Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study

Environmental Impact Study (EIS)

Revised Draft

January 12, 2022

Prepared for:

London
CANADA

arva

BEST MANAGED COMPANIES
Platinum member

Oxford Street West and Gideon Drive Environmental Assessment (EA) Study

Environmental Impact Study (EIS) Revised Draft

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Executive Summary

R.V. Anderson Associates Limited (RVA) was retained by the City of London (City) to undertake a Municipal Class Environmental Assessment (EA) Study and Preliminary Design for improvements to the Oxford Street West and Gideon Drive intersection (Project). The Project will be undertaken as a Schedule B project in accordance with the Municipal Class EA process. In support of the Class EA, a scoped Environmental Impact Study (EIS) was prepared to verify and document existing natural heritage features within the study area in accordance with the City of London Official Plan (OP) and the City of London Environmental Management Guidelines.

The EIS describes the natural heritage features and functions within the Study Area and identifies potential impacts the Project may have on them. Through the preliminary impact analysis, RVA recommends mitigation measures to avoid the potential impacts. The EIS was initiated through a comprehensive review of available background data, including citizen science databases, prior reports, and local and provincial planning documents. Information collated from this process was summarized and was provided to relevant agencies for their review and comment to scope the field work and reporting. Field review included breeding bird surveys, a single site visit during the active growing season to complete a floral inventory, Ecological Land Classification/review, incidental observations of wildlife and signs within and beyond the right-of-way (ROW), as well as an aquatic habitat assessment at the Tributary C crossing of Oxford Street West. Additional visits were made to measure water quality in Tributary C and to perform a tree inventory.

The Study Area is located in a landscape which is transitioning from rural residential and agricultural land use to a commercial and urban residential one, with sections of preserved natural areas associated with wetlands, watercourses or other designated features. Tributary C, a coldwater stream with a resident Brook Trout (*Salvelinus fontinalis*) population, is the primary watercourse in and adjacent to the Study Area. This feature is associated with Significant Valleylands, Significant Wildlife Habitat (SWH) and a Provincially Significant Wetland (PSW) and is regulated by the Upper Thames River Conservation Authority (UTRCA). Several exotic invasive species were noted and have been mapped within and beyond the Study Area including European Common Reed (*Phragmites*), Common Buckthorn (*Rhamnus cathartica*), and Autumn Olive (*Elaeagnus umbellate*).

Based on the existing condition of the Study Area, the preliminary design, and construction methodologies, the Project is not expected to have any significant, long-term negative impacts on the natural environment. Further analysis of impacts in the next phase of design will be required to determine the potential effects of the project on the water balance and implications to the PSW and Tributary C. Opportunities for ecological benefits exist in the control and removal of invasive species, as well as revegetation of the area post-construction with native grass, forb, and shrub species with a focus on wildlife and pollinator habitat.

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1.0 Introduction

The City of London (City) has retained R.V. Anderson Associates Ltd. (RVA) to undertake a Municipal Class Environmental Assessment (EA) Study and Preliminary Design for improvements to the Oxford Street West and Gideon Drive intersection (Project). The Oxford Street West and Gideon Drive intersection is currently a three-legged, stop controlled intersection. However, the extension of Kains Road is underway and meets the intersection as the fourth leg, north of the intersection. Oxford Street is a major east/west corridor in the city that also connects surrounding areas west of the city. The ongoing and future developments on the west side of the City, like those associated with the Kains Road extension and nearby developments, are anticipated to increase the traffic volumes through the Oxford Street West and Gideon Drive intersection.

In support of the Class EA, a scoped Environmental Impact Study (EIS) is required to identify and evaluate existing Natural Heritage Features within the Study Area, assess impacts and net effects of the Project to these features, and provide environmental management recommendations in accordance with the City of London Official Plan (OP) and the City of London Environmental Management Guidelines.

1.1 Indigenous Land Acknowledgement

The Project is located within the traditional territory of the Attawandaron, Anishinaabeg, Haudenosaunee, and Lunaapeewak peoples. The local First Nation communities of this area include Chippewas of the Thames First Nation (COTTFN), Oneida Nation of the Thames, and Munsee-Delaware Nation. The Project is located within the London Township Treaty area to which the COTTFN) is a signatory, and also falls within the Big Bear Creek Additions to Reserve (ATR) land selection area.

1.2 Study Area

The Project includes the City right of way (ROW) surrounding the Oxford Street West and Gideon Drive intersection (Subject Lands) and within 120 m bordering those lands (Study Area) (Figures 1.1 and 1.2, also see Appendix A).

Figure 1.1 – Oxford Street West and Gideon Drive General Study Area

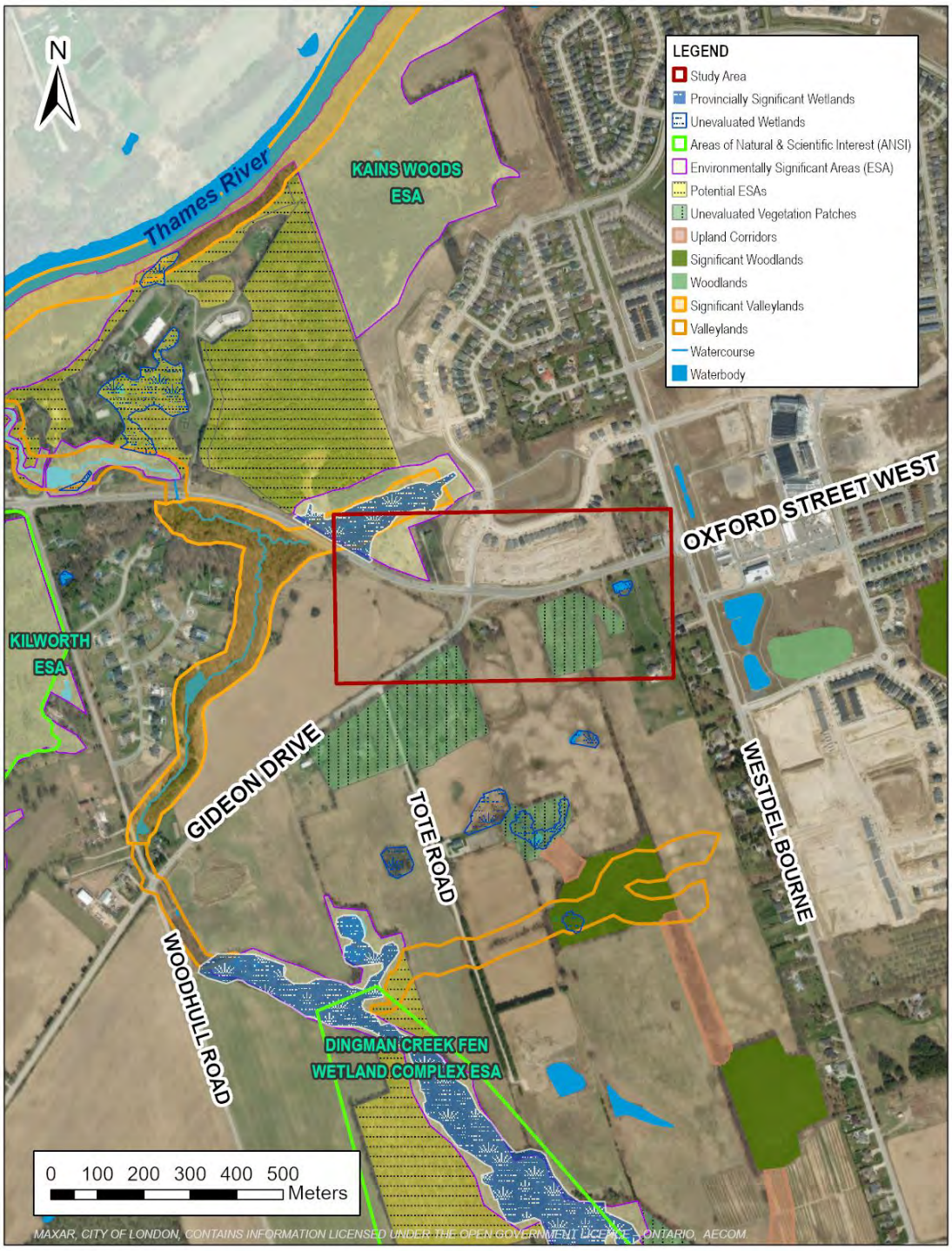

Figure 1.2 – Natural Heritage Features in the General Study Area

1.3 Project Intent and EIS Objectives

The intent of the Project is to undertake an EA study to provide the framework for the identification, systematic review and evaluation of alternatives based on the consideration of all aspects of the environment, including public and agency input. The EA will identify the needs and balance the requirements of the full range of potential users within the community and will recommend a design that reflects both the existing and planned land and corridor uses.

The objectives of this EIS include:

- Characterizing the existing natural heritage features within the Study Area through field investigations and consultation with agencies;
- Evaluating the significance of the identified natural heritage features and functions;
- Identifying potential constraints and opportunities of the Project;
- Assessing the potential impacts of the Project on the natural heritage features; and
- Determining mitigation measures to minimize the impacts and recommending enhancement possibilities where possible.

1.4 Study Scoping

On March 26, 2021, an EIS Scoping meeting was held with the City of London's Environmental & Parks Planning Division, the Upper Thames River Conservation Authority (UTRCA), the City of London's Environmental and Ecological Planning Advisory Committee (EEPAC), and RVA.

The EIS Scoping Letter and Checklist reviewed during the EIS Scoping Meeting are provided in Appendix B.

During the EIS Scoping Meeting it was determined that the proposed improvements will be contained within the City ROW, and it was agreed that unevaluated features would be considered significant and mitigated for accordingly. As such, an evaluation of significance and boundary delineation is not required as part of this EIS. It was also agreed that field investigations would be limited to complement the existing inventory of the natural environment in support of this Project. The following studies were undertaken to inform the EIS: Tree Inventory, Floral Inventory, Aquatic Habitat/Surface Drainage, Significant Wildlife Habitat, Breeding Birds, and Incidental Wildlife.

2.0 Governing Environmental Policy Framework

The governing policy framework provides guidance on the protection of natural heritage features and the evaluation of their significance. Candidate features identified within the Study Area were evaluated against the applicable federal, provincial, and municipal planning policies.

2.1 Federal Legislation

2.1.1 Fisheries Act

The *Fisheries Act* (Government of Canada 1985) is administered by Fisheries and Oceans Canada (DFO) and provides a framework for the proper management and control of fisheries as well as the conservation and protection of fish and fish habitat, including the prevention of pollution. In June of 2019, Canada modernized the *Fisheries Act;* the new provisions and stronger protections aim to better support the sustainability of Canada's fish and fish habitat for future generations. In particular, Section 34.4 prohibits any work, undertaking or activity (other than fishing) that results in the death of fish; Section 35.1 prohibits the harmful alteration, disruption or destruction of fish habitat (HADD); and Section 36 prohibits the deposit of deleterious substances.

The *Fisheries Act* requires that projects avoid causing death of fish or HADD of fish habitat unless authorized by DFO or a designated representative. Proponents are responsible for planning and implementing works, undertakings or activities in a manner that avoids harmful impacts to fish and fish habitat. Should proponents believe that their work, undertaking or activity will result in harmful impacts to fish and fish habitat, a Request for Review (RFR) must be submitted, and the DFO will work with them to assess the risk and provide advice and guidance on how to comply with the *Fisheries Act*.

2.1.2 Migratory Birds Convention Act

The *Migratory Birds Convention Act* (MBCA) was passed in 1917 and updated in 1994 to implement the Migratory Birds Convention, a treaty signed with the United States in 1916 (Government of Canada 1994a). Environment and Climate Change Canada administers the MBCA, which is enforced through the Migratory Birds Regulations. Together the MBCA and Migratory Birds Regulations serve to protect most migratory birds, their nests, and eggs anywhere they are found in Canada (Government of Canada 1994b).

2.1.3 Species at Risk Act

At a federal level, Species at Risk (SAR) designations for species occurring in Canada are initiated by the completion of a comprehensive Status Report by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). If approved by the federal Minister of the Environment, species are added to the federal List of Wildlife Species at Risk (Government of Canada 2002).

Species that are included on Schedule 1 as Endangered or Threatened are afforded both individual and critical habitat protection on federal lands under the *Species at Risk Act* (SARA). On private or provincially owned lands, only aquatic species listed as Endangered, Threatened or Extirpated are protected under SARA, unless ordered by the Governor in Council.

2.2 Provincial Legislation

2.2.1 Environmental Assessment Act

The *Environmental Assessment Act* (Government of Ontario 1990a) was created to provide for the protection, conservation, and wise management of the environment in Ontario. The Act applies to:

- (a) enterprises or activities or proposals, plans or programs in respect of enterprises or activities by or on behalf of Her Majesty in right of Ontario or by a public body or public bodies or by a municipality or municipalities;
- (b) major commercial or business enterprises or activities or proposals, plans or programs in respect of major commercial or business enterprises or activities of a person or persons, other than a person referred to in clause (a), designated by the regulations;
- (c) an enterprise or activity or a proposal, plan or program in respect of an enterprise or activity of a person or persons, other than a person or persons referred to in clause (a), if an agreement is entered into under Section 3.0.1 in respect of the enterprise, activity, proposal, plan or program. R.S.O. 1990, c. E.18, s. 3; 2001, c. 9, Sched. G, s. 3 (3).

The Oxford Street West and Gideon Drive intersection improvement project is being completed in accordance with the Municipal Class Environmental Assessment (MCEA), Schedule "B". In support of the MCEA, an EIS was conducted.

2.2.2 Provincial Policy Statement

The Provincial Policy Statement (PPS, Ministry of Municipal Affairs and Housing (MMAH) 2020) sets the policy direction for regulating development and land use planning in the province. Both provincial and local land-use planning decisions build on the PPS and its relevant policies. This report deals specifically with the policies contained in Part V, Section 2.1 (Natural Heritage) of the PPS which is directed at protection and management of natural heritage systems and features. A natural heritage system is defined by the Province of Ontario as:

A system made up of natural heritage features and areas, and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species and ecosystems. These systems can include natural heritage features and areas, federal and provincial parks and conservation reserves, other natural heritage features, lands that have been restored or have the potential to be restored to a natural state, areas that support hydrologic functions and working landscapes that enable ecological functions to continue. (MMAH 2020).

Natural heritage features of significance are described in the Natural Heritage Reference Manual (MNR, 2010) and include:

- significant wetlands;
- significant coastal wetlands;
- other coastal wetlands in Ecoregions 5E, 6E and 7E;

- fish habitat;
- significant woodlands;
- significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
- habitat of endangered and threatened species;
- significant wildlife habitat; and
- significant areas of natural and scientific interest (ANSIs).

Development and site alteration is not permitted in:

- significant wetlands in Ecoregions 5E, 6E and 7E and significant coastal wetlands;
- significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E, significant woodlands and significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River), significant wildlife habitat, significant ANSIs, and coastal wetlands in Ecoregions 5E, 6E and 7E that are not subject to policy 2.1.4(b), unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions; and
- fish habitat or habitat of endangered and threatened species except in accordance with provincial and federal requirements.

2.2.3 Endangered Species Act

At the provincial level, SAR and their habitats are protected under the *Endangered Species Act* (ESA, Government of Ontario 2007) which is administered by the Ministry of Environment, Conservation and Parks (MECP). SAR designations for species in Ontario are initiated by the completion of a comprehensive Status Report by the Committee on the Status of Species at Risk in Ontario (COSSARO), and if approved by the provincial Minister of the Environment, Conservation and Parks, species are added to the Species at Risk in Ontario (SARO) List (O. Reg. 230/08) under the ESA. Section 9(1) of the ESA, 2007 prohibits the killing, harming, harassment, capture, taking, possession, transport, collection, buying, selling, leasing, trading, or offering to buy, sell, lease or trade species listed as Extirpated, Endangered, or Threatened on the SARO List. Section 10(1) prohibits damaging or destroying habitat of Endangered or Threatened species on the SARO List and may apply to Extirpated species through special regulations. General habitat protection applies to all Endangered and Threatened species, with some species having 'categorized habitat', which protects areas within specific distances from known records. Some SAR are afforded a more precise habitat protection through a habitat regulation (regulated habitat), as identified in Ontario Regulation 242/08. Species designated as Special Concern are not protected under the Act.

The ESA, 2007 does include provisions for permits under Section 17(2)(c) that would otherwise contravene the Act. Projects which propose impacts to SAR or their habitat would require a permit or other process (e.g., registration) to proceed without contravening the Act.

2.2.4 Conservation Authorities Act

Section 28(1) of the *Conservation Authorities Act* (Government of Ontario 1990b) empowers Conservation Authorities with the ability to make regulations governing development that can have an impact on watercourses and water bodies, including wetlands. The Study Area is located within the Upper Thames River Conservation Authority (UTRCA) watershed, and sections are regulated under the Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses, Ontario Regulation (O. Reg.) 157/06 (see Appendix A – Map 2 for regulation areas).

Under O. Reg. 157/06, UTRCA may grant permission to straighten, change, divert, or interfere with the existing channel of a river, creek, stream, or watercourse, or to change or interfere with a wetland under conditions outlined in the regulation (Government of Ontario 1990c).

2.2.5 Clean Water Act

In response to the Walkerton crisis in 2000, the *Clean Water Act*, 2006, was established to protect raw municipal drinking water at its source by preventing its contamination and overuse. Source water includes untreated water taken from underground aquifers and surface water features, such as streams, rivers, and lakes, to supply municipal drinking water systems. The *Clean Water Act* legislates the development of watershed-based source protection plans that identify community driven policies and programs to manage and protect the quality and quantity of both existing and future municipal drinking water sources. Once a Source Water Protection Plan is approved by the Ministry of the Environment, Conservation and Parks (MECP), its policies are implemented by the various authorities designated by the Source Protection Plan.

The Approved Source Water Protection Plan for the Thames-Sydenham & Region Source Water Protection Areas (2015) was reviewed to inform of any source water protection details in the Study Area. The Study Area is within the Upper Thames River source protection area. While highly vulnerable aquifer and significant groundwater recharge areas are mapped within the Study Area, no wellhead protection areas or intake protection zones were identified. Conservation Authorities were designated as plan implementors within the Thames-Sydenham & Region Source Water Protection Plan area and are responsible for assisting with policies implemented by other authorities.

2.2.6 Invasive Species Act

Invasive species are an emerging concern, both due to impacts to ecosystems as well as land use and infrastructure. In Ontario, the *Invasive Species Act* (ISA, Government of Ontario 2015) sets out rules to prevent and control the spread of invasive species. The ISA recognizes two classes of invasive species: prohibited and restricted. In the case of restricted invasive species, it is illegal to import, deposit, release, breed/grow, buy, sell, lease or trade restricted invasive species. Prohibited species have the same restrictions, but it is also illegal to possess or transport these species.

