Deciduous Forest Type	Heavily logged with no understory.
Woodland	FODM5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest Type	Large maples on forest edge, but most interior trees are <10cm DBH.
Woodland	FOD6	Fresh – Moist Sugar Maple Deciduous Forest Ecosite	Community described by NRSI.
Woodland	FOD7-4	Fresh – Moist Black Walnut Lowland Deciduous Forest Type	Community described by NRSI
Woodland	FODM8-1	Fresh – Moist Poplar Deciduous Forest Type	Poplar dominated. Triangular wetland north of Middle Block Road.
Meadow	CUM1	Mineral Cultural Meadow Ecosite	Community described by NRSI
Meadow	MEF	Forb Meadow	Small section in agricultural field south of Middle Block Road that was plowed but did not contain crop.
Meadow	MEFM1-1	Goldenrod Forb Meadow Type	Goldenrod dominated community south of Middle Block Road adjacent to abandoned farmstead
Meadow	MEGM3-4	Kentucky Blue Gras Graminoid Meadow Type	A fallow lawn adjacent to an abandoned home on the corner of Fountain Street North and Middle Block Road.
Meadow	MEGM3-5	Smooth Brome Graminoid Meadow Type	Bindweed and bedstraw dominated
Meadow	MEMM3	Dry - Fresh Mixed Meadow Ecosite	Outside of Subject Property to the north
Meadow	MEMM4	Fresh - Moist Mixed Meadow Ecosite	Reed canary grass moist mixed meadow
Agriculture	Ag	Agriculture	Sod farm
Agriculture	OAG	Open Agriculture	Recently plowed; fallow field
Agriculture	OAGM1	Annual Row Crops	Corn
Agriculture	OAGM3	Specialty Crops	Sod Farm
Wetland	SWD2-2	Green Ash Mineral Deciduous Swamp Type	Described by NRSI
Wetland	SWD4-1	Willow Mineral Deciduous Swamp Type	Described by NRSI

Table 4: Vegetation Communities Documented in the Study Area

Type	Code	Title	Community Description
Wetland	SWDM4-5	Poplar Mineral Deciduous Swamp Type	Poplar dominated. Triangular wetland north of Middle Block Road.
Wetland	SWDM3-3	Swamp Maple Mineral Deciduous Swamp Type	Freeman's maple dominated, south of Middle Block Road
Wetland	SWTM2	Dogwood Mineral Deciduous Thicket Swamp Ecosite	Triangular wetland north of Middle Block Road.
Woodland	THDM2-6	Buckthorn Deciduous Shrub Thicket Type	Buckthorn thicket
Woodland	THDM3	Dry - Fresh Deciduous Hedgerow Thicket Ecosite	Deciduous shrub thicket east of Riverbank Drive.
Woodland	WOD	Deciduous Woodland	Woodland associated with existing residence along Middle Block Road. Mix of planted species such as weeping willow, sugar maple, black locust.
Woodland	WODM4	Dry - Fresh Deciduous Woodland Ecosite	Hedgerow and homestead influenced, north of Middle Block Road.
Woodland	WODM4-1	Hawthorn / Apple Deciduous Woodland Type	Hawthorne and apple growth along agricultural field; primarily dense buckthorn.
Woodland	WODM5-3	Fresh - Moist Manitoba Maple Deciduous Woodland Type	Manitoba Maple and black walnut woodland east of Riverbank Drive.
Aquatic	OA	Open Water	Grand River

Polygons noted with an asterisk on **Figure 2, Appendix A** are within the Study Area but are being examined by another environmental consultant in association with an application for lands west of Riverbank Drive.

4.3.1.2 Botanical Inventory

The following is a floristic summary for the Study Area based on botanical assessments carried out in 2022 by Stantec. A detailed list with scientific plant names and species statuses is provided in **Appendix C**.

- A total of 162 vascular plants were recorded, including one taxon identified to species, subspecies (ssp.) and variation (var.) levels.
- 85 of the 162 recorded plants are native to Ontario, and 77 are exotic species not native to Ontario.

- All but one native species had a provincial rank of S5 or S4, indicating they are common or uncommon (but not rare) and secure or apparently secure in Ontario.
- One provincially rare plant species (e.g., S1, S2 or S3) was recorded (thornless honey locust; S2?), associated with a residential property on Middle Block Line (see Stantec 2023a); however, this species is likely planted as it is not known to occur naturally in the Waterloo Region.
- Seven regionally rare plant species were recorded on the Subject Property, including:
  - Canada germander, located within the cultural meadow (CUM1) bound by sod fields (Ag) to the west and green ash swamp (SWD2-2) to the east, see Figure 2 (Appendix A) for ELC communities.
  - American plum, located within the hedgerows on the Subject Property.
  - Common hackberry[1], found in the Hackberry Deciduous Forest (ELC community FOD4-3; Figure 2, Appendix A) and scattered throughout the various hedgerows on the Subject Property. A detailed tree inventory of the hedgerows included an assessment of 34 common hackberry trees, found in the *Madison Lands, Cambridge, Ontario Tree Management Plan* (Stantec 2023a)
  - Common juniper[2], associated with disturbed areas along Riverbank Drive (e.g., THDM2-6; see Stantec 2023) and therefore not considered significant (not demonstrably indigenous)
  - White spruce[2], associated with residential areas along Middle Block (see Stantec 2023a) and therefore not considered significant (not demonstrably indigenous)
  - Eastern cottonwood[2], located along Fountain Street and the associated residence (see Stantec 2023a) but may also occur within treed communities elsewhere on the Subject Property
  - Black walnut[1,2], numerous trees throughout the Study Area in hedgerows and woodlands (e.g., WOD5-4, WODM4-1) with 138 inventoried trees found in Stantec 2023a
- No species at risk plant species (e.g., butternut, black ash) were observed in the Study Area.
- One highly sensitive native plant species with a high coefficient of conservatism value of 8, 9 or 10 was observed in the Study Area (common hackberry; coefficient of conservatism value of 8), described above.

4.3.2 Amphibian Surveys

Eight amphibian call count stations were established on the Subject Project and SWM Block lands as shown on **Figure 2, Appendix A**.

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[1] Significant but with the expectation that additional research may prove otherwise
[2] Significant only if demonstrably indigenous – most populations in the Region are thought to be of non-indigenous origin

An American Toad was recorded at call station AMP07 (one individual observed), associated with a wetland outside the Study Area. A Gray Treefrog was heard calling beyond 100 m of call station AMP01 (associated with the SWM Block lands; one individual observed). Spring Peepers were heard at call stations AMP03 (associated with the SWM Block lands), AMP06 and AMP07 (associated with candidate habitat on adjacent lands). Wood Frogs were heard at call station AMP03 (associated with the SWM Block lands) calling within 50 m of the station. All four species are ranked as common and secure (S5) in Ontario. Results of the call count surveys are summarized in **Table 5** with the scientific names and species statuses included in **Appendix D.**

Table 5: Amphibian Calling Activity Levels

Station	Date	Species (Call Level Code and Number of Individuals)							Notes
		AMTO	GRTR	GRFR	NLFR	PIFR	SPPE	WOFR	
AMP01	April 22, 2022								No calls
	May 18, 2022								No calls
	June 10, 2022		1,1**						Calling outside 100 m of station across Grand River
AMP02	April 22, 2022								No calls
	May 18, 2022								No calls
	June 10, 2022								No calls
AMP03	April 22, 2022							1, 3	Calling within 50 m
	May 18, 2022						1, 1**		Calling outside 100 m of station. Calls heard closer to Grand River
	June 10, 2022								No calls
AMP04	April 22, 2022								No calls
	May 18, 2022								No calls
	June 10, 2022								No calls
AMP05	April 22, 2022								No calls

Table 5: Amphibian Calling Activity Levels

Station	Date	Species (Call Level Code and Number of Individuals)							Notes
		AMTO	GRTR	GRFR	NLFR	PIFR	SPPE	WOFR	
	May 18, 2022								No calls
	June 10, 2022								No calls
AMP06	April 22, 2022								No calls
	May 18, 2022						1, 1*		Calling within 50 m
	June 10, 2022								No calls
AMP07	April 22, 2022	1, 1*					2, 5*		Calling outside 100 m
	May 18, 2022								No calls
	June 10, 2022								No calls
AMP08	April 22, 2022								No calls
	May 18, 2022								No calls
	June 10, 2022								No calls

AMTO: American Toad *Anaxyrus americanus*
GRTR: Gray Treefrog *Hyla versicolor*
GRFR: Green Frog *Lithobates clamitans*
NLFR: Northern Leopard Frog *Lithobates pipiens*
SPPE: Spring Peeper *Pseudacris crucifer*
WOFR: Wood Frog *Lithobates sylvaticus*
CHFR: Chorus Frog *Pseudacris triseriata*

* denotes species heard outside of the Subject Property and SWM Block lands but within the Study Area.
** denotes species heard outside of the Study Area.

4.3.3 Breeding Bird Surveys

A total of 55 species were observed during breeding bird surveys in 2022, 48 of which are expected to be breeding within the Study Area. The seven species that are not expected to be breeding within the Study Area are Great Blue Heron, Mallard, Double-crested Cormorant, Canada Goose, Spotted Sandpiper, Turkey Vulture and Ring-billed Gull. These seven species were either observed flying over during surveys (not indicative of breeding behaviour) or it was determined that breeding habitat was absent from the

Study Area. All species observed have provincial breeding status ranks of S5B (Secure—Common, widespread, and abundant in the province) or S4B (Apparently Secure—Uncommon but not rare). Two species, Barn Swallow and Eastern Wood-Pewee, are "special concern" in Ontario. A list of bird species identified in the Study Area is provided in **Appendix D**.

4.3.4 Bat Habitat and Acoustic Surveys

A summary report providing the full results of the bat ARU survey is provided in **Appendix F**. That report was prepared following the first submission of the EIS. The following is a summary of the results.

Four potential high quality maternity roosts were identified on the Site (**Figure 1, Appendix F**). These trees are all deciduous species with a large DBH, and contain cavities or crevices, peeling bark and/or signs of decay. Three of these trees were located along the hedgerow at the northern property boundary. The fourth is located along the hedgerow near the center of the Subject Property.

ARU locations were chosen to provide spatial coverage of the site (**Figure 1, Appendix F**). Five ARUs were deployed from June 1 to 15, for a total of 14 nights of monitoring. The weather conditions for these dates were reviewed for the closest weather station (Kitchener/Waterloo) (ECCC 2023), to determine that at least 10 nights of suitable weather conditions (temperature > 10°C, low wind and no precipitation), as defined by the MNRF, had occurred.

The most commonly recorded species was Big Brown Bat (*Eptesicus fuscus*), followed by Hoary bat (*Lasiurus cinereus*) and Silver-haired Bat (*Lasionycteris noctivagans*). All three of these species were recorded at all five survey locations. Big Brown Bat is a resident species that can be found in Ontario year-round. Winters are spent hibernating in houses, barns and other anthropogenic structures, or at underground sites (caves or mines). Hoary Bat, Silver-haired Bat and Eastern Red Bat are migratory species that only occur in Ontario during the spring, summer and fall.

A total of 61 recordings were categorized as Myotis species. These calls could only be identified to genus due to the quality of the call. Myotis species have very similar calls that can be difficult to reliably differentiate based on acoustic recordings. The species in this category may include Little Brown Myotis, Northern Myotis, or Eastern-Small Footed Myotis.

In addition, many calls were identified at High Frequency Unknown or Low Frequency Unknown, where they could not be identified to species or genus. High frequency species include the three Myotis bats, Tri-coloured bat and Eastern Red Bat. Low frequency species include Big Brown Bat, Hoary Bat and Silver-haired Bat.

4.3.5 Incidental Wildlife

Incidental observations of wildlife and wildlife evidence included two birds (Red-tailed Hawk and Common Nighthawk), one reptile (Eastern Gartersnake), two amphibians (American Toad and Leopard Frog) and two mammals (Coyote and unknown bat species). Identified species have a provincial rank of S5 or S4, indicating they are secure / apparently secure in Ontario. A positive identification of the two bats observed incidentally during amphibian surveys on May 18, 2022 could not be obtained, therefore ranks are unknown. The Common Nighthawk (observed calling over the Grand River during amphibian surveys on May 18) is "special concern" in Ontario and is not expected to be breeding on the Subject Property or the SWM Block lands. The complete list of wildlife species and their status and scientific name is provided in **Appendix D**.

4.3.6 Significant Wildlife Habitat

4.3.6.1 Seasonal Concentration Areas

Review of the NHIC and LIO databases did not identify seasonal concentration areas within the Study Area.

The potential for seasonal concentration areas to occur in the Study Area based on the results of the field surveys conducted is provided in Table 6.

Table 6: Seasonal Concentration Areas

Habitat Type	Habitat Features	Candidate SWH in the Study Area
Waterfowl Stopover and Staging Areas (Terrestrial)	Field with evidence of annual spring flooding from meltwater or runoff; aquatic habitats such as ponds, marshes, lakes, bays, and watercourses used during migration, including large marshy wetlands	None (candidate features not observed)
Waterfowl Stopover and Staging (Aquatic)	Ponds, lakes, marshes bays, coastal inlets used during migration. Sewage treatment ponds do not qualify.	**POTENTIALLY PRESENT** (The Grand River and riparian zone meet ELC requirements for terrestrial staging area; documented use by qualifying species, aggregations not confirmed)
Shorebird migratory stopover area	Beaches and un-vegetated shorelines of lakes, rivers, and wetlands	None (candidate features not observed)
Raptor wintering areas	Combination of fields and woodland (>20 ha)	None (meadow and woodland complexes are too small to be considered significant)
Bat hibernacula	Abandoned mine shafts, underground foundations, caves, and crevices	None (candidate features not observed)

Table 6: Seasonal Concentration Areas

Habitat Type	Habitat Features	Candidate SWH in the Study Area
Bat maternity colonies	Mixed and deciduous forests and swamps with large diameter dead or dying trees with cavities	**POTENTIALLY PRESENT** - SWD, FOD units have large trees and are likely to support roosting bats. Candidate suitable cavity trees observed during field surveys in 2022.
Turtle wintering area	Permanent waterbodies and large wetlands with sufficient depth and dissolved oxygen	**POTENTIALLY PRESENT** -The Grand River has potential for turtle overwintering.
Reptile hibernacula	Rock piles or slopes, stone fences, crumbling foundations	None (candidate features not observed). An old foundation observed in WODM4 (Hawthorn/Apple Deciduous Woodland) community located on the northern edge of Middle Block Road did not appear to be below grade and is therefore not considered candidate SWH.
Colonially – nesting bird breeding habitat (bank and cliff)	Eroding banks, sandy hills, steep slopes, rock faces or piles	None (candidate features not observed; appropriate ELC types along Grand River not present.)
Colonially – nesting bird breeding habitat (trees/shrubs)	Dead trees in large marshes and lakes, flooded timber, and shrubs, with nests of colonially nesting heron species.	None (candidate features not observed; breeding bird surveys did not document use by qualifying species)
Colonially – nesting bird breeding habitat (ground)	Rock islands and peninsulas in a lake or large river	None (candidate features not observed; breeding bird surveys did not document use by qualifying species)
Migratory butterfly stopover area	Meadows and forests that are a minimum of 10 ha and are located within 5 km of Lake Erie or Lake Ontario	None (not located within 5km of Lake Erie or Lake Ontario)
Landbird migratory stopover area	Woodlands of a minimum size located within 5km of Lake Erie or Lake Ontario	None (woodlands are too small to be considered significant)
Deer Yarding Areas	In winter, deer congregate in “yards” to survive severe winter conditions.	None (candidate features not observed). Deer probably present on Subject Property, but no yards observed.
Deer wintering congregation areas	Deer yards are mapped by MNRF.	None (no background records of features)

4.3.6.2 Rare or Specialized Habitats

The potential for rare or specialized habitats to occur in the Study Area is provided in Table 7 and Table 8.

Table 7: Rare or Specialized Habitats

Habitat Type	Habitat Features	Candidate SWH in the Study Area
Sand barren, alvar, cliffs and talus slopes	Sand barren, Alvar, Cliff and Talus ELC Community Classes, and other areas of exposed bedrock and patchy soil development, near vertical exposed bedrock and slopes of rock rubble	None (not documented during vegetation surveys)
Prairie and savannah	Open canopy habitats (tree cover < 60%) dominated by prairie species	None (not documented during vegetation surveys)
Old growth forest	Relatively undisturbed, structurally complex; dominant trees > 100 years' old	None (not documented during vegetation surveys)
Other rare vegetation communities	Vegetation communities ranked S1-S3 by the NHIC.	None (not documented during vegetation surveys)

Table 8: Specialized Habitats of Wildlife considered SWH

Habitat Type	Habitat Features	Candidate SWH in the Study Area
Waterfowl nesting areas	Upland habitats adjacent to wetlands (within 120m)	None (wetlands are likely too small to be considered significant)
Bald Eagle and Osprey nesting, foraging and perching habitat	Treed communities adjacent to rivers, lakes, ponds, and other wetlands with stick nests of Bald Eagle or Osprey	**POTENTIALLY PRESENT –** The Study Area contains FOD and SWD communities adjacent to the Grand River. These communities may provide suitable habitat for Bald Eagle and Osprey. However, these species were not observed during field studies conducted in 2021 or 2022.
Woodland raptor nesting habitat	Forested ELC communities >30 ha with 10 ha of interior habitat	None (woodlands are too small to be considered significant)
Turtle nesting areas	Exposed soil, including sand and gravel in open sunny areas near wetlands	**POTENTIALLY PRESENT –** Candidate features may be present adjacent to the Grand River.

Table 8: Specialized Habitats of Wildlife considered SWH

Habitat Type	Habitat Features	Candidate SWH in the Study Area
Seeps, springs, and mineral licks	Any forested area with groundwater at surface within the headwaters of a stream or river system	**PRESENT –** seeps observed during field investigations in 2022 (see WODM4 [Hawthorn/Apple Deciduous Woodland] unit on northern edge of Middle Block Road, **Figure 2, Appendix A**). Springs and mineral licks: none (features not observed)
Amphibian breeding habitat (woodland and wetland)	Treed uplands with vernal pools, and wetland ecosites	None. Results of the amphibian studies on the Subject Property and SWM Block lands did not identify suitable numbers of breeding amphibians to qualify for significance in the Study Area.
Woodland area sensitive breeding bird habitat	Large mature forest stands, woodlots >30ha and >200m from the forest edge	None (woodlands are too small to be considered significant)

4.3.6.3 Habitat for species of conservation concern

Candidate habitats for species of conservation concern are discussed in **Table 9**.

Table 9: Habitat for Species of Conservation Concern

Habitat Type	Habitat Features	Candidate SWH in the Study Area
Marsh bird breeding habitat	Wetlands with shallow water with emergent aquatic vegetation	None (wetlands are too small to be considered significant). Species listed in the SWH Criteria were not observed during field investigations in 2022.
Open country bird breeding habitat	Large grasslands and fields (>30ha)	None (meadows are too small to be considered significant).
Shrub/early successional bird breeding habitat	Large shrub and thicket habitats (>10ha)	None (thickets are too small to be considered significant)
Terrestrial Crayfish	Wet meadows and edges of shallow marshes	None (evidence of terrestrial crayfish was not observed)

Habitat Type	Habitat Features	Candidate SWH in the Study Area
Special Concern and Rare Wildlife Species	Habitat that sustains species that are Special Concern or provincially rare (S1-S3, SH).	**PRESENT** - Eastern Wood-Pewee (provincially listed as "special concern") was observed in the Study Area in 2022 (in offsite woodlots north and east of the Subject Property) and appropriate habitat exists within the Study Area. Common Nighthawk and Barn Swallow were also observed in the Study Area, but appropriate breeding habitat for these two species is absent. Refer to **Appendix E** for a list of identified Special Concern and provincially rare (S1-3, SH) species for which suitable habitat is absent within the Study Area.

Animal movement corridors are distinct passageways or defined natural features that are used by wildlife to move between habitats, usually in response to seasonal requirements. Movement corridors are identified once the following seasonal concentration areas or specialized habitats are confirmed as SWH: amphibian breeding habitat and deer wintering habitat. Candidate animal movement corridors are discussed in **Table 10**.

Table 10: Summary of Animal Movement Corridors

Habitat Type	Habitat Features	Candidate SWH in the Study Area
Deer movement corridors	Associated with confirmed deer wintering habitat	None (deer wintering habitat was determined to be absent as noted above)
Amphibian movement corridors	Associated with confirmed amphibian breeding habitat	None (significant amphibian breeding habitat was determined to be absent)

4.3.6.4 SWH Summary

The SWH assessment identified five (5) candidate SWH components and two (2) confirmed SWH components for the Study Area:

- **Candidate Waterfowl Stopover and Staging Area (Aquatic) –** The Study Area includes the Grand River which may be important for local and migrant waterfowl populations during the spring or fall migration or both periods combined.
- **Candidate Bat Maternity Colonies –** The Study Area includes FOD and SWD communities that have the potential to support bat maternity colonies. Hedgerows (e.g. FODM11) do not qualify as SWH.
- **Candidate Turtle Wintering Areas –** The Grand River in the Study Area is a permanent waterbody. Midland Painted Turtle and Snapping Turtle have the potential to occur within the Study Area and both species may overwinter in the vicinity.

- **Candidate Bald Eagle and Osprey Nesting, Foraging and Perching Habitat –** The Study Area contains FOD and SWD communities adjacent to the Grand River. Although these species were not observed during the study, they are known to use the Grand River corridor, and these communities may provide suitable habitat for Bald Eagle and Osprey.
- **Candidate Turtle Nesting Areas –** Candidate habitat may exist adjacent to the Grand River within the Study Area.
- **Confirmed Seeps –** Three confirmed seeps are present within the Subject Property (see **Figure 2, Appendix A**).
- **Candidate Special Concern and Rare Wildlife Species–** Eastern Wood-Pewee was observed within the Study Area in the offsite woodlots to the north (associated with AMP06**; Figure 2, Appendix A**) and southeast (associated with BBS#6; **Figure 2, Appendix A**). Although Barn Swallow and Common Nighthawk were observed in 2022, these two species were flying over the area and are not expected to be breeding in the Study Area. Therefore, candidate habitat occurs only for Eastern Wood-Pewee in the noted locations of the Study Area.

No other SWH was identified during the background review or site investigations. Results of the assessment are summarized below for each of the SWH feature types. The results are organized according to the four categories of SWH described by the Ecoregion 6E Criteria Schedule.

4.3.7 Headwater Drainage Feature Assessments

Headwater Drainage Features (HDF) were assessed on April 6 (Visit 1) and May 18 (Visit 2). While the conditions observed during the first two visits did not warrant the requirement for a third visit as per the guidelines (CVC and TRCA, 2014), additional observations were carried out on June 10 and June 17 during site visits for other surveys. HDF segments that were reviewed are identified as HDF1, HDF2, HDF3 and HDF4 on **Figure 2, Appendix A**.

Table 11 provides a summary of flow characteristics observed during site visits undertaken in accordance with the timing prescribed by the guidelines.

Table 11: HF Characteristics Per Visit

Drainage Feature	Visit #1 April 4, 2022	Visit #1 May 18, 2022	Visit #1 June 17, 2022
HDF1	No feature observed – no flow, no standing water	No feature observed, dry	No feature observed, dry
HDF2	Low amount of surface flow through braided flow path that became discontinuous at midpoint.	Dry	Dry
HDF3	Low amount of flow through single path towards hedgerow. Reached dead furrow with redirection and eventual disappeared	Low amount of flow that dissipated and dried up by hedgerow.	Dry
HDF4	Poor definition with some standing water.	Dry	Dry

These features are all within cultivated farmland and dry up soon after spring freshet. They are normally cultivated and planted by mid-May. Their primary function is to provide a short duration delivery of water in the direction of the Grand River, but primarily dry up or infiltrate prior to reaching the flow destination. The assessment of functions and resulting management recommendations as per the guidelines are summarized in **Table 12** below.

Table 12: Summary of Headwater Drainage Feature Assessments

Drainage Feature	Step 1		Step 2	Step 3	Step 4	Management Recommendation
	Hydrology	Modifiers	Riparian	Fish Habitat	Terrestrial Habitat	
HDF1	Limited or Recharge	Tilled swale with no discernible feature present	Limited	Likely Contributing at best	Limited	Maintain Recharge
HDF2	Recharge or Limited	Tilled flow path	Limited	Likely Contributing at best	Limited	Maintain Recharge
HDF3	Limited or Recharge	Tilled flow path dry by June	Limited	Likely Contributing at best	Limited	Mitigation
HDF4	Limited or Recharge	Tilled poorly defined	Limited	Likely Contributing at best	Limited	Maintain Recharge

A drain was observed in the second east-west hedgerow north of Middle Block Road and was identified as Grand_3 in the Randall and Breslau Drain watershed study. It consists of a defined channel section that accepts flow from a tile drain at its east end, however an exit outlet could not be found, nor was there a surface channel exiting the west end of the hedgerow. During fieldwork for the Breslau and Randall Drains Subwatershed Study in 2016, the drain was observed to be dry (WSP, 2018), and Stantec observed minimum water present during 2022 field investigations. Water presence is dictated by whether the tile drain is flowing or not. While a defined channel is present in the hedgerow, there is no defined channel exiting the downstream end of the hedgerow where the channel ends abruptly. The SWS identified Grand_3 as a drainage feature rather than a defined watercourse. It was concluded that the hedgerow drainage feature would not be subject to the management recommendations of the SWS.

4.3.8 Fish Habitat

None of the HDFs on the Subject Property support fish habitat and their primary function is to deliver water in a short-lived period during or shortly after spring freshet.

Riverbank Creek is located in the wetland immediately west of the SWM Block lands and originates in a woodlot at the rear of 1010 Riverbank Drive. The creek was examined thoroughly in 2017 and documented in an addendum report to the Randall and Breslau Drains Subwatershed Study (WSP, 2018) As described in the addendum, Riverbank Creek is poorly defined throughout much of its reach and exhibits characteristics of a drainage swale rather than a defined watercourse. The swale extends south through the Linear Grand River Floodplain Wetland (**Figure 2, Appendix A**) and is generally obscured by vegetative growth, including Reed Canary Grass and Phragmites, during the growing season.

A farm lane crossing of the swale was noted by WSP in 2017 and confirmed by Stantec during field surveys in 2022. The farm lane extends from the SWM Block lands, through the wooded area to the agricultural field adjacent to the Grand River. This farm lane is the best alignment location for the SWM pond outlet given that it is a treeless clearing flanked by woodland on both sides.

The swale was dry when examined by WSP in 2017 and when observed by Stantec in 2022. The Addendum report identified that, in 2017, a local landowner had noted that the watercourse had been drying up in recent years, conveying ephemeral flows during the spring months only.

In 2011, GRCA conducted a fish and aquatic habitat assessment at the approximate midpoint of Riverbank Creek, identified as station NS9044 on Figure A3-20 of the Addendum report (WSP, 2018). The station is located at a driveway crossing associated with 850 Riverbank Drive. At the time of the GRCA survey, deep pools were noted at the corrugated steel pipe (CSP) culvert at this crossing location.

Three (3) Central Mudminnow (*Umbra limi),* one Fathead Minnow (*Pimephales promelas)* and 38 Brook Stickleback (*Culaea inconstans)* were captured during the GRCA survey. This area of Riverbank Creek supports direct fish habitat, while the area in the vicinity of the farm lane crossing (proposed SWM outlet alignment) functions more as contributing habitat by conveying flows to the downstream area. There is a possibility that the farm lane area may provide seasonal fish habitat at best.

The Grand River flows on the west edge of the Study Area. This section of the Grand River is within the Fisheries Management Sub-Basin referred to in the *Grand River Fisheries Management Plan* as the

Middle Grand (GRCA 2005). This sub-basin of the Grand River supports a diverse warmwater fish community that includes Smallmouth Bass, Northern Pike, Common Carp, Black Crappie, panfish (e.g. Yellow Perch, Pumpkinseed) and redhorse suckers (GRCA 2017). Species at Risk in the Grand River, identified through DFO SAR mapping, include Silver Shiner (Threatened provincially and federally), Black Redhorse (Threatened provincially and federally), Wavy-rayed Lampmussel (Threatened provincially and Special Concern federally) and Rainbow (Special Concern provincially and federally).

4.3.9 Species At Risk

SAR bats were detected during the acoustic surveys (Little Brown Myotis and Tri-coloured bat), and it is therefore recommended that an Information Gathering Form (IGF) be submitted to MECP to determine authorization and mitigation requirements prior to tree removals.

4.3.10 Designated Feature Summary

The following designated and observed natural features were identified in the Study Area:

- Small wetland pockets on the northern edge of Middle Block Road, directly east of the Grand River (Linear Grand River Floodplain Wetland on the SWM Block lands) and the Maple Grove Road Wetland Complex located off-site and south of Middle Block Road.
- Candidate waterfowl stopover and staging area (SWH) associated with the Grand River
- Candidate bat maternity habitat associated with SWD and FOD communities
- Confirmed presence of SAR bats and habitat on the Subject Property within the Study Area
- Candidate turtle nesting and wintering areas associated with the Grand River
- Confirmed seeps associated with WODM4-1 (Hawthorn/Apple Deciduous Woodland Type)
- Confirmed special concern and rare wildlife species based on observations of Eastern Wood-Pewee, during surveys in 2022.
- SAR habitat for Silver Shiner, Black Redhorse and Wavy-rayed Lampmussel in the Grand River
- Fish habitat in the Grand River
- Significant Valleylands
- Core Environmental Features as per Region OP
- Locally Significant Natural Areas as per City OP
- Proposed Greenlands Network

5.0 DESCRIPTION OF PROPOSED DEVELOPMENT

5.1 DEVELOPMENT COMPONENTS

The proposed development is of a residential subdivision with an institutional Block, Park, and 3 Medium Density Residential Blocks. The Draft Plan prepared by KLM Planning Partners Inc. for the Subject Property is presented in the Functional Servicing Report (FSR; Stantec 2023b), under separate cover and comprises single family homes, townhomes fronting onto proposed municipal roads with rear lanes, three Multiple-Family Residential Blocks summing to an approximate area of 13.68 ha, one elementary school, and a Park Block. The stormwater management (SWM) facility that supports this development is located outside of the Draft Plan Limits, west of Riverbank Drive. The Draft Plan can be found on **Figure 4, Appendix A.**

Middle Block Road will be widened to accommodate future traffic levels and to bring the road into urban design compliance. Currently the road exhibits a rural cross-section. It is expected that the widening and upgrading of Middle Block Road will be addressed through an Environmental Assessment (EA).

5.2 STORMWATER MANAGEMENT

The proposed SWM strategy for the Subject Property was detailed in the *Madison Development Stormwater Management Report* (WSP 2020), which includes SWM control for the Subject Property as well as developable lands located to the northwest of the Subject Property and Middle Block Road.

A SWM pond is proposed on the SWM Block lands, and includes a forebay, wet cell and infiltration cell. The forebay and permanent pool have been designed to provide an Enhanced level of water quality control. Stormwater will enter the pond through the forebay and spill into the wet cell. The first flush of storm events, including the 25 mm design storm, will be conveyed to the infiltration cell. Extended detention of the 25 mm design storm event will be provided within the wet cell by the 325 mm diameter orifice, placed between the wet and infiltration cell, meeting the minimum residence time of 24 hours. In addition to being treated in the wet cell, the 25 mm design storm will be infiltrated within the infiltration cell. The 2-year design storm event and above will have flow in excess of the infiltration cell's capacity and will discharge to the proposed outlet, draining toward the Grand River. The outlet pipe to the Grand River has been sized with capacity for the 100-year storm event, and the outlet configuration at the river will be reviewed at detailed design. While it is noted that the Regional storm event will not be controlled to pre-development levels, the SWM facility is designed to provide safe conveyance of the Regional storm event without overtopping the SWM facility.

An emergency overflow weir is provided to the north of the infiltration cell to discharge any stormwater in excess of the cell's capacity toward the Grand River via overland flow. The SWM pond is designed to provide safe conveyance of the Regional storm event without overtopping the facility.

A maintenance access road (4 m wide) has been provided for ease of inspection and maintenance of the forebays, inlet and outlet structures. The access road will have an asphalt surface and a maximum longitudinal slope of 10:1.

The final design of the infiltration cell within the SWM pond and the outlet configuration at the Grand River will be completed when a comprehensive understanding of the local groundwater conditions, including seasonally high levels, is gained.

6.0 IMPACT ASSESSMENT

The proposed Draft Plan of subdivision on the Subject Property and the proposed SWM facility on the SWM Block lands were overlaid on an aerial base showing the existing natural heritage features and are both shown on (Figure 4, Appendix A). The context of the Draft Plan in relation to the existing natural heritage features informs the assessment of potential direct and indirect impacts, including potential impacts associated with construction and potential long-term impacts associated with development of the subdivision. Direct impacts are quantifiable effects and include the direct loss of features, while indirect effects are qualitative in nature and may include effects such as sedimentation and noise impacts to wildlife on adjacent lands.

Site-specific and standard recommendations are identified below to mitigate potential impacts to natural features and enhance the natural heritage system where appropriate. Site-specific measures are recommended to address the specific natural heritage features and functions identified for the Subject Property and SWM Block lands, while standard measures address strategies that are typically generic and applicable to many situations, and often required for construction.

6.1 DIRECT IMPACTS AND MITIGATION

6.1.1 Stormwater Management

Impacts of stormwater management on adjacent features, including the onsite wetland, are typically associated the potential reduction in groundwater recharge associated with the elimination of pervious areas (due to the increase in impervious areas). As detailed in the FSR, under separate cover, a feature and site-level water balance was completed to compare pre- to post-development management.

6.1.1.1 Site Level Water Balance (Subject Property and SWM Block Lands)

Monthly water balance calculations are provided in the Hydrogeological Assessment report (Stantec 2023c) as well as Appendix D of the FSR (Stantec 2023). The analysis indicated an annual groundwater recharge rate of 173.2 mm/year for a total of 96,821 m3 under the pre-development conditions. Based on the previously mentioned water balance components, the annual volume of infiltration occurring at the Subject Property together with the SWM Block lands under pre-development conditions is estimated to be 97,047 m3 (172 mm/year), with annual surface water runoff totaling 133,447 m3 (236 mm/year). Under the post-development condition, the annual volume of infiltration entering the subsurface of the Subject Property is estimated to be 23,296 m3 (41 mm/year). Overall, an infiltration deficit of 73,751 m3 is projected to occur across the Subject Property and SWM Block lands from the pre- to post-development condition, if left unmitigated. The annual volume of surface water runoff occurring in the SWM Block lands plus Subject Lands under the post-development condition is estimated to be 208,129 m3. Overall, a surface water runoff surplus of 74,682 m3 is projected to occur across the property from the pre- to post-development condition.

To address the projected groundwater recharge deficit, post-development, an infiltration cell has been proposed within the SWM facility. It has been sized to store and infiltrate the first 10 mm of rainfall below-grade from an area of 56.68 ha of the Subject Property draining toward the SWM pond. The SWM pond will first capture stormwater within the forebay and wet cell, providing an Enhanced level of water quality treatment, prior to being directed toward the infiltration cell. The pre-treatment within the pond will mitigate clogging of the infiltration cell. Assuming 80% capture of the first 10 mm of rainfall, the infiltration cell will provide an annual groundwater recharge volume of 74,110 m3. Therefore, the infiltration cell is calculated to provide sufficient infiltration to match pre-development levels.

If it is determined during detailed design that additional infiltration measures are required at-source, provision of at-source infiltration (where soil conditions permit) equivalent to the first 25 mm of runoff from single family residential rooftop surfaces can be implemented.

6.1.1.2 Wetland Feature Water Balance

The Hydrogeological Assessment (Stantec 2023c) and FSR (Stantec 2023b) also examined the two wetland features that are receiving drainage under existing conditions, including the onsite wetland on the Subject Property (along Middle Block Road) and the offsite wetland, located to the northeast of the Subject Property.

The Hydrogeological Assessment Report noted that the onsite wetland is confined to a closed surface water catchment. Under the pre-development condition, the annual infiltration rate in the onsite wetland catchment is 225 mm, closely matching the annual infiltration rate of 245 mm estimated for the wetland as presented in GRCA regional mapping. This infiltration rate (225 mm/year) equates to an annual infiltration volume of 6,535 m^3, with the annual the surface water runoff volume totaling 5,347 m^3 (184 mm/year).

Under the proposed post-development condition, the pre-development catchment will be reduced to 2.46 ha with impervious surfaces covering 13% of the catchment area (as opposed to no impervious cover pre-development). The annual volume of infiltration occurring in the reduced catchment under the post-development condition is estimated to be 4,806 m^3 (195 mm/year). Overall, an infiltration deficit of 1,729 m^3 is projected to occur in the onsite wetland catchment from the pre- to post-development condition.

The onsite wetland is not classified as a groundwater discharge feature and any loss of infiltration occurring in this catchment is not expected to affect the form or function of this wetland. Infiltration that does occur throughout the wetland catchment after reaching the groundwater table will flow to the northwest away from the wetland, eventually discharging to the Grand River. Consequently, any potential loss in infiltration provided by the wetland catchment under the post-development condition will be mitigated as part of the greater infiltration augmentation strategy that is proposed.

Overall, the onsite wetland appears to be sustained by surface water inputs and the proposed post-development strategy of directing runoff to the wetland from the rear lots that will surround the wetland together with runoff generated from the park blocks is expected to result in a surface water deficit of only 2%. In the future, surface water inputs to the onsite wetland will also be provided from the Iport

Cambridge Industrial Subdivision lands to the south of Middle Block Road as a part of the stormwater management strategy associated with those lands.

For the offsite wetland to the northeast, a portion of the Subject Property drains northward and provides runoff contributions towards this wetland. As discussed in the Hydrogeological Assessment report (Stantec 2023c), groundwater flow in this area of the Subject Property is interpreted to move northwest and east away from this wetland and, as such, any infiltration occurring on the Subject Property that recharges the shallow groundwater system is unlikely to reach the offsite wetland. In addition, regional mapping indicates that downward vertical hydraulic gradients are present beneath the offsite wetland and that the wetland is a groundwater recharge feature. Based on this, the Subject Property is unlikely to be a source of groundwater inputs to the offsite wetland and subsequently, no post-development groundwater recharge augmentation measures are required in this area of the Subject Property to assist in maintaining the form and/or function of the wetland.

6.1.2 Vegetation Impacts

Direct vegetation impacts will occur through the removal of the partial east-west and north-south hedgerows on the Subject Property as well as the removal of portions of the hedgerow extending east-west along the north property boundary. Residential plantings associated with the existing houses on the Subject Property will also be removed.

The Tree Management Plan (Stantec 2023a) provides an inventory of all trees located on the Subject Property as well as the SWM Block lands. As detailed in the Tree Protection Plan, a total of 792 trees are proposed for removal to facilitate the proposed development. As detailed in the Tree Protection Plan compensation for trees proposed to be removed to facilitate the development, replacement plantings or cash-in-lieu, or a combination of the two will be required. This will be discussed with the City and the Region to arrive at an appropriate level of compensation for the Project.

As discussed in **Section 2.3.2**, hedgerows are identified as Locally Significant Natural Areas (LSNAs) in the City of Cambridge OP and therefore require an analysis as part of the EIS process. Collectively, hedgerow understoreys throughout the Subject Property were predominantly common buckthorn, an exotic and invasive shrub species. None of the vegetation species or community types identified are rare and bird SOCC were not observed utilizing the hedgerows on the Subject Property. One sensitive species (CC of 8), common hackberry, was noted in the onsite hedgerows. As outlined in the *Madison Lands, Cambridge, Ontario Tree Management Plan* (Stantec, 2023a), a total of 34 common hackberry trees were inventoried and 7 of those are proposed to be removed.

Hedgerows are being assessed for use by bats through ARU monitoring in June 2023. Results from the ARU surveys will be discussed in an addendum to this EIS.

As detailed in the Tree Management Plan (2023a), the two east-west hedgerows on the Subject Property are predominantly Manitoba Maple (approximately 50-70% of trees surveyed). From an ecological perspective, these partial hedgerows do not provide an important function on the landscape for the reasons previously described above as well as their lack of connectivity to other features. These hedgerows terminate in the existing cultivated agricultural fields and do not connect to any other larger habitat features that would complete their function as a viable corridor.

The north-south hedgerow is dominated by sugar maple with bitternut hickory and green ash as associates. Significant characteristics (SAR, rare community types, SOCC) are not present based on existing information. Corridor function is impaired as features are absent at the terminus of the hedgerow at Middle Block Line. This hedgerow was discussed during the preparation of the secondary plan and was removed as a feature for retention due to the layout of the draft plan in the context of the overall community plan.

The hedgerow along the northern boundary of the Subject Property could provide connectivity between the offsite woodlots to the north and to the east. The quality of the off-site woodlot to the east is low based on property boundary assessments. The proposed road network of the Subject Property and the surrounding off-site lands will require several crossings of this hedgerow as well.

The results of the amphibian surveys did not identify SWH for amphibians on the Subject Property, on the SWM Block lands, and in the Study Area. Therefore, candidate SWH amphibian movement corridors are absent. Locally significant movement corridors for amphibians are also anticipated to be absent. In the event that amphibians are overwintering in ponds in the Study Area to the north, movement beyond the upland forest would likely not occur. Similarly, amphibians using the PSW to the south would potentially stay within that corridor.

Overall, tree cover is relatively low at the site and is limited to the hedge rows. However, if roost trees are removed during the bat active season, there is potential for injury or mortality of roosting bats. Both Little Brown Myotis and Tri-coloured bats (SAR species) form maternity colonies in trees where females give birth to and raise their young. The removal of a maternity roost tree can be particularly detrimental, since these are important habitat features that are potentially used by tens or hundreds of female bats and their young. Pups are particularly vulnerable to roost destruction before they have developed the ability to fly, when they would be unable to escape.

The conversion of habitat from an agricultural area to a residential subdivision may also result in a loss of suitable foraging areas for bats.

The future upgrading of Middle Block Road will be addressed through a separate EA process. There is the potential for the widening to impact existing roadside vegetation, particularly in the western portion of the Greenlands Network (FODM11) and the forested wetland area (FODM8-1/SWDM4-5) adjacent to Middle Block Road. Vegetation impacts will be addressed through that EA study.

6.1.2.1 Buffers and Setbacks

Feature boundaries were established in the field by staking and surveying their driplines with staff from the Region of Waterloo and City of Cambridge on July 6, 2022. The agreed-upon boundaries are shown on **Figure 3**, and in the context of the Draft Plan on **Figure 4, Appendix A**. A total of five (5) feature boundaries were delineated on the Subject Property. The SWM Block lands contain three (3) features that were delineated by NRSI and reviewed with Region and City staff on July 6, 2022. Wetland boundaries were also delineated, staked and surveyed on July 6, 2022 in conjunction with GRCA staff. One wetland feature (SWDM4-5) is located on the Subject Property, embedded within a woodland, while the Linear Grand River Floodplain Wetland was delineated by NRSI on the SWM Block lands. The wetland boundaries are also shown on **Figure 3**, and in the context of the Draft Plan on **Figure 4, Appendix A.**

To mitigate against potential direct (and indirect) impacts to vegetation and the designated natural features identified on **Figure 3, Appendix A**, the Draft Plan for the Subject Property and SWM Block lands was developed to avoid these features (**Figure 4, Appendix A**). Additionally, development is set back a minimum of 10 m from driplines and 15 m from wetland feature boundaries. These buffer areas are intended to protect the form and function of these adjacent natural areas from potential impacts of the development as well as provide areas for enhancement opportunities. Enhancement opportunities can potentially be used to compensate for tree removals required elsewhere on the Subject Property.

The buffers are intended to serve a number of functions including the following:

- Maintain surface water contributions to the wetland
- Reduce sediment load to the wetland
- Reduce Phosphorus load to the wetland
- Reduce the biological contaminant and pesticide load to the wetland
- Minimize and prevent impacts from human disturbance
- Soften edge effects already occurring under existing conditions (e.g., invasive species, bird nest predation, wind)
- Provide habitat protection by vegetating the buffer, either naturally or through a buffer planting plan

Dripline Buffers

As shown on **Figure 4, Appendix A**, and in the proposed grading plans for the Draft Plan, a 10 m buffer has been applied to the driplines. This setback generally achieves the minimum setback identified in the City of Cambridge Official Plan for Core Environmental Features (3.A.3 (7)) and is in accordance with the Region of Waterloo Official Plan (7.C.11), although none of the features on the Subject Property are Core Environmental Features under the definition of the Region OP. Both Region and City OPs acknowledge that buffer establishment will be undertaken as part of an EIS. The proposed 10 m set back is considered sufficient based on the ability of this buffer given the sensitivity of the features, and to protect the root zones of the adjacent woodland trees and is consistent with other nearby jurisdictions (e.g., City of Guelph).

Some minor encroachment of the Draft Plan into this 10 m woodland setback occurs in a few locations. For the woodland FODM8-1 located at Middle Block Road, there are proposed 1-3 m encroachments of lots flanking both sides of the northern apex of the dripline buffer of the northern portion of this feature. At this location, the trees are predominantly Trembling Aspen with a perimeter of an invasive species, Common Buckthorn. Due to the quality of the woodland at this location and the larger buffer provided on the east side of this feature, impacts to the woodland are not anticipated. The minor encroachment is considerably offset by the extensive distance between the dripline buffer and the rear lot lines on the east side of this feature.

Along the northern boundary of the Subject Property and the south edge of the woodland FODM5-2 there will be some deviation from the 10 m buffer limit for a few individual lots. On average, the rear lot areas will encroach approximately 2.0 m into the buffer, leaving 8 m of buffer to the FODM5-2. The greatest encroachment of approximately 4.81 m will occur in the vicinity of lots 23 and 24 of the draft plan. Rear lot limits will be fenced, and to offset the reduction in buffer width, an aggressive planting plan will be prepared for the buffer area at detail design.

A walkway entrance to a future trail location is proposed at the north end of the rectangular polygon of the Greenlands Network (FODM11 end of WOMD4-1) in the west end of the Subject Property, to provide access from the street (Street 1 on grading plans) immediately north of Lot 264 on the grading plans to the proposed Park Block (Block 427 on grading plans). While the exact trail location will be determined at detailed design, it is expected that the trail will traverse through the buffer from east to west at the top end of this feature. A fence-topped retaining wall will be established in the rear lot areas at or beyond the 10 m setback from dripline of this feature. Trails are typically an accepted use in buffer areas due to their low impact passive function, and as a means to allow trail users to make a positive experiential connection with natural areas without entering the feature itself. The Cambridge OP Policy 3.A.3 (10,11) speaks to the use of buffers for recreational trails. The walkway entrance location into the buffer area is not seen as an impact from an ecological perspective.