2.3 Municipal Legislation

2.3.1 The London Plan and 1989 Official Plan

The City is currently working with two official plans. The London Plan was adopted by City Council and was approved by the province in December 2016 (City of London 2021). The London Plan remains partially under appeal, and until it is fully in force, the 1989 Official Plan (City of London 1989) must also be consulted. The London Plan establishes a policy framework to guide the City's growth and development.

The London Plan describes the *City's Natural Heritage System is a system of natural heritage features and areas and linkages intended to provide connectivity at the regional or site level and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of native species, and ecosystems* (Policy 1298). It further goes on to explain that *the Natural Heritage policies of this Plan provide for the identification and protection of natural heritage features and areas and the ecological functions, processes, and linkages that they provide over the long term* (Policy 1307).

Map 5 of the London Plan details the Natural Heritage System features, and within the Study Area and surrounding area, there are no site-specific appeals. Significant components of the Natural Heritage System identified or delineated for protection are shown as Green Space Place Type on Map 1 of the Plan. The features and areas included in the Green Space Place Type include:

- Fish Habitat;
- Habitat of Endangered Species and Threatened Species;
- Provincially Significant Wetlands (PSW) and Wetlands;
- Significant Woodlands and Woodlands;
- Significant Valleylands ;
- Significant Wildlife Habitat (SWH);
- Areas of Natural and Scientific Interest (ANSI);
- Water Resource Systems;
- Environmentally Significant Areas (ESA);
- Upland Corridors;
- Naturalization Areas; and
- Other lands as identified through an environmental study.

Natural heritage features and areas within the Environmental Review Place Type (as delineated on Map 1 of the Plan) include:

- Unevaluated Wetlands;
- Unevaluated Vegetation Patches;
- Valleylands; and
- Potential Environmentally Significant Areas.

Relevant areas and features from Map 1 and Map 5 of The London Plan within the Study Area are shown on Map 2 in Appendix A.

Environmental Impact Studies – Policies 1431 through 1437, include the requirements for when an EIS is required, i.e., *where development or site alteration is proposed within or adjacent to components of the Natural Heritage System* (Policy 1432), and what shall be included in an EIS (Policy 1436).

Permitted Uses and Activities – Infrastructure – Policies 1395 through 1402, state that *new or expanded infrastructure shall be permitted within the Natural Heritage System only where it is clearly demonstrated through an environmental assessment process under the* Environmental Assessment Act*, including an environmental impact study, that it is the preferred alternative for the location of the infrastructure* (Policy 1396).

Furthermore, that *for infrastructure projects within the Natural Heritage System, the City shall require specific mitigation and compensatory mitigation measures that are identified in the accepted environmental impact study to address impacts to natural features and functions caused by the construction or maintenance of the infrastructure* (Policy 1400).

3.0 Methodology

A desktop review was completed for the entire Study Area, with field investigations focussed on the ROW / roadside.

3.1 Review of Background Information and Potential Species at Risk Data

The preliminary background review included review of the following publicly available sources, including databases and published reports, for information related to geological and natural environment components within the Study Area:

Table 3.1 – Summary of Background Information Sources Reviewed

Survey Type	Data
Past Studies	• 14 Gideon Drive and 2012 Oxford Street West – Environmental Impact Study (MTE 2020); • Eagle Ridge Subdivision Phase II – Scoped Environmental Impact Study (AECOM 2016); • Functional Design of the Tributary C Storm Drainage and Stormwater Management Servicing Works (Matrix 2015); and, • Municipal Class Environmental Study Report – Schedule 'C' – Storm/Drainage & Stormwater Management,

Survey Type	Data
	Transportation & Sanitary Trunk Servicing Works for Tributary C, Downstream Thames Subwatershed (AECOM 2013).
City of London	• The London Plan (City of London 2021); • 1989 Official Plan (City of London 1989); and, • City of London Open Data.
MECP	• Information Request Letter; and, • Source Protection Information Atlas.
Northern Development, Mines, Natural Resources and Forestry (NDMNRF, formally Ministry of Natural Resources and Forestry (MNRF))	• Aylmer District Information Request Letter; • Natural Heritage Information Centre (NHIC) database; • NHIC Make A Map: Natural Heritage Areas; • Land Information Ontario (LIO) Mapping – Aquatic Resource Areas (ARA); and, • Fish ON-Line.
Upper Thames River Conservation Authority (UTRCA)	• Information Request Letter; • Thames-Sydenham & Region Source Protection Region Online Mapping; and, • UTRCA Watershed Report Card – River Bend (UTRCA 2017).
Fisheries and Oceans Canada (DFO)	• Aquatic SAR Mapping.
Ministry of Agriculture, Food and Rural Affairs (MAFRA)	• AgMaps.
Other Publicly Available Data	• Ontario Breeding Bird Atlas (OBBA, Cadman *et al.* 2007); • Ontario Nature – Ontario Reptile and Amphibian Atlas (ORAA, Ontario Nature 2021); • iNaturalist (screened to include Research Grade and Threatened species); • Ontario Moth Atlas (Kaposi *et al.* 2021); • Ontario Butterfly Atlas (MacNaughton *et al.* 2021); • Ontario Freshwater Fishes Life History Database, Robert J. Eakins (1999-2021); and, • eBird (Warbler Woods).

3.2 Agency Consultation and Background Review

Natural heritage information requests were sent to the following agencies on March 8, 2021. Agencies generously responded with the following information for the Study Area, which was utilized in the creation of this report. Agency Correspondence can be found in Appendix B.

MECP – Information pertaining to aquatic and terrestrial SAR potentially present in the vicinity of the Study Area was requested. After completing an initial SAR information screening MECP provided a response on June 18, 2021. In addition to the SAR identified during the background review, MECP added three additional SAR occurrences to RVA's SAR list not previously identified.

MNDNRF (Aylmer District) – Additional natural heritage data was requested to supplement information obtained during the background review. MNDMNRF (previously MNRF) provided a response on April 13, 2021, with nothing further to add.

UTRCA – Additional natural heritage data was requested to supplement information obtained during the background review. UTRCA provided a response on September 2, 2021, which included information related to regulation mapping, woodlots, fish records, and benthic data.

3.3 Field Investigations

Field investigations were conducted in the 2021 spring/summer field season as shown in Table 3.2. In addition to targeted surveys, all incidental wildlife, habitat, and pertinent landscape data was recorded to support a thorough assessment of the Study Area.

Table 3.2 – Field Investigations Schedule

Survey Type	Date	Weather	RVA Staff
Breed Bird Survey; Vegetation; Incidental Observations	June 2	Partly cloudy, 10 °C	Paul Mikoda
Fish and Fish Habitat – Assessment; Incidental Observations	June 16	Sunny, 20 °C	Natasha Welch
Breeding Bird Survey; Vegetation/ELC; Incidental Observations	June 16	Sunny, 20 °C	Paul Mikoda
Tree Inventory (>10 cm)	*August 12*	*Overcast with rain, 23 °C*	*Ron Koudys L.A. Inc.*
Fish and Fish Habitat – Water Quality	September 8	Broken clouds, 23 °C	Courtney Beneteau

Survey Type	Date	Weather	RVA Staff
Tree Inventory (<10 cm)	*November 20*	*Clear, 5 °C*	*Ron Koudys L.A. Inc.*

The following sections provide detailed methodologies used to assess the flora and fauna during field investigations.

3.3.1 Ecological Land Classification and Vegetation Inventory

Ecological Land Classification (ELC) mapping had been completed for most of the Study Area in the previous EISs noted in Table 3.1 above, which were referenced during the field visit. A single-season floral inventory and ELC confirmation/update was completed for the Study Area. Field visits were timed to correspond with a spring/summer inventory window to identify as many plant species as possible. ELC was completed for areas not previously recorded and areas with existing ELC were reviewed and updated as per Lee *et al.* (1998).

Vegetation surveys were restricted to the right of way (ROW) within the Study Area and immediately adjacent areas. Surveys were completed over two field visits (following breeding bird surveys) by walking transects throughout the roadsides. Areas exhibiting variation in floral or topographical composition, such as ditches or vegetation clumps, were reviewed in further detail. Species not readily identifiable in the field were sampled and identified later utilizing Michigan Flora Online (Reznicek *et al.* 2011).

3.3.2 Tree Inventory

Trees and woody vegetation within and adjacent to the roadway were inventoried in two surveys by Ron Koudys Landscape Architects Inc. (RKLA) these reports can be found in Appendix G. Information recorded included tree species, dbh (diameter at breast height), crown radius, structural form, and notes on tree health and condition.

3.3.3 Breeding Birds

Breeding birds were assessed within the Study Area using the Ontario Breeding Bird Atlas point-count protocol and augmented with incidental data as pertinent (e.g., breeding evidence) (Cadman 2003). Species recorded outside of dedicated surveys were included as field work occurred during the migratory bird breeding season. The locations of the breeding bird survey points are presented in Appendix A – Map 6 and field sheets are provided in Appendix D.

3.3.4 Significant Wildlife Habitat and Incidental Terrestrial Wildlife

During all site visits, terrestrial wildlife, including call and signs, were recorded. Specific habitats surveyed for included gravel roadsides (reptile nesting), mammal burrows (often on slopes), crayfish burrows (associated with ditches or wetlands), recently disturbed soils, potential cover

objects, or other anomalous or unique features or habitat within the Study Area including large dead or decaying (wildlife) trees. Wildlife surveys were conducted in conjunction with floral surveys, described above.

Targeted surveys for snag and cavity trees (i.e., in leaf-off conditions) were not included in the scope of this EIS. Potential habitat for SAR bats was inferred from the tree inventory, where the condition of all trees was documented (Koudys 2021).

3.3.5 Significant Features

Potentially Significant Wildlife Habitat (SWH) features were identified using the criteria in the Significant Wildlife Habitat Criteria Schedule for Ecoregion 7E (MNRF 2015) and the Significant Wildlife Habitat Technical Guide (MNRF 2000). The significance of vegetation patches was evaluated using the City's Guideline Document for the Evaluation of Ecologically Significant Woodlands (2006).

3.3.6 Aquatic Habitat

The potential for fish habitat was investigated in the Study Area. Fish habitat investigations were limited to the municipal ROW and involved identifying and recording:

- Potential surface flow connectivity to Tributary C;
- Water chemistry including temperature, dissolved oxygen, pH, and conductivity;
- Habitat information/locations including stream morphology, bed substrate, bank characteristics, stream flow and depth;
- "Critical" or important habitat areas including potential spawning areas, nursery cover, and feeding areas; and
- Potential constraints, habitat compensation or enhancement opportunities.

Photographs were taken of the in-stream habitat and roadside ditches. This representative photographic record can be found in Appendix C.

3.4 Species at Risk Screening

Provincially protected SAR can be found throughout Ontario in both documented and undocumented populations. A list of SAR with potential to occur in the Study Area was compiled from background sources and the habitat requirements for these species were identified using the MNRF's Significant Wildlife Habitat Technical Guide (OMNR 2015) and assessment reports from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The field studies described above were compared to the known habitat preferences and general locations of SAR noted in background review documents to determine the potential that these species or their habitat could occur in the Study Area. SAR that were confirmed to be present or were determined to have a high probability of occurring in the Study Area are discussed in detail in Section 5.0.

4.0 Existing Conditions

The natural heritage system features (as shown on Map 5 of the London Plan) within the Study Area include: significant valleylands, ESAs, unevaluated wetlands, unevaluated vegetation patches, fish habitat, and PSWs. Other natural heritage features which require an evaluation to determine presence/absence, such as SWH and SAR, will be discussed in the following sections, along with those confirmed in the Study Area.

An overview of the natural heritage features and regulated areas in the Study Area is presented in Appendix A – Map 2.

4.1 Physical Setting

4.1.1 Physiography and Soils

The Study Area is underlain by Middle Devonian-aged bedrock composed of limestone, dolostone, and shale of the Hamilton Group (OGS 2011). The Study Area is within a confluence of two Physiographic Units, with the bulk being within the Caradoc Sand Plains and London Annex (including the Gideon and Oxford intersection) with the eastern section just within the upper edge of the Mount Elgin Ridges unit. Within the Study Area, the Sand Plains are part of an ancient Spillway and associated Sand Plain, while the Mount Elgin Ridges unit here is composed of a Till Moraine (Chapman and Putnam 2007). Surficial geology within the Study Area is variable as a result of historic glacial processes. Lands in the eastern half of the Study Area are generally glaciolacustrine till with areas of both fine and coarse-textured materials, while lands in the western half are formed by glaciofluvial activity, though a small 'T' shaped island of till remains immediately west of the intersection, extending west south of Oxford and south to cross Gideon Drive. Soils within the Study Area are composed mainly of moderately to imperfectly drained Muriel silt/clay loams with gentle slopes, with a small area of variably drained, gently sloping Teeswater silt loams in the western section. At the western limit of the Study Area is an area of Eroded Channel associated with Tributary C (Hagerty and Kingston 1992).

4.1.2 Subwatershed

The Study Area is located within the downstream extent of the Upper Thames River watershed falling within the River Bend subwatershed, which drains a catchment area of approximately 58 km^2. According to UTRCA's 2017 Watershed Report Card, land use within the River Bend subwatershed is dominated by agriculture (41%), with urban and natural areas comprising 28% and 26% of the landscape, respectfully (UTRCA 2017). However, due to the subwatershed receiving flows from upstream areas, water quality within the River Bend catchment area is influenced by activities occurring throughout the Upper Thames watershed. While water quality has improved over the years, little change has occurred within the last decade with certain contaminants still found to exceed provincial guidelines (UTRCA 2017).

Within the Upper Thames River planning area, natural cover is highest within the River Bend subwatershed, with forest cover comprising 19.3% of the landscape. While forest cover exceeds the watershed average of 11.1%, it is below the federal guidelines (30%) with many existing woodlots too small to support sensitive forest interior species. While forest cover does not meet national standards, forested riparian zones were found to exceed Environment Canada's guideline. With less than 10% of watercourses within the River Bend subwatershed confirmed to be cool/coldwater systems, which are becoming rarer throughout the province, retaining, and restoring riparian cover is important to retain these thermal regimes. Conversely, forest cover is currently declining due to surrounding urbanization (UTRCA 2017).

4.1.3 Topography and Drainage

The topography of the Study Area generally slopes down to the northwest, draining towards Tributary C which crosses the northwest extent of the Study Area. Tributary C then flows to the Thames River approximately 700 metres (m) northwest of the Study Area. Surface drainage within the Study Area is conveyed by overland flow, roadside ditches, and municipal drains, eventually discharging into Tributary C and surrounding wetlands.

A municipal drain known as Parker Drain is present within the Study Area. Parker Drain is delineated to function as a class F drain conveying intermittent flow northwest through the eastern extent of the study area, towards the upstream extent of Tributary C. Parker Drain transitions into a class D drain where it connects with Tributary C to convey permanent flow from the northeast to southwest into the Study Area. Recent areal imagery shows the landscape through which the class F reach of Parker Drain flowed, previously managed as agricultural land, is currently under development, suggesting this surface water feature has been removed from the landscape.

Significant changes to the Study Area's topography and drainage are currently underway north of Oxford Street to accommodate a new housing development. In support of this new housing development, drainage patterns have been altered, but inputs to Tributary C should be maintained. A detailed study regarding the new development and site alterations, which includes a water balance analysis, was completed in 2015 (Matrix 2015).

4.2 Designated Natural Areas

No provincially or locally designated parks, conservation areas, reserves, or Areas of Natural or Scientific Interest (ANSI) were identified in the Study Area. The following sections examine the designated natural areas and features found in the Study Area.

4.2.1 Wetlands and Provincially Significant Wetlands (PSWs)

The wetland associated with Tributary C was found to be provincially significant as it provides supportive habitat to the resident Brook Trout (*Salvelinus fontinalis*) population through

groundwater discharge, buffering from adjacent land uses, and shading of surface water by its swamp communities (AECOM 2016).

The unevaluated wetland, located south of Oxford Street near the eastern extent of the Study Area, was investigated from the property edge. It was observed to support cattails (*Typha* sp.) as well as the invasive Yellow Iris (*Iris pseudacorus*). This wetland appears to be an anthropogenic landscape feature (dug pond), as it does not appear on 1954 Ortho Imagery. Further review of publicly available orthoimagery shows this feature was originally an open water habitat which has been slowly infilling with vegetation over time.

Wetlands and PSWs are presented in Appendix A – Map 2.

4.2.2 Environmentally Significant Areas (ESAs)

The Kains Woods ESA, which includes the PSW noted above, and as described in the AECOM 2013 EIS, is present in the northwestern-most extent of the Study Area. The ESA overlaps entirely with the Brook Trout habitat and PSW noted above, but also provides habitat for one provincially rare (S3) plant species which was observed, Slender Mountain Mint (*Pycnanthemum tenuifolium)*, five regionally rare (R1 and R2 species) plant species with an unknown regional status, and several regionally and locally identified birds of conservation concern (AECOM 2013).

Surrounding the Study Area are two other recognized ESAs: Dingman Creek Fen Wetland Complex (500 m to the south) and Kilworth (600 m to the west). All ESAs in and around the Study Area are presented in Appendix A – Map 2.

4.2.3 Significant Valleylands

In the northwest corner of the Study Area, significant valleylands are associated with Tributary C (Appendix A – Map 2). Valleylands contain and provide a link for many aspects of the natural heritage system, facilitating species richness, movement, and diversity. In addition, they also provide protection from flooding and other natural hazard processes (Policy 1345 of the London Plan). There are no other valleylands identified within the Study Area.

4.2.4 Regulated Areas

O. Reg. 157/06 (the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation) under Section 28 of the *Conservation Authorities Act*, administrated by the UTRCA, applies to the area surrounding Tributary C in the Study Area (Appendix A – Map 2). Under this regulation, any development, site alteration, construction, or placement of fill within the regulated area requires a permit from UTRCA, as does interference with a wetland or any alteration to an existing watercourse channel.

4.2.5 Unevaluated Vegetation Patch

Two Unevaluated Vegetation Patches are indicated within the Study Area (The London Plan Map 5 – Natural Heritage). These patches are not adjacent to each other or any additional vegetation patches, as shown in Appendix A – Map 2. One patch, located on municipal addresses 2012 and 1976 Oxford Street West, was assessed as part of a recent report (MTE 2020). During the field work to support this study (2018), the Unevaluated Vegetation Patch was classified as a Mineral Cultural Woodland (CUW1) dominated by a canopy of Black Walnut (*Juglans niger*) and Hackberry (*Celtis occidentalis*), with Black Raspberry (*Rubus occidentalis*), Tartarian Honeysuckle (*Lonicera tatarica*) and Riverbank Grape (*Vitis riparia*) in the lower layers, with the eastern half of the community recently mowed. This report confirmed breeding habitat for Eastern Wood Pewee (*Contopus virens*, Special Concern), making the vegetation patch Significant Wildlife Habitat (SWH).