A similar walkway entrance is proposed adjacent to FODM4-5 on the west side of the Subject Property and will provide access to the proposed Park Block. A fence-topped retaining wall will be established at the 10 m buffer limit from this feature, with the walkway along the east side of the retaining wall. No encroachment into the buffer is proposed.

Of note, all retaining walls in the Draft Plan will be topped with a fence as a safety element.

Proposed grading for the SWM facility on the SWM Block lands is proposed to meet the 10 m buffer to the woodland dripline, or the 15 m buffer from the linear wetland, whichever is greater. There will be encroachments into the dripline and associated buffer at the location of the outlet pipe and associated maintenance access; however, these encroachments will occur at the entrance to the existing farm lane crossing. Under Cambridge OP Policy 3.A.3 (10,11), permitted uses within buffers includes open space, vegetation restoration, recreational trails, and stormwater management facilities.

Wetland Buffers

Wetland buffers of 15 m have been applied to all wetlands on the Subject Property and SWM Block lands. The wetland located at Middle Block Road on the Subject Property is unevaluated and is embedded within a woodland which provides additional buffering function within the 15 m limit. The 15 m wetland buffer is considered sufficient given the surrounding vegetation and will result in an improvement to existing conditions that see the cultivation line up to the base of trees ringing the feature.

The 15 m buffer applied to SWM facility is deemed appropriate given that the facility itself is part of the buffering system. The areas around the pond will be planted using an appropriate landscape plan that incorporates naturalization with native species such that grading out of the berms will blend into the dripline and wetland buffer limits. SWM ponds function to treat storm runoff and thereby provide a buffering function for water quality.

6.1.3 Aquatic Habitat Impacts

Stormwater from the Subject Property will be treated to an Enhanced level of protection and will be an improvement over existing conditions where seasonal flows traverse a cultivated agricultural landscape and likely deliver suspended sediment loads to downstream areas. A headwall will be constructed at the Grand River to provide an outlet for the SWM pond discharge, and specific impacts will be assessed at detailed design. Depending on location, the headwall and other outlet infrastructure may encroach upon the regulated habitat of the threatened Silver Shiner in the Grand River. Regulated habitat consists of the watercourse, its meander belt and an additional 30 m of the floodplain. The degree of encroachment will be clarified at the detailed design stage.

6.1.3.1 Headwater Drainage Feature Impacts

Table 11 in **Section 4.3.7** identifies the management recommendations for the headwater HDFs on the Subject Property utilizing the management recommendation flowchart contained within the CVC/TRCA guidelines. For three out of the four reaches, a management recommendation of “Maintain Recharge” was derived from the flowchart. For this management scenario it is recommended to maintain overall water balance by providing mitigation measures to infiltrate clean stormwater. As discussed in **Section 4.3.7**, the headwater features on the Subject Property tend to dry up before reaching the Grand River or more likely, the water infiltrates the local soils. Groundwater flow is in the direction of the Grand River. The goal of the management recommendations is to maintain recharge to the groundwater table that flows towards the Grand River. As discussed in **Sections 5.1** and **6.1.1**, the SWM facility has been designed to promote infiltration and achieve this function. If necessary, and if it is determined during detailed design that additional infiltration measures are required at-source, provision of at-source infiltration (where soil conditions permit) equivalent to the first 25 mm of runoff from single family residential rooftop surfaces can be implemented.

The remaining HDF was assigned a management recommendation of mitigation. This management approach calls for measures to replicate the function of the HDF, in this case, the delivery of flow towards the Grand River. Water from the catchment area for this feature will be captured through the SWM system, treated in the SWM facility and ultimately reach its destination of the Grand River through the SWM outlet.

6.1.3.2 Fish Habitat Impacts

Riverbank Creek will be undercrossed by the proposed SWM outlet. The crossing construction will occur by excavating a trench through the farm lane and at Riverbank Creek. The crossing can be carried out while the swale is dry to reduce the potential for sediment transport to downstream reaches. As a precaution, temporary coffer dams could be established upstream and downstream of the crossing to reduce the potential for impacts in the event of a severe precipitation event.

A headwall will be established at the Grand River to house the SWM outlet discharge location. Potential impacts will be verified at the detailed design stage and will be dependent on the exact location of the headwall relative to riparian vegetation in the floodplain. Given the presence of Silver Shiner in the Grand River, further assessment in the context of the ESA will be undertaken, as the regulated habitat of Silver Shiner includes the floodplain within the meander belt plus 30 m.

Stormwater discharge to the Grand River from the SWM facility will be treated to an Enhanced level of protection. Currently, drainage from the Subject Property and SWM Block lands is from cultivated agricultural lands. With the Enhanced level of treatment, no negative impacts of stormwater discharge on the Grand River are anticipated.

6.1.4 Trail Systems and Connections

The trail system for the proposed development will be developed during detailed design, and an assessment of potential impacts of the trail location will be competed at that time. At present, the EIS addresses some proposed walkway entrances to future trail locations with respect to buffer encroachments under **Section 6.1.2.1**.

6.2 INDIRECT IMPACTS AND MITIGATION

Inadvertent encroachment of heavy equipment, siltation and/or spills of deleterious substances, noise, and dust migration into natural features were identified as potential indirect impacts from construction. These impacts may alter species composition by compacting and smothering vegetation and introducing substances that could be harmful to vegetation and wildlife, such as fuel used by construction vehicles, and spreading of invasive species. Additional disturbance may be required to facilitate spill clean-up activities. Where they occur, these impacts are expected to be localized to the construction area and adjacent areas.

Long term impacts of the proposed development may include:

- encroachment into natural features (humans, dogs, cats) causing disturbances to wildlife.
- invasive species introduction (e.g., garden waste)
- dumping (e.g., refuse).

6.2.1 Mitigation Recommendations

6.2.1.1 Standard Measures for Construction

Potential indirect effects to natural heritage features include construction phase activities such as inadvertent encroachment of heavy equipment, siltation and/or spills of deleterious substances, noise, and dust migration. These impacts may alter species composition by compacting and smothering vegetation and introducing substances that could be harmful to vegetation and wildlife, such as fuel used by construction vehicles.

Additional disturbance may be required to facilitate spill clean-up activities. Where they occur, these impacts are expected to be localized to the construction area and adjacent areas.

These potential indirect effects are common to various types of construction and can be controlled using standard mitigation measures for erosion and sediment control. The primary principles associated with sedimentation and erosion protection measures are to:

- Reduce the duration of soil exposure
- Retain existing vegetation, where feasible
- Encourage re-vegetation
- Divert runoff away from exposed soils
- Keep runoff velocities low
- Trap sediment as close to the source as possible

To address these principles, the following mitigation measures should be implemented during construction:

- Silt fencing should be used along all construction areas adjacent to natural features. No equipment will be permitted to enter natural features beyond the fencing.
- Natural features inadvertently disturbed during construction will be stabilized and re-vegetated, through the placement of seed and mulching or seed and an erosion control blanket, promptly upon completion of construction activities.
- Equipment will be re-fueled >30 m away from natural features avoid potential impacts, in the event that an accidental spill occurs.

- Maintain proper muffling of machinery and equipment to mitigate noise during construction.
- Re-vegetation within or adjacent to natural areas will use native species that are suited to the site conditions.

As detailed in the FSR, a preliminary erosion and sediment control plan has been prepared and includes the following considerations:

- Steep slopes (>3:1) shall have erosion blankets
- Light and/or heavy-duty silt fencing will be erected on all site boundaries where there is potential for runoff to be discharged offsite, and around all protected wetlands and natural areas, to protect adjacent downstream lands from migration of sediment in overland flow. The location of this fencing will be adjacent to the limit of grading. Silt fence attached to paige wire fencing will be installed periodically throughout the site adjacent to sensitive areas. Silt fencing should be erected before grading begins to protect adjacent and downstream areas from migration of sediment in overland flow
- Double row of heavy-duty silt fencing to be installed at the limits of grading adjacent to external wetland areas and the existing residential properties fronting onto Riverbank Drive such to provide additional protection from migration of sediment onto private properties
- Storm service outlets will be installed during servicing and roadworks construction to provide lot level dead and live storage
- Erosion control berms/swales will be located in appropriate (critical) areas to divert flows to temporary sediment basins
- A construction entrance feature (“mud-mat”) will be provided at all site entrances to minimize the offsite transport of sediment via construction vehicles
- Swales constructed onsite will have temporary rock check dams to help attenuate flows and encourage deposition of suspended sediment where appropriate
- Disturbed areas where construction is not expected for 30 days shall be re-vegetated with 50 mm of topsoil and hydro-seeding according to OPSS 572
- During construction, catchbasins are to be sealed until roads are paved to prevent sediment deposition in the catchbasins sumps and conveyance of silt to the SWM facility
- An Erosion Control Implementation Schedule will be included with the Detailed Erosion and Sedimentation Control Plan, prepared in conjunction with the Pre-grading Application and/or Final Engineering Design
- Following completion of construction, defined as 90% house construction, and site stabilization, erosion and sediment control measures and accumulated sediment are to be removed.

- Disturbed soils are readily colonized by Phragmites and other invasive plant species. Standard construction phase mitigation measures for sediment and erosion control will reduce substrate disturbance to the extent possible and re-vegetate disturbed areas with desirable species as soon as possible following disturbance.
- Equipment that accesses areas of invasive species should be cleaned before travelling to other parts of the construction site to prevent the spread of seeds, roots and propagules of invasive species.
- Soil from areas with existing invasive species, such as Phragmites colonies or buckthorn stands, will not be stockpiled for reuse. Soil may be returned to initial source once invasive species are removed. Soils laden with invasive plant material should be removed from the site and disposed of in accordance with all municipal, provincial, and federal regulations.

6.2.1.2 Bird's Nests

Construction activities with the potential to remove migratory bird habitat (including SOCC such as Eastern Wood-Pewee), such as vegetation clearing, should be avoided during the breeding season which is generally from April 1- August 31 in southern Ontario (Environment Canada 2017). Should vegetation clearing activities be unavoidable during this window, a mitigation program should be developed, which includes measures to reduce and avoid impacts to migratory birds and their nests. This program should include preventative and mitigation measures but may also include avoidance of clearing during key sensitive periods and in key locations. If clearing is to be completed during the bird nesting season, nest sweeps should be completed 3-5 days prior to clearing activities.

6.2.1.3 Species at Risk

As noted in **Section 4.3.9**, candidate habitat for SAR bats occurs on the Subject Property and SAR bats were recorded during ARU surveys in June 2023. Consultation with MECP through the submission of an IGF is recommended prior to any tree removals.

Following consultation with MECP on any further action, and at a minimum, to further reduce the likelihood of harm to bats, it is recommended that trees > 10 cm diameter at breast height (DBH) be removed outside the bat active period, which includes a maternity roosting period. Bats typically give birth in late-May to early-June, and females fly with newborn young until they become excessively heavy. Young begin to fly in mid- to late-June, at age three to four weeks. Rearing is completed by August and bats move to swarming and hibernation sites in August or September, before starting hibernation in late September or October (Broders et al. 2006, Cagle and Cockrum 1943, Gerson 1984). Therefore, removal of trees > 10 cm DBH is not recommended between March 15 and September 30 (inclusive).

- If tree removal must occur during the bat active season (March 15 to September 30), bat exit surveys should be conducted at suitable roost trees by qualified biologists. If any bats are observed exiting or entering the tree, clearing of that tree must not occur until after the active season.

7.0 MONITORING PROGRAM

The primary objective of compliance and effects monitoring is to check that mitigation and protective measures are effectively implemented and to measure the impacts of activities associated with construction on environmental and socio-economic features. Ultimately, the knowledge gained from monitoring is used to avoid or reduce issues which may arise during construction of subsequent projects.

7.1 CONSTRUCTION MONITORING

Stantec is recommending compliance monitoring during construction, which will include the daily inspection of:

- erosion and sediment controls (see the FSR, under separate cover)
- compliance with the grading plan
- limits of construction
- protection of retained trees.

Construction compliance monitoring reports will be provided monthly to the City of Cambridge while the Subject Property is being actively developed. Reports will include inspection date, observed conditions, and any recommended remedial actions.

7.2 POST-CONSTRUCTION MONITORING

7.2.1 Stormwater Management Monitoring

The SWM facility will be inspected periodically to observe any evidence of sediment deposition or malfunctioning of the facility or LID measures. During the first two years of operation, Stantec recommends that the stormwater management facility be inspected after significant storm events to determine if and when maintenance activities are required.

7.2.2 Vegetation Plantings

The successful establishment of the vegetation that will be planted as part of the tree compensation program will be guaranteed for two years after installation. Monitoring will be conducted once in the spring and once in the fall and results will be summarized in an annual memo report with a 1:1 replacement of dead trees and shrubs.

7.2.3 Subwatershed Monitoring Program

The goal of the Randall and Breslau Drain Subwatershed Study Monitoring Program (WSP 2016) is to assess the function of the natural heritage system within the subwatersheds. This includes groundwater, surface water and natural heritage features such as woodlands, wetlands, aquatic features and wildlife. The monitoring program should assess the efficacy of recommended mitigation measures in the protection of natural heritage features and identify opportunities for adaptive management approaches based on land use changes and pressures (WSP 2018). A detailed overview of monitoring plan components is provided in the East Side Lands MESP, which includes the components of the Randall and Breslau Drain Subwatershed Study Monitoring Program. It is anticipated that a comprehensive monitoring program will be developed for the Subject Property and SWM Block lands at the detailed design stage, once the Draft Plan has been reviewed by the municipalities and GRCA, such that specific location components can be identified for monitoring activities.

8.0 FUTURE WORK AND DETAIL DESIGN CONSIDERATIONS

This EIS was prepared in support of a Zoning By-law Amendment and Draft Plan of Subdivision for the proposed development on the Subject Property, with recognition that some additional work will be required at the detail design stage to address certain components of the development. The following items are anticipated to be addressed in the detail design submission:

- Final design of the infiltration cell within the SWM pond based on a comprehensive understanding of local groundwater conditions.
- If it is determined that additional infiltration measures are required at-source, the incorporation of additional infiltration measures (e.g., low impact development approaches) where soil conditions permit will be examined.
- The SWM outlet pipe alignment and headwall configuration at the Grand River will be finalized and assessed for natural heritage impacts. The degree of encroachment into natural heritage features, including the regulated habitat of Silver Shiner, will be assessed and appropriate mitigation or permitting requirements will be determined.
- Buffer treatments will be designed in consultation with the City and Region, particularly in the case where some buffer encroachments are currently proposed. Along the north boundary and the south edge of woodland FODM5-2, buffer reductions were deemed acceptable provided a planting plan is developed for the reduced buffer area at detail design.
- The particulars of tree compensation for the removal of hedgerows and other trees from the Subject Property will be developed at detail design. The Tree Management Plan (Stantec 2023a) provides some options for compensation.
- The location of trails will be determined in conjunction with municipal staff in accordance with design considerations and in consideration of buffer encroachments in certain areas.
- Consultation with MECP will be undertaken to determine any additional information needs that are required to address the presence of SAR bats, particularly in the areas where hedgerow trees are proposed for removal.
- An erosion and sediment control (ESC) plan will be required to accommodate the grading plan in the detail design submission.
- A monitoring plan will be developed in conjunction with municipal and agency staff and will incorporate components of the Randall and Breslau Drain Subwatershed Study Monitoring Program. It is anticipated that a comprehensive monitoring program will be developed for the Subject Property and SWM Block lands at the detailed design stage, once the Draft Plan has been reviewed by the municipalities and GRCA, such that specific location components can be identified for monitoring activities.

- Clearly identify all permit and approval requirements for detail design. At a minimum, the following permits/approvals are anticipated to be considered with respect to the natural environment:
  - GRCA Permit Pursuant to Ontario Regulation 41/24 (Prohibited Activities, Exemptions and Permits Regulation)
  - Consultation with MECP with respect to SAR bat presence and provincial SAR species in the Grand River (related to the SWM discharge infrastructure), initiated through the submission of an IGF.
  - Consultation with DFO with respect to fish and fish habitat potentially affected by the SWM discharge infrastructure, initiated through the submission of a RfR form. The RfR also initiates review under SARA, which may be required for encroachment into Silver Shiner habitat.

9.0 SUMMARY AND CONCLUSION

This report was prepared to document natural features that require consideration through the design of the proposed development. The results of the background review and site investigations documented the following natural features in the Study Area:

- Small wetland pockets on the northern edge of Middle Block Road, directly east of the Grand River (Linear Grand River Floodplain Wetland) and the Maple Grove Road Wetland Complex south of Middle Block Road.
- Candidate waterfowl stopover and staging area (SWH) associated with the Grand River
- Candidate bat maternity habitat associated with SWD and FOD communities
- Candidate turtle nesting and wintering areas associated with the Grand River
- Confirmed seeps associated with WODM4-1 (Hawthorn/Apple Deciduous Woodland Type)
- Confirmed special concern and rare wildlife species based on observations of Eastern Wood-Pewee, Common Nighthawk and Barn Swallow during surveys in 2022.
- Fish habitat in the Grand River

Recommendations were provided to protect the natural features including measures to mitigate potential impacts to natural and enhance the natural heritage system where appropriate. These measures include:

- Stormwater management strategy that balances pre- and post-development infiltration on the Subject Property and two wetland features
- Avoidance of natural features where feasible
- Specific mitigation approaches such as design alternatives or offsetting where practical (e.g., tree planting)
- Standard measures for construction, including sediment and erosion control, tree protection fencing, and invasive species management
- Timing restrictions to avoid wildlife during sensitive periods, such as breeding birds and bats.
- Natural revegetation and/or planting of buffers with native species

Prior to construction on the SWM Block lands, which is regulated under Ontario Regulation 150/06, which includes the placement or removal of fill material, grading activities, the erection of any structures, and/or the alteration of regulated features, written approval (i.e., a Permit) will be required from GRCA.

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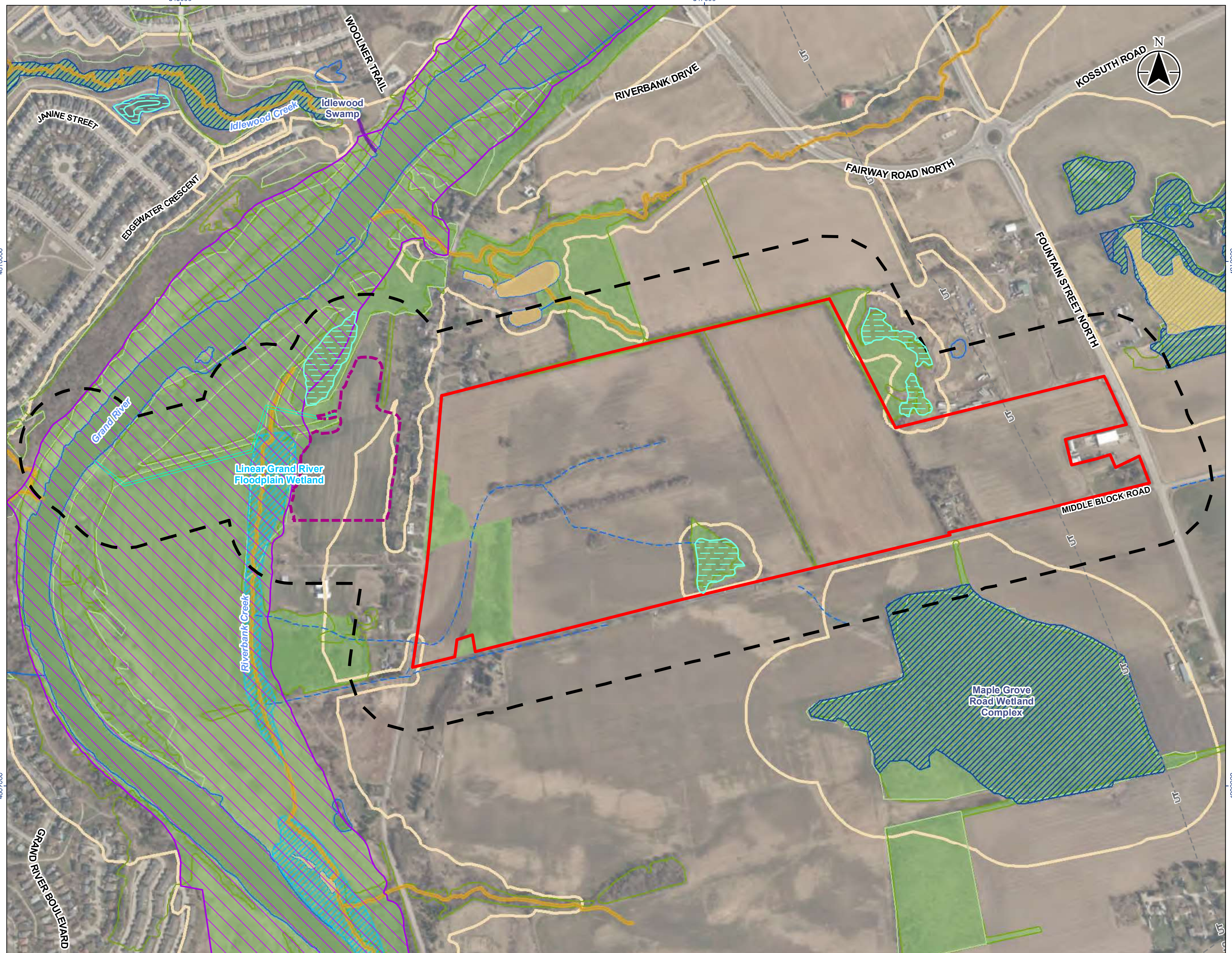
APPENDIX A: FIGURES



Stantec

Legend

- Subject Property
- Proposed SWM Block
- Unknown Transmission Line
- Proposed SWM Outlet
- Thermal Regime, Cold
- Thermal Regime, Warm
- Headwater Drainage Feature
- Watercourse (Permanent)
- Thermal Regime, Warm
- Waterbody
- Wetland (GRCA)
- Wetland, Provincially Significant
- Wetland, Other Evaluated
- Significant Woodland (Region of Waterloo)
- Wooded Area (LIO)
- Regulation Limit (GRCA)
- Recommended Greenlands Network (Region of Waterloo)
- Significant Valleylands (Region of Waterloo)
- Study Area (120 m)

0 200 400 m

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Notes

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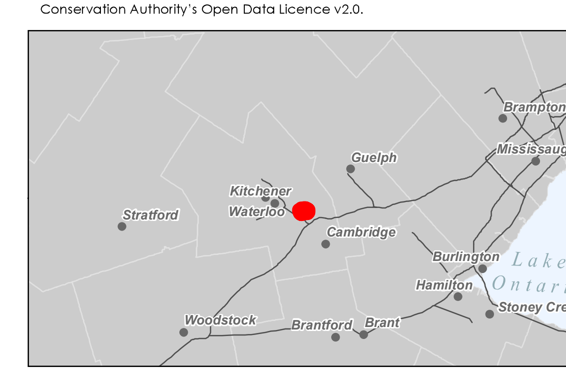
4. Wetland (GRCA) dataset contains information made available under Grand River Conservation Authority's Open Data Licence v2.0.