The second Unevaluated Vegetation Patch is located within the southern edge of the Study Area, along Gideon Drive, with the bulk extending outside of the Study Area boundary. This Unevaluated Vegetation Patch is located on existing residential lots 120, 80, 62, 52 44 and 36 Gideon Drive and is subject to a variety of maintenance regimes as can be seen both from Gideon Road and on ortho imagery. In fact, most of the patch along the frontage of Gideon is maintained as lawn. Similar to the patch evaluated by MTE, Black Walnut dominates the canopy of this community. Interestingly, a review of historic ortho imagery (University of Toronto 1954) shows both vegetation patches existed in some form at that time and may share a similar history. No rare or at-risk species were noted within either patch during field investigations.

4.3 Vegetation and Vegetation Communities

The Study Area is located in a landscape which is transitioning from rural residential and agricultural land use to a commercial and urban residential one, with sections of preserved natural areas associated with wetlands, watercourses or other designated features.

Within the Study Area, on the north side of Oxford Street West, land use is mainly high-density single family residential in the form of a recently approved subdivision, still under construction. Low density residential lots are located on either side of the new subdivision. In the northwestern corner, a fallowed agricultural field (Dry Moist Old Field Meadow, CUM1-1) buffers a mosaic of natural/regenerating communities associated with Tributary C, the most notable of these being various swamps (Willow Mineral Deciduous Swamp, SWD4-1; White Cedar – Hardwood Organic Mixed Swamp, SWM4-1 and Manitoba Maple Mineral Deciduous Swamp, SWD3-4) and meadow-marshes (Narrow-leaved Sedge Organic Meadow Marsh, MAM3-5; Forb Organic Meadow Marsh, MAM3-9 and Organic Meadow Marsh, MAM3), which comprise a Provincially Significant Wetland (AECOM 2013) (Appendix A – Map 3).

South of Oxford, land use is a mixture of rural/estate residential and active agriculture, but with active planning applications. Communities here are cultural in origin and vary between Black Walnut-dominated woodland (Mineral Cultural Woodland, CUM1) and Dry Moist Old Field Meadow (CUM1-1), interspersed with residences and associated maintained areas. Lands to the west of the Oxford Street West/Gideon Drive intersection are active agriculture and Dry Moist Old-Field Meadow (CUM1-1). Classification of vegetation communities in the vicinity of the Study Area were undertaken in detail as a component of prior planning applications and are incorporated into our report as noted.

The Dry Moist Old-Field Meadow in the immediate vicinity of the intersection within the Study Area, was not assessed as a component of prior studies and as a result, was evaluated during field investigations. Field sheets are included in Appendix D. All communities are common and secure in the province.

4.3.1 Tree Inventory

The inventory by RKLA captured 64 individual trees identified within the City ROW and on private properties adjacent to the proposed construction. No tree species listed as endangered or threatened were observed during the tree inventory and all trees observed are common and typical of the current land uses (Ron Koudys 2021).

4.3.2 Flora

Seven rare floral species were noted in background documents, with the potential to occur within the Study Area (Table 5.1). Most are species of very specific habitats, such as wetlands and high-quality woodlots, but some can be found as planted specimens as part of residential landscaping. None of the noted species were located during site investigations, however one rare species, Honey Locust (*Gleditsia triacanthos*, S2?) was observed as two stems on two residential properties. As it they were each noted to be the thornless variety, they are almost certainly planted landscape specimens. The potential presence of False Rue-anemone (*Enemion biternatum*) was noted as a part of the project scoping, but no individuals or suitable habitats (mature maple beech forest) were observed within the Study Area. The details of the single-season plant inventory are found in Appendix E – Table 1.

4.3.3 Invasive Species

Notable invasive species observed within the Study Area included European Common Reed (*Phragmites australis*), Common Buckthorn (*Rhamnus cathartica*), and Autumn Olive (*Elaeagnus umbellate*). Invasive species have been mapped in the Study Area and are presented in Appendix A – Map 4.

4.4 Wildlife

4.4.1 Breeding Birds

The Study Area contains terrestrial and aquatic communities and habitats that have the potential to support a variety of bird life. Birds recorded during citizen science surveys (Ontario Breeding Bird Atlas 2001-2005) are indicative of the variety of habitats present in the broader area, from interior woodland indicators to those that utilize urban habitats. At-risk species include those associated with anthropogenic habitats and features, as well as those which utilize various specialized habitats, including interior woodlands, open grasslands, and thickets (Table 5.1). As noted in Section 3.3.3, dedicated surveys for breeding birds were carried out as per the Ontario Breeding Bird Atlas point-count protocol and augmented with incidental data as pertinent (e.g., breeding evidence) (Cadman 2003) Results are summarized in Appendix E – Table 2. A single observation of a foraging Barn Swallow (*Hirundo rustica*) was the only rare/at-risk species noted during investigations. No nests or indication of nesting were noted in nor were typical nesting habitats (bridges, box culverts, etc.). The remainder of birds recorded during surveys are common and secure in the province. Road noise was notable during surveys.

4.4.2 Reptiles and Amphibians

Most of the reptile and amphibian records for the Study Area and vicinity include commonly encountered species that would be expected based on the habitat in the area. Five provincially protected at-risk species were noted, two Threatened species; Blanding's Turtle (*Emydoidea blandingii*) and Eastern Hog-nosed Snake (*Heterodon platirhinos*), and three Endangered species; Queensnake (*Regina septemvittata*), Eastern Foxsnake (*Pantherophis gloydi*) and Spiny Softshell (*Apalone spinifera*) (MECP correspondence 2021), as were additional Special Concern species (Table 5.1). No reptiles were observed during site investigations, no candidate critical habitat was observed (nests, potential hibernacula, cover objects), and no at-risk species have been recorded during prior local investigations. Many of the at-risk reptiles noted have specific habitat requirements that are not met within the Study Area, with the following exceptions. Eastern Milksnakes are habitat generalists and can be found in a variety of habitats, including anthropogenic ones such as the Cultural Meadow within the right-of-way. Snapping Turtles are likely present in nearly every permanent waterbody in southern Ontario but are not well documented as they bask less than other species. Finally, Eastern Hog-nosed Snake has very specific nesting and hibernation requirements, but otherwise is a wide-ranging habitat generalist in its search for toads, its main prey item. As a result of the limited, locally common habitat within the right-of-way, neither snake species is expected to be relying on the Study Area for critical life-history activities, instead using these areas for movement or as incidental foraging habitat. Of the two, Milksnake would be the most likely to be encountered. Snapping Turtle would be expected to be found in Tributary C with the potential to occur within the reach that is included within the Study Area. Habitat assessments are provided in Table 5.1. A Green Frog (*Rana clamitans*) was observed

in Tributary C during water quality sampling in September (Appendix E – Table 3). This species is common in southern Ontario wherever permanent water is available. Additional amphibian species, including Spring Peeper (*Pseudacris crucifer*), Wood Frog, (*Lithobates sylvaticus*), Leopard Frog (*Lithobates pipiens*), American Toad (*Anaxyrus americanus*) and Gray Treefrog (*Hyla versicolor*) were recorded associated with Tributary C wetlands as part of prior work (AECOM, 2016). In addition to supporting the amphibian species noted above, Tributary C could also support Midland Painted (*Chrysemys picta marginata*).

4.4.3 Mammals

No rare mammal species were noted as occurring in the Study Area during background review, however, MECP noted the potential presence of Endangered mammals, including American Badger (*Taxidea taxus*) and SAR bats (Endangered) which is assumed to include Little Brown Little brown bat (*Myotis lucifugus*), Northern long-eared bat (*Myotis septentrionalis*) and Tri-colored bat (*Perimyotis subflavus*). The right-of-way within the Study Area is generally sparsely treed, with most trees, and as such suitable bat habitat, occurring well outside any areas considered for tree removals. Of the trees considered for removal, one, Tree 64, a Manitoba Maple (*Acer negundo*) exhibits signs of decline that make it a candidate bat maternity habitat (see Appendix G). Four additional trees to be retained were noted in the Tree Assessment Report to be either dead or with features (rot, cavities, dead wood) that would also make them candidate bat maternity habitat. The most recent advice from MECP regarding SAR bat surveys and mitigation of impacts notes that "If a proposed activity or project is expected to adversely affect (e.g., remove, stub, etc.) 'a small number' of potential maternity or day roost trees in treed habitats, but the timing of tree removal will avoid the bat active season (April 1 – September 30 in Southern Ontario / May 1 to August 31 in Northern Ontario), then there is no need to conduct species at risk bat surveys of treed habitats." (Kathryn Markham pers. comm. March 2021).

Mammals expected to be observed within the Study Area are species commonly encountered in association with local anthropogenic and natural habitats. Mammals and sign observed during site investigations included a road-killed Red Squirrel (*Tamiasciurus hudsonicus)* in the eastern existing residential section of the Study Area and the skeletal remains of two white-tailed deer (*Odocoileus virginianus*) just west of the existing intersection, one on either side of Oxford Street West. A game trail and deer scat were also noted in association with the skeletons. (Appendix E – Table 3).

4.4.4 Insects/Other Invertebrates

The habitat types within the Study Area are suitable to support many insect species, including rare butterfly and Odonate (dragonfly and damselfly) species (Table 5.1). As insects are not commonly surveyed for and can have short periods of detection (adult stage), it is possible that other species of provincial interest may utilize habitat within or adjacent to the Study Area. A single Monarch (*Danaus plexippus*) was identified south of Oxford Street West within the Study Area, associated with the Mineral Cultural Meadow/roadside habitat, which was noted to contain Common Milkweed (*Asclepias syriaca*), a host plant for Monarch. (Appendix E – Table 3). No additional notable invertebrates (bumblebees, odonates, butterflies or moths) were observed.

4.5 Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) assessment was completed using the Ecoregion 7E Criterion (see Appendix F for assessment rationale tables). Utilizing a combination of existing data and information collected for this project, candidate wildlife habitat was identified for the following categories: Raptor Wintering Area, Turtle Wintering Area, Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs), Waterfowl Nesting, Marsh Breeding Bird Habitat, and Terrestrial Crayfish. Most of these habitats are associated with the evaluated/PSW in the northwest section of the Study Area. Amphibian Breeding Habitat (Woodland) within the PSW, breeding habitat for Eastern Wood Pewee (Special Concern) and foraging/rearing habitat for Monarch (Special Concern) was confirmed within the Study Area.

4.6 Aquatic Habitat and Communities

4.6.1 Aquatic Habitat

Within the Study Area a watercourse, known as Tributary C, crosses the northwestern extent of the Study Area (Appendix A – Map 3). Tributary C is a coldwater 1st order stream (Strahler Stream Order) that drains a wetland east of Oxford Street West, recently identified as a PSW that falls within the Kains Woods ESA (see Section 4.2.2) (Map 5 of the London Plan). West of Kains Road, Tributary C and the surrounding lands are managed as Significant Valleylands (see Section 4.2.3). Immediately downstream of the Study Area, Tributary C transitions into a 2nd order system as it continues towards the Thames River less than 1 km downstream of the Study Area.

While aquatic field investigations were limited to the municipal ROW, past studies identified Tributary C as an intermittent drainage feature northeast of the study area. Tributary C transitions into a permanent watercourse mapped as a Class D municipal drain, called Parker Drain, before flowing onto site. Within the Study Area, Parker Drain does not extend through the subject lands suggesting it transitions into a natural watercourse, not modified to accommodate agricultural drainage, approximately 140 m east of Oxford.

Within the Study Area, Tributary C flows southwest through a meadow marsh before it is conveyed west diagonally under Oxford Street West by a corrugated steel culvert. West of Oxford, Tributary C then continues through a retained natural corridor known as Woodhull Ravine (as per the City of London Open Data - Parks). While there was no evidence of hardening within the upstream and downstream study reaches, Tributary C where it crosses Oxford appears to have been straightened.

At the time of investigation, Tributary C upstream of the Oxford Street West crossing, was hydraulically connected to its floodplain and little to no surface flow was observed. Riparian and instream cover was limited to vascular macrophytes, dominated by cattails, which shaded the watercourse. Watercress was abundant and a small, vegetated island was observed within the channel and unconsolidated material form the bed substrate. As the watercourse flowed towards the culvert, the channel narrowed, and water was observed to flow both into and under the inlet due to the submerged invert being unembedded. Immediately upstream of the inlet, a backwater area was observed on the south side of the main channel. Per the findings of the geomorphic study completed in 2015, the upstream study reach was in a transitional state (Matrix 2015).

Downstream of the Oxford Street West crossing, the culvert outlet was observed to be perched approximately 0.10 m above the surface of Tributary C, resulting in the formation of a plunge pool. A ditch, draining an agricultural field to the east, flowed through a wooded area and into the channel from the south bank, discharging into the outlet pool. The flow path of the roadside ditch running parallel to the south side of Oxford was also observed to convey drainage into Tributary C, with flow appearing to discharge along the south side of the culvert outlet down the road embankment and into the channel. Fine bed material comprised the pool substrate, with sediment almost 0.5 m deep at the tail of the pool. A dense mat of Pennsylvania Bittercress (*Cardamine pensylvanica*), a type of watercress, was observed to be growing from this thick sediment.

Downstream of the pool, the channel narrowed into a riffle-run sequence with coarser material present within the riffles. Undercut banks were noted throughout the downstream reach, suggesting bank instability, but also providing additional cover and habitat for fish. Other in-stream cover was provided by overhanging and instream vascular plants, woody debris, and cobble. A mixed forest was observed to shade the channel from the south bank, while a cattail marsh formed the north bank.

The aquatic habitat features observed in the tributary are summarized in Table 4.1. Water quality parameters were also measured and are reported in Table 4.2.

The creek showed evidence of groundwater discharge with abundant watercress observed throughout the tributary surrounding Oxford Street West. Additional surface water features were noted within the Study Area and included roadside ditch swales, which were dry at the time of investigations. Due to the ephemeral nature of the roadside ditch swales, and elevations in relation

to adjacent permanent waterbodies, these drainage features were determined to provide indirect fish habitat, only contributing flows to Tributary C following rain events.

Table 4.1 – Aquatic Habitat in Tributary C – Oxford St. W. CSP Culvert Crossing

Habitat Attribute	Upstream	Downstream
Flow Regime	Permanent	Permanent
Thermal Regime	Coldwater	Coldwater
Flow Velocity (m/s)	Nil (stagnant)	0.33
Morphology (%)	Flat (100%)	Run (40%), riffle (40%), pool (10%)
Mean Wetted Depth (m)	0.26	0.08, 0.05, 0.45
Mean Wetted Width (m)	-	1.2, 1.2, 2.3
Substrate	Silt, clay, sand, detritus	Cobble, gravel, silt, sand
Bank Stability	-	Slightly to moderately unstable
Instream Cover (%)	Instream/overhanging vascular macrophytes (90/10%)	Instream/overhanging vascular macrophytes (40/10%), instream/overhanging woody debris (20/10%), undercut banks (10%), cobble (5%), organic debris (5%)
Riparian Vegetation	Mixed Forb Organic Meadow Marsh	Mixed Forest, Cattail Mineral Shallow Marsh
% Stream Shaded	60% (vascular macrophytes)	75%
Migratory Barriers	-	Perched culvert
Evidence of Groundwater	Watercress (abundant), wetland	Watercress (abundant)
Adjacent Land Use	Marsh/floodplain, construction, residential	Forest (Woodhull Ravine), marsh/floodplain, agricultural, residential

Note: Aquatic habitat characteristics observed on June 16, 2021

Table 4.2 – Water Quality in Tributary C – Oxford St. W. CSP Culvert Crossing

Parameter	Upstream	Downstream
Temperature (°C)	13.2	16.2
pH	7.75	7.90
Conductivity (µS/cm)	1072	1163
Dissolved Oxygen (mg/L)	8.79	8.65
Air Temperature (°C)	24.0	24.0

Note: Water quality parameters measured in-situ on September 8, 2021

4.6.2 Fish Community

Fish community sampling was not included in the scope of this EIS. UTRCA sampling records in Tributary C as it crosses Oxford Street West within the Study Area (Site Code UT.RI106) note Brook Trout (*Salvelinus fontinalis*) in 1999 – "many", and in 2010 – "abundant". Brook Trout is an important, native, fall-spawning species with specialized habitat requirements that restrict its distribution.

Parker Drain is classified by DFO as a class D drain indicating it supports sensitive fish species.

DFO mapping of the Study Area did not indicate any aquatic SAR, however, aquatic SAR are mapped in the Thames River, within 1 km of the Study Area; these species are discussed in Table 5.1.

4.6.1 Freshwater Mussel Community

While there are no records of freshwater mussel in the Study Area, several SAR were identified in background information within 1 km of the Study Area, due to proximity to the Thames River. These species are discussed in Table 5.1.

4.6.2 Benthic Invertebrate Community

UTRCA provided benthic invertebrate temporal sampling records from two sites in Tributary C both within and downstream of the Study Area. The Hilsenhoff Biotic Index (HBI) was calculated for each of the samples and the resulting indices and stream health estimates are provided in Table 4.3. HBI estimates the overall tolerance of the benthic community, weighted by the relative abundance of each taxonomic group. Organisms are assigned tolerance values based on their ability to live under a variety of stressful conditions, such as low oxygen content in the water. HBI values range from 0 to 10, where low HBI values reflect a higher abundance of sensitive groups, thus a higher water quality and better stream health.

Table 4.3 – Hilsenhoff Biotic Index (HBI) and Stream Health for Tributary C

UTRCA Sampling Date	Water Quality Indicator (HBI) by Site	
	UT.RI105 (Woodeden Camp)	UT.RI106 (Oxford St. W.)
23/06/1999	5.93 – Fairly Poor	5.66 – Fair
20/06/2000	n/a	5.87 – Fairly Poor
05/11/2002	5.13 – Fair	4.99 – Good

5.0 Species of Conservation Concern and Species at Risk

A variety of floral and faunal species of provincial interest have been recorded in the vicinity of the Study Area by various sources, including citizen scientists/projects and provincial databases. A long history of existing and ongoing development/habitat removal has left a landscape that is expected to support species that are tolerant of or benefit from anthropogenic landscapes and structures. A full list of SAR identified in the background sources with potential to be found in the Study Area, discussion on their habitat preferences, and probability of occurrence as determined following field investigations and assessment is presented in Table 5.1.