Project Location
Regional Municipality of Waterloo

161414188 REV4
Prepared by PRM on 2023-06-16
Technical Review by SG on 2024-07-11

Client/Project
MADISON GROUP
CAMBRIDGE LANDS

Figure No.
1

Title
Background Review and Designated Features

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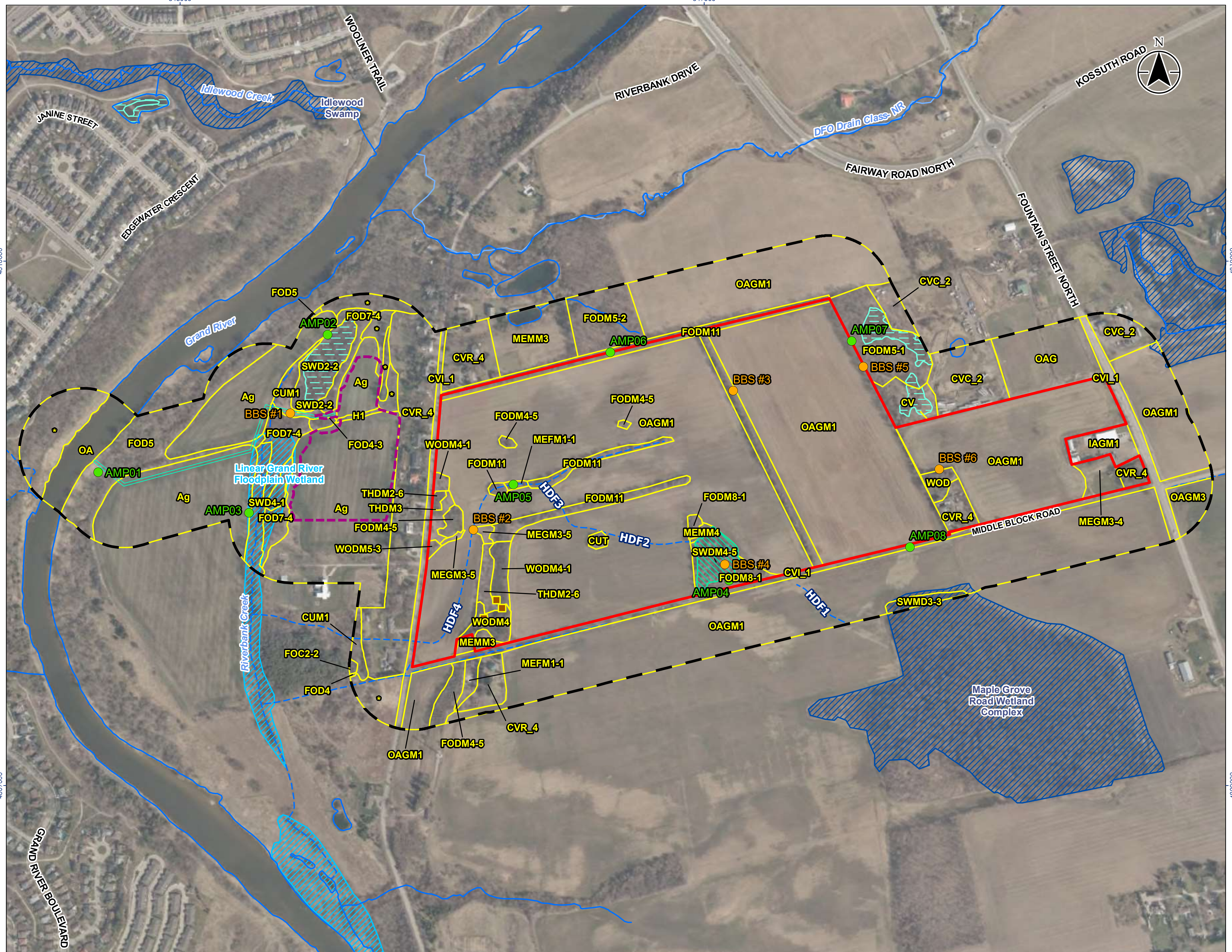

Stantec

Legend

- Subject Property
- Proposed SWM Block
- Amphibian Call Station
- Breeding Bird Point Count Locations
- Seep
- Proposed SWM Outlet
- Headwater Drainage Feature
- Watercourse (Permanent)
- Constructed Drain
- Waterbody
- Wetland (Confirmed with GRCA, July 6, 2022)
- Wetland (GRCA)
- Wetland, Provincially Significant
- Wetland, Other Evaluated
- Study Area (120 m)
- ELC Communities

ELC Description

Ag - Agriculture
CUM1 - Native Forb Meadow
CUT - Cultural Thicket
CV - Constructed
CVC_2 - Light Industry
CVI_1 - Transportation
CVR_4 - Rural Property
FOC2-2 - Dry White Cedar Calcareous Bedrock Coniferous Forest Type
FOD4-3 - Dry – Fresh Hackberry Deciduous Forest Type
FOD4 - Dry – Fresh Upland Deciduous Forest Ecosite
FOD5 - Dry - Fresh Sugar Maple - Hardwood Calcareous Shallow Deciduous Forest Ecosite
FOD7-4 - Fresh – Moist Black Wlanut Lowland Deciduous Forest Type
FODM11 - Naturalized Deciduous Hedge-row Ecosite
FODM4-5 - Dry - Fresh Manitoba Maple Deciduous Forest Type
FODM5-1 - Dry – Fresh Sugar Maple Deciduous Forest Type
FODM5-2 - Dry – Fresh Sugar Maple – Beech Deciduous Forest Type
FODM8-1 - Fresh – Moist Poplar Deciduous Forest Type
IAGM1 - Agricultural Buildings
MEFM1-1 - Goldenrod Forb Meadow Type
MEGM3-4 - Kentucky Blue Gras Graminoid Meadow Type
MEGM3-5 - Smooth Brome Graminoid Meadow Type
MEMM3 - Dry - Fresh Mixed Meadow Ecosite
MEMM4 - Fresh - Moist Mixed Meadow Ecosite
OA - Open Water
OAG - Open Agriculture
OAGM1 - Annual Row Crops
OAGM3 - Specialty Crops
SWD2-2 - Green Ash Mineral Deciduous Swamp Type
SWD4-1 - Willow Mineral Deciduous Swamp Type
SWDM4-5 - Poplar Mineral Deciduous Swamp Type
SWMD3-3 -
THDM2-6 - Buckthorn Deciduous Shrub Thicket Type
THDM3 - Dry - Fresh Deciduous Hedgerow Thicket Ecosite
WOD - Deciduous Woodland
WODM4-1 - Hawthorn / Apple Deciduous Woodland Type
WODM4 - Dry - Fresh Deciduous Woodland Ecosite
WODM5-3 - Fresh - Moist Manitoba Maple Deciduous Woodland Type
***** - Not visited by Stantec

0 200 400 m

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Project Location
Regional Municipality of Waterloo

161414188 REV4
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Technical Review by SG on 2024-07-03

Client/Project
MADISON GROUP
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Figure No.
2

Title
Ecological Land Classification and Wildlife Survey Stations

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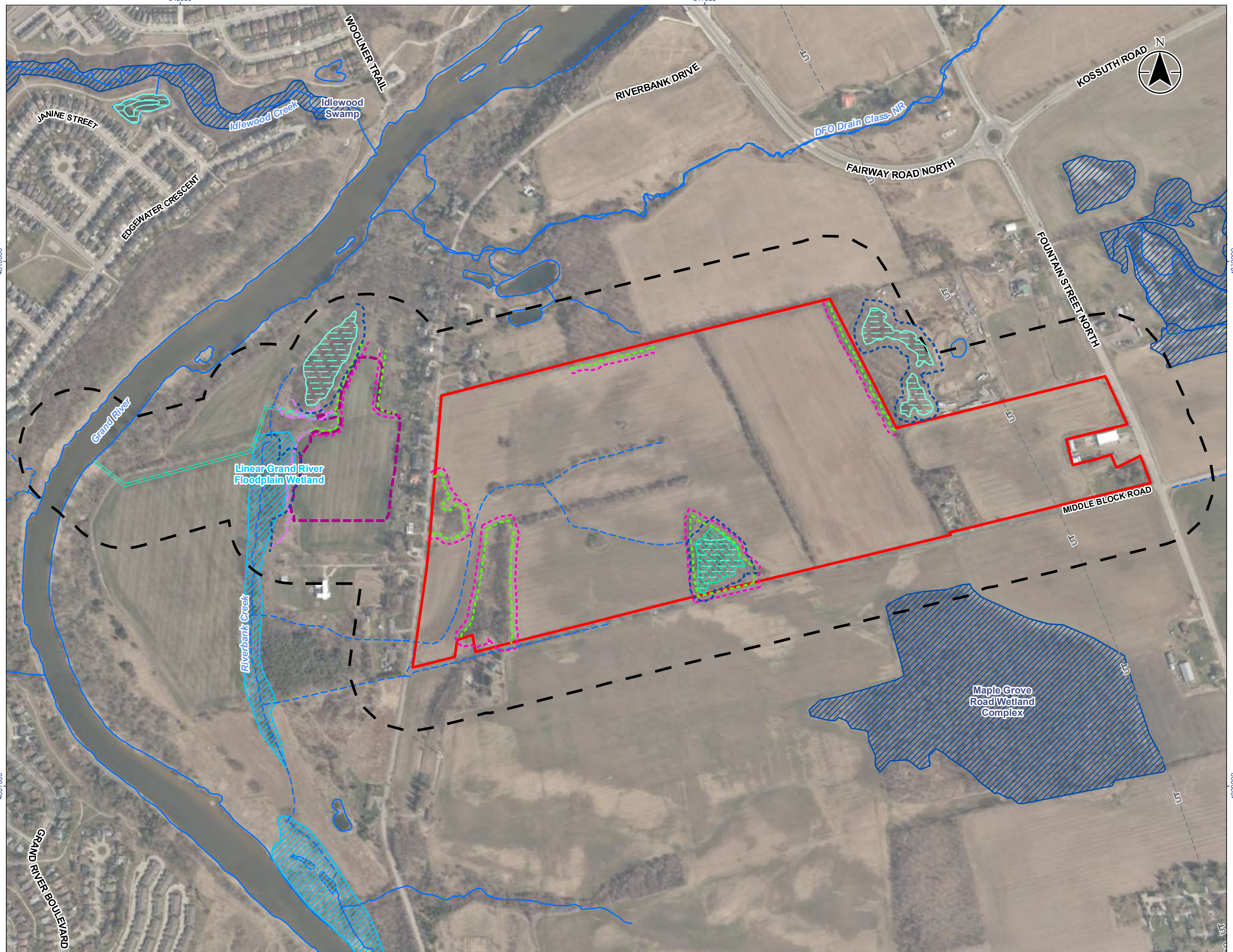

Stantec

Legend

- Subject Property
- SWM Block
- Unknown Transmission Line
- Proposed SWM Outlet
- Existing Dripline (Surveyed by Stantec and Reviewed by City/Region July 6, 2022)
- Existing Dripline (Flagged by NRSI on May 6, 2022, Reviewed by City/Region on July 6, 2022)
- 10.0m Dripline Setback
- 15.0m Wetland Setback
- Constructed Drain
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Waterbody
- Wetland (GRCA)
- Wetland (Confirmed with GRCA, July 6, 2022)
- Wetland, Provincially Significant
- Wetland, Other Evaluated
- Study Area (120 m)

0 200 400 m

1:7,500 (At original document size of 11x17)

Notes

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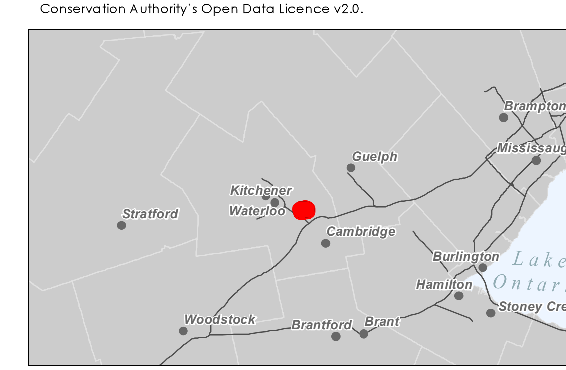

Project Location
Regional Municipality of Waterloo

161414188 REV4
Prepared by PRM on 2023-06-16
Technical Review by SG on 2024-07-03

Client/Project
MADISON GROUP
CAMBRIDGE LANDS

Figure No.
3

Title
Retained Features and Setbacks

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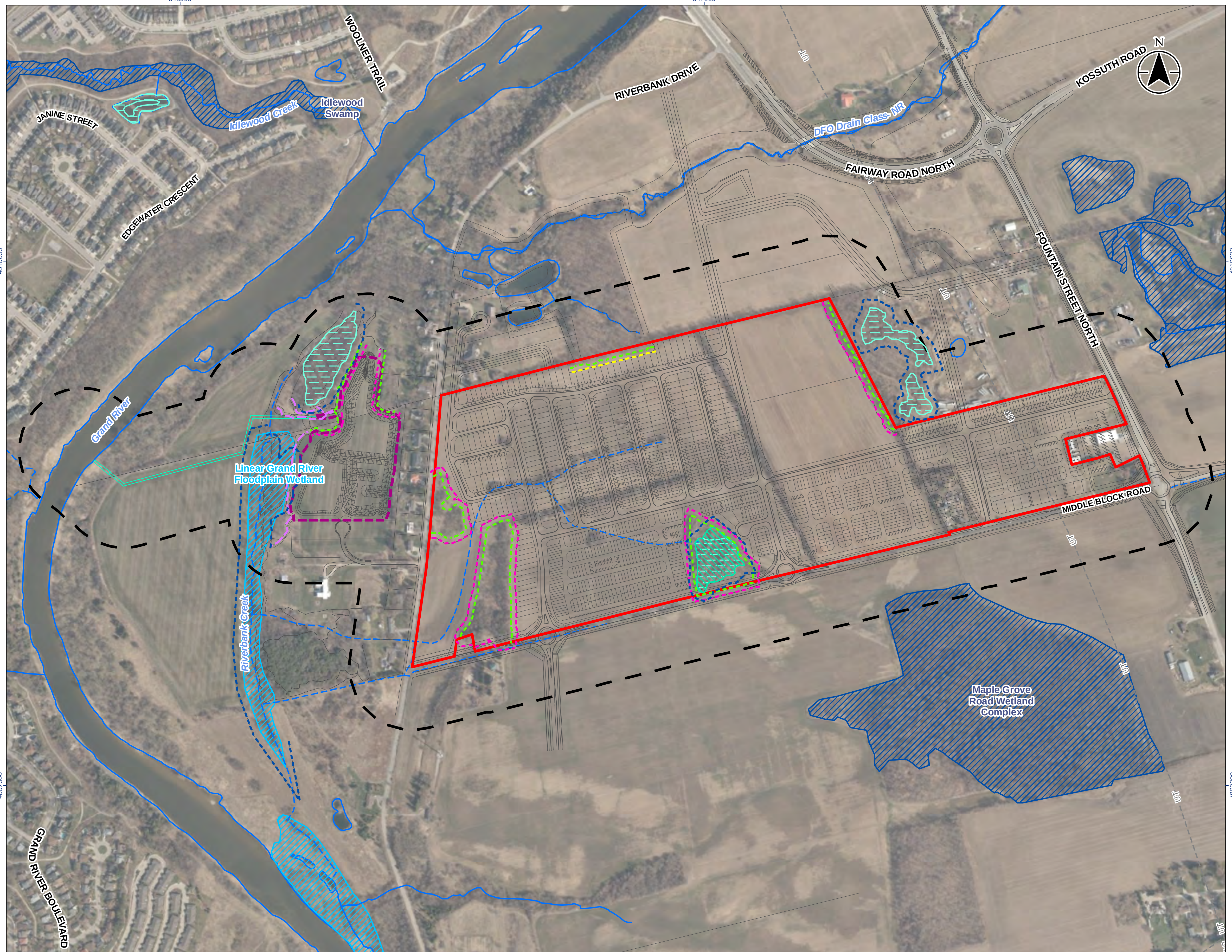

Stantec

Legend

- Subject Property
- SWM Block
- Unknown Transmission Line
- Existing Dripline (Surveyed by Stantec and Reviewed by City/Region July 6, 2022)
- Existing Dripline (Flagged by NRSI on May 6, 2022, Reviewed by City/Region on July 6, 2022)
- 10.0m Dripline Setback
- 15.0m Wetland Setback
- Adjusted Buffer For North Woodlot
- Proposed SWM Outlet
- Proposed Site Plan
- Constructed Drain
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Waterbody
- Wetland (GRCA)
- Wetland (Confirmed with GRCA, July 6, 2022)
- Wetland, Provincially Significant
- Wetland, Other Evaluated
- Study Area (120 m)

0 200 400 m

1:7,500 (At original document size of 11x17)

Notes
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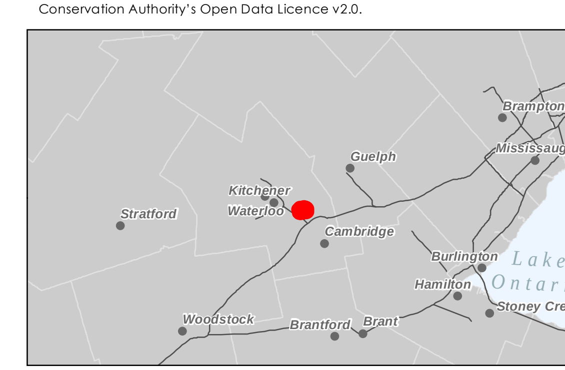

Project Location
Regional Municipality of Waterloo

161414188 REV4
Prepared by PRM on 2023-06-16
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Client/Project
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Figure No.
4

Title
Site Plan

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APPENDIX B:
TERMS OF REFERENCE

Stantec

Terms of Reference for an Environmental Impact Study (EIS) for Lot 1, Beasley's Middle Block, City of Cambridge ("Madison Lands")

City of Cambridge Application File No. D51/21

Original: May 30, 2022
Revised: June 20, 2023
File: 161414188

The following information outlines the scope of work planned in support of the preparation of an Environmental Impact Study (EIS) for lands associated with Lot 1 (also known as Bricker Lot), Beasley's Middle Block, City of Cambridge in the Regional Municipality of Waterloo (herein referred to as the "Subject Lands"). The EIS will include documentation of the existing conditions on the Subject Lands as well as adjacent lands within 120 m of the Subject Lands, collectively referred to as the Study Area.

Purpose

The studies described in this Terms of Reference (ToR) are intended to address GRCA and municipal policies by defining and describing the features and functions, identifying and assessing the potential environmental impacts, and recommending appropriate mitigation, restoration and enhancement measures.

This information will be presented in the context of the current regulatory and policy framework, and is intended to satisfy the policies, requirements and guidelines provided by *GRCA Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulations* (GRCA, 2008), the Region of Waterloo Official Plan (ROP; Region of Waterloo, 2015) and the City of Cambridge Official Plan (OP; City of Cambridge, 2018).

Background Information

The Subject Lands are located within the Regional Municipality of Waterloo (Region) and within the administrative jurisdiction of the Grand River Conservation Authority (GRCA). The Subject Lands are located directly adjacent (south and east) of the provincial Natural Heritage System (Growth Plan, 2020; Land Information Ontario, 2021) and east of the Region's designation of Core Environmental Feature and Significant Valleylands surrounding the Grand River. Wetlands, woodlands, watercourses and GRCA regulated areas have been mapped on portions of the Subject Lands. The Subject Lands lie within the Randall Drain and Riverbank/Allendale Creek subwatersheds of the Grand River Watershed.

Given this geographic context, the following documents and information sources will be reviewed as part of the assessment:

- A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2020)
- Grand River Watershed Water Management Plan (2014)
- GRCA regulations and policies, records and database reviews
- Official Plan for the Regional Municipality of Waterloo (2015, as amended)
- Cambridge Official Plan (September 2018 Consolidation)
- Endangered Species Act and associated regulations

- MNRF's Land Information Ontario (LIO) database, including mapping of designated natural areas, topographic mapping, etc.
- MNRF's Natural Heritage Information Centre (NHIC) database
- Fisheries and Oceans Canada (DFO) species at risk mapping
- Species at Risk (SAR) and wildlife atlas database reviews
- Topographic mapping
- Historical and current high resolution ortho imaging (aerial photographs)
- Subwatershed Study for the Randal and Breslau Drain (2017)
- East Side Lands (Stage 2) MESP and Secondary Plan
- Region of Waterloo Greenlands Network Implementation Guideline (2016)
- Previous data collected and/or reports prepared by others as available (MESP, Class EAs, ESRs etc.)

Information requests will be submitted to GRCA, MECP and MNRF to confirm online data and to obtain any additional data that may not be available through the online resources.

Policy Framework

The Scoped EIS will be based on the following policies:

- Ontario Regulation 150/06 (Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation)
- Region of Waterloo Official Plan (ROP, 2015)
- City of Cambridge Official Plan (OP, 2018)
- Endangered Species Act (ESA, 2007)
- Migratory Birds Convention Act (MBCA, 1994)
- Fisheries Act (2019)

Site Investigations

Site investigations will confirm and update background data, and document natural features on the Subject Lands. Adjacent Lands will be assessed from the edge of the Subject Lands or road right-of ways. The field studies are based on provincial protocols and the level of effort typically required to prepare an EIS acceptable for planning applications. The scope of this EIS involves the following surveys:

- Amphibian surveys (3 rounds) to identify the presence and species of any amphibians associated with wetland areas on the Subject Lands (completed April, May and June)
- Botanical inventory (3-season) of the vegetation communities within the Study Area to identify species composition, sensitivity, significance and the presence of any rare, threatened or endangered plant species

- Classification of the vegetation communities (ecosites and ecotypes) within the Study Area based on the Ecological Land Classification (ELC) System (Lee et al., 1998) to identify the presence of any rare or specialized vegetation communities
- Tree Inventory as per the Locally Significant Natural Area Policies in the Cambridge Official Plan (Section 3.A.4).
- Delineation of wetland boundaries based on the Ontario Wetland Evaluation System (OWES) methodology of the OWES Southern Manual, 4th Edition (MNRF, 2022) (to be reviewed with GRCA)
- Delineation of woodland boundaries based on the Randall and Breslau Drains Subwatershed Study (to be confirmed by the City and the Region)
- Breeding bird surveys (2 rounds) to identify bird species breeding within the Study Area, including any rare, threatened or endangered breeding bird species (completed in 2022)
- Bat Acoustic Recording Unit surveys to be completed where potential bat maternity roosts exist
- General wildlife habitat assessment to identify and describe habitat features, characteristics and potential usage, including the potential existence of specialized wildlife habitat (during each field investigation)
- Incidental wildlife observations to document wildlife species presence within the Study Area (during each field investigation)
- Headwater Drainage Feature Assessment according to protocols outlined by the document entitled *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (CVC/TRCA 2014)
- Aquatic Habitat Assessment of any aquatic habitats beyond headwater drainage features, if present in the Study Area.

Reporting

The proposed EIS report will include the following:

- A description of the proposed project components, including identification of treatment areas and feature conditions in those areas.
- A description and assessment of the existing natural environment features and functions within, and adjacent to, the trail alignment that will or might reasonably be expected to be impacted, including confirmation of natural heritage features and boundaries.
- A species at risk habitat and wildlife habitat assessment.
- An assessment of Locally Significant Natural Areas (LSNA) in accordance with City of Cambridge Official Plan policies.
- An identification and assessment of the magnitude and significance of potential short-term and long-term impacts, both direct and indirect, to the natural environment resulting from construction of project elements
- An assessment of buffers/setbacks to natural features

- The recommendations of appropriate mitigation measures to avoid and minimize potential negative impacts, as well as restoration, enhancement or compensation measures (as appropriate).