Table 5.1 – Species of Conservation Concern and Species at Risk Assessment

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Flora		
Hairy-fruited Sedge (*Carex trichocarpa*) S3 | N3*	The NHIC database has a record of this species in the vicinity of the Study Area. Hairy-fruited Sedge grows in marshes, floodplains and wet meadows. Suitable conditions exist for this species within the northwestern section of the Study Area.	Low – Multiple studies within and adjacent to the Study Area have failed to locate this species.
Green Dragon (*Arisaema dracontium*) Special Concern | Special Concern	The NHIC database has a record of this species in the vicinity of the Study Area. Green Dragon grows in wet to moist woodlands and riparian areas. Suitable habitat for this species is present within the northwestern section Study Area.	Low – Multiple studies within and adjacent to the Study Area have failed to locate this species.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
American Chestnut (*Castanea dentata*) Endangered | Endangered	The NHIC database has a record of this species in the vicinity of the Study Area. American Chestnut prefers dryer upland forest with sandy soils. This habitat is not present within the Study Area.	**Low –** No suitable habitat and multiple studies within and adjacent to the Study Area have failed to locate this species.
Eastern False Rue-anemone (*Enemion biternatum*) Threatened | Threatened	The NHIC database has a record of this species in the vicinity of the Study Area. Eastern False Rue-anemone grows in rich soils in deciduous forests and thickets. This habitat is not present within the Study Area.	**Low –** No suitable habitat and multiple studies within and adjacent to the Study Area have failed to locate this species.
Striped Cream Violet (*Viola striata*) S3 | N3	The NHIC database has a record of this species in the vicinity of the Study Area. Striped Cream Violet grows a variety of moist to mesic habitats, from woodlands to meadows. This habitat is present within the Study Area.	**Low** – Multiple studies within and adjacent to the Study Area have failed to locate this species.
Blue Ash (*Fraxinus quadrangulate*) Threatened | Threatened	The NHIC database has a record of this species in the vicinity of the Study Area and it has been recorded in the Kains Woods ESA. Blue Ash grows in deciduous floodplain forest. This habitat is not present within the Study Area.	**Low** – Multiple studies within and adjacent to the Study Area have failed to locate this species and it was not identified during inventories in 2021.
Orange Coneflower (*Rudbeckia fulgida*) S1 | N1	Citizen science observers noted this species in the vicinity of the Study Area. This species utilizes various habitats, including woodlands, savannahs and wetlands. Suitable habitats are present within the Study Area.	**Low** – Multiple studies within and adjacent to the Study Area have failed to locate this species.
Trumpet Creeper (*Campsis radicans*) S2? | N2	Citizen science observers noted this species in the vicinity of the Study Area. Trumpet Creeper can be aggressive and utilizes any available open habitats. Suitable habitats are present within the Study Area.	**Low** – Multiple studies within and adjacent to the Study Area have failed to locate this species.
Large Yellow Pond Lily (*Nuphar advena*) S3 | NNR	Citizen science observers noted this species in the vicinity of the Study Area. Large Yellow Pond Lily lives in sheltered shallow wetlands with mud bottoms. Suitable habitats are present within the Study Area.	**Low** – Multiple studies within and adjacent to the Study Area have failed to locate this species.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Fish		
Black Redhorse (*Moxostoma duquesnei*) Threatened | Threatened	This species lives in pools and riffle areas of medium-sized rivers and streams that are usually less than two metres deep. These rivers usually have few aquatic plants, a moderate to fast current, and a sandy or gravel bottom. In the spring, it migrates to breeding habitat where eggs are laid on gravel in fast water. The winter is spent in deeper pools. DFO records of this species are associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C. No suitable habitat in the Study Area for this species.
Eastern Sand Darter (*Ammocrypta pellucida*) Endangered | Threatened	This species has very specific habitat preferences and is found almost exclusively on sandy bottoms of large stream and nearshore areas of the Great Lakes in southern Ontario. NHIC and DFO records of this species are associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C. No suitable habitat in the Study Area for this species.
Greenside Darter (*Etheostoma blennioides*) S4 | Special Concern	This species inhabits rivers and streams where the water is fairly clear and the flow is moderate to fast. The breeding areas of this fish are areas of fast-moving water where the rocks are covered with green algae. Records of this species are associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C.
Lake Sturgeon (Great Lakes – Upper St. Lawrence River population) (*Acipenser fulvescens* pop. 3) Endangered | N3	Lake Sturgeon are coolwater benthic generalists that require a variety of habitats to complete their lifecycle. Adults inhabit soft bottom lakes and rivers, but typically migrate to shallow, fast-flowing water comprised of boulders and gravel associated with the base of waterfalls, rapids, or dams, to spawn. Moving water is critical to egg success with hatching dependent on egg aeration. During the larval stage, larvae will burrow within the gravel substrate to hide from predators while they continue to develop. NHIC records indicate this species is present within 1 km of the Study Area; however, this record is likely associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C. No suitable habitat in the Study Area for this species.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Pugnose Minnow (*Opsopoeodus emiliae*) Threatened | Threatened	This species cool, clear, shallow, heavily vegetated costal wetlands, and slow-moving river and streams with warm water and abundant vegetation. DFO records of this species are associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C. No suitable habitat in the Study Area for this species.
Silver Shiner (*Notropis photogenis*) Threatened | Threatened	This species prefers moderate to large size streams with swift currents that are free of weeds and have clean gravel or boulder bottoms. They live in schools and feed on crustaceans and adult flies that fall in the water or fly just above the surface. Records of this species are most likely associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C. No suitable habitat in the Study Area for this species.
Spotted Sucker (*Minytrema melanops*) Special Concern | Special Concern	This species inhabits clear creeks and small to moderate sized rivers with sand, gravel or hard-clay bottoms, usually free of silt, but can also be found in turbid habitats. In late spring and early summer, Spotted suckers move to rocky riffle areas of streams to breed. DFO records of this species are most likely associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C. No suitable habitat in the Study Area for this species.
Mussels		
Fawnsfoot (*Truncilla donaciformis*) Endangered | Endangered	This species inhabits medium and large rivers with moderate to slow flowing water. It usually inhabits shallow waters (one to five metres deep) with gravel, sand or muddy bottoms. DFO records of this species are associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, it would be difficult for mussels (via fish hosts) to access Tributary C. No suitable habitat in the Study Area for this species.
Mapleleaf (*Quadrula quadrula*) Special Concern | Special Concern	This species if found in medium to large rivers with slow to moderate currents and firmly packed sand, gravel, or clay and mud bottoms. It also lives in lakes and reservoirs. The fish host of the Mapleleaf is the Channel Catfish.	Low – Due to several migration barriers downstream of the Study Area, it would be difficult for mussels (via fish hosts) to access Tributary C. No suitable habitat in the Study Area for this species.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Purple Wartyback (*Cyclonaias tuberculata*) S2 | N3	The species occupies small to large rivers with a range of flow conditions and favours a substrate comprised of cobble, gravel, and sand. NHIC records of the species are most likely associated with the Thames River, downstream of the Study Area.	**Low** – Due to several migration barriers downstream of the Study Area, it would be difficult for mussels (via fish hosts) to access Tributary C.
Threehorn Wartyback (*Obliquaria reflexa*) Threatened | Threatened	This species is found in large rivers with moderate current and stable gravel, sand, and mud bottoms. Common host fish for the Threehorn Wartyback are Common Shiner and Longnose Dace.	**Low** – Due to several migration barriers downstream of the Study Area, it would be difficult for mussels (via fish hosts) to access Tributary C. No suitable habitat in the Study Area for this species.
Birds		
Bald Eagle (*Haliaeetus leucocephalus*) Special Concern | N5B, N5N, N5M	Bald Eagle has been recorded in the vicinity of the Study Area as part of targeted citizen science surveys. Bald Eagles nest in large trees near lakes or large rivers feeding on fish, ducks and carrion. Trees immediately adjacent to the Thames River (north of Study Area) are likely to be preferred for nesting as compared to those within the Study Area.	**Low –** This species has not been recorded within the Study Area during targeted surveys as part of this or prior local studies.
Eastern Meadowlark (*Sturnella magna*) Threatened | Threatened	Presence of Eastern Meadowlark in the vicinity of the Study Area has been noted by multiple data sources. The species breeds primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in other open areas. Fallowed fields within the Study Area could provide nesting habitat for this species.	**Low** – A small area of potential habitat for this species (Cultural Meadow) was confirmed during site visits, but no individuals were noted during target surveys as part of this or prior local studies.
Yellow-breasted Chat (*Icteria virens*) Endangered | Endangered	The NHIC database has a record of this species in the vicinity of the Study Area, but this record is not corroborated with recent citizen science records. This is a large songbird with a distinctive song found in scrub and thickets where it nests and feeds. There is a small amount of suitable habitat for this species within the Study Area.	**Low** – No individuals were observed during targeted surveys as part of this or prior local studies.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Bobolink (*Dolichonyx oryzivorus*) Threatened | Threatened	Bobolink was recorded in the vicinity of the Study Area as part of targeted citizen science surveys. Historically found in tallgrass prairie and other open meadows, the species now breeds in hayfields. Fallowed fields within the Study Area could provide nesting habitat for this species.	**Low** – A small area of potential habitat for this species (Cultural Meadow) was confirmed during site visits, but no individuals were noted during target surveys as part of this or prior local studies.
Wood Thrush (*Hylocichla mustelina*) Special Concern | Threatened	Wood Thrush were recorded in the vicinity of the Study Area as part of targeted citizen science surveys. They live in moist, mature deciduous and mixed forests with well-developed undergrowth and tall trees for singing perches. They prefer larger forests but will also use smaller woodlots. Habitat for this species is present outside of the Study Area.	**Low** – This species was not recorded in the Study Area during targeted surveys for this or prior local studies.
Grasshopper Sparrow (*Ammodramus savannarum*) Special Concern | Special Concern	Grasshopper Sparrow was noted in the vicinity of the Study Area by citizen scientists. It breeds in open cultural and natural habitats. This habitat is present within the Study Area.	**Low** – No individuals were observed during targeted surveys for this or prior local studies.
Barn Swallow (*Hirundo rustica*) Threatened | Threatened	Recorded in the vicinity of the Study Area as part of targeted citizen science surveys. Barn Swallow are still relatively common and build their cup-shaped mud nests almost exclusively on human-made structures like open barns, under bridges, and in culverts. Suitable nesting habitat for this species likely exists within the Study Area.	**High** – One individual was observed during targeted surveys and nesting habitat (buildings) is present.
Bank Swallow (*Riparia riparia*) Threatened | Threatened	Bank Swallow were recorded in the vicinity of the Study Area as part of targeted citizen science surveys. Nests are excavated in vertical faces of silt or sand, including gravel pits and material stockpiles. Suitable habitat was not observed within the Study Area.	**Low** – No habitat or individuals were observed during targeted surveys or prior local studies.
Chimney Swift (*Chaetura pelagica*) Threatened | Threatened	Recorded in the vicinity of the Study Area as part of targeted citizen science surveys. Chimney Swifts nested in caves and hollow trees prior to European settlement and are today most often associated with chimneys and other manmade structures. Suitable habitat my be present within the Study Area.	**Low** – No habitat or individuals were observed during targeted surveys or prior local studies.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Common Nighthawk (*Chordeiles minor*) Special Concern | Special Concern	Common Nighthawk was recorded in the vicinity of the Study Area as part of targeted citizen science surveys. They nest in open areas such as forest clearings, rock barrens and shorelines, but may also nest in fields, orchards, parks and gravel along road edges and railways. In urban situations, this species nests on flat rooftops. Suitable habitat is likely present within the Study Area.	Moderate – No individuals were observed during targeted surveys or prior local studies, but nesting habitat is present (open fields and edge habitats).
Eastern Wood-Pewee (*Contopus virens*) Special Concern | Special Concern	Recorded in the Study Area as part of targeted citizen science and Environmental Impact surveys. Eastern Wood-Pewee prefers mid-canopy layer of forest clearings and edges of deciduous and mixed forests and can often be found in parks or other modified habitats. Suitable habitat is present within the Study Area.	High – Habitat for this species was confirmed in the Study Area south of Oxford Street in 2018 (MTE, 2020).
Purple Martin (*Progne subis*) S3S4B | N5B,N5M	This species was recorded in the vicinity of the Study Area during targeted citizen science surveys. In Eastern North American, it nests almost exclusively in nest boxes and foraging in the surrounding area. As a result, there is habitat for this species within the Study Area.	Low – No nest boxes and no individuals were observed during targeted surveys or prior local studies.
Reptiles		
Blanding's Turtle (*Emydoidea blandingii*) Threatened | Endangered	This species was recorded in the vicinity of the Study Area by citizen scientists. Blanding's Turtles live in shallow water, typically associated with wetlands, ponds and lakes, often with abundant aquatic vegetation. These turtles also utilize terrestrial habitats for movement, foraging and nesting. The Study Area contains limited habitats that are suitable for this species.	Low – Small amounts of wetland habitats for this species are present within and beyond the Study Area, but none were observed during these or prior local studies.
Snapping Turtle (*Chelydra serpentina*) Special Concern | Special Concern	Snapping Turtles have been recorded in the vicinity of the Study Area by citizen scientists. Snapping turtles can utilize any available permanent aquatic habitat, including lakes, rivers and wetlands, also stormwater ponds and sewage lagoons. This species is expected to be found in all permanent water features within the Study Area.	High – Though none were observed, Snapping Turtles are potentially present in all permanent water features within the Study Area, including Tributary C and the dug pond in the eastern section of the Study Area.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Northern Map Turtle (*Graptemys geographica*) Special Concern | Special Concern	Northern Map Turtles have been recorded by local citizen science observers near the Study Area. Typical habitat includes lakes and rivers of sufficient quality to support molluscs, a large part of the females' diet. Habitat for this species is outside of the Study Area associated with the Thames River	**Low** – No habitat is present within the Study Area and none were observed during these or prior local studies.
Queensnake (*Regina septemvittata*) Endangered | Endangered	Queensnake have been recorded by local citizen science observers near the Study Area. Queensnake are restricted to aquatic habitats, often watercourses but occasionally wetlands, that have a large population of crayfish, which they feed on almost exclusively. Habitat for this species is outside of the Study Area associated with the Thames River.	**Low** – No habitat is present within the Study Area and none were observed during these or prior local studies.
Spiny Softshell (*Apalone spinifera*) Endangered | Endangered	MECP noted that there were known occurrences of Spiny Softshell with the potential to also occur in the Study Area. Spiny Softshell are restricted to aquatic habitats, typically larger lakes and rivers in Ontario with well-oxygenated hibernation sites being a critical habitat component. Habitat for this species is outside of the Study Area associated with the Thames River.	**Low -** No habitat is present within the Study Area and none were observed during these or prior local studies.
Eastern Foxsnake (*Pantherophis gloydi*) Endangered | Endangered	Eastern Foxsnake have been recorded by local citizen science observers in the vicinity of the Study Area. This species is typically associated with existing or former prairie, wetland or shoreline habitats but can utilize a wide range of habitats. The Study Area is outside of its typical range in southern Ontario and the noted records are likely animals collected and released by people.	**Low** – No individuals were observed during these or prior local studies. These records are anomalous and likely attributable to human interference.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Eastern Hog-nosed Snake (*Heterodon platirhinos*) Threatened | Threatened	Eastern Hog-nosed Snake have been recorded by local citizen science observers near the Study Area. This species is associated with sandy soils, which it requires for nesting but otherwise can utilize various habitats for hunting toads, which it feeds on nearly exclusively. As this species is a generalist with a large home range, suitable habitat is found within the Study Area.	Low/Medium – No individuals were observed during these or prior local studies, however, this species is notoriously cryptic and is easily missed, even during dedicated surveys. Incidental occurrences are possible as this is a wide-ranging habitat generalist outside of nesting and hibernation seasons but the Study Area is not expected to be part of the core range of the local population, centered within Komoka Provincial Park.
Eastern Milksnake (*Lampropeltis triangulum*) S4 | Special Concern	Eastern Milksnake have been recorded by local citizen science observers in the vicinity of the Study Area. This species uses a wide variety of habitats, including fields and forests and wetlands. The Study Area includes habitat for this species.	Medium – No individuals were observed during these or prior local studies, however, this species has the potential to be occasionally encountered within the Study Area as it is a habitat generalist and can utilize anthropogenic habitats.
Insects		
Sleepy Duskywing (*Erynnis brizo)* S1 | N3*	Citizen science data reports this species is historic in the local area. Sleepy Duskywing lives in sandy habitats with oaks and pines. Suitable habitat for this species is not present in the Study Area.	Low – This species was last formally recorded in the area in 1971.
Hackberry Emperor (*Asterocampa celtis*) S3 | N3*	Citizen science data reports this species is present in the vicinity of the Study Area. Hackberry Emperor are obligate on Hackberry (Celtis spp.) and can be found where sufficient numbers of hosts are available. Suitable habitat for this species is potentially present within and adjacent to the Study Area.	Medium– This species was not observed during these or prior local studies. Host species were recorded within the Study Area during prior inventories (MTE, 2020).

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Tawny Emperor (*Asterocampa clyton*) S3 | N3*	There are citizen science records of this species is present in the vicinity of the Study Area. Tawny Emperor are obligate on Hackberry (Celtis spp.) and can be found where sufficient numbers of hosts are available. Suitable habitat for this species is potentially present within and adjacent to the Study Area.	Medium – This species was not observed during these or prior local studies. Host species were recorded within the Study Area during prior inventories (MTE, 2020).
Reversed Haploa (*Haploa reversa*) S1? | Endangered	Citizen science data reports this species in the vicinity of the Study Area. Reversed Hapola inhabits dry oak savannah, woodland and dune systems. Habitat for this species is potentially present beyond the Study Area.	Low – This species was not observed during these or prior local studies, and no host species were recorded during inventories.
Fratternal Potter Wasp (*Eumenes fraternus*) S3 | N3*	There is a citizen science record of this species near the Study Area. Little is known about this wasp but based on food requirements it could be present wherever suitable nectar sources (adults) and Lepidoptera larva (young) are found. Potential habitat for this species is present within the Study Area.	Low/Medium – This species was not observed during these or prior local studies, however, potentially suitable habitat is present.
Differentiated Grasshopper (*Melanoplus differentialis*) S3 | N3*	This species has been observed by citizen scientists immediately west of the Study Area. It lives in grasslands, woodlands, meadows and croplands, where they eat a variety of foods, including agricultural crops. Habitat for this species is found within the Study Area.	High – This species was not observed during these or prior local studies, however, based on the presence of an adult nearby, they are likely present.
Monarch (*Danaus plexippus*) Special Concern | Special Concern	There are citizen science records of this species in general area. Monarchs require milkweed plants for larva to feed on, while adults forage on the nectar of available wildflowers. As roadsides and other edge habitat may support milkweed and wildflower species, Monarchs are expected to be present within the Study Area.	High – One adult was observed within the Study Area during site investigations.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Mammals		
American Badger (*Taxidea taxus)* Endangered | Endangered	MECP noted that there were known occurrences of American Badger with the potential to also occur in the Study Area. American Badger known to inhabit the the London area,but are not well-documented throughout their range as a result of their nocturnal and nomadic habits. Presence is most often assumed when appropriate burrows or digging associated with foraging is observed in areas known to support the species.Potential habitat for this species is within the Study Area.	**Low –** No large (>10cm) mammal burrows or signs of foraging (excavation for small mammals) were observed during site investigations by an observer familiar with badger activity. This species may pass through the area incidentally.
SAR Bats Little brown bat (*Myotis lucifugus* Northern long-eared bat (*Myotis septentrionalis*) Tri-colored bat (*Perimyotis subflavus*) Endangered | Endangered	MECP noted that there were known occurrences of SAR bats with the potential to also occur in the Study Area. Outside of known hibernacula, SAR bats are associated with dead and dying trees which provide maternity roost habitat, as well as in some cases attics and other buildings. Habitat for these species is present within the Study Area but higher-quality habitat is present outside of the Study Area associated with forested communities to the north.	**Medium –** Suitable treed habitats with the potential to support SAR bats are present in the Study Area, outside of the road right-of-way. A small number of trees within the right-of-way possess features (decay, peeling bark etc) that could provide maternity colony habitat for SAR Bats. These habitats are low quality compared to those within and beyond the Study Area associated with more natural habitats and watercourses.

Source: NHIC; NatureServe; DFO Aquatic SAR Mapping – 2021
**S*/N* – range of uncertainty about the status of the species*
S1/N1 – Critically Imperiled: At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
S2/N2 – Imperiled: At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
S3/N3 – Vulnerable: At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors
S4/N4 – Apparently Secure: At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
S5/N5 – Secure: At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.

6.0 Ecological Constraints and Opportunities

6.1 Constraints

Tributary C is a coldwater stream with a resident Brook Trout population in the City of London. This is a rare and sensitive natural feature that should be protected. North of Oxford Street West, the watercourse is surrounded by a PSW which provides habitat for a diverse community of rare plants and wildlife habitat for species of conservation concern, in particular amphibians and reptiles. The wetland is also associated with significant valleylands which border the tributary which help to buffer the watercourse from the adjacent development-related disturbances.

Detailed design should consider minimizing encroachment into sensitive features, particularly the Tributary C and the PSW. Design should also consider surface drainage patterns and impacts to the water balance.

6.2 Opportunities

Several opportunities to enhance the natural heritage system in the Study Area were identified though background research and field investigations.

Enhanced surface water treatment – Flat bottom ditches vegetated with a native wetland meadow mix will encourage infiltration, reducing flow velocity and erosive potential, and reducing road contaminants that enter the nearby watercourses. Swamp milkweed (*Asclepias incarnata*) is an ideal plant to include in this seed mix as it provides pollinator habitat, spreads and competes with invasive reeds – both benefits described further, below.

Invasive species management/Phragmites management - Notable invasive species observed within the Study Area included European Common Reed (*Phragmites australis*), Common Buckthorn (*Rhamnus cathartica*), and Autumn Olive (*Elaeagnus umbellate*). This provides an opportunity for enhancement by implementing invasive species management procedures consistent with the City's Invasive Plant Management Strategy (City of London 2020).

Pollinator habitat/roadside naturalization – Revegetation of disturbed areas with a native grass/forb seed mix and a wetland meadow mix would benefit the larger ecosystem and add diversity to the roadside habitats. Milkweed seed could be included, however as noted above, we recommend Butterfly or Swamp Milkweed (*Asclepias tuberosa; A. incarnata*) which are less common on the landscape in comparison to the common variety and also will thrive in a wetland mix. A more robust revegetation plan could include native shrubs, specifically ones with flowers and fruit that benefit local pollinators and bird species.

Wildlife crossing/signs/lights - Wildlife are regularly crossing Oxford Street West, west of the intersection. The skeletal remains of two white-tailed deer (*Odocoileus virginianus*) were observed

just west of the existing intersection, one on either side of Oxford Street West. A game trail and deer scat were also noted in association with the skeletons. A potential crossing solution for smaller wildlife would be presented when future work to rehabilitate the Tributary C culvert crossing Oxford Street West is undertaken. Since the culvert itself is perched above the streambed both upstream and downstream of the crossing, replacement would likely be proposed to restore fish passage. Intentionally oversizing the replacement culvert would be a simple way to provide wildlife passage across the road, which has potential to benefit turtles as road-killed turtles were noted by a nearby homeowner during the November 17, 2021, Public Information Centre (PIC).

7.0 Proposed Solution

7.1 Evaluation of Alternatives

The study objectives for the Project as a whole, were to evaluate and select a preferred alternative solution for the intersection improvements at Oxford Street West and Gideon Drive that would also incorporate a new connection with Kains Road and future developments. Several alternatives, noted below, were identified and evaluated, including signalized intersection, single and multi-lane roundabouts, and were compared to a 'do-nothing' alternative.

7.1.1 Alternative 1 – Do Nothing

This alternative maintains the existing condition of the Oxford Street West and Gideon Drive intersection (Figure 7.1). While doing nothing does not impact the natural features in the Study Area, it does not improve traffic operation or safety, does not accommodate projected traffic volumes, nor does it improve active transportation facilities. Do Nothing also eliminates the opportunity for enhancement of natural features.

Figure 7.1 – Alternative Solution 1 – Do Nothing

7.1.2 Alternative 2 – Signalized Intersection

This alternative consists of the installation of traffic signals, crosswalks and cycling facilities (Figure 7.2). The signalized intersection impacts the least area of natural features, while still addressing some of the traffic operation issues, but it would result in increased queuing along Oxford Street which would result in increased noise and air pollution from starts/stops and vehicle idling.

Figure 7.2 – Alternative Solution 2 – Signalized Intersection

7.1.3 Alternative 3 – Single-Lane Roundabout

This alternative consists of a traditional roundabout (one approach lane per direction), crosswalks and cycling facilities (Figure 7.3). The roundabout impacts a larger area than the first two alternatives and does provide traffic calming. This alternative would have a lower increase in noise and air pollution compared to the signalized intersection due to the reduced need for vehicles to stop or idle while at a red light.

Figure 7.3 – Alternative Solution 3 – Single-Lane Roundabout

7.1.4 Alternative 4 – Multi-Lane Roundabout

This alternative consists of a multi-lane roundabout with additional lanes to accommodate heavier traffic movements, crosswalks and cycling facilities (Figure 7.4). While this alternative impacts the largest area, similar to the single-lane roundabout, it integrates with potential future widening of Oxford Street and avoids the need for re-disturbance. This alternative would have a lower increase in noise and air pollution compared to the signalized intersection or the single lane roundabout due to the reduced need for vehicles to stop or idle while at a red light. It provides for improved flow of traffic over the single lane roundabout option.

Figure 7.4 – Alternative Solution 4 – Multi-Lane Roundabout

7.1.5 Impact Summary of Alternative Solutions

Considering the natural heritage features within the proposed project area and the ecological constraints noted in Section 6.1, the environmental impacts of each alternative were generally comparable. A brief summary of measured areas of impact for each alternative are presented in Table 7.1.

Table 7.1 – Areas (in hectares) of Impact by Alternative

Natural Feature	1 – Do Nothing	2 – Signalized Intersection	3 – Single-Lane Roundabout	4 – Multi-Lane Roundabout
Ecosites (Total)	0	0.06	0.35	0.36
Cultural Meadow (CUM1)	-	0.06	0.34	0.35
Cultural Savanah (CUS1)	-	-	0.005	0.005
Cultural Thicket (CUT1)	-	-	0.0003	0.0003
Cultural Savanah - Walnut Inclusion (CUS1)	-	-	0.0005	0.008
Confirmed SWH	0	0.06	0.34	0.35
Candidate SAR Habitat	0	0	0.005	0.01
Tree Removal (> 10 cm)	1	2	20	20

7.2 Preferred Alternative – Multi-Lane Roundabout

The overall evaluation of the alternative solutions determined the multi-lane roundabout to be the preferred solution. To accommodate this roundabout design, Oxford Street West will be slightly realigned, and the roundabout will be positioned at and to the south of the existing intersection. No additional property is required as the preferred solution will be accommodated within the existing ROW. It is however recommended that the City acquire a portion of the property at #2085 Oxford Street West to take over ownership of the existing culvert under the driveway for ongoing maintenance activities as this culvert is currently on private property and conveys flows from the public right-of-way.

Sidewalks/multi-use paths will be extended and connect to existing paths along Oxford and Kains Road and to future developments on the south side of Oxford. Stormwater management will be provided by new flat-bottom ditches with flow checks and native vegetation. Space within the roadway is being protected for potential future sanitary sewers and watermain, for future connections, should additional future developments materialize. Road work for this alternative stops short of the Tributary C crossing on Oxford Street West.

7.2.1 Proposed Project Activities

The preferred alternative includes several construction activities that have potential to impact the natural heritage features:

- Vegetation clearing;
- Excavation;
- Grading and paving;
- Dewatering/unwatering;
- Use of industrial equipment; and
- Hardening of natural pervious surfaces (i.e., new asphalt/concrete).

8.0 Preliminary Assessment of Potential Impacts

The following sections provide discussion on the potential impacts of the preferred alternative, multi-lane roundabout, on the natural heritage features and suggest avoidance and operational constraints to mitigate these impacts.

8.1 Terrestrial Vegetation

Potential direct impacts to terrestrial vegetation as a component of construction of the multi-lane roundabout and sidewalk/multi-use pathway construction include complete removal through construction and grading activities, as well as vegetation clearing to support surveying and construction equipment access. Indirect impacts to woody vegetation along the periphery of construction areas may occur due to damage to roots, stems and branches through interaction

with construction equipment. Excessive dust raised by construction activities may also negatively impact vegetation.

The preferred solution for the Oxford Street West and Gideon Drive intersection will directly impact existing anthropogenic vegetation communities. This includes mainly Cultural Meadow (CUM1-1) within roadsides/road right-of ways as well as mowed/landscaped areas within existing residential properties. These areas are occupied by pioneering native and exotic species, mainly grasses and forbs and this intersection and surrounding area have a long history of disturbance, as witnessed by the isolated area of asphalt west of the existing intersection. Two problematic invasive species, Autumn Olive and invasive Phragmites are present within the Study Area, including the proposed project footprint.

Terrestrial vegetation within the Study Area will be impacted by the proposed intersection improvement activities through clearing and removals associated with installation of a roundabout and sidewalks, as well as associated road widening, shoulder and slope grading. As the vegetation communities impacted are common, cultural features composed of pioneering species with no unique components, mitigations will focus on the retention and reduction of impacts to adjacent remaining vegetation, invasive species control and ecological revegetation.

- Revegetation of cleared areas should consider using non-invasive native plant species with high wildlife value (fruit-producing shrubs and trees, wildflowers, etc.) which will provide long-term ecological contributions to the local terrestrial system. Species and densities should be chosen so that at maturity, plants may reach typical size without interfering with each other or safe operation of the roadway, thus reducing maintenance.
- Areas of invasive Phragmites and Autumn Olive within the Study have been identified as a part of this study. Prior to the implementation of construction and efforts should be made to not spread these species. The Clean Equipment Protocol for Industry should be provided to contractors at the implementation stage to assist with these efforts.
- Control of invasive Phragmites and Autumn Olive throughout the right-of-way as a component of construction would also provide long-term benefit, as these species causes significant negative ecological impacts and Phragmites can impact infrastructure as well.

- The impacts of dust on the surrounding ecosystem can be mitigated by moistening dry soils with water as required during construction and adhering to erosion and sediment management measures as described below.

8.2 Invasive Species

Certain species, including Common Buckthorn, Autumn Olive, and Phragmites (European Common Reed) are recognized as problematic invasive species and their responsible removal will reduce the spread of these plants. Care should be taken not to spread these plants beyond their current limits during construction phases. Management of these invasive plants within the ROW should be

considered at detailed design. Mitigation measures to limit the spread should include removal of the noxious plants, especially Phragmites, prior to construction.

8.3 Terrestrial Wildlife and Habitats; Significant Wildlife Habitat

Potential impacts to wildlife and their habitats during construction can occur through direct injury and habitat loss as well as indirect impacts such as avoidance of areas of active construction and resulting modification to established daily movement patterns.

Wildlife and habitats identified during site visits were typical of rural and urbanizing areas of southern Ontario. A section of Confirmed Significant Wildlife Habitat (SWH) was located within the area proposed to be impacted by the roundabout and sidewalk/pathway design (Habitat for Special Concern Species (Monarch). This habitat (Cultural Meadow) is also present elsewhere in the Study Area and few milkweed plants are within the areas proposed to be impacted. No other Confirmed or Candidate Significant Wildlife Habitat is present within the area to be impacted.

Most of Canada's birds are protected under the MBCA. Vegetation clearing has the potential to impact breeding birds through disturbance of nesting birds and destruction of nests, eggs and young.

Construction activities have the potential to indirectly affect all other wildlife within the surrounding landscape through vibration along with light and noise pollution. This disturbance will be temporary, and it is anticipated that local wildlife is accustomed to human disturbances.

Construction activities required to implement the preferred solution will impact terrestrial wildlife habitats and have the potential to impact individuals. The following measures are recommended to reduce these impacts.

- To prevent incidental impacts to nesting birds and bat maternity colonies, woody vegetation clearing should be restricted to outside of the bat maternity and migratory bird nesting seasons, generally April 1 through October 31. If vegetation clearing must occur within this window, a qualified ecological professional should be retained to ensure no birds or bats are incidentally harmed by vegetation removals.
- Grading activities should be limited to the active season for wildlife if practical, typically May 1 through September 30 to prevent entombment within burrows, tunnels or other subterranean features.

Limiting construction activities to daylight hours will reduce the impacts to behaviour changes (avoidance) of local wildlife in response to the project. Construction of the roundabout and sidewalk/multi-use pathways has the potential to have a positive impact on the local ecosystem.

- Immediately west of the existing intersection is an area of wildlife crossing, and subsequent mortality of white-tailed deer was noted associated with this crossing. During surveys, vehicles were also noted travelling through this area at excessive speeds. The roundabout will slow traffic along Oxford Street West, which may lead to fewer wildlife-vehicle collisions.

- Use of LIDs/bioswales as a component of stormwater management provides an opportunity to diversify local vegetation as these features will support a broader variety of plant species, which will in turn provide habitat for a broader array of wildlife.

8.4 Aquatic Habitat and Communities

Potential impacts to aquatic habitats and the communities therein can be identified as: a direct loss of habitat; direct injury to fish (or other aquatic organisms) as a result of construction; or indirect changes to the aquatic habitat that may occur in the long term and/or over a larger area. In general, road reconstruction and stormwater management (new ditching) are likely to cause impacts to the surrounding riparian vegetation, changes to existing slopes and surface drainage, localized impacts to the streambed and fish habitat in potential areas of direct disturbance, and potentially more widespread impacts as a result of sedimentation and thermal changes. Potential impacts to aquatic habitat and communities have been assessed further by taking into consideration the project activities noted in Section 7.1.1 and are discussed below.

Vegetation clearing exposes soils and increases the likelihood of erosion and release of sediments into nearby water features. Impacts of terrestrial vegetation clearing and general mitigation measures are also discussed in Section 8.1.1. Release of sediment into Tributary C could have significant detrimental impacts to water quality and fish habitats. Sediments that enter a watercourse can increase stream turbidity, abrade fish gill membranes (leading to physical stress), cover spawning areas and incubating juvenile fish, cover/smother mussel beds, decrease food production, and smother eggs in nests. Removing riparian vegetation can also decrease watercourse shading, thereby potentially affecting the water temperature of surface flows, and can limit the natural shedding of organic materials which may flow into the nearby watercourse which may provide food, cover, and nutrients to the aquatic ecosystems.

Excavation will be required to install the sanitary sewers, remove the existing roads at the intersection and to prepare for the new alignment and roundabout. Excavation exposes soils and increases the likelihood of erosion and release of sediments into the nearby water features (as discussed above). Excavation also changes the shape of the land, which affects slopes and drainage. This activity will most likely also require the use of industrial equipment and grading.

Grading will be required following road realignment and roundabout construction, and to shape the new ditches and slopes. Grading operations, similar to excavation activities, disturb the ground and expose soils, increasing the likelihood of erosion and the potential release of sediments into nearby water features. These activities most likely also require the use of industrial equipment.

Dewatering of groundwater may be required during excavation for the sanitary sewers based on the groundwater elevation determined in the Preliminary Geotechnical Assessment (Golder 2021). This has potential to impact the water balance in the wetland, groundwater upwellings in Tributary C, and the groundwater recharge area.

Unwatering of stormwater may be required during roundabout construction. The resulting effluent will be directed to overland drainage swales, ultimately entering Tributary C and have potential to cause sedimentation and erosion in the receiving watercourse.

Industrial equipment accessing surface water drainage paths may release deleterious materials such as debris, oil, fuel, and grease that could be conveyed into the nearby watercourse.

As the primary impacts to the aquatic habitat and communities for this Project are associated with riparian vegetation removal, industrial equipment, changes in surface drainage, and changes to groundwater, the following measures are recommended to be carried forward into detailed design:

- Vegetation clearing impacts to the Tributary C slopes and banks should be mitigated by access limitations and Erosion and Sediment Controls (ESCs – e.g., silt fence, fibre filtration tubes, etc.) in place during construction.
- Excavation impacts will be mitigated by the ESCs implemented during construction, such as timing constraints on covering exposed slopes, and silt fence/fibre filtration tubes surrounding areas of exposed soils to slow water velocities and allow settling of suspended sediments. All permanent changes to the slopes in the area as a result of excavation will be stabilized in the short term with interim products (such as bonded fibre matrix) and long term with vegetation (grasses and native plantings). All excess materials generated by excavation will be stockpiled, handled, and disposed of in a manner that prevents entry into the adjacent waterbody or features.
- Riparian vegetation removal should be kept to a minimum, as required for construction and access only. Vegetation scheduled for removal should have proper clearing techniques implemented to protect and retain the surrounding vegetation, and root masses will be left in place for bank stabilization, where feasible.
- Restoration plan – all exposed soils should be immediately stabilized with a suitable seed and cover mix, and riparian areas should be replanted with native trees and shrubs to provide/replace stream shading.
- Enhanced swales have been included as part of the SWM design to slow the flow of stormwater, filter contaminants, and encourage infiltration by using flat-bottom ditches and appropriate vegetation (i.e., native wetland meadow mix).
- No in-water work is required for this Project, meaning no work below the high water mark of Tributary C is permitted.
- Design and implement ESCs to contain/isolate the construction zone, manage site drainage and prevent erosion of exposed soils and migration of sediment to adjacent watercourses/waterbodies during all phases of the project.
- All ESC measures should be inspected and maintained to ensure they are functioning as intended throughout the construction period and until such time that disturbed areas have stabilized.
- To prevent any deleterious substances from entering the watercourse, operate, store and maintain all equipment, vehicles and associated materials at a minimum, 30 m away from any watercourse.

- Manage and treat dewatering/unwatering effluent to prevent erosion and/or release of sediment laden or contaminated water to the waterbody. Additional dewatering considerations:
    - Use of appropriately designed and sited temporary settling basin, filter bag, overland through 30 m of vegetation, etc., such that sediment is filtered out prior to the water entering a waterbody.
    - Use of energy dissipation measures to prevent bank and bed erosion.
- Travel paths, stockpile areas and staging areas, within the vicinity of the crossing, should be pre-planned and followed.

Mitigation measures should be updated and refined during the detailed design phase of the project.

8.5 Species at Risk and Species of Conservation Concern

One species protected under the Ontario ESA Barn Swallow (Threatened) was observed during site investigations, but no protected habitat (nests) was observed. were located during field investigations.