- As per the recommendations of the Randall and Breslau Subwatershed Study (Section 11.0), a monitoring program will be included.

- The EIS will be integrate with, and be informed by, other supporting studies (e.g.,hydrogeology study) to assist in identifying opportunities and constraints to development. The EIS will inform the development design including site grading, buffers/setbacks and mitigation requirements for stormwater management (SWM) that will be documented in the SWM design and the Functional Servicing Report.

This information will be presented in the context of the current regulatory and policy framework, and is intended to satisfy the policies, requirements and guidelines provided by the GRCA Regulation 150/06, Region of Waterloo Official Plan, City of Cambridge Official Plan, Endangered Species Act, Migratory Birds Convention Act and Fisheries Act. Consideration will also be given to the GRCA policies with respect to the regulation of wetland boundaries, as well as potential species at risk that may be identified through consultation with the MECP. This information will be consolidated into a stand-alone document for submission to the review and approval agencies as part of a complete application.

The scoped EIS report will follow a Table of Contents as outlined below:

1.0 Introduction
- 1.1 Study Area
- 1.2 Approach
- 1.3 Regulatory and Advisory Agency Consultation

2.0 Natural Heritage and Hazard Policy Considerations
- 2.1 Federal Context
  - 2.1.1 Fisheries Act
  - 2.1.2 Migratory Birds Convention Act
- 2.2 Provincial context
  - 2.2.1 The Planning Act / Provincial Policy Statement
  - 2.2.2 Conservation Authorities Act
  - 2.2.3 Endangered Species Act
  - 2.2.4 Fish and Wildlife Conservation Act
- 2.3 Municipal Planning Context
  - 2.3.1 Region of Waterloo Official Plan
  - 2.3.2 City of Cambridge Official Plan

3.0 Methods
- 3.1 Background Data Collection and Review
- 3.2 Field Investigations
  - 3.2.1 Vegetation Surveys
  - 3.2.2 Amphibian Surveys
  - 3.2.3 Breeding Bird Surveys
  - 3.2.4 Incidental Wildlife
  - 3.2.5 Wildlife Habitat
  - 3.2.6 Headwater Drainage Feature Assessments

APPENDIX C:
VASCULAR PLANT LIST

VASCULAR PLANT LIST - Madison Lands, Cambridge, Ontario

Plant species observed in 2022

LANDS WEST OF RIVERBANK DRIVE	EAST OF RIVERBANK DR.			SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO STATUS	COSEWIC STATUS	COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS	RARE IN REGION OF WATERLOO
	THICKETS & WOODLANDS	POPLAR FOREST & SWAMP AREA	HEDGEROWS & FIELDS								
				PTERIDOPHYTES (FERNS & FERN ALLIES)							
		x		Equisetum arvense	Field Horsetail	S5			0	0	NA
x				Equisetum hyemale ssp. affine	Common Scouring-rush	S5			2	0	NA
				GYMNOSPERMS (CONIFERS)							
	x			Juniperus communis	Common Juniper	S5			4	3	+
	x			Picea glauca	White Spruce	S5			6	3	+
			x	Pinus sylvestris	Scots Pine	SE5				3	NA
x	x			Thuja occidentalis	Eastern White Cedar	S5			4	-3	NA
				ANGIOSPERMS (DICOTS)							
x			x	Abutilon theophrasti	Velvetleaf	SE5				3	NA
x	x	x	x	Acer negundo	Manitoba Maple	S5			0	0	NA
x				Acer nigrum	Black Maple	S4?			7	3	NA
x			x	Acer platanoides	Norway Maple	SE5				5	NA
	x	x	x	Acer saccharum	Sugar Maple	S5			4	3	NA
		x		Acer x freemanii	Freeman's (Swamp) Maple	S5			6	-5	NA
			x	Achillea millefolium	Common Yarrow	SE5?				3	NA
x				Ageratina altissima	White Snakeroot	S5			5	3	NA
x				Agrimonia gryposepala	Hooked Agrimony	S5			2	3	NA
	x	x	x	Alliaria petiolata	Garlic Mustard	SE5				0	NA
x			x	Ambrosia artemisiifolia	Common Ragweed	S5			0	3	NA
x	x			Ambrosia trifida	Great Ragweed	S5			0	0	NA
		x		Amelanchier sp.	Serviceberry Species	S5			5		
x				Anemonastrum canadense	Canada Anemone	S5			3	-3	NA
	x			Apocynum cannabinum	Hemp Dogbane	S5			3	0	NA
	x	x	x	Arctium minus	Common Burdock	SE5				3	NA
			x	Asclepias syriaca	Common Milkweed	S5			0	5	NA
		x		Bidens sp.	Beggarticks Species						
x				Calystegia sepium	Hedge False Bindweed	S5			2	0	NA

VASCULAR PLANT LIST - Madison Lands, Cambridge, Ontario

Plant species observed in 2022

	EAST OF RIVERBANK DR.										
LANDS WEST OF RIVERBANK DRIVE	THICKETS & WOODLANDS	POPLAR FOREST & SWAMP AREA	HEDGEROWS & FIELDS	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO STATUS	COSEWIC STATUS	COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS	RARE IN REGION OF WATERLOO
			x	Carya cordiformis	Bitternut Hickory	S5			6	0	NA
x	x			Celastrus orbiculatus	Oriental Bittersweet	SE2				5	NA
x	x		x	Celtis occidentalis	Common Hackberry	S4			8	0	*
			x	Centaurium pulchellum	Branching Centaury	SE3				0	NA
			x	Chenopodium album	Common Lamb's-quarters	SE5				3	NA
			x	Cichorium intybus	Wild Chicory	SE5				5	NA
x	x			Circaea canadensis	Enchanter's Nightshade	S5			2	3	NA
x	x	x		Cirsium arvense	Canada Thistle	SE5				3	NA
			x	Cirsium vulgare	Bull Thistle	SE5				3	NA
x				Clematis virginiana	Virginia Clematis	S5			3	0	NA
x	x		x	Clinopodium vulgare	Wild Basil	S5			4	5	NA
			x	Convolvulus arvensis	Field Bindweed	SE5				5	NA
x	x			Cornus alternifolia	Alternate-leaved Dogwood	S5			6	3	NA
x		x		Cornus racemosa	Grey Dogwood	S5			2	0	NA
x	x	x		Cornus sericea	Red-osier Dogwood	S5			2	-3	NA
	x	x	x	Crataegus sp.	Hawthorn Species						
x			x	Daucus carota	Wild Carrot	SE5				5	NA
			x	Dipsacus fullonum	Common Teasel	SE5				3	NA
x	x	x	x	Echinocystis lobata	Wild Cucumber	S5			3	-3	NA
x				Elaeagnus umbellata	Autumn Olive	SE3				3	NA
		x		Epilobium hirsutum	Hairy Willowherb	SE5				-3	NA
	x			Epilobium parviflorum	Small-flowered Hairy Willowher	SE4				3	NA
			x	Erigeron canadensis	Canada Horseweed	S5			0	3	NA
x	x	x		Euthamia graminifolia	Grass-leaved Goldenrod	S5			2	0	NA
x				Eutrochium maculatum	Spotted Joe Pye Weed	S5			3	-5	NA
x			x	Fallopia convolvulus	Eurasian Black Bindweed	SE5				3	NA
	x			Fragaria virginiana	Wild Strawberry	S5			2	3	NA
x	x	x		Frangula alnus	Glossy Buckthorn	SE5				0	NA
x		x		Fraxinus americana	White Ash	S4			4	3	NA

VASCULAR PLANT LIST - Madison Lands, Cambridge, Ontario

Plant species observed in 2022

	EAST OF RIVERBANK DR.										
LANDS WEST OF RIVERBANK DRIVE	THICKETS & WOODLANDS	POPLAR FOREST & SWAMP AREA	HEDGEROWS & FIELDS	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO STATUS	COSEWIC STATUS	COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS	RARE IN REGION OF WATERLOO
x	x	x		Fraxinus pennsylvanica	Red Ash	S4			3	-3	NA
x			x	Galium mollugo	Smooth Bedstraw	SE5				5	NA
x	x			Geum canadense	Canada Avens	S5			3	0	NA
	x			Geum urbanum	Wood Avens	SE3				5	NA
	x			Glechoma hederacea	Ground-ivy	SE5				3	NA
			x	Gleditsia triacanthos var. inermis	Thornless Honey Locust	S2?					NA
		x		Helianthus cf. tuberosus	Jerusalem Artichoke	SU			1	0	NA
x	x			Hesperis matronalis	Dame's Rocket	SE5				3	NA
			x	Hypericum perforatum	Common St. John's-wort	SE5				5	NA
x		x		Impatiens capensis	Spotted Jewelweed	S5			4	-3	NA
x	x		x	Juglans nigra	Black Walnut	S4?			5	3	*+
			x	Lactuca serriola	Prickly Lettuce	SE5				3	NA
x	x			Laportea canadensis	Canada Wood Nettle	S5			6	-3	NA
x				Lapsana communis	Common Nipplewort	SE5				3	NA
x	x			Leonurus cardiaca	Common Motherwort	SE5				5	NA
			x	Leucanthemum vulgare	Oxeye Daisy	SE5				5	NA
	x	x	x	Lonicera tatarica	Tatarian Honeysuckle	SE5				3	NA
x				Lonicera x bella	(Lonicera morrowii X Lonicera tatarica)	SE				3	NA
			x	Lotus corniculatus	Garden Bird's-foot Trefoil	SE5				3	NA
x			x	Lysimachia arvensis	Scarlet Pimpernel	SE4				3	NA
x	x	x		Lythrum salicaria	Purple Loosestrife	SE5				-5	NA
	x	x	x	Malus pumila	Common Apple	SE4				5	NA
			x	Matricaria discoidea	Pineappleweed	SE5				3	NA
x			x	Medicago lupulina	Black Medick	SE5				3	NA
	x			Morus alba	White Mulberry	SE5				0	NA
			x	Ostrya virginiana	Eastern Hop-hornbeam	S5			4	3	NA
	x		x	Oxalis stricta	Upright Yellow Wood-sorrel	SE5				3	NA
			x	Oxybasis glauca	Oak-leaved Goosefoot	SE5				-3	NA
x	x	x	x	Parthenocissus vitacea	Thicket Creeper	S5			4	3	NA

VASCULAR PLANT LIST - Madison Lands, Cambridge, Ontario

Plant species observed in 2022

LANDS WEST OF RIVERBANK DRIVE	EAST OF RIVERBANK DR.			SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO STATUS	COSEWIC STATUS	COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS	RARE IN REGION OF WATERLOO
	THICKETS & WOODLANDS	POPLAR FOREST & SWAMP AREA	HEDGEROWS & FIELDS								
			x	Persicaria maculosa	Spotted Lady's-thumb	SE5				-3	NA
x				Physalis heterophylla	Clammy Ground-cherry	S4			3	5	NA
x	x			Plantago lanceolata	English Plantain	SE5				3	NA
x			x	Plantago major	Common Plantain	SE5				3	NA
			x	Polygonum aviculare	Prostrate Knotweed	S4?			0	3	NA
x				Populus deltoides ssp. deltoides	Eastern Cottonwood	S5			4	0	+
x		x	x	Populus tremuloides	Trembling Aspen	S5			2	0	NA
			x	Potentilla norvegica	Rough Cinquefoil	S5			0	0	NA
	x			Prunella vulgaris	Common Self-heal	S5			0	0	NA
		x		Prunus americana	American Plum	S4			6	5	1
			x	Prunus avium	Sweet Cherry	SE4				5	NA
x		x	x	Prunus serotina	Black Cherry	S5			3	3	NA
x	x		x	Prunus virginiana	Chokecherry	S5			2	3	NA
	x			Pyrus communis	Common Pear	SE4				5	NA
x	x		x	Quercus macrocarpa	Bur Oak	S5			5	3	NA
		x		Ranunculus pensylvanicus	Pennsylvania Buttercup	S5			3	-5	NA
x	x	x	x	Rhamnus cathartica	European Buckthorn	SE5				0	NA
		x	x	Ribes sp.	Gooseberry Species						
x				Rosa multiflora	Multiflora Rose	SE5				3	NA
		x	x	Rubus idaeus ssp. strigosus	N. American Red Raspberry	S5			2	3	NA
x	x			Rubus occidentalis	Black Raspberry	S5			2	5	NA
		x		Rubus pubescens	Dwarf Raspberry	S5			4	-3	NA
	x			Rudbeckia hirta	Black-eyed Susan	S5			0	3	NA
x				Rudbeckia laciniata	Cut-leaved Coneflower	S5			7	-3	NA
			x	Rumex crispus	Curled Dock	SE5				0	NA
		x	x	Salix amygdaloides	Peach-leaved Willow	S5			6	-3	NA
		x		Salix bebbiana	Bebb's Willow	S5			4	-3	NA
		x	x	Salix eriocephala	Cottony Willow	S5			4	-3	NA
x		x	x	Salix sp.	Exotic Willow						

VASCULAR PLANT LIST - Madison Lands, Cambridge, Ontario

Plant species observed in 2022

LANDS WEST OF RIVERBANK DRIVE	EAST OF RIVERBANK DR.			SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO STATUS	COSEWIC STATUS	COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS	RARE IN REGION OF WATERLOO
	THICKETS & WOODLANDS	POPLAR FOREST & SWAMP AREA	HEDGEROWS & FIELDS								
x				Saponaria officinalis	Bouncing-bet	SE5				3	NA
			x	Silene noctiflora	Night-flowering Catchfly	SE5				5	NA
			x	Silene vulgaris	Bladder Campion	SE5				5	NA
		x		Solanum dulcamara	Bittersweet Nightshade	SE5				0	NA
			x	Solidago altissima	Tall Goldenrod	S5			1	3	NA
x	x		x	Solidago canadensis	Canada Goldenrod	S5			1	3	NA
x		x		Solidago gigantea	Giant Goldenrod	S5			4	-3	NA
x			x	Sonchus arvensis	Field Sow-thistle	SE5				3	NA
x				Sonchus asper	Prickly Sow-thistle	SE5				3	NA
	x			Symphyotrichum ericoides	White Heath Aster	S5			4	3	NA
	x			Symphyotrichum laeve	Smooth Aster	S5			7	3	NA
		x	x	Symphyotrichum lanceolatum	Panicled Aster	S5			3	-3	NA
x			x	Symphyotrichum novae-angliae	New England Aster	S5			2	-3	NA
	x		x	Syringa vulgaris	Common Lilac	SE5				5	NA
	x		x	Tanacetum vulgare	Common Tansy	SE5				5	NA
			x	Taraxacum officinale	Common Dandelion	SE5				3	NA
x				Teucrium canadense	Canada Germander	S4S5			6	-3	1
x			x	Tilia americana	Basswood	S5			4	3	NA
		x	x	Toxicodendron radicans	Poison Ivy	S5			2	0	NA
x				Tragopogon pratensis	Meadow Goatsbeard	SE5				5	NA
x				Trifolium pratense	Red Clover	SE5				3	NA
x				Tussilago farfara	Coltsfoot	SE5				3	NA
	x	x	x	Ulmus americana	White Elm	S5			3	-3	NA
			x	Ulmus pumila	Siberian Elm	SE3				3	NA
x			x	Valeriana officinalis	Common Valerian	SE3				3	NA
			x	Verbascum thapsus	Common Mullein	SE5				5	NA
x				Verbena urticifolia	White Vervain	S5			4	0	NA
	x			Viburnum lentago	Nannyberry	S5			4	0	NA
x	x	x	x	Viburnum opulus var. opulus	Cranberry Viburnum	SE4?				-3	NA

VASCULAR PLANT LIST - Madison Lands, Cambridge, Ontario

Plant species observed in 2022

	EAST OF RIVERBANK DR.										
LANDS WEST OF RIVERBANK DRIVE	**THICKETS & WOODLANDS**	**POPLAR FOREST & SWAMP AREA**	**HEDGEROWS & FIELDS**	**SCIENTIFIC NAME**	**COMMON NAME**	**PROVINCIAL STATUS (S-RANK)**	**SARO STATUS**	**COSEWIC STATUS**	**COEFFICIENT OF CONSERVATISM**	**COEFFICIENT OF WETNESS**	**RARE IN REGION OF WATERLOO**
			x	Vicia cracca	Tufted Vetch	SE5				5	NA
	x			Vincetoxicum rossicum	European Swallowwort	SE5				5	NA
x	x	x	x	Vitis riparia	Riverbank Grape	S5			0	0	NA
				ANGIOSPERMS (MONOCOTS)							
x	x	x		Agrostis gigantea	Redtop	SE5				-3	NA
		x		Arisaema triphyllum	Jack-in-the-pulpit	S5			5	-3	NA
			x	Asparagus officinalis	Garden Asparagus	SE5				3	NA
x	x		x	Bromus inermis	Smooth Brome	SE5				5	NA
x			x	Cyperus esculentus	Perennial Yellow Flatsedge	S5			1	-3	NA
x	x		x	Dactylis glomerata	Orchard Grass	SE5				3	NA
			x	Erythronium americanum	Yellow Trout-lily	S5			5	5	NA
		x	x	Hemerocallis fulva	Orange Daylily	SE5				5	NA
			x	Juncus bufonius	Toad Rush	S5			1	-3	NA
			x	Juncus compressus	Compressed Rush	SE5				-3	NA
x				Juncus dudleyi	Dudley's Rush	S5			1	-3	NA
x				Panicum capillare	Common Panicgrass	S5			0	0	NA
		x	x	Phalaris arundinacea	Reed Canarygrass	S5			0	-3	NA
x	x			Phleum pratense	Common Timothy	SE5				3	NA
x			x	Phragmites australis ssp. australis	European Reed	SE5				-3	NA
			x	Poa compressa	Canada Bluegrass	SE5				3	NA
x		x		Poa palustris	Fowl Bluegrass	S5			5	-3	NA
	x			Poa pratensis	Kentucky Bluegrass	S5			0	3	NA
x				Scirpus atrovirens	Dark-green Bulrush	S5			3	-5	NA
x				Setaria pumila	Yellow Foxtail	SE5				0	NA
		x	x	Typha angustifolia	Narrow-leaved Cattail	SE5				-5	NA
x		x		Typha latifolia	Broad-leaved Cattail	S5			1	-5	NA

Legend

NA : Not Assigned

VASCULAR PLANT LIST - Madison Lands, Cambridge, Ontario

Plant species observed in 2022

	EAST OF RIVERBANK DR.										
LANDS WEST OF RIVERBANK DRIVE	THICKETS & WOODLANDS	POPLAR FOREST & SWAMP AREA	HEDGEROWS & FIELDS	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO STATUS	COSEWIC STATUS	COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS	RARE IN REGION OF WATERLOO

+ : Significant only if demonstrably indigenous - most populations in the RMW are typically not

* : significant but with the expectation that additional research may prove otherise

1 : Significant

FLORISTIC SUMMARY				TOTAL
Total Species				162
Native Species				85
Introduced (exotic) species				77
Species at Risk in Ontario (END, THR or SC)				0
Species at Risk in Canada (END, THR or SC)				0
Rare in Ontario (S1, S2 or S3)				1
Uncommon to common in Ontario (S4)				9
Common to very common in Ontario (S5)				74
Highly sensitive plant species with C value of 8, 9 or 10				1
Wetland Plant Species (-5, -4 or -3)				37

APPENDIX D:
WILDLIFE LIST

Table D-1: Wildlife List

	Common Name	Scientific Name	Ontario Status	Global Status	SARO	SARA	
Amphibians	American Toad	*Anaxyrus americanus*	S5	G5			
	Tetraploid Gray Treefrog	*Hyla versicolor*	S5	G5			
	Spring Peeper	*Pseudacris crucifer*	S5	G5			
	Northern Leopard Frog*	*Lithobates pipiens*	S5	G5	NAR	NAR	
	Wood Frog	*Lithobates sylvatica*	S5	G5			
Reptiles	Eastern Gartersnake	*Thamnophis sirtalis*	S5	G5			
							Highest Breeding Evidence
Birds	Mourning Warbler	*Geothlypis philadelphia*	S4B	G5			S
	Baltimore Oriole	*Icterus galbula*	S4B	G5			S
	Gray Catbird	*Dumetella carolinensis*	S4B	G5			S
	Great Crested Flycatcher	*Myiarchus crinitus*	S4B	G5			S
	House Wren	*Troglodytes aedon*	S5B	G5			S
	Indigo Bunting	*Passerina cyanea*	S4B	G5			S
	Eastern Towhee	*Pipilo erythrophthalmus*	S4B	G5			S
	Red-eyed Vireo	*Vireo olivaceus*	S5B	G5			S
	Common Grackle	*Quiscalus quiscula*	S5B	G5			P
	Song Sparrow	*Melospiza melodia*	S5B	G5			A
	Yellow Warbler	*Setophaga petechia*	S5B	G5			S
	Blue Jay	*Cyanocitta cristata*	S5	G5			H
	Brown-headed Cowbird	*Molothrus ater*	S4B	G5			S
	Killdeer	*Charadrius vociferus*	S5B, S5N	G5			H
	Great Blue Heron	*Ardea herodias*	S5	G5			F
	Horned Lark	*Eremophila alpestris*	S5B	G5			S
	Northern Cardinal	*Cardinalis cardinalis*	S5	G5			S
	American Goldfinch	*Spinus tristis*	S5B	G5			S
	Cedar Waxwing	*Bombycilla cedrorum*	S5B	G5			S
	Northern Flicker	*Colaptes auratus*	S4B	G5			S
	Vesper Sparrow	*Pooecetes gramineus*	S4B	G5			S
	Barn Swallow	*Hirundo rustica*	S4B	G5	SC	THR	F
	Red-winged Blackbird	*Agelaius phoeniceus*	S4	G5			P
	American Crow	*Corvus brachyrhynchos*	S5B	G5			H
	American Robin	*Turdus migratorius*	S5B	G5			S
	Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S4B	G5			S
	Pileated Woodpecker	*Dryocopus pileatus*	S5	G5			S
	European Starling	*Sturnus vulgaris*	SNA	G5			S
	Eastern Wood-Pewee	*Contopus virens*	S4B	G5	SC	SC	S
	Chestnut-sided Warbler	*Setophaga pensylvanica*	S5B	G5			S
	Willow Flycatcher	*Empidonax traillii*	S5B	G5			S
	Mallard	*Anas platyrhynchos*	S5	G5			P
	Black-capped Chickadee	*Poecile atricapillus*	S5	G5			S
	Double-crested Cormorant	*Phalacrocorax auritus*	S5B	G5	NAR	NAR	F
	White-breasted Nuthatch	*Sitta carolinensis*	S5	G5			S
	Downy Woodpecker	*Dryobates pubescens*	S5	G5			S
	Canada Goose	*Branta canadensis*	S5	G5			H
	Eastern Kingbird	*Tyrannus tyrannus*	S4B	G5			H
	Red-bellied Woodpecker	*Melanerpes carolinus*	S4	G5			S
	Spotted Sandpiper	*Actitis macularia*	S5	G5			H
	Scarlet Tanager	*Piranga olivacea*	S4B	G5			S
	Turkey Vulture	*Cathartes aura*	S5B	G5			F
	Mourning Dove	*Zenaida macroura*	S5	G5			S
	Chipping Sparrow	*Spizella passerina*	S5B	G5			S
	Ring-billed Gull	*Larus delawarensis*	S5B,S4N	G5			F
	Black-billed Cuckoo	*Coccyzus erythropthalmus*	S5B	G5			S
	Warbling Vireo	*Vireo gilvus*	S5B	G5			S
	Tree Swallow	*Tachycineta bicolor*	S4B	G5			S
	Brown Thrasher	*Toxostoma rufum*	S4B	G5			S
	Belted Kingfisher	*Megaceryle alcyon*	S4B	G5			H
	Common Yellowthroat	*Geothlypis trichas*	S5B	G5			S
	Alder Flycatcher	*Empidonax alnorum*	S5B	G5			S
	American Redstart	*Setophaga ruticilla*	S5B	G5			S