One species of conservation concern (Monarch) was located during site investigations and another, Eastern Wood Pewee, was not located but is expected to be present based on prior surveys (MTE 2020). There is a low likelihood of impacts to individuals or important habitats of the remaining species of conservation concern and species at risk noted in Table 5.1.

The roundabout and sidewalk/multi-use pathway will result in the loss of a small amount of Cultural Meadow (CUM1-1) that provides supporting habitat for Monarch, but few host plants (milkweed). Areas of host plants are present elsewhere within as well as beyond the Study Area and are locally common. The loss of habitat proposed as a result of the project is not anticipated to affect the ability of Monarch to use remaining local habitats.

The various potential SAR and Species of Conservation Concern noted in Section 8.4 will be generally protected through the proper application of the general mitigation measures noted in the sections above. The following discussion explains any SAR specific measures and recommendations:

- Vegetation clearing timing windows (no clearing between April 1 through October 31) will serve to protect against incidental impacts to Monarch eggs, larva and pupa. The restoration plan/seed mix should consider inclusion of milkweed species, as well as various flowering plants that together could provide nectar sources throughout the active season for Monarchs. Education of construction staff regarding the potential of encountering wildlife, including turtles and snakes, as well as appropriate actions (i.e., allow the animal to leave on its own, contact a wildlife professional, etc.) is an effective mitigation against unintended impacts to wildlife.

In addition to the mitigation measures and operational constraints noted in this section, specific measures and commitments may be specified by the permitting agencies and described in the

potential issued permits and approvals. Potential permits and approvals are identified in Section 10.0.

8.6 Cumulative Impacts of Adjacent Construction

Construction and development immediately surrounding the Study Area which is already occurring or is planned may have cumulative effects to the surface flows in the Study Area. These impacts cannot be quantified in this study but should be considered at the overall land use and planning level.

9.0 Preliminary Net Effects Assessment

A preliminary assessment of the predicted net effects of the Project on the existing natural heritage features is presented in Table 9.1.

Table 9.1 – Preliminary Net Effects Assessment

Natural Feature	Potential Impacts	Mitigation Measures	Net Effects Following Mitigation	Management and Monitoring
Terrestrial Vegetation	Removal of vegetation for construction, staging, access, etc.	Floral inventory confirmed the absence of rare species.	None – currently no known rare plants present in removal areas	n/a
		Revegetate with typical lawn grass seed mix where required and native grass/forb mixture outside of areas to be maintained by municipality.	Positive – lawn grass seed would be comparable to existing conditions; addition of native species would support increased biodiversity	Restoration Plan – enhance restoration areas through invasive species management and native plantings.
	Damage to retained vegetation adjacent to the construction zone	Prepare a tree preservation plan to ensure protection of adjacent trees during construction. Demark protection area with high-visibility exclusion fencing.	None – no impacts to retained trees providing tree exclusion fencing is installed correctly and respected.	Tree Preservation Plan to protect adjacent trees
	Spread of invasive plant species.	Contractors should adhere to the Clean Equipment Protocol for Industry (Halloran *et al.* 2013)	None – no impacts from spread of invasive species.	None required though species may spread into disturbed areas from seed sources nearby. Invasives are easiest to manage during the initial stages of infestation.
Wildlife and Wildlife Habitat	Disturbance or destruction of active bird nests	Complete all necessary vegetation removals between September 1 – March 31, outside of the core breeding bird season. Instruct workers to have Suspected active nests should be vetted by an experienced professional and work modified	None – all impacts to active bird nests will be avoided through timing windows and modified work, if required.	Environmental Monitoring During Construction – ensure no active bird nests within work areas

Natural Feature	Potential Impacts	Mitigation Measures	Net Effects Following Mitigation	Management and Monitoring
		or ceased to prevent harm or disturbance to the nest.		
	Disturbance to local wildlife	Active construction to be completed during the daylight hours to reduce disturbance to crepuscular wildlife.	Low – disturbance to local wildlife will be mostly avoided.	n/a
	Harm to wildlife in the construction work area	Instruct workers that any wildlife discovered on the site is not to be harmed or harassed, and should be left to vacate the site on its own unless there is a risk of immediate harm to the animal.	None – harm or harassment of wildlife will be avoided	Environmental Monitoring During Construction – check for wildlife within work areas
		Any wildlife that is injured by construction activities should be transported immediately to an approved wildlife rehabilitator.	Low – no harm to wildlife is anticipated. However, in the unlikely event that an animal is injured by construction activities it will be transported to a wildlife rehabilitator.	Environmental Monitoring During Construction – check for wildlife within work areas
Provincially Significant Wetland (PSW)	Impacts of dewatering to construct sanitary sewers to groundwater balance.	Water balance study in detailed design should inform of potential mitigation measures and impacts.	Unknown	TBD
Tributary C	Sedimentation of surface water.	Erosion and sediment controls should be installed and maintained until vegetative cover establishes.	Low – properly installed and maintained ESC measures will reduce erosion and avoid sediment transfer to the watercourse.	Environmental Monitoring During Construction – a qualified environmental monitor should regularly inspect ESC measures to ensure they are functioning correctly.

Natural Feature	Potential Impacts	Mitigation Measures	Net Effects Following Mitigation	Management and Monitoring
		Limit construction equipment access on banks and floodplain.	Low – equipment access will be limited to work areas delineated in the contract plans; isolation methods may be employed near the watercourse.	Environmental Monitoring During Construction
		Enhanced surface water treatment with flat bottom ditches and native vegetation.	None – potential for sediment (and contaminant) retention to be enhanced in final drainage ditches.	Restoration Plan – enhance surface water treatment with native vegetation.
	Contamination of surface water by road runoff.	Design appropriate containment and treatment of road runoff to ensure that contaminated water is not directed, untreated towards the watercourse.	Low – measures will be incorporated in design to mitigate the impacts of road runoff.	Environmental Monitoring During Construction
	Impacts to groundwater upwellings and coldwater fish habitat due to dewatering to construct sanitary sewers.	Water balance study in detailed design should inform of potential mitigation measures and impacts.	Unknown	TBD
	Loss of riparian habitat surrounding the watercourse as a result of grading.	Limit design of new ditching to avoid the riparian habitat surrounding Tributary C.	Unknown – pending encroachment of final ditch design.	TBD
		Revegetate new ditches and road embankments with native species. Provide native plantings to replace any loss of the riparian habitat.	Low – vegetation will be maintained and restored in the new roadside ditches.	Restoration Plan – enhance restoration areas through invasive species management and native plantings.

Natural Feature	Potential Impacts	Mitigation Measures	Net Effects Following Mitigation	Management and Monitoring
Species at Risk and Species of Conservation Concern	Construction with slight encroachment into areas where SoCC habitats occurs.	Vegetation clearing during the inactive season for birds and insects will reduce the potential for incidental direct impacts. Revegetation of disturbed areas with native species will mitigate long-term impacts.	Low – minor loss of candidate habitat for Monarch.	Restoration Plan – enhance disturbed areas through invasive species management and native plantings, including milkweeds and flowering species.
	Opportunity for improvement of wildlife habitat	Management of areas dominated by *Phragmites* consistent with existing City funded management, control and monitoring and replace with native species.	Positive – creation of habitat for Monarch as well as adding biodiversity to the local area.	Restoration Plan – enhance restoration areas through invasive species management and native plantings.

10.0 Potential Permits and Approvals

In general, the Oxford Street West and Gideon Drive intersection improvements (and the associated stormwater upgrades, vegetation clearing, sanitary sewers, and sidewalks) have potential to impact the natural environment that cannot be fully mitigated by the measures and operational constraints described. Such impacts may require agency permitting and/or approvals, and include alterations within UTRCA regulated habitat, and potential impacts to SAR, and groundwater balance. The following list of potential approvals and permits should be considered and confirmed with the appropriate agencies during the next phase of design:

UTRCA – O. Reg. 157/06 (Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses) establishes regulated areas where development could be subject to flooding, erosion or dynamic beaches, or where interference with wetlands and alterations to shorelines and watercourses might have an adverse effect on those environmental features. UTRCA regulated lands can be found in Appendix A – Map 2. Under this regulation, any proposed development, interference or alteration within these areas requires a permit from UTRCA.

MECP – No permitting anticipated based on field work and habitats identified.

MOECC – Impacts of temporarily lowering the groundwater level to facilitate construction, potentially impacting the recharge to the wetland and watercourse require further investigation in the next phase of design and a permit to take water (PTTW) or Environmental Activity and Sector Registry (EASR) may be required.

11.0 Conclusions and Recommendations

Recommendations to be carried forward into detailed design include the following:

- Through consultation with the City and UTRCA, determine the scope of groundwater impact monitoring and water balance study required;
- Minimize tree and vegetation removal;
- Protect Tributary C from any impacts resulting from construction activities;
- Consideration of flat bottom ditches enhanced with native wetland meadow mix seed;
- Consideration of pollinator corridor plantings and enhancement;
- Consideration for the treatment of / removal of invasive Phragmites prior to commencement of construction to reduce the potential for further spread;
- Implement the Clean Equipment Protocol for Industry practices;
- Prepare an Invasive Species Management Plan for the control of priority invasive species consistent with the LIPMS (City of London 2020);
- Time construction activities outside of sensitive timing windows (e.g., vegetation removal in the late autumn through early spring);
- Produce a restoration plan that includes restoration or enhancement of adjacent natural heritage features; and

- Prepare a plan for monitoring during construction: ESCs, wildlife presence, etc.

Post-construction monitoring activities may include:

- Inspect seeded and planted material for deficiencies and replace as required under warranty; and
- Vegetation monitoring to assess the success of plantings and *Phragmites* management.

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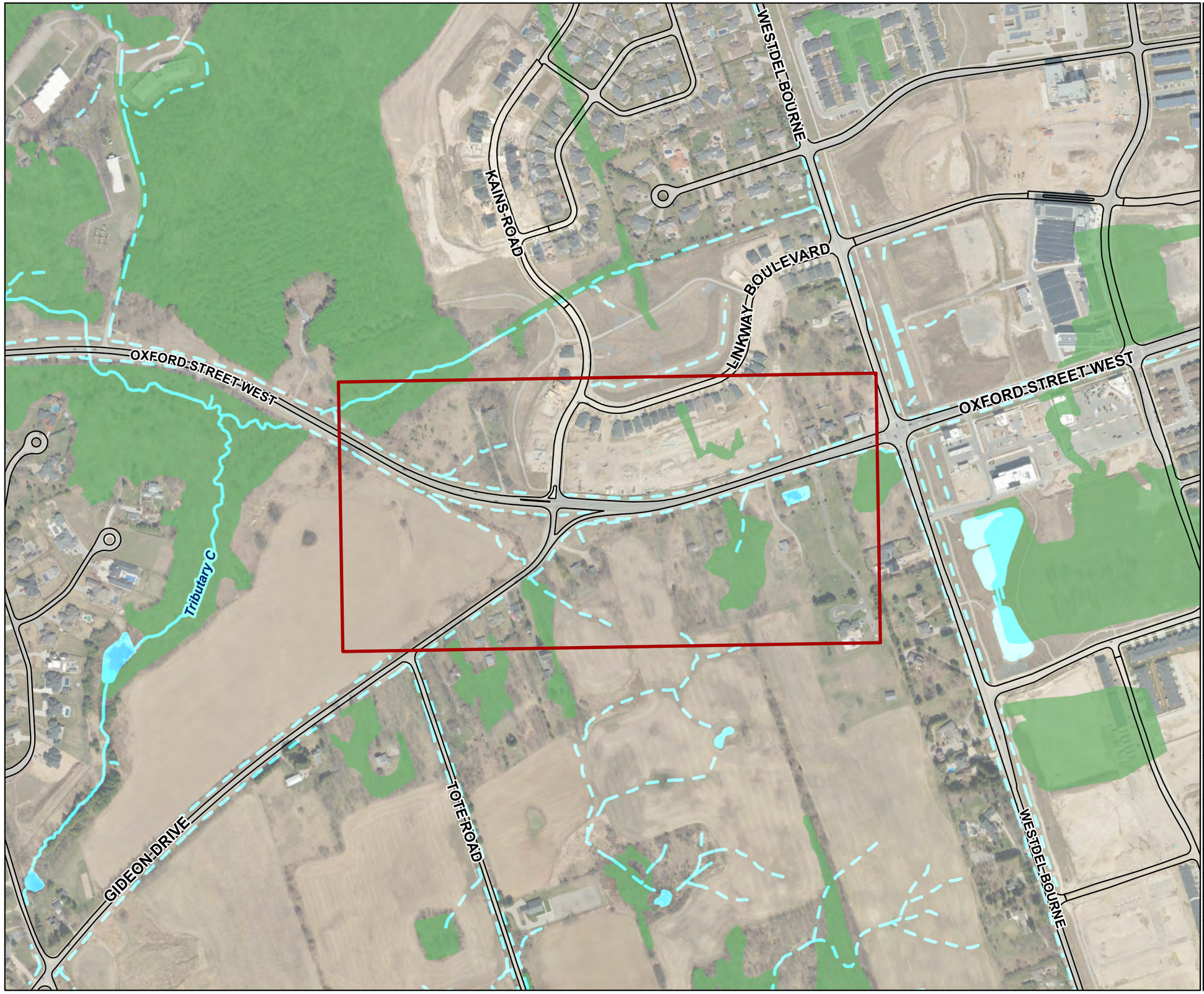
Appendix A

Maps



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Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study
Environmental Impact Study (EIS)
Draft

Map 1 - Study Area Overview

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water
- Wooded Area

NOTE
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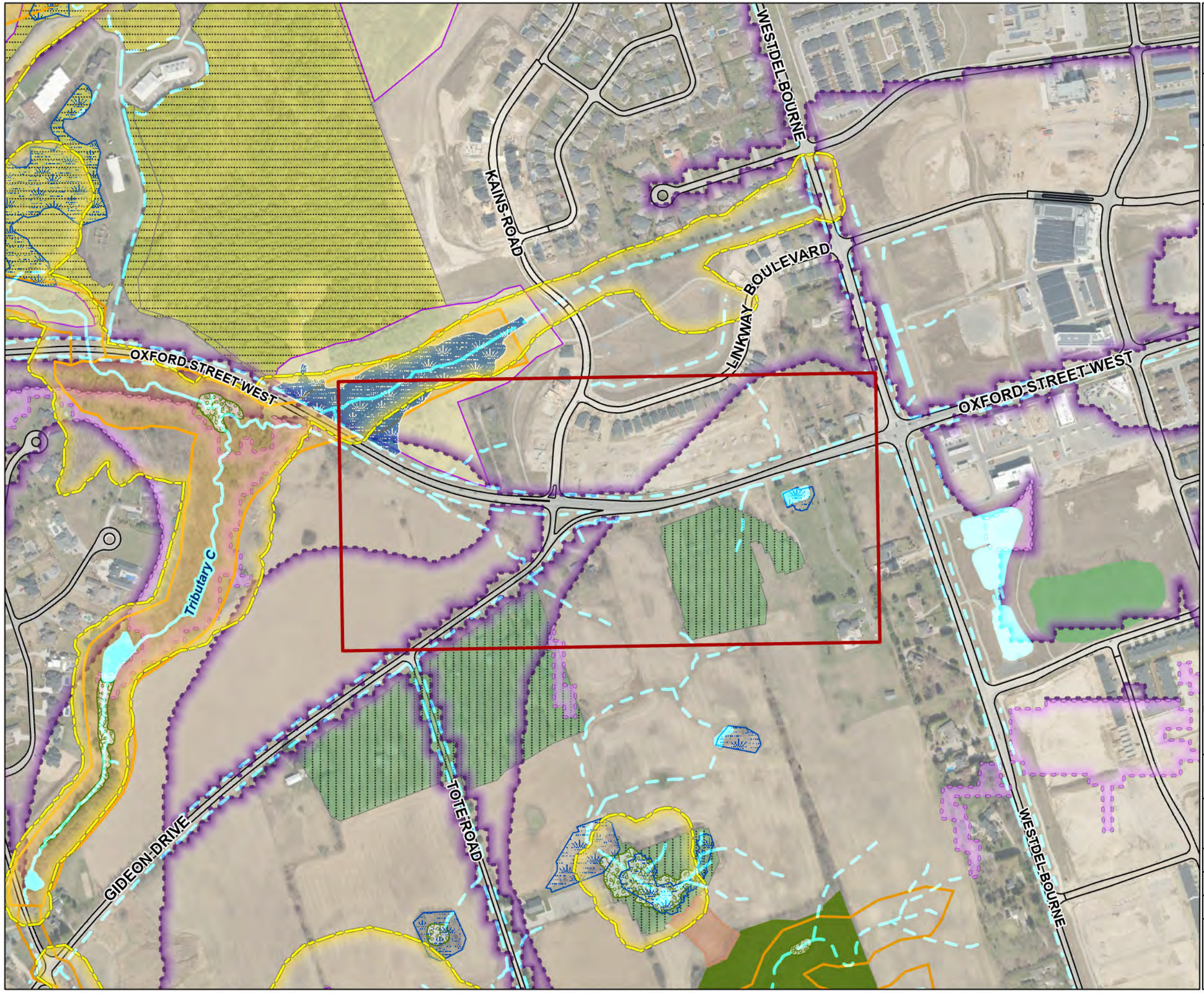

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Map 2 - Overview of Natural Heritage Features & Conservation Authority Regulated Area

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water
- UTRCA Regulated Area (O. Reg. 157/06)
- Valleylands
- Significant Valleylands
- Provincially Significant Wetlands (PSW)
- Unevaluated Wetlands
- Marshes
- Significant Groundwater Recharge Areas - (2 - 4)
- Significant Groundwater Recharge Areas - (6)
- Environmentally Significant Areas (ESA)
- Potential ESA
- Woodlands
- Unevaluated Vegetation Patches
- Significant Woodlands
- Upland Corridors

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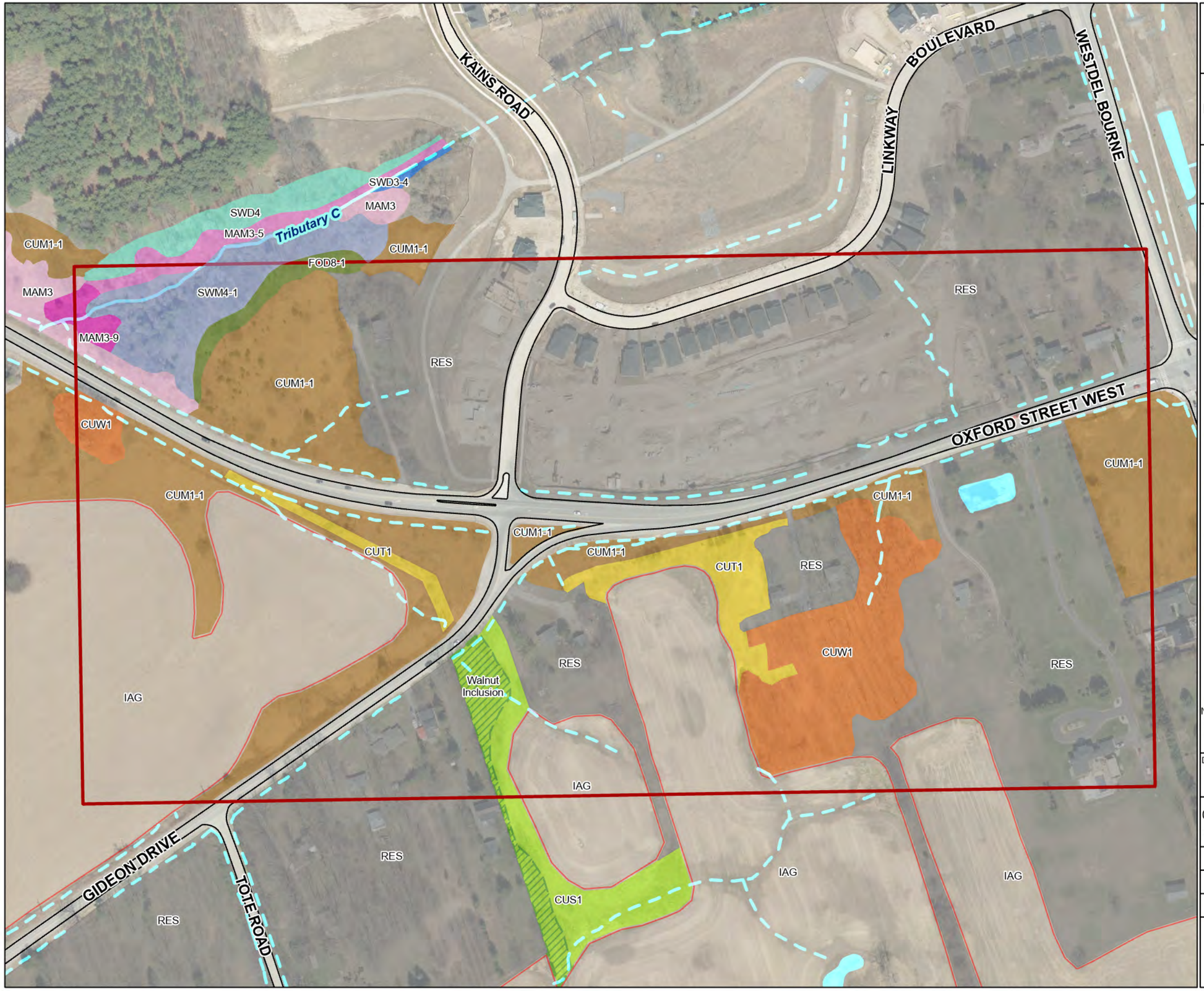

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Map 3 - Vegetation Communities

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water

Vegetation Community

- MAM3 - Organic Meadow Marsh Ecosite
- MAM3-5 - Narrow-leaved Sedge Organic Meadow Marsh
- MAM3-9 - Forb Organic Meadow Marsh
- FOD3-1 - Fresh Moist Poplar Deciduous Forest
- SWD3-4 - Manitoba Maple Mineral Deciduous Swamp
- SWD4-1 - Willow Mineral Deciduous Swamp
- SWM4-1 - White Cedar - Hardwood Organic Mixed Swamp
- CUS1 - Mineral Cultural Savannah Ecosite
- CUS1 - CUS1 with Walnut Hedgerow Inclusion
- CUM1-1 - Dry Moist Old Field Meadow
- CUT1 - Mineral Cultural Thicket
- CUW1 - Mineral Cultural Woodland Ecosite
- IAG - Intensive Agriculture
- RES - Residential and Development

NOTE
Base mapping referenced from AECOM (January, 2016) and MTE (August, 2020). ELC assessments were completed on site by RVA June 16, 2021. Aerial imagery was also used to supplement field assessments. Publicly available London Open Data modified in agreement with Terms of Use.

DATA SOURCES
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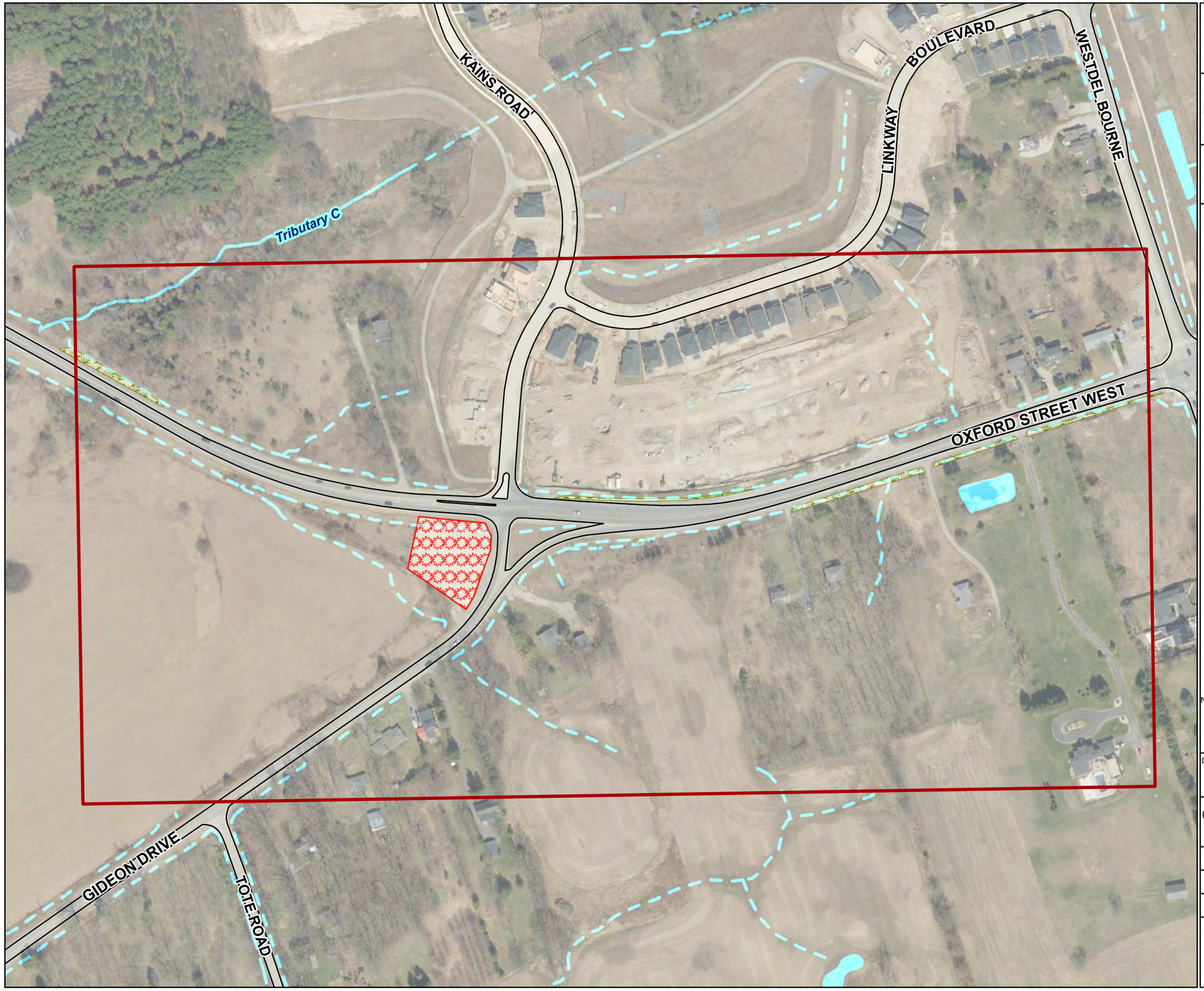

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Map 4 - Invasive Species

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water
- Phragmites
- Autumn Olive

NOTE
Observations were made on site June 16, 2021 by RVA.
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Map 5 - Aquatic Habitat and Topography

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water
- Contour (2 metre)

UTRCA Sampling Record

- UT.RI105
- UT.RI106

Stream Order

- 1st Order Stream
- 2nd Order Stream

Elevation (metre)

- 290.89 - 300
- 281.78 - 290.89
- 272.67 - 281.78
- 263.56 - 272.67
- 254.44 - 263.56
- 245.33 - 254.44
- 236.22 - 245.33
- 227.11 - 236.22
- 218 - 227.11

Slope (Degree)

70.0
0.0

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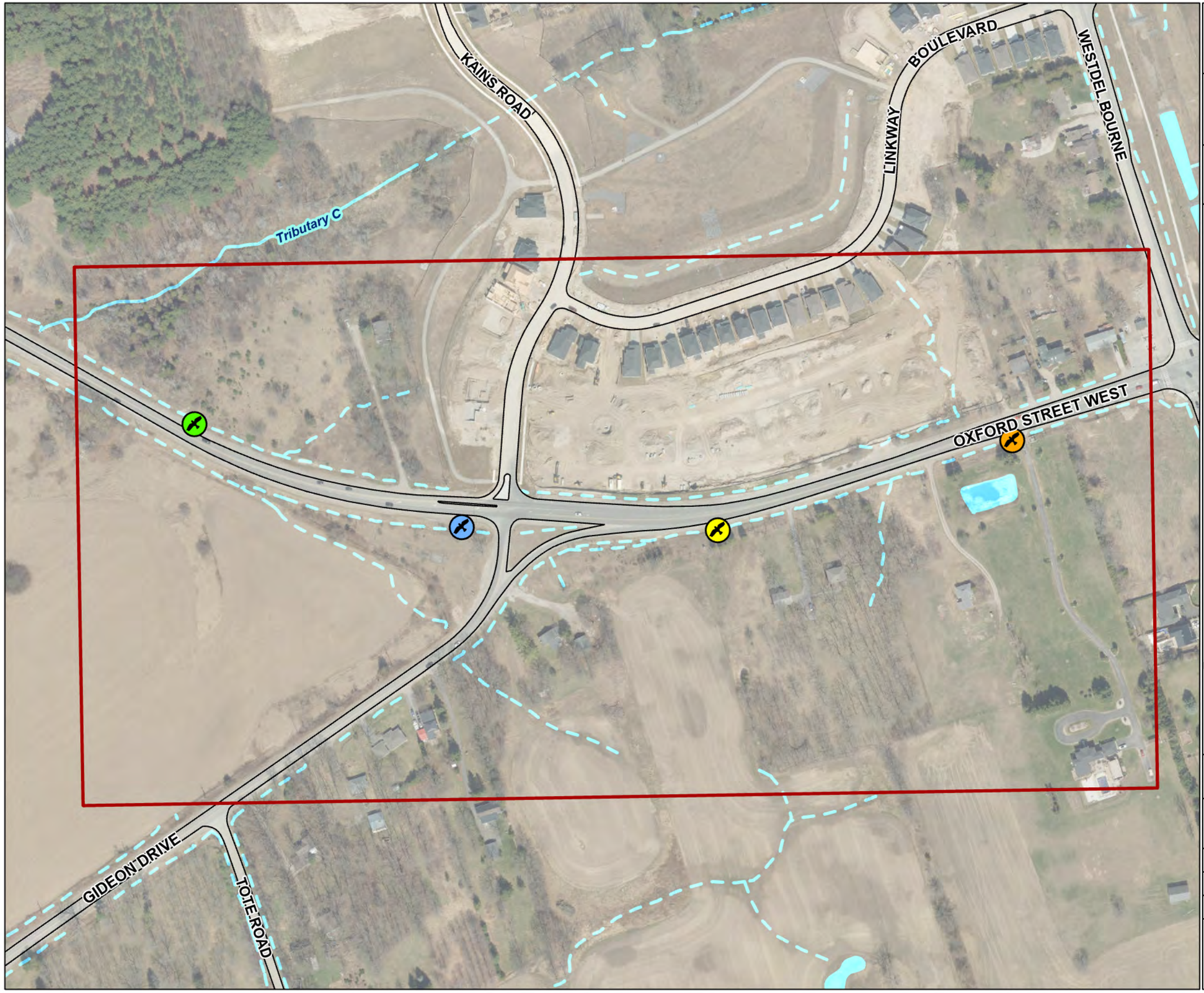

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Map 6 - Breeding Bird Survey

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water
- Breeding Bird Survey Point
- BB1
- BB2
- BB3
- BB4

NOTE
Breeding Bird surveys conducted on site June 2, 2021 and June 16, 2021 by RVA.
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RVA accepts no liability whatsoever in respect to improper use of this map that may result in loss, damages or injury of any kind to the user of the map or any third party. Not a plan of survey.

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0 50 100 150 200 Metres

SCALE 1:2,500	**REVIEW** CB/PM
DATE 2022-01-10	**MAP PAGE** 6
JOB NUMBER 205505	**DRAFT BY** CER

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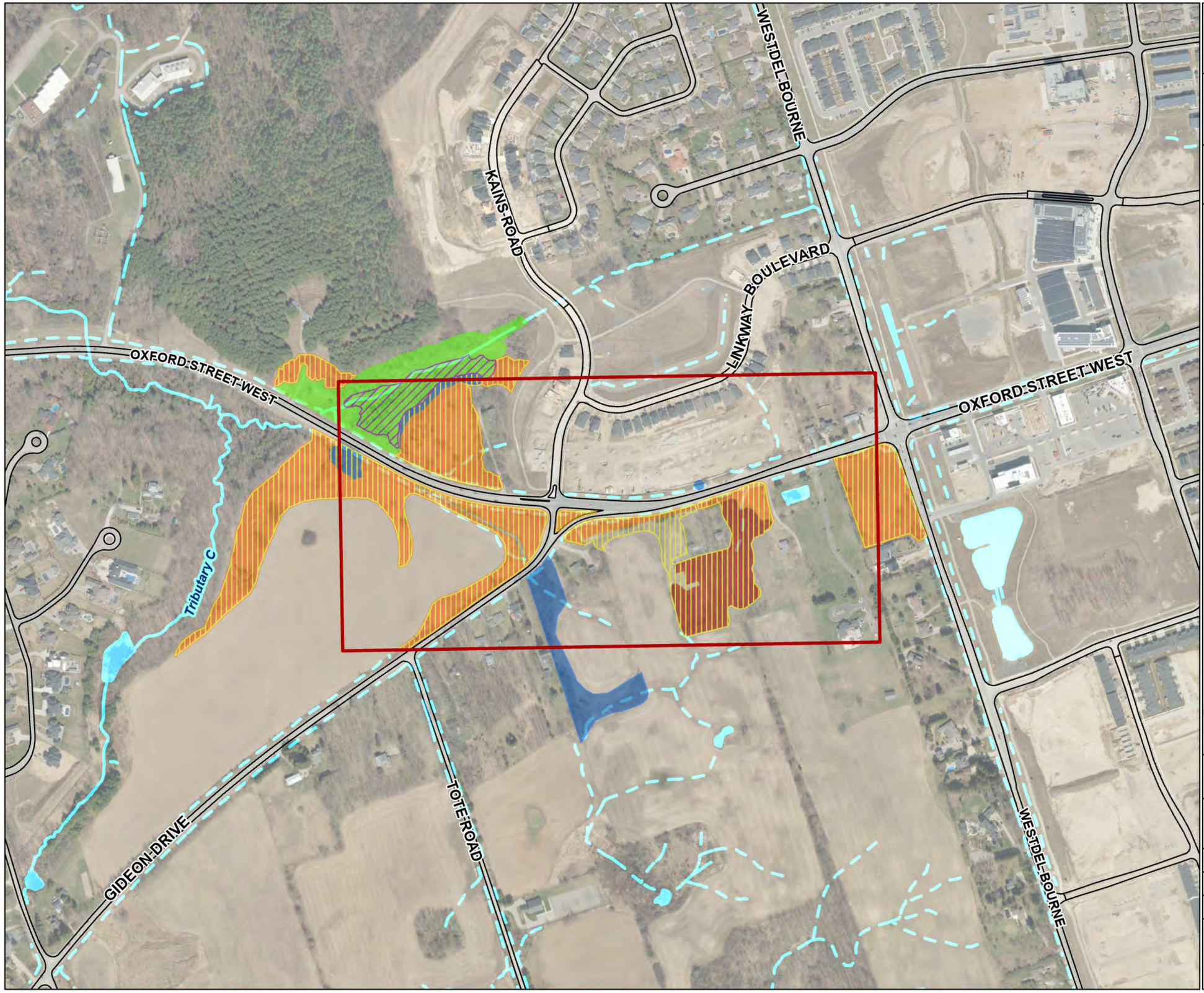

CITY OF LONDON

Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study
Environmental Impact Study (EIS)
Draft

Map 7 - Significant Wildlife Habitat and Candidate Species At Risk Habitat

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water

Habitats

- Candidate Bat
- Candidate Eastern Milksnake
- Candidate Eastern Wood-Pewee
- Candidate Snapping Turtle
- Confirmed Amphibian Breeding Habitat
- Confirmed Monarch Butterfly

NOTE
Base mapping referenced from AECOM (January, 2016) and MTE (August, 2020). Assessments were completed on site by RVA June 2 and June 16, 2021. Aerial imagery was also used to supplement field assessments. Publicly available London Open Data modified in agreement with Terms of Use.

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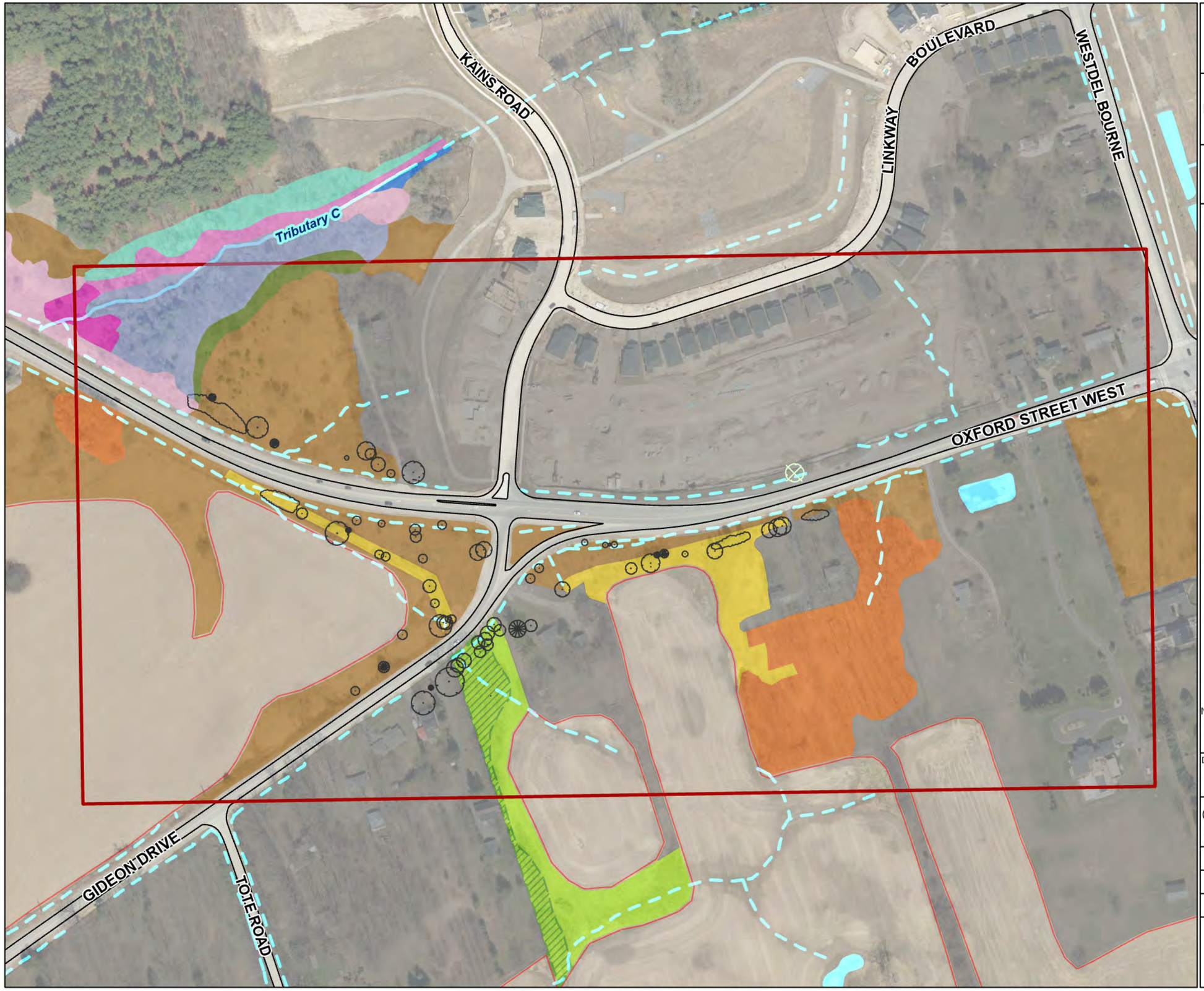

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Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study
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Map 8 - Alternative 1 - Do Nothing

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water

Vegetation Community

- MAM3 - Organic Meadow Marsh Ecosite
- MAM3-5 - Narrow-leaved Sedge Organic Meadow Marsh
- MAM3-9 - Forb Organic Meadow Marsh
- FOD3-1 - Fresh Moist Poplar Deciduous Forest
- SWD3-4 - Manitoba Maple Mineral Deciduous Swamp
- SWD4-1 - Willow Mineral Deciduous Swamp
- SWM4-1 - White Cedar - Hardwood Organic Mixed Swamp
- CUS1 - Mineral Cultural Savannah Ecosite
- CUS1 - CUS1 with Walnut Hedgerow Inclusion
- CUM1-1 - Dry Moist Old Field Meadow
- CUT1 - Mineral Cultural Thicket
- CUW1 - Mineral Cultural Woodland Ecosite
- IAG - Intensive Agriculture
- RES - Residential and Development
- Tree - Deciduous
- Tree - Coniferous
- Tree - Removal

NOTE
Base mapping referenced from AECOM (January, 2016) and MTE (August, 2020). ELC assessments were completed on site by RVA June 16, 2021. Aerial imagery was also used to supplement field assessments. Publicly available London Open Data modified in agreement with Terms of Use.

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JOB NUMBER 205505	**DRAFT BY** CER

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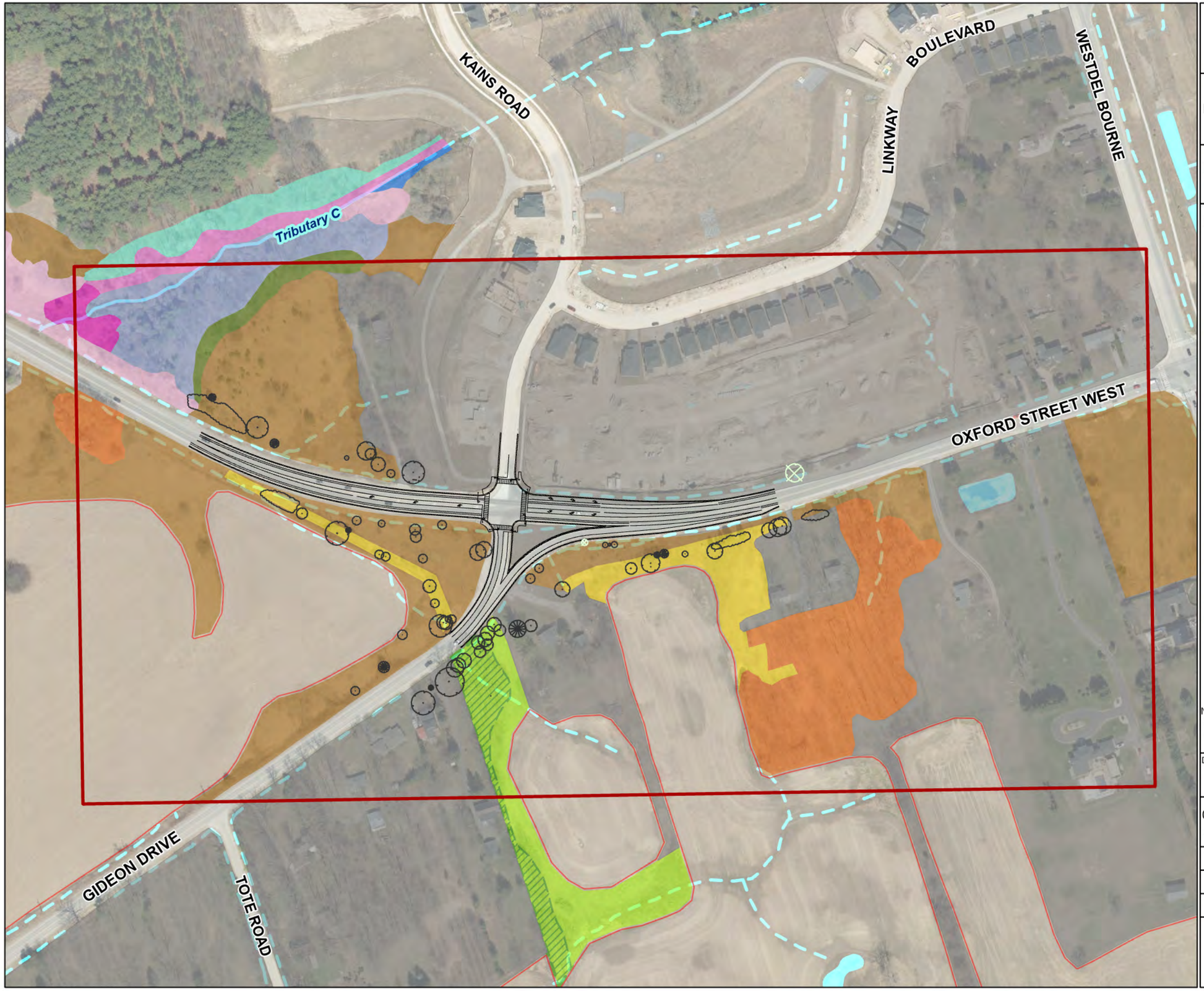

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Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study
Environmental Impact Study (EIS)
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Map 9 - Alternative 2 - Signalized Intersection

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water

Vegetation Community

- MAM3 - Organic Meadow Marsh Ecosite
- MAM3-5 - Narrow-leaved Sedge Organic Meadow Marsh
- MAM3-9 - Forb Organic Meadow Marsh
- FOD3-1 - Fresh Moist Poplar Deciduous Forest
- SWD3-4 - Manitoba Maple Mineral Deciduous Swamp
- SWD4-1 - Willow Mineral Deciduous Swamp
- SWM4-1 - White Cedar - Hardwood Organic Mixed Swamp
- CUS1 - Mineral Cultural Savannah Ecosite
- CUS1 - CUS1 with Walnut Hedgerow Inclusion
- CUM1-1 - Dry Moist Old Field Meadow
- CUT1 - Mineral Cultural Thicket
- CUW1 - Mineral Cultural Woodland Ecosite
- IAG - Intensive Agriculture
- RES - Residential and Development
- Tree - Deciduous
- Tree - Coniferous
- Tree - Removal

NOTE
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DATE 2022-01-12	**MAP PAGE** 9
JOB NUMBER 205505	**DRAFT BY** CER

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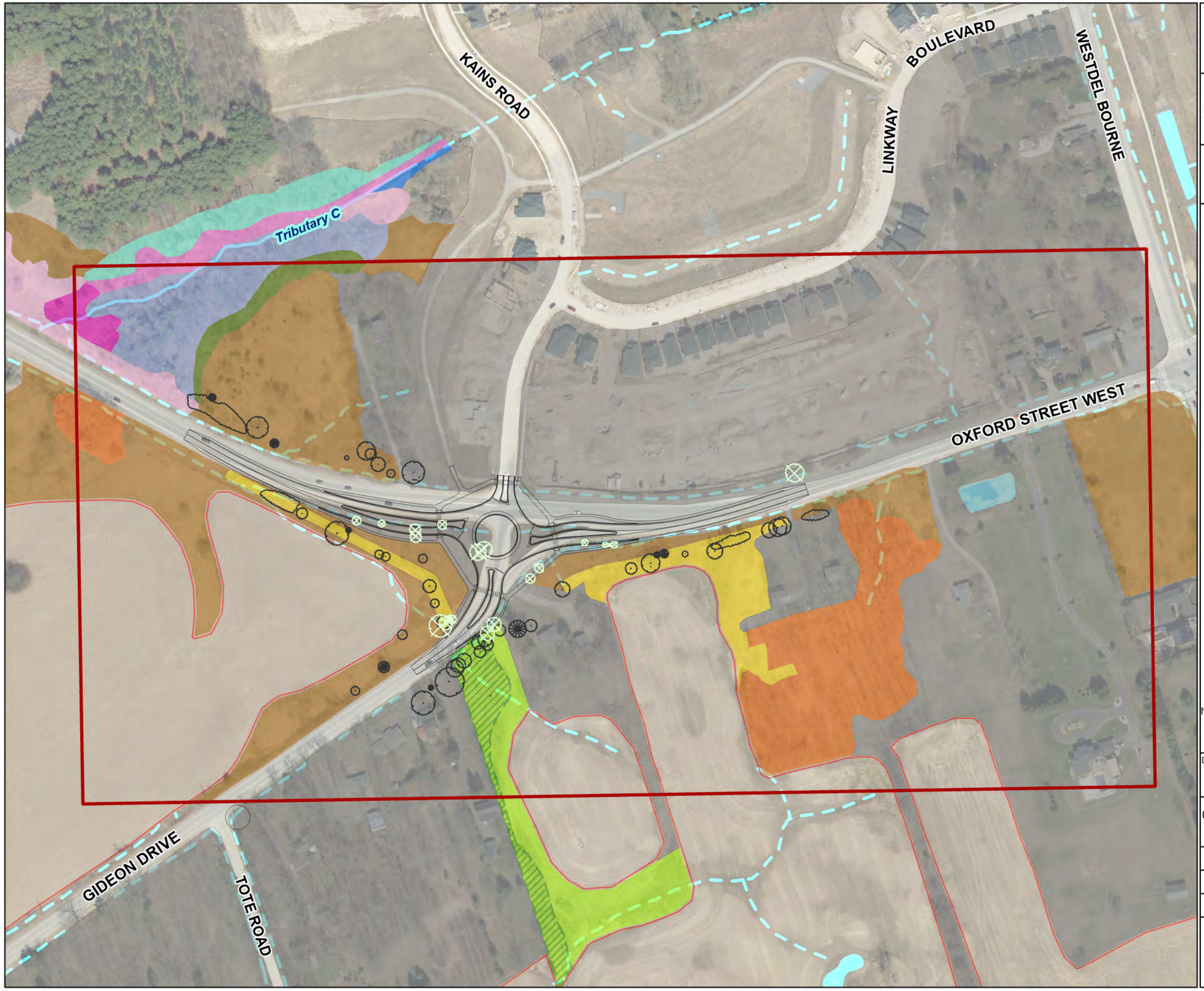

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Map 10 - Alternative 3 - Single-Lane Roundabout

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water

Vegetation Community

- MAM3 - Organic Meadow Marsh Ecosite
- MAM3-5 - Narrow-leaved Sedge Organic Meadow Marsh
- MAM3-9 - Forb Organic Meadow Marsh
- FOD3-1 - Fresh Moist Poplar Deciduous Forest
- SWD3-4 - Manitoba Maple Mineral Deciduous Swamp
- SWD4-1 - Willow Mineral Deciduous Swamp
- SWM4-1 - White Cedar - Hardwood Organic Mixed Swamp
- CUS1 - Mineral Cultural Savannah Ecosite
- CUS1 - CUS1 with Walnut Hedgerow Inclusion
- CUM1-1 - Dry Moist Old Field Meadow
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- CUW1 - Mineral Cultural Woodland Ecosite
- IAG - Intensive Agriculture
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- Tree - Coniferous
- Tree - Removal

NOTE
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0 50 100 150 200 Metres

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DATE 2022-01-12	**MAP PAGE** 10
JOB NUMBER 205505	**DRAFT BY** CER

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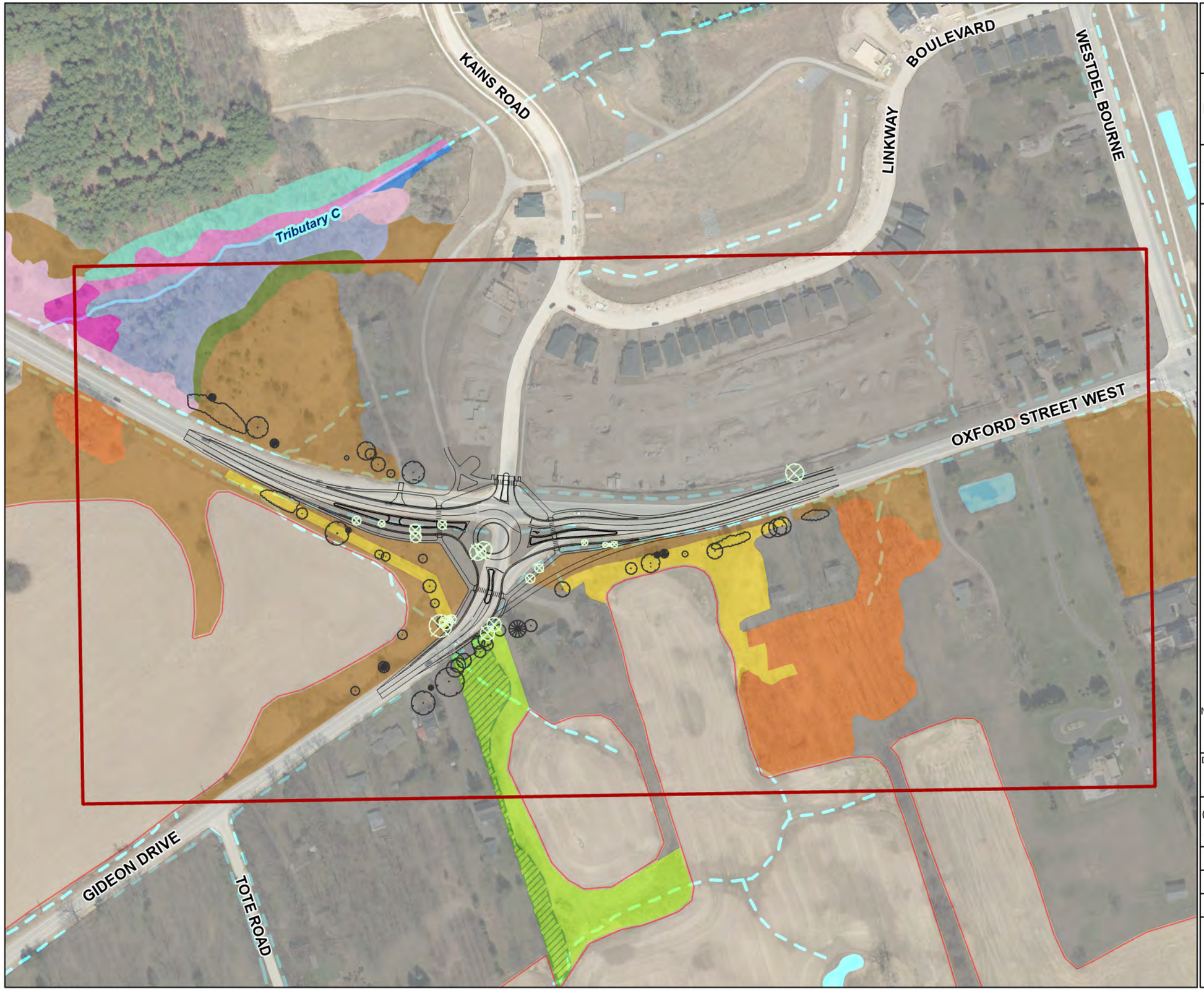

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Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study
Environmental Impact Study (EIS)
Draft

Map 11 - Alternative 4 - Multi-Lane Roundabout

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water

Vegetation Community

- MAM3 - Organic Meadow Marsh Ecosite
- MAM3-5 - Narrow-leaved Sedge Organic Meadow Marsh
- MAM3-9 - Forb Organic Meadow Marsh
- FOD3-1 - Fresh Moist Poplar Deciduous Forest
- SWD3-4 - Manitoba Maple Mineral Deciduous Swamp
- SWD4-1 - Willow Mineral Deciduous Swamp
- SWM4-1 - White Cedar - Hardwood Organic Mixed Swamp
- CUS1 - Mineral Cultural Savannah Ecosite
- CUS1 - CUS1 with Walnut Hedgerow Inclusion
- CUM1-1 - Dry Moist Old Field Meadow
- CUT1 - Mineral Cultural Thicket
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- IAG - Intensive Agriculture
- RES - Residential and Development
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- Tree - Coniferous
- Tree - Removal

NOTE
Base mapping referenced from AECOM (January, 2016) and MTE (August, 2020). ELC assessments were completed on site by RVA June 16, 2021. Aerial imagery was also used to supplement field assessments. Publicly available London Open Data modified in agreement with Terms of Use.

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Appendix B

EIS Scoping and Agency Response

Environmental Impact Study
ISSUES SUMMARY CHECKLIST REPORT

Application Title: Oxford Street West and Gideon Drive Intersection Improvements
Date Submitted: March 18, 2021 Date Revised: March 26, 2021
Proponent: City of London

Qualification

Primary Consultant: R.V.Anderson Associates Ltd. (RVA)
Key contact person: Tisha Doucette, Planning Ecologist
Other consultant / field personnel

Hydrogeology / Hydrology: Previous studies
Biological – Flora: RVA
Biological – Fauna: RVA
Other: Archaeology (Stage 1-2) / Cultural Heritage - Golder

Context for Background Information

Subwatershed: Downstream Thames and Dingman Creek
Tributary Fact Sheet Number:
Planning / Policy Area: River Bend

Technical Advisory Review Team

- ☑ Ecologist Planner: Linda McDougall / Emily Williamson
- ☑ Planner for File: Linda McDougall / Emily