	Yellow-bellied Sapsucker	*Sphyrapicus varius*	S5B	G5			F
	Pine Warbler	*Setophaga pinus*	S5B	G5			S
	Common Nighthawk*	*Chordeiles minor*	S4B	G5	SC	THR	X
	Red-tailed Hawk*	*Buteo jamaicensis*	S5	G5	NAR	NAR	X
Mammals	Coyote*	*Canis latrans*	S5	G5			
	Unknown Bat Species*						

Total Amphibians: 5
Total Birds: 57
Total Mammals: 2
Total Reptiles: 1

*denotes an incidental observation

APPENDIX E:
SIGNIFICANT WILDLIFE HABITAT ASSESSMENT TABLE

Table E-1: Habitat Availability for SAR Identified Through Background Review

Species	Status		Habitat Suitability within the Study Area
	Ontario ESA, SARO List	Federal SARA, Schedule 1	
Plants			
Butternut (*Juglans cinerea*) [1, 6]	Endangered	Endangered	Suitable habitat (i.e., deciduous forest, Riverbank Creek) is present within the Study Area outside the Subject Property. No Butternut was identified within the Study Area during field investigations.
Black Ash (*Fraxinus nigra*) [6]	Endangered	No Status	Suitable habitat (i.e., wetlands) are present within the Study Area and Subject Property. Black Ash was not identified within the Study Area during field investigations.
Birds			
Bank Swallow (*Riparia riparia*) [2]	Threatened	Threatened	Suitable habitat may exist within the Study Area (along the banks of the Grand River) Bank Swallow was not observed during field investigations.
Bobolink (*Dolichonyx oryzivorus*)[1],[2]	Threatened	Threatened	Suitable habitat(i.e., hayfield, pasture, cover crop) is absent from the Study Area. There is a MEMM3 community on the northern edge of the Study Area that is approximately 100m x 100m in size and is likely too small to support grassland species.
Chimney Swift (*Chaetura pelagica*) [2]	Threatened	Threatened	Suitable habitat (i.e., anthropogenic structures, large, hollow trees) may be present within the Study Area. Chimney Swift was not observed during field investigations.
Yellow-breasted Chat (*Icteria virens*)[2]	Endangered	Endangered	Suitable habitat (i.e., thicket) is present within the Study Area. Yellow-breasted Chat was not observed during field investigations.
Red-headed Woodpecker (*Melanerpes erythrocephalus)*[2]	Endangered	Endangered	Suitable habitat (i.e., forest) is present within the Study Area. Red-headed Woodpecker was not observed during field investigations.
Eastern Meadowlark (*Sturnella magna*)[1], [2, 5]	Threatened	Threatened	Suitable habitat(i.e., hayfield, pasture, cover crop) is absent from the Study Area. There is a MEMM3 community on the northern edge of the Study Area that is approximately 100m x 100m in size and is likely too small to support grassland species.
Mammals			
Eastern small-footed Myotis (*Myotis leibii*) [6]	Endangered	No Status	Suitable habitat (i.e., forest) is present within the Study Area. Eastern Small-footed Myotis was not observed during field investigations.
Little brown Myotis (*Myotis lucifungus*) [6]	Endangered	Endangered	Suitable habitat (i.e., forest) is present within the Study Area. Little Brown Bat was observed during acoustic surveys.
Northern Myotis (*Myotis septentrionalis*) [6]	Endangered	Endangered	Suitable habitat (i.e., forest) is present within the Study Area. Northern Myotis was not observed during field investigations.
Tri-colored Bat (*Perimyotis subflavus*) [6]	Endangered	Endangered	Suitable habitat (i.e., forest) is present within the Study Area. Tri-coloured Bat was observed during acoustic surveys.
Amphibians			
Jefferson Salamander (*Ambystoma jeffersonianum)* [3]	Endangered	Endangered	Suitable habitat (i.e., wetlands) are present within the Study Area and Subject Property. Jefferson Salamander was not observed during field investigations
Reptiles			
Blanding's Turtle (*Emydoidea blandingi)* [3]	Threatened	Endangered	Suitable nesting and overwintering habitat may be present in association with the Grand River which intersects the Study Area. Blanding's Turtle was not observed during field investigations.
Fish			
Silver Shiner (*Notropis photogenis*)[1,7]	Threatened	Threatened	Suitable habitat may exist within the Study Area (the Grand River). Aquatic surveys were not conducted and the species was not observed during field investigations.
Black Redhorse (*Moxostoma duquesni*) [1,7]	Threatened	Threatened	Suitable habitat may exist within the Study Area (the Grand River). Aquatic surveys were not conducted and the species was not observed during field investigations.
Molluscs			
Wavy-rayed Lampmussel (*Lampsilis fasciola*) [1],[7]	Threatened	Special Concern	Suitable habitat may exist within the Study Area (the Grand River). Aquatic surveys were not conducted and the species was not observed during field investigations.

[1] Ministry of Natural Resources (MNRF) Natural Heritage Information Centre (NHIC) Database

[2] Ontario Breeding Bird Atlas (Cadman et. al., 2007)

[3] Ontario Reptile and Amphibian Atlas (Ontario Nature, 2019)

[4] iNaturalist (2022)

[5] eBird Database (eBird 2022)

[6] Species at Risk in Ontario List (MECP 2020)

[7] DFO Species at Risk mapping (2023)

Table E-2: Significant Wildlife Habitat Assessment for Special Concern and Rare Wildlife Species

Species	Status		Habitat Suitability within the Study Area
	Ontario ESA or Provincial Rank	Federal SARA, Schedule 1	
Birds			
Bald Eagle (*Haliaeetus leucocephalus*)[2, 5]	Special Concern		Suitable perching and nesting habitat (treed areas) are present within the Study Area. Bald Eagle was not observed during field investigations.
Canada Warbler (*Cardellina canadensis*)[2]	Special Concern	Threatened	Suitable habitat (moist deciduous forest) is present within the Study Area. Canada Warbler was not observed during field investigations.
Barn Swallow (*Hirundo rustica*)[2,5]	Special Concern	Threatened	Suitable habitat (anthropogenic structures) are present within the Study Area. Barn Swallow was observed during breeding bird surveys.
Common Nighthawk (*Chordeiles minor*)[5]	Special Concern	Threatened	Suitable nesting habitat (cleared areas such as rock barrens, burned areas) do not exist within the Study Area. Suitable foraging habitat associated with the Grand River exists within the Study Area. Common Nighthawk was observed incidentally foraging during field investigations.
Peregrine Falcon (*Falco peregrinus*)[2,5]	Special Concern	Special Concern	Suitable habitat (cliffs, tall buildings, quarries) is absent from the Study Area. Peregrine Falcon was not observed during field investigations.
Eastern Wood-Pewee (*Contopus virens*)[2, 5]	Special Concern	Special Concern	Suitable habitat (forest) is present within the Study Area and Subject Property. Eastern Wood-Pewee was observed during field investigations.
Grasshopper Sparrow (*Ammodramus savannarum*)[2]	Special Concern	Special Concern	Suitable habitat(i.e., hayfield, pasture, cover crop) is absent from the Study Area. There is a MEMM3 community on the northern edge of the Study Area that is approximately 100m x 100m in size and is likely too small to support grassland species.
Wood Thrush (*Hylocichla mustelina*)[2, 5]	Special Concern	Threatened	Suitable habitat (forest) is present within the Study Area and Subject Property. Wood Thrush was not observed during field investigations.
Insects			
Black Dash (Euphyes conspicua)[7]	Provincial S3 Rank		Suitable habitat (boggy marshes, wet meadows) is absent within the Study Area. Black Dash was not observed during field investigations.
Monarch (*Danaus plexippus*)[7]	Special Concern	Special Concern	Suitable habitat (areas containing nectaring flowers) exists within the Study Area and Subject Property. Monarch was not observed during field investigations.
Tawny Emperor (*Asterocampa clyton*)[7]	Provincial S3 Rank		Suitable habitat (forest, wooded riparian areas) exists within the Study Area. Tawny Emperor was not observed during field investigations.
Reptiles			
Eastern Milksnake (*Lampropeltis Triangulum*)[3]	Not at Risk	Special Concern	Suitable habitat (both naturalized areas with forest and anthropogenically-modified habitat) exists within the Study Area. Eastern Milksnake was not observed during field investigations.
Eastern Ribbonsnake (*Thamnophis sauritus*)[3]	Special Concern	Special Concern	Suitable habitat (riparian areas that likely support amphibians and fish for foraging) exist within the Study Area (associated with the Grand River). Eastern Ribbonsnake was not observed during field investigations.
Midland Painted Turtle (*Chrysemys picta marginata*)[1,3]	Not at Risk	Special Concern	Suitable nesting and overwintering habitat may be present in association with the Grand River which intersects the Study Area. Snapping Turtle was not observed during field investigations.
Snapping Turtle (*Chelydra serpentina*)[1,3]	Special Concern	Special Concern	Suitable nesting and overwintering habitat may be present in association with the Grand River which intersects the Study Area. Midland Painted Turtle was not observed during field investigations.
Amphibians			
Western Chorus Frog - Great Lakes - St. Lawrence - Canadian Shield population (*Pseudacris maculata* pop. 1)[1]	Not at Risk	Threatened	Suitable breeding habitat (wet areas) and overwintering habitat (areas adjacent to wetlands) is present within the Study Area and Subject Property. Western Chorus Frog was not observed during field investigations.
Molluscs			
Rainbow (*Villosa iris*)[1,8]	Special Concern	Special Concern	Suitable habitat may exist within the Study Area (the Grand River). Aquatic surveys were not conducted and the species was not observed during field investigations.

[1] Ministry of Natural Resources (MNRF) Natural Heritage Information Centre (NHIC) Database

[2] Ontario Breeding Bird Atlas (Cadman et. al., 2007)

[3] Ontario Reptile and Amphibian Atlas (Ontario Nature, 2019)

[4] Species at Risk in Ontario List (MECP 2020)

[5] eBird Database (eBird 2022)

[6] iNaturalist Database (iNaturalist 2022)

[7] Ontario Butterfly Atlas (TEA 2022)

[8] DFO Species at Risk mapping (2023)

APPENDIX F:
2023 BAT SURVEY RESULTS REPORT

Madison Group Cambridge Lands Subdivision: 2023 Bat Results

Addendum to EIS

April 10, 2024

Prepared for:
Madison Group

Prepared by:
Stantec Consulting Ltd

Project Number:
161414188

Limitations and Sign-off

The conclusions in the Report title Madison Group Cambridge Lands Subdivision: 2023 Bat Results are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Madison Group (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided to applicable authorities having jurisdiction and others for whom the Client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

Prepared by: ______________________
Signature

Jennifer Randall B.Sc., MES
Terrestrial Ecologist
Printed Name and Title

Reviewed by: ______________________
Signature

Sean Geddes
Senior Biologist
Printed Name and Title

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1 Introduction

Stantec Consulting Ltd. (Stantec) was retained by Madison Group ("the Client") to complete an Environmental Impact Study (EIS) for the proposed residential subdivision (the Cambridge Lands Subdivision, "Subject Property"), located within the North Cambridge, East Side lands Phase 2 Planning Area of the City of Cambridge (City). The EIS was submitted in June 2023. At that time, the bat field monitoring program was underway, and could not be included in the EIS document.

This report is in addendum to the EIS and includes the results of the 2023 bat field surveys.

The Endangered Species Act, 2007 (ESA) protects species listed by the Committee on the Status of Species at Risk in Ontario (COSSARO) as threatened, endangered, or extirpated in Ontario and their habitats by prohibiting anyone from killing, harming, harassing, or possessing protected species, as well as prohibiting any damage or destruction to the habitat of the listed species. Listed species are referred to as Species at Risk (SAR) and are provided with habitat protection under the ESA aimed at protecting areas that species depend on to carry out their life processes, such as reproduction, rearing, hibernation, migration or feeding. For some species, there are detailed habitat regulations that go beyond the general habitat protection to define specifically the extent and character of protected habitats.

There are four species of bats in Ontario that are listed as Endangered by COSSARO; Little Brown Myotis (*Myotis lucifungus*), Northern Myotis (*Myotis septentrionalis*), Tri-coloured Bat (*Perimyotis subflavus*), and Eastern Small-footed Bat (*Myotis leibii*). These species are collectively referred to as species at risk (SAR) bats and are known to roost in trees during their active period (March 15 to September 30). These species generally use maternity roosting habitat in spring / summer and hibernate in caves or other underground structures in the winter. Maternity roosts are typically located in poorly ventilated, dark sites with high temperatures. Maternity roosts may be found in anthropogenic habitats (i.e., buildings, attics) or natural habitats (trees within woodlands). In natural settings, SAR bats may roost in tree cavities or under loose bark. Maternity roosts are most likely to occur in cavity trees, which are typically defined as tall, large diameter trees with heart rot, which creates cavities that are large enough to house colonies and provide suitable temperatures for roosting (ECCC 2018; MNRF 2017).

2 Methods

2.1.1 Maternity Roost Tree Survey

Bat maternity roost surveys were conducted when Stantec staff were on site on December 3, 2021 and May 23, 2022. According to MNRF guidelines, any tree with a diameter breast height (DBH) of 10 cm or greater is considered potential bat maternity roost habitat (MNRF 2017). High potential bat maternity roost trees have a DBH of 25 cm or greater, with a large amount of loose, peeling bark, cavities, or crevices at least 10 metres (m) high, with an open canopy, and exhibiting the early stages of decay (MNRF 2017).

2.1.2 Bat Acoustic Surveys

Five bat autonomous recording units (ARUs) were deployed within the Study Area on June 1, 2023. Song MeterSM4Bat FS recorders (Wildlife Acoustics) were used and were programmed to record from 30 minutes prior to sunrise until 30 minutes after sunset. ARUs were deployed to capture a minimum of 10 warm/mild nights (i.e., ambient temperature >10°C) with low wind and no precipitation, as required by MNRF (2017) protocols.

Data were analyzed using Kaleidoscope Pro software by Wildlife Acoustics. The data processing through Kaleidoscope Pro involves running the software's automatic identification, which screens out noise files and provides a suggested species for each bat call file. For calls identified by Kaleidoscope Pro as non-SAR bats, the automatic species IDs were used and were not reviewed in detail. For high-frequency calls that were identified as a potential SAR bat, each call was reviewed by a qualified biologist to confirm the identification by visually assessing the call file spectrographs to identify if the frequency range and shape were consistent with the species assigned by the software. In addition, calls that were identified as 'No ID' by Kaleidoscope Pro with a minimum frequency of 35 kHz or above were reviewed, as they have the potential to be made by SAR bats. Where calls were not of sufficient quality to identify to species, they were classified as high frequency unknown (where the minimum frequency was 35 kHz or above) or low frequency unknown (where minimum frequency is less than 35 kHz). All calls with under five pulses were classified as high frequency unknown, low frequency unknown, or No ID, as a short call can not be reliably identified.

Bat detectors cannot distinguish the number of bats flying within the area, as multiple calls often come from the same individual as they pass the microphone multiple times; however, the number of calls can be used as an index of bat activity in a given area.

3 Results

3.1.1 Maternity Roost Tree Survey

Four potential high quality maternity roosts were identified on the Site (**Figure 1**). These trees are all deciduous species with a large DBH, and contain cavities or crevices, peeling bark and/or signs of decay. Three of these trees were located along the hedgerow at the northern property boundary. The fourth is located along the hedgerow near the center of the Subject Property.

3.1.2 Bat Acoustic Surveys

ARU locations were chosen to provide spatial coverage of the site (**Figure 1**). Five ARUs were deployed from June 1 to 15, for a total of 14 nights of monitoring. The weather conditions for these dates were reviewed for the closest weather station (Kitchener/Waterloo) (ECCC 2023), to determine that at least 10 nights of suitable weather conditions (temperature > 10°C, low wind and no precipitation), as defined by the MNRF, had occurred. Weather conditions observed during the bat surveys are summarized in Table 3.1.

Table 3.1 Weather Conditions during Bat Acoustic Surveys

Date (Night of)	Average Temperature	Total Precipitation	Average Wind Speed
1-Jun-23	16.55	0	6.4
2-Jun-23	18.74	0	6.8
3-Jun-23	9.75	0	10
4-Jun-23	9.68	0	4.9
5-Jun-23	13.59	0	8.1
6-Jun-23	8.48	0	7.5
7-Jun-23	11.76	0	8.7
8-Jun-23	10.72	0	6.8
9-Jun-23	9.12	0	2.7
10-Jun-23	16.08	0	4.8
11-Jun-23	14.29	20.3	22.3
12-Jun-23	11.02	0	10.7
13-Jun-23	11.54	0.2	9.4
14-Jun-23	10.46	0	7.5

Six species of bats were identified in the acoustic surveys. This included two SAR: Little Brown Myotis and Tri-coloured bat. Both of these species were recorded at BMS-1, and Little Brown Myotis was also recorded at BMS-5. Only two acoustic files were recorded for Tri-colored bat.

The most commonly recorded species was Big Brown Bat (*Eptesicus fuscus*), followed by Hoary bat (*Lasiurus cinereus*) and Silver-haired Bat (*Lasionycteris noctivagans*). All three of these species were recorded at all five survey locations. Big Brown Bat is a resident species that can be found in Ontario year-round. Winters are spent hibernating in houses, barns and other anthropogenic structures, or at underground sites (caves or mines). Hoary Bat, Silver-haired Bat and Eastern Red Bat are migratory species that only occur in Ontario during the spring, summer and fall.

A total of 61 recordings were categorized as Myotis species. These calls could only be identified to genus due to the quality of the call. Myotis species have very similar calls that can be difficult to reliably differentiate based on acoustic recordings. The species in this category may include Little Brown Myotis, Northern Myotis, or Eastern-Small Footed Myotis.

In addition, many calls were identified at High Frequency Unknown or Low Frequency Unknown, where they could not be identified to species or genus. High frequency species include the three Myotis bats, Tri-coloured bat and Eastern Red Bat. Low frequency species include Big Brown Bat, Hoary Bat and Silver-haired Bat.

Table 3.2 Bat Acoustic Survey Results

Survey Station	Number of Acoustic Files Recorded by Species									No ID	Total
	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis	Myotis species	Tri-coloured Bat	High Frequency Unknown	Low Frequency Unknown		
BMS-1	97	4	37	25	7	42	2	190	174	149	**727**
BMS-2	5	-	16	5	-	15	-	22	145	79	**287**
BMS-3	92	14	35	12	-	1	-	4	99	92	**349**
BMS-4	171	3	29	23	-	3	-	47	313	235	**824**
BMS-5	38	2	29	20	1	-	-	11	44	77	**222**
Total	**403**	**23**	**146**	**85**	**8**	**61**	**2**	**274**	**775**	**632**	**2409**

4 Effects of the Project on Bats

Site preparation activities will include vegetation clearing and tree removal. Overall, tree cover is relatively low at the site and is limited to the hedge rows. However, if roost trees are removed during the bat active season, there is potential for injury or mortality of roosting bats. Both Little Brown Myotis and Tri-coloured bats (SAR species) form maternity colonies in trees where females give birth to and raise their young. The removal of a maternity roost tree can be particularly detrimental, since these are important habitat features that are potentially used by tens or hundreds of female bats and their young. Pups are particularly vulnerable to roost destruction before they have developed the ability to fly, when they would be unable to escape.

The conversion of habitat from an agricultural area to a residential subdivision may also result in a loss of suitable foraging areas for bats.

5 Recommendations and Mitigation

SAR bats were detected during the acoustic surveys (Little Brown Myotis and Tri-coloured bat), and it is therefore recommended that an Information Gathering Form be submitted to MECP to determine authorization and mitigation requirements prior to tree removals.

It is recommended that trees > 10 cm diameter at breast height (DBH) be removed outside the bat active period, which includes a maternity roosting period. Bats typically give birth in late-May to early-June, and females fly with newborn young until they become excessively heavy. Young begin to fly in mid- to late-June, at age three to four weeks. Rearing is completed by August and bats begin to more towards swarming and hibernation sites in August or September, before moving into hibernation in late September or October (Broders et al. 2006; COSEWIC 2013). Therefore, removal of trees > 10 cm DBH is not recommended between March 15 and September 30 (inclusive).

If tree removal must occur during the bat active season (March 15 to September 30), bat exit surveys should be conducted at suitable roost trees by qualified biologists. If any bats are observed exiting or entering the tree, clearing of that tree must not occur until after the active season.

6 References

Broders, H. G., G. J. Forbes, S. Woodley, and I. D. Thompson. 2006. Range extent and stand selection for roosting and foraging in forest-dwelling Northern Long-Eared Bats and Little Brown Bats in the Greater Fundy Ecosystem, New Brunswick. The Journal of Wildlife Management 70(5): 1174-1184.

COSEWIC. 2013. COSEWIC assessment and status report on the Little Brown Myotis Myotis lucifugus, Northern Myotis Myotis septentrionalis and Tri-colored Bat Perimyotis subflavus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxiv + 93 pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).

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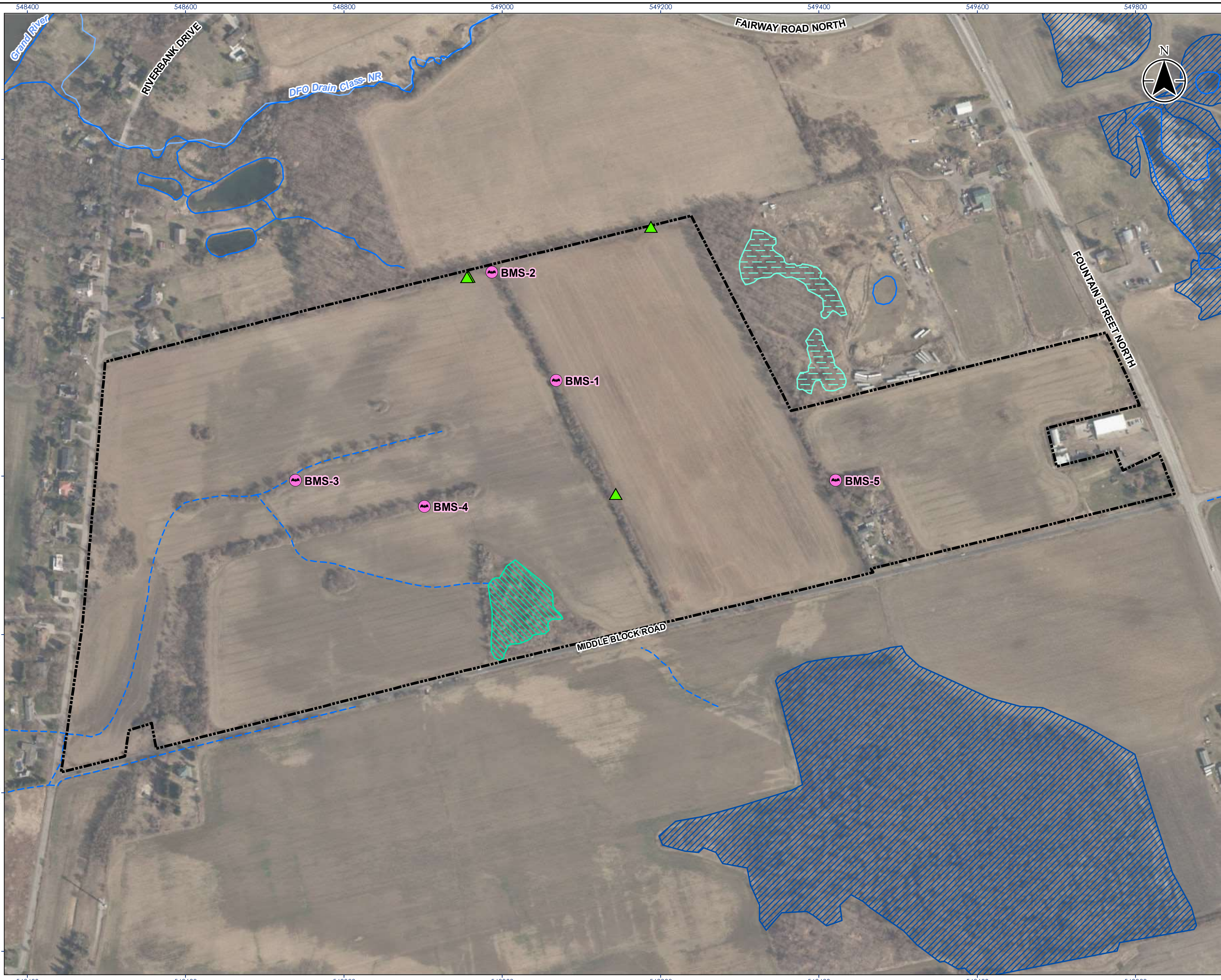
Appendices

Appendix A Figures



Stantec

Legend

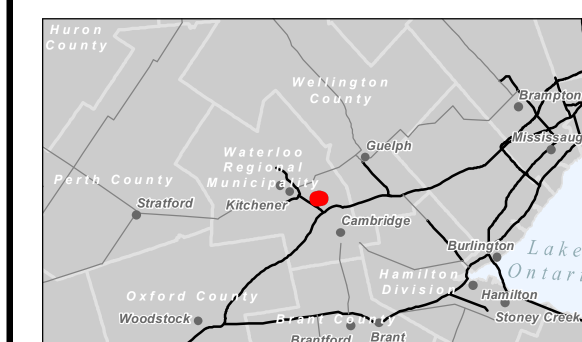
- Subject Property
- High Quality Candidate Bat Roost Tree
- Bat Monitoring Station
- Headwater Drainage Feature
- Watercourse (Permanent)
- Constructed Drain
- Waterbody
- Wetland (Confirmed with GRCA, July 6, 2022)
- Wetland (GRCA)
- Wetland, Provincially Significant

0 100 200 m

1:5,000 (At original document size of 11x17)

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, 2021.
3. Orthoimagery © First Base Solutions, 2021. Imagery Date, 2021.



Project Location
Regional Municipality of Waterloo

161414188 REV4
Prepared by PRM on 2023-11-10
Technical Review by LM on 2023-11-15

Client/Project
MADISON GROUP
CAMBRIDGE LANDS

Figure No.
1

Title
2023 Bat Survey Locations

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

APPENDIX G:
CURRICULUM VITAE OF AUTHORS/KEY STAFF

Laura Marshall B.E.S., Dipl. Ecological Restoration and Rehabilitation

Stantec

Ecologist

6 years of experience · Waterloo, Ontario

Laura holds a Bachelor of Environmental Studies (Honours) with a Diploma of Ecological Restoration and Rehabilitation from the University of Waterloo. Laura comes to Stantec with three years of consulting experience and two years of experience as a crew lead for an NGO specializing in Phragmites management in Ontario. Her consulting experiences have included extensive work in Southwestern Ontario, Southern Alberta, Saskatchewan and Manitoba. Laura has been involved in a variety of project types including renewable energy, oil and gas, mining and urban development. She is well versed in terrestrial surveys with an emphasis on avifauna. Laura is also an Ontario Benthos Biomonitoring Network (OBBN) member.

EDUCATION

Bachelor of Environmental Studies, University of Waterloo, Waterloo, Ontario, Canada, 2017

Diploma of Ecological Restoration and Rehabilitation, University of Waterloo, Waterloo, Ontario, Canada, 2017

CERTIFICATIONS & TRAINING

OBBN, Ontario Benthos Biomonitoring Network, Dwight, Ontario, Canada, 2019

PROJECT EXPERIENCE

ACOUSTIC MONITORING (WILDLIFE)

Lakeshore Gold | Lakeshore Gold | 2023 | Ecologist

Provided field support (installation) of acoustic recording units (ARUs) at the Lakeshore Gold mine near Timmins, ON. Analysis of acoustic data (nightjars, breeding birds) after ARUs had been collected.

PROPOSALS & PURSUITS

Enbridge Gas Integrity Digs | Enbridge Gas Inc. | 2024

Assisted in the completion of approximately ten proposals to support Enbridge Gas Inc. integrity dig work in 2024. Proposals included scopes of work for ecological assessments and surveys.

ENVIRONMENTAL IMPACT ASSESSMENTS

Tecumseh Road Street and Storm Sewer Improvements | Tecumseh, Ontario | 2024

Assisted in the completion of the Tecumseh Hamlet Environmental Impact Assessment to assess environmental constraints and identify natural heritage features within the Study Area.

BASELINE STUDIES

World Energy Green Hydrogen 2 | World Energy | Stephenville, NL, Canada | 2023 | Ecologist

Ecologist conducting avian studies and pre-construction surveys for the World Energy Green Hydrogen Project in western Newfoundland.

Bemersyde Wind* | CanNorth | Bemersyde, SK, Canada | 2018 | Ecologist

Provided support during initial pre-construction surveys including wetland delineation, breeding bird surveys and amphibian surveys.

Enbridge Line 3 Replacement* | Enbridge | Saskatchewan, Canada | 2018 | Ecologist/Field Tech

Conducted breeding bird nest sweeps and amphibian relocation in support of construction activities

MIGRATORY BIRD AND EAGLE SURVEYS

Bobcaygeon Natural Gas Pipeline | Enbridge | Bobcaygeon | 2022 | Ecologist

Conducted grassland breeding bird, least bittern and nightjar surveys along proposed pipeline alignment.

Borden | Borden, Ontario, Canada | 2021-2022 | Ecologist

Conducted grassland breeding bird surveys, targeted species at risk surveys (Henslow's Sparrow, Short-eared Owl, Common Nighthawk, Eastern Whip-Poor-Will) and acoustic bat surveys.

Adelaide Wind Power Project | Suncor | Adelaide, Ontario, Canada | 2021-2023 | Ecologist

Conducted migratory raptor behavioural surveys as part of the Enhanced Raptor Mitigation Plan (ERMP). Assisted in composition of year-end reports.

MLS Canso Spaceport | Maritime Launch Services | Canso, NS | 2022 | Ecologist

Conducted migratory bird surveys and marine bird point counts in support of the proposed Canso Spaceport.

ECOLOGICAL MONITORING

Comber/Gosfield Wind Power Project | Evolugen | Comber, ON | 2023-2024 | Ecologist/Coordinator

Coordination of project work (mortality monitoring). Conducted SAR mortality monitoring at 94 turbines at the Comber/Gosfield Wind Power projects. Completed the SAR mortality report.

Underwood and Cruickshank Operational Mitigation Plan 5-year Species at Risk Monitoring | Enbridge inc. | Ontario, Canada | 2021 | Wildlife Ecologist

** denotes projects completed with other firms*

Post-construction Monitoring for the Adelaide Wind Energy Centre | Suncor Energy inc | Strathroy, Ontario, Canada | 2021-2022 | Wildlife Ecologist

Post-construction Monitoring for the Amherst Island Wind Project* | Windlectric Inc. | County of Lennox and Addington | 2020 | Avian Biologist

Jericho/Adelaide/Bornish Wind Energy Centre* | NextEra | Bornish, Ontario, Canada | 2015-2017 | Terrestrial Ecologist

Conducted post-construction mortality monitoring at wind farms in Southern Ontario

REPORTING

Habitat Restoration and Invasive Species Monitoring Reporting for Henvey Inlet Wind Farm, Henvey Inlet First Nation Reserve Lands | Pattern Energy | Ontario, Canada | 2021-present | Vegetation and Wildlife Habitat Ecologist

Co-authored restoration and invasive species monitoring reports for the HIW project.

Activa East Galt | Activa | East Galt | 2021-2023 | Ecologist

Conducted field studies on-site including breeding bird, amphibian and snake cover board surveys. Reporting tasks for environmental impact study.

INVASIVE SPECIES MANAGEMENT

Phragmites Management* | Invasive Phragmites Control Centre | Various locations in Ontario | 2019-2020 | Crew Leader

Crew lead on the Invasive Phragmites Control Centre's manual control crew. Conducted Phragmites management and site assessments for a variety of private and public clients throughout Ontario.

WILDLIFE MITIGATION PLANNING

Armow Wind | Pattern | 2023-2024

Completed updates to the Project's Operational Mitigation Plan (OMP). Subsection 23.20 (4) 5. ii. of O.Reg. 242/08 specifies that the OMP be updated once every five years to include information obtained from previous monitoring years as well as to provide updates to the mitigation plan using current research and industry standards. The Armow Wind OMP Addendum was completed to reflect these standards and increase consistency amongst the operational mitigation plans implemented across Pattern Energy's Ontario wind facilities. The OMP Addendum makes adjustments to mitigation recommendations for 'Isolated,' 'Repeat' and 'Continued' Impacts to SAR bats and birds.

Samsung Grand Renewable Energy Park | Samsung Renewable Energy Inc. | Haldimand County, ON, Canada | 2022 | Ecologist

Assisted with updates to 2014 OMP.

TKC-15 Pipeline Decommissioning | Enbridge Gas Inc. | Corunna, Ontario, Canada | 2022 | Ecologist

Completed mitigation plan for Butler's Gartersnake and Common Five-lined Skink.

ENVIRONMENTAL IMPACT STATEMENTS

Northwest Oshawa Recreation and Aquatics Facility | City of Oshawa | Oshawa, ON, Canada | 2023-present | Ecologist

Assisted in the creation of the Environmental Impact Study (EIS) that summarizes existing site conditions and impact assessments.

Champlain | Menkes | Whitby, ON, Canada | 2021-2023 | Ecologist

Provided technical support during field assessments/surveys in 2021 season. Provided assistance with EIS composition.

ENVIRONMENTAL ASSESSMENT

Bass Pro Mills Drive Environmental Assessment | City of Vaughan | City of Vaughan | 2021 | Vegetation and Wildlife Ecologist

Environmental Services for the London Lines Replacement Project | Enbridge Gas Inc | Southwestern Ontario | 2021-2022 | Vegetation and Wildlife Ecologist

NWMO South Bruce Biodiversity | Nuclear Waste Management Organization | South Bruce | 2022 | Crew Lead, Wildlife Technical Lead

Conducted significant wildlife habitat assessments to support potential work at South Bruce Performed daily crew lead duties Coordinated crews, scheduling and project work throughout summer 2022

SOCIAL IMPACT ASSESSMENT

Environmental Impact Study, Part of Lot 19, Concession 1 | Menkes Developments Inc | Champlain Avenue, Town of Whitby | 2021-2023 | Vegetation and Wildlife Ecologist

Natural Heritage Impact Assessment and Tree Inventory | Enbridge Gas Incorporated | 3157 & 3161 Kennedy Road, Toronto | 2021 | Vegetation and Wildlife Ecologist

ENDANGERED SPECIES/SPECIES AT RISK ASSESSMENTS

NPS 6 and 8 Picton Integrity Digs | Enbridge Gas Inc. | Prince Edward, Ontario, Canada | 2024-present | Ecologist

Laura was involved with the creation of the proposal for the NPS 6 and 8 project and completed the field work component for each of the eight dig locations in April 2024. Field work involved high-level ecological land classification (ELC), species at risk habitat assessment and significant wildlife habitat investigations. Laura also assisted in the creation of the mitigation plan for the project which included mitigation recommendations for grassland species at risk birds and Blanding's Turtle.

CN Milton Logistics Hub - Environmental Assessment | Canadian National Railway | Milton, Ontario, Canada | 2022-present | Ecologist

Conducted Western Chorus Frog acoustic surveys using parabolic equipment.

Grassland Breeding Birds and Nighttime Species at Risk Surveys, Canadian Forces Base Borden | 2021-2022 | Wildlife Ecologist

** denotes projects completed with other firms*

Bobcaygeon Pipeline Expansion | Enbridge Gas Inc. | Bobcaygeon, Ontario | 2022 | Ecologist

Conducted targeted species at risk surveys for Eastern Meadowlark, Bobolink, Common Nighthawk, Eastern Whip-poor-will, Least Bittern and Blanding's Turtle. Assisted with study design, technical memo and report synthesis and data summary.

ECOLOGICAL LAND CLASSIFICATION

Champlain | Menkes | Whitby, Ontario, Canada | 2021 | Ecologist

Conducted amphibian surveys, breeding bird surveys, vegetation inventory, wetland delineation and ecological land classification on subject property.

NWMO South Bruce Biodiversity Project | Nuclear Waste Management Organization | Ontario, Canada | 2022 | Wildlife Technical Lead

Supported Vegetation technical leads in Ecological Land Classification assessments.

COMMUNITY INVOLVEMENT

Administrator, Lambton Shores Phragmites Community Group (LSPCG), Lambton, Ontario, Canada 2017-Present

Principle Atlasser for one Atlas square, Ontario Breeding Bird Atlas, Grand Bend, Ontario, Canada Spring 2021-Present

PRESENTATIONS

Breeding Bird Application Presentation . *Ecosystems Lunch and Learn Series*, 2024.

Melissa Straus M.Sc.

Stantec

Project Manager

19 years of experience · Waterloo, Ontario

Melissa is a Project Manager and Terrestrial Ecologist in Stantec's Guelph office, with 15 years of experience in the environmental field. Melissa completed her undergraduate degree with honours in Environmental Sciences at the University of Guelph and her Master's degree in Biology at Trent University.

Melissa's experience involves implementation of the Migratory Birds Convention Act, the Species at Risk Act, and Endangered Species Act. Melissa is a skilled birder and has extensive field experience conducting avian, reptile, amphibian, Ecological Land Classification (ELC), and botany surveys, including rare and protected species. She performs construction monitoring, wetland delineations according to the Ontario Wetland Evaluation System (OWES), butternut health assessments according to provincial guidance, and post-construction monitoring for wind power projects.

In the City of Guelph, Melissa coordinates and/or manages environmental surveys and reporting for a number of local development projects, including the Metalworks, 220 Arkell Road, and the Bluewater Development, as well as provided support to Victoria Park Village, 1888 Gordon, and 781 Victoria Road. She has also been involved with environmental planning and baseline studies on projects in the City of London, the Greater Toronto Area, as well as Kitchener/Waterloo. Through these projects Melissa has had the opportunity to work with and develop an understanding of procedures with various municipalities as well as agencies such as the Ministry of Natural Resources and Forestry, Ministry of Environment, Conservation and Parks, and local Conservation Authorities.

EDUCATION

M.Sc. in Biology, Trent University, Peterborough, Ontario, Canada, 2009

B.Sc. in Environmental Sciences, Co-op Program, University of Guelph, Guelph, Ontario, Canada, 2003

CERTIFICATIONS & TRAINING

Certificate, Ontario Ministry of Natural Resources / Butternut Health Assessor, Hamilton, Ontario, 2015

Certificate, Ontario Ministry of Natural Resources / Ontario Wetland Evaluation System, North Bay, Ontario, Canada, 2012

Certificate, Ontario Ministry of Natural Resources / Ecological Land Classification System for Southern Ontario, Kemptville, Ontario, Canada, 2010

Certificate, St.John Ambulance / Standard First Aid with CPR C + AED, Guelph, Ontario, 2017

PROJECT EXPERIENCE

MULTI-UNIT / FAMILY RESIDENTIAL

Natural Heritage Evaluations for Various Residential Development Projects | Various Sites, Southern Ontario | 2011-2020 | Terrestrial Ecologist

Terrestrial surveys included breeding bird, species at risk (e.g., Barn Swallow, bat species at risk), habitat assessment, ELC and wetland delineations for multiple residential development projects in Kitchener-Waterloo, Guelph, the Greater Toronto Area and London, Ontario.

Kortright East Phase 4 | Guelph, Ontario | 2015 | Project Manager

Project manager and lead writer of the Environmental Implementation Report Addendum for Phase 4 of a previously approved phased subdivision in the City of Guelph

220 Arkell Road | Guelph, Ontario | 2019 | Terrestrial Ecologist/Task Manager

Coordinated and participated in a multi-year field program that included movement studies where small mammals, amphibians, and reptiles were trapped and trail cameras were deployed. Additional surveys included targeted searches (i.e., turning cover objects) for Milksnakes, winter raptor surveys, as well as ELC, botanical, and breeding birds.

Metalworks Development | Guelph, Ontario | 2013-2021 | Project Manager

Project manager and lead writer of the Environmental Impact Study, Environmental Implementation Report, and environmental briefs (Phases 2-4 and 6) for the multi-phase Metalworks brownfield development. Based on recommendations contained within the EIR, bird friendly building design was implemented, and a historic chimney will be retained for Chimney Swifts.

148-152 MacDonnell and 150 Wellington Condominium Developments | Guelph, Ontario | 2013 | Terrestrial Ecologist / Task Manager

Vegetation removal surveys and lead writer of the Environmental Impact Study for both properties, including attendance at Environmental Advisory Committee meetings with the City

Daniels High Park Condominiums, High Park Village and Minto High Park | Toronto, Ontario | 2015-2019 | Coordinator

Development and coordinator of a bird-building collision monitoring program for three condominium developments near High Park in Toronto. This work led to collaboration with the City of Toronto, Canadian Wildlife Service, and FLAP on the creation of bird collision monitoring requirements for new developments in the City of Toronto. These protocols have since been issued by the Canadian Standards Association.

Private Development | Schomberg, Ontario | 2013-2018 | Terrestrial Ecologist

Conducted surveys for Bobolink, Eastern Meadowlark, Barn Swallow, and bat species at risk in compliance with Ministry of Natural Resources and Forestry protocols. Registration and creation of a Habitat Management Plan for Bobolink and Eastern Meadowlark in compliance with the Endangered Species Act.

1250 Gordon Development | Guelph, Ontario | Terrestrial Ecologist

Participated in botanical field studies and corridor surveys in support of a proposed plan of condominium on the property. Lead writer of the forthcoming Environmental Impact Study, which includes ongoing consultation with the City of Guelph.

Bluewater Development | Guelph, Ontario | 2020 | Project Manager

Coordinator and participated in a road mortality monitoring program for amphibians and reptiles along a busy 4-lane roadway in Guelph, the results of which were used to develop mitigation measures in consultation with the City of Guelph. Lead writer of the submitted Environmental Impact Study and forthcoming Environmental Implementation Report.

RENEWABLE ENERGY

Adelaide Wind Power Project | Strathroy, Ontario | 2015-2021 | Coordinator

Conducted ELC and wildlife habitat assessments pre-construction surveys. Coordinator for the 2015-2021 mortality monitoring program, including oversight of monitoring, data management, reporting, species identification, agency notification for raptors and species at risk, as well as the development of a targeted raptor behavioral monitoring program for review by regulatory agencies.

Grand Renewable Energy Project | Cayuga, Ontario | 2011 | Terrestrial Ecologist / Technical Reporting

Conducted pre-construction ELC and wildlife habitat assessments, salamander trapping including sampling for Jefferson's Salamander, coordinated and conducted winter raptor and Short-eared Owl surveys, assisted with NHA, EIS, and species at risk reporting.

K2 Wind Power Project | Goderich, Ontario | 2018 | Terrestrial Ecologist / Coordinator

Performed environmental monitoring tasks both pre- and post-construction related to breeding amphibians, bat species at risk, and assessment of a heronry. Coordinator for daily monitoring, data management, reporting as well as identification and notification of bat and bird species at risk during the mortality monitoring program in 2016-2018.

OIL AND GAS PIPELINES

Enbridge Gas Distribution Inc. GTA Project | Greater Toronto Area, Ontario | 2015 | Wildlife Lead

Worked as part of a multidisciplinary team to coordinate the bird nest sweep program for compliance with the Migratory Bird Convention Act during installation of a new gas pipeline within the Greater Toronto Area. This entailed tracking positive locates, establishing construction buffers based on bird species, and coordinating deployment of technical staff for follow-up checks to determine activity status of nests.

Union Gas Sarnia Expansion | Corunna, Ontario | 2014 | Terrestrial Ecologist / Environmental Inspector

Conducted pre-construction environmental surveys including bird surveys, botanical inventories including searches for plant species at risk, as well as coverboard surveys for Butler's Gartersnake. Served as on site environmental inspector during construction, responsible for species at risk mitigation.

MUNICIPAL

City of Hamilton Professional and Consultant Services Roster 2011-2012 (C12-06-10); Garner/Rymal Road and Garth Street Environmental Assessment | City of Hamilton | Hamilton, Ontario | 2011 | Terrestrial Ecologist

Served as study lead and conducted a tree inventory to document existing trees and shrubs within 10 m of the existing municipal right-of-way; identified constraints with respect to species at risk within the right-of-way for the proposed expansion of Garner/Rymal Road.

Sean Geddes B.Sc. (Hons.)

Senior Aquatic Biologist

33 years of experience · Waterloo, Ontario

Sean Geddes has over 30 years of experience in the field of ecological sciences, including fish habitat and community assessments, impact analyses and site monitoring for projects in the aggregate, waste management, energy, transportation, and land planning and development sectors. His experience includes a mix of private and public sector work, with projects ranging from streams to large rivers, and small inland lakes to the Great Lakes environments. He has conducted numerous assessments of aquatic habitat to determine potential impacts, and has been responsible for the development of habitat enhancement plans aimed at achieving the best productivity results for both short and long term time frames.

Sean previously served as a plan review aquatic biologist with the Grand River Conservation Authority where he was responsible for the review of projects under the federal *Fisheries Act* on behalf of DFO. Sean has developed extensive experience in the permits and approvals process, including developing and negotiating fish habitat mitigation and offsetting approaches to achieve *Fisheries Act* authorizations. He maintains an excellent rapport with DFO and other review agencies.

Sean applies his combined public and private sector experience to a variety of project types involving aquatic habitat, however he also has an excellent understanding of terrestrial components and applies this integrated knowledge base to identify key issues and potential complexities associated with projects of all sizes. Sean examines projects in a practical manner, and develops logical, cost-effective solutions that address client interests, habitat issues and agency concerns.

EDUCATION

Specialized Honours Bachelor of Science, Fisheries Biology, minor in Wildlife Biology, University of Guelph, Guelph, Ontario, 1990

CERTIFICATIONS & TRAINING

Certificate, Fisheries and Oceans Canada / Fisheries Protection Act Training, Burlington, Ontario, Canada, 2015

PROJECT EXPERIENCE

ENVIRONMENTAL PLANNING

Balmoral Secondary Plan Master Environmental Servicing Plan (Natural Environment Coordinator) - ongoing | Brantford

Manage and coordinate the natural heritage component of an ongoing MESP including fieldwork planning, EIS design and integration with MESP discipline leads.

Columbus Subwatershed Study | Columbus Landowner Group | Oshawa, Ontario | Senior Aquatic Biologist

Coordinated the field program for the collection of aquatic habitat and fisheries field data as part of the preparation of a Subwatershed Study report intended to support the development of a Secondary Plan for the Columbus Community area north of Oshawa.

North Markham Future Urban Area* | Markham, Ontario | Project Manager, Environmental

Coordinated the multi-year terrestrial and aquatic field program for natural heritage features in the Future Urban Area of North Markham. Lead fisheries biologist for analysis of headwater stream network and Redside Dace habitat issues.

Springdale North Phase 1 Master Environmental Servicing Plan | Brampton, Ontario | Project Manager

Coordinated the field programs for terrestrial and aquatic ecosystem data collection to identify the natural heritage existing conditions for a 650 ha area in the City of Brampton. Phase 1 identified preliminary constraint mapping and Natural Heritage System to guide future land use planning in the block of lands.

LaSalle Small Coastal Waterfront Experience Master Plan | Town of LaSalle | LaSalle, Ontario | Senior Aquatic Biologist

Natural environment coordinator and senior aquatic biologist providing guidance on study design, site component design, impact assessment and approvals processes.

Brantford Industrial Park Site Development | Brantford, Ontario | Project Manager, Environmental

Coordination of agency consultation, design of habitat compensation for watercourse alterations in commercial block.

Windsor Annexed Area | Windsor, Ontario | Project Manager

Identification and assessment of natural heritage features to develop a Natural Heritage System for lands being considered for annex by the city.

** denotes projects completed with other firms*

ENVIRONMENTAL ASSESSMENTS

East Boundary Road Environmental Assessment* | Cambridge, Ontario. | Project Manager, Natural Environment

Coordinated multi-disciplinary natural heritage studies (terrestrial and aquatic) to identify key environmental features for consideration during analysis of route alternatives.

CN Milton Logistics Hub | Milton, Ontario | Senior Aquatic Biologist

Developed and completed analysis of potential offsetting approaches to address fish habitat alterations as part of site plan development during EA process. Testified before CEAA Hearing Panel.

Colchester Harbour Environmental Assessment | Town of Essex | Colchester, Ontario | Senior Aquatic Biologist

Conducted fish habitat assessment of harbour and boat launch area as part of EA for DFO transfer to municipality.

Columbia Lake Dam Removal and Lake Enhancement, Waterloo Research and Technology Park | Waterloo, Ontario | Project Biologist

Design of habitat enhancements for the reconfiguration of Columbia Lake and a lake bypass channel for Laurel Creek.

Silver Lake Environmental Assessment and Environmental Impact Study | City of Waterloo | Waterloo, Ontario | Ecosystems Coordinator

Coordinated ecosystems (aquatic and terrestrial) field work and data review to support analysis of alternatives and recommend a preferred alternative with development of habitat restoration treatments in various areas of Waterloo Park.

Ayr Wastewater Treatment Plant Upgrade and Nith River Crossing | Ayr, Ontario | Project Biologist

Fisheries Act Letter of Intent for contingency open cut crossing of sewer forcemain across the Nith River.

Chinguacousy Road EA and Preliminary Design | Brampton, Ontario | Project Manager, Environmental

Identification of fish habitat compensation alternatives and approach to road crossing design.

Park Place | Barrie, Ontario | Environmental Project Manager

Coordinated field programs for the assessment of aquatic and terrestrial natural heritage features and provided environmental planning input to redevelopment of Molson Park site.

Emery Estates, Bradford-West Gwillimbury | Bradford, Ontario | Project Manager

Rural estate subdivision planning to provide adequate protection and management of drainage features and obtain agency approvals on plan of subdivision.

** denotes projects completed with other firms*

Jennifer Randall B.Sc., MES

Terrestrial Ecologist

12 years of experience · Waterloo, Ontario

Jennifer is a terrestrial ecologist with Stantec in Waterloo, Ontario. Jennifer has a strong background in wildlife ecology/environmental science and has extensive field work experience. Jennifer has conducted breeding bird surveys for a variety of projects across Atlantic Canada and Ontario, which often have a focus on avian species at risk. She also has experience conducting surveys for wood turtles, mainland moose, marine mammals, and bats. Her experience working with bats has involved acoustic surveys, live trapping, PIT tagging and radio-telemetry. Additionally, Jennifer has also been trained in wetland delineation, classification, and functional assessments, which she applies to a variety of projects. She has contributed to environmental assessments for a variety of different projects and both the federal and provincial level. She is frequently involved in data analysis, assessment and reporting on wildlife. Jennifer has also been involved in a variety of environmental monitoring programs, and has experience with air, water and soil sampling.

EDUCATION

Master of Environmental Studies (MES), Dalhousie University, Halifax, Nova Scotia, 2011

Bachelor of Science (B.Sc.) in Environmental Sciences, University of Guelph, Guelph, Ontario, 2008

Wetland Delineation and Classification, Fern Hill Institute of Plant Conservation, Wolfville, Nova Scotia, 2016

CERTIFICATIONS & TRAINING

Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC), in collaboration with New Brunswick Environment & Local Government, Nova Scotia Environment, and PEI Dept. of Communities, Land & Environment, Aulac, New Brunswick, 2016

AWARDS

2009 ESRI Canada Scholarship, Dalhousie University

2009 Godsoe Graduate Scholarship, Dalhousie University

2010 NSERC CGS-M Scholarship, Dalhousie University

PROJECT EXPERIENCE

MARINE MAMMALS

Energy East Project: Bay of Fundy Marine Mammal Surveys | Trans-Canada | Nova Scotia | 2015 | Field Technician

Conducted aerial marine mammal surveys over the Bay of Fundy.

Energy East Pipeline: Marine Mammal Monitoring at Cacouna Terminal | TransCanada Corporation | St. Lawrence River, Quebec | 2014 | Marine Mammal Observer

Conducted both land-based and aerial (from a small aircraft) marine mammal surveys. Although beluga whales were the focus of these surveys, all marine mammals observed were identified and behavioural data was collected.

WILDLIFE ASSESSMENTS

Impact Assessment for Highway 3 Twinning, Highway 4 Widening and Talbotville Bypass | MTO | Talbotville, Ontario, Canada | Ecologist

Conducted bat acoustic surveys, breeding bird surveys and Pileated Woodpecker surveys for Impact Assessment. Analysed and reported on data.

Yorkshire Wind Farm | Yorkshire Wind Farm | Amherst, Nova Scotia | 2017 | Wildlife Biologist

Produced the bird monitoring protocol to be used for pre-construction monitoring at the proposed Yorkshire Wind Farm. Consulted experts for their input on the document.

Highway 400 and Simcoe Road 88 Interchange Reconstruction Project SAR Assessment | MTO | Bradford West Gwillimbury, Ontario, Canada | Ecologist

Conducted a bat species-at-risk habitat assessment and acoutic survey.

Grand Falls Development Project - Environmental Impact Assessment | New Brunswick Power | Grand Falls, New Brunswick | 2017 | Wildlife Biologist

Conducted acoustic surveys for bats, wood turtle surveys and breeding bird surveys at two sites in Grand Falls, New Brunswick.

Environmental DNA (eDNA) from Air Research Project | Hamilton, Ontario, Canada | Ecologist

Collected eDNA samples for a research project in collaboration with the McMaster University to test different sampling techniques to capture eDNA from air in indoor environments, assessing the presence and species of bats present in buildings.

Borden Transmission Line | Maritime Electric Company Limited | Borden, Prince Edward Island | 2017 | Wildlife Biologist

Conducted breeding bird surveys along the proposed transmission line route.

Northwest Oshawa Community Center | City of Oshawa | Oshawa, Ontario, Canada | Wildlife Field Lead

Conducted breeding bird and bat surveys at the Project site.

Shellburne Basin Venture: Exploration Drilling Project – Migratory Bird Environmental Effects Monitoring Report | Shell Canada Limited | Nova Scotia | 2017 | Author

Analyzed and reported on results of the migratory bird monitoring program for Shell Canada's Shelburne Basin exploratory drilling project.

Newmarket Northwest Quadrant Trails | Town of Newmarket | Newmarket, Ontario, Canada | Wildlife Biologist

Conducted surveys for species at risk (including bats) and submitted an Information Gathering Form to MECP as required under the Endangered Species Act.

Bear Paw Pipeline – Wildlife Surveys | Bear Paw Pipeline Corporation | Nova Scotia | 2016 | Wildlife Biologist

Conducted field surveys for mainland moose, wood turtles and breeding birds. Moose and turtle surveys involved walking transects to observe individuals, or any signs thereof. Breeding bird surveys were conducted as a series of 10-minute point counts.

Ontario Line | Metrolink | Toronto, Ontario, Canada | Wildlife Biologist

Coordination of species at risk field work, analysis of field data (including acoustic bat data) and reporting

Energy East Pipeline: Wood Turtle Surveys | Trans-Canada | New Brunswick | 2015 | Field Technician

Conducted wood turtle surveys at watercourses along the pipeline route.

Kemptville Correctional Facility Breeding Bird Survey | Infrastructure Ontario/Fotenn | Kemptville, Ontario, Canada | 2021 | Wildlife Biologist

Conducted breeding bird surveys, including species-at-risk surveys for Eastern Meadowlark and Bobolink.

Dartmouth Refinery Demolition and Decommissioning Wildlife Protection Plan | Tervita | Dartmouth, Nova Scotia | 2015 | Author

Authored a wildlife protection plan for the demolition and decommissioning of the Dartmouth oil refinery.

CFB Borden Grassland Bird and Species at Risk Surveys | DCC | Borden, Ontario, Canada | 2021 | Wildlife Biologist

Conducted field surveys for grassland birds, including Eastern Meadowlark, Bobolink, and Grasshopper Sparrow, throughout CFB Borden. Surveys were also conducted for other species-at-risk, including Short-eared owl, Common Nighthawk, Eastern Whip-Poor-Will, and bats. Survey types included point counts, transects, and the use of acoustic recording units.

Landbird Species at Risk Monitoring | Southwest Nova Scotia | 2015 | Wildlife Biologist

Conducted playback surveys for Canada warbler, olive-sided flycatcher and rusty blackbird throughout the NS southwest biosphere reserve, including Kejimkujik National Park. Conducted vegetation surveys to characterize the habitat for these species.

CN Milton Logistics Hub - Environmental Assessment | Canadian National Railway | Milton, Ontario, Canada | Wildlife Bologist

Conducted a variety of species at risk surveys before, during and after construction, including surveys breeding birds, amphibians, and reptiles.

Energy East Pipeline: Breeding Bird Surveys | TransCanada Corporation | New Brunswick | 2014 | Wildlife Biologist

Conducted breeding bird point count surveys along the proposed pipeline route in New Brunswick. Analyzed data and presented results in a technical data report.

Halifax International Airport Wildlife Management Plan Review | Halifax International Airport Authority | Halifax, Nova Scotia | 2014 | Ecologist

Reviewed the airport wildlife management plan, using strike data to assess how well management actions are working.

Lower Churchill Project – Muskrat Falls Hydroelectric Facility | Nalcor Energy | Goose Bay, Newfoundland and Labrador | 2014 | Nest Search Crew Lead

Conducted pre-construction nest searches.

Point Tupper Wind Farm Bird and Bat Monitoring* | Renewable Energy Services Limited | Point Tupper, Nova Scotia | 2012 | Field Technician

Completed post-construction surveys to assess bird and bat wind turbine mortalities.

Bat Monitoring at Proposed and Current Wind Farm Locations* | Nova Scotia Power | Nova Scotia | 2011 | Field Technician

Completed acoustic bat monitoring at several proposed wind farms in Nova Scotia; completed acoustic and trapping surveys at one active wind farm and identified bat roosts using radio telemetry.

** denotes projects completed with other firms*

Avalon Breeding Bird and SAR Surveys | Avalon Rare Metals Inc. | East Kemptville, Nova Scotia | 2018 | Wildlife Biologist

Conducted breeding bird surveys through the mine property. Also conducted surveys for other species at risk (SAR), including snapping turtles.

Ovintiv Bird Deterrent Work | Ovintiv | Goldboro, Nova Scotia, Canada | 2020 | Wildlife Ecologist

Conducted nest searches and set up bird nesting deterrents at Ovintiv site in preparation for a pipeline decommissioning.

Holton Transmission Line – Breeding Bird Surveys | New Brunswick Power | Woodstock, New Brunswick | 2018 | Wildlife Biologist

Conducted breeding bird surveys along the proposed transmission line right-of-way.

Atlantic Potash Bird Surveys and Wetland Delineation | Atlantic Potash Corporation | Saint Stephen, New Brunswick, Canada | 2019 | Wildlife Ecologist

Conducted breeding bird surveys and wetland delineation on an Atlantic Potash property.

Coastal GasLink Pipeline Project | TC Energy | Groundbirch to Kitimat, British Columbia, Canada | 2019 | Wildlife Ecologist

Conducted bird nest searches and amphibian salvage along the pipeline route.

ENVIRONMENTAL ASSESSMENTS

Scotian Basin Exploration Drilling Project | BP Exploration (Canada) Limited | Nova Scotia | 2017 | Environmental Scientist

Contributed to information requests for the EIS.

Environmental Impact Assessment for the Neguac Transmission Line | New Brunswick Power | Neguac, New Brunswick | 2017 | Environmental Scientist

Delineated and classified wetlands along the right of way of the proposed transmission line. Conducted breeding bird and wood turtle surveys. Authored wildlife chapter in the EIA registration document.

Highway 101 Twinning Windsor Environmental Assessment | Nova Scotia Department of Transportation & Infrastructure Renewal | Windsor, Nova Scotia | 2016 | Ecologist

Conducted shorebird surveys along the Avon River causeway in July and August. Conducted terrestrial breeding bird surveys in June.

Highway 101 Digby to Marshalltown Corridor Environmental Assessment | Nova Scotia Department of Transportation & Infrastructure Renewal | Digby, Nova Scotia | 2016 | Ecologist

Conducted breeding bird surveys along the length of the highway right of way. Delineated wetlands and conducted wetland functional assessments.

Environmental Effects Determination Reporting – Various Small Craft Harbours | Public Works and Government Services Canada | Nova Scotia | 2016 | Environmental Scientist

Authored Environmental Effects Determination reports for construction work occurring at several DFO Small Craft Harbours. Reports identify potential effects on the local plants and wildlife (including species at risk), wetlands and sensitive areas, and provide mitigation measures and management planning.

Bear Paw Pipeline | Bear Paw Pipeline Corporation | Nova Scotia | 2015 | Author

Contributed to the freshwater environment and wildlife sections of the Bear Paw Pipeline environmental assessment document.

Review of Sediment Control Plan at CFB Gagetown* | Moncton, New Brunswick | 2015 | Environmental Scientist

Contributed to a report that reviewed the sediment control plan at CFB Gagetown. Water quality and benthic data were reviewed to assess the efficacy of sediment control measures.

MARLANT Operating Area Management Plan (MOAMP) 2015 Update | DND/DCC | Halifax, Nova Scotia | 2015 | Environmental Scientist

Helped compile an updated version of the MOAMP. This document includes an environmental setting for Atlantic Canada, potential effects of marine training activities and mitigation actions.

MARLANT Marine Training Activities: Environmental Assessment* | Department of National Defence/Defence Construction Canada | Halifax, Nova Scotia | 2014 | Environmental Scientist

Compiled a report that outlined the relevant environmental impacts and subsequent mitigations for Maritime Forces Atlantic (MARLANT) marine training activities in foreign waters.

National Gypsum Mine Extension Environmental Assessment | National Gypsum | Halifax, Nova Scotia | 2014 | Ecologist

Contributed to wildlife data analysis and report writing.

Valentine Gold Project Environmental Impact Statement | Marathon Gold | Newfoundland and Labrador, Canada | 2020 | Author

Authored the Wildlife Chapter of the Environmental Impact Assessment. Described baseline conditions, including species at risk and their habitat. Described direct and indirect residual effects of the project on various wildlife species, and provided mitigation measures.

Voisey's Bay Wind Project | Vale | Newfoundland and Labrador, Canada | Wildlife Biologist

Coordinated bat field program, authored technical reports and sections of the EIS

** denotes projects completed with other firms*

Project Nujio'qonik GH2 | World Energy | Newfoundland and Labrador, Canada | 2022-Present | Wildlife Biologist

Technical advisor and coordinator of bat field program, authored bat and wildlife chapters of EIS

AQUATIC ECOLOGY

Bear Paw Pipeline – DFO Request for Review | Bear Paw Pipeline Corporation | Nova Scotia | 2016 | Ecologist

Authored the DFO request for review application for the freshwater watercourses that the Bear Paw Pipeline proposed to cross. Described the species found in these watercourses, and the potential effects of the project and related mitigation measures.

Lake Banook and Micmac Weed Harvesting | Halifax Regional Municipality | Dartmouth, Nova Scotia | 2015 | Author

Authored the DFO Request for Review application for the weed harvesting in Lakes Banook and Micmac.

ENVIRONMENTAL MONITORING

Line 2A Emergency Response | Enbridge | Edmonton, Alberta | 2017 | Data Management

Data management for a very large dataset of soil and water sampling results for the Line 2 emergency response.

Shannon Park Phase II Environment Assessment | Public Works and Government Services Canada | Dartmouth, Nova Scotia | 2017 | Technician

Conducted groundwater monitoring and soil sampling through test pits and boreholes. Involved in the drilling of monitoring wells and boreholes.

Airport Remediation: Flight 624 | Halifax International Airport Authority | Enfield, Nova Scotia | 2015 | Technician

Monitored watercourses following an accidental release of hydrocarbons at the airport. Collected surface water and soil samples.

Lake Banook and Micmac Pollution Control Study | Halifax Regional Municipality | Dartmouth, Nova Scotia | 2018 | Environmental Scientist

Collected surface water samples, and determined flow velocities at multiple inflows and outflows to Lakes Banook and Micmac. These samples were sent for several types analysis to determine sources of pollution to the lakes.

OSCO Aggregates Water Sampling | OSCO Aggregates Limited | Debert, Nova Scotia, Canada | 2018 | Field Technician

Collected surface water samples at a variety of locations.

ENVIRONMENTAL SCIENCES

Masstown Antenna Site Natural Resource Management Plan | Defence Construction Canada | Masstown, Nova Scotia | 2016 | Environmental Scientist

Conducted bird and wetland surveys at the Masstown antenna site DCC property. Monitoring was also conducted for any other species at risk. Completed the analysis of this data and authored the natural resources management plan update.

Amherst Riffle Range Natural Resource Management Plan | Defence Construction Canada | Amherst, Nova Scotia | 2016 | Environmental Scientist

Conducted bird, bat and wetland surveys at the Amherst Rifle Range property. This involved point counts for breeding birds, and acoustic monitoring for bats. Monitoring was also conducted for any other species at risk. Completed the analysis of this data and authored the natural resources management plan update.

Western Mediterranean Environmental Setting | Department of National Defence/Defence Construction Canada | Halifax, Nova Scotia | 2016 | Environmental Scientist

Developed environmental setting (species at risk and other mammals, marine birds and sea turtles) for Atlantic Canada, and identified potential effects of marine training activities and relevant mitigation actions.

MARINE ENVIRONMENTAL STUDIES

Marine Sediment Sampling Program; Analysis and Reporting: Various DFO Small Craft Harbours | Public Works and Government Services Canada | Nova Scotia | 2016 | Environmental Scientist

Reviewed analytical results of marine sediment samples and compared these results to relevant environmental guidelines. Produced a report summarizing the results and guideline exceedances. Reports support overall management planning for Federal sites.

Marine Sediment Sampling Programs; Field Sampling: Various DFO Small Craft Harbours | Public Works and Government Services Canada | Nova Scotia | 2016 | Field Crew Lead

Led marine sediment sampling field program at various DFO small craft harbours in NS. Samples were collected from a boat using a grab sampler, and by hand at low tide. Also conducted underwater video collection along a defined transect using an underwater camera on a tow line or on land during low tide to survey aquatic benthic habitat.

Marine Turbidity Monitoring at Wedge Point Wharf | Public Works and Government Services Canada | Wedgeport, Nova Scotia | 2016 | Field Crew Lead

Conducted turbidity monitoring from a zodiac during the construction of a breakwater at Wedge Point DFO Small Craft Harbour in support of regulatory monitoring requirements.

ARCHAEOLOGY

Bear Paw Archaeological Assessment | Bear Paw Pipeline Corporation | Guysborough, Nova Scotia | 2017 | Field Technician

Dug test pits to conduct an archaeological assessment along the Salmon River near Guysborough. Worked closely with an archaeologist.

AIR QUALITY

Three Fathom Harbour H2S Monitoring | NSTIR | Three Fathom Harbour, Nova Scotia | 2018 | Environmental Scientist

Conducted hydrogen sulfide (H2S) monitoring at the location of a restored wetland. Methods included using Summa canisters and a hand held H2S analyzer.

Boat Harbour Ambient Air Monitoring | NS Lands | Pictou Landing, Nova Scotia | 2018 | Environmental Scientist

Conducted long term air monitoring in Pictou Landing, Nova Scotia. Samples are collected according to the 3-day NAPS schedule, and include TSP, PM10, PM2.5, PAH, Dioxins, Furans, VOCs, total reduced sulfur, ammonia and aldehydes. Also conducted real time monitoring at the Boat Harbour effluent treatment facility during the pilot scale remediation project.

WETLANDS

Kent Building Supplies Wetland Alteration Permit | Kent Building Supplies | Sydney, Nova Scotia | 2018 | Environmental Scientist

Authored a wetland alteration permit application for a Kent development in Sydney, NS for submission to Nova Scotia Environment. This alteration proposal included a description of wetland conditions, anticipated alterations, and anticipated impacts of functional characteristics.

MECL Transmission Line – Wetland Assessment | Maritime Electric Company | New Brunswick | 2018 | Wetland Assessor

Conducted post-construction wetland monitoring along the transmission line one year after the right of way was cleared. Compared wetland conditions in disturbed areas to undisturbed, reference sites. Identified wetland stressors.

PUBLICATIONS & WHITEPAPERS

Habitat Modelling for the Common Nighthawk (Chordeiles minor) in Southwest Nova Scotia. *Presentation – MTRI Second Annual Science Conference*, 2013.

The Identification and Characterization of Swarming Sites Used by Bats in Nova Scotia.. *Masters Thesis.*, 2011.

Randall, J. and Broders, H. G. Identification and characterization of swarming sites used by bats in Nova Scotia, Canada. *Acta Chiropterologica 16(1), 109-116*, 2014.

Ferrari, C., Westwood, A., Randall, J., Darlington-Moore, S., Kindree, M., Staicer, C. 2014. Species distribution models for six species of landbirds at risk in southwestern Nova Scotia.. *Poster Presentation - Mersey Tobeatic Research Institute 3rd Annual Science Meeting (regional), Nov 7, 2014, Lunenburg, Nova Scotia*, 2014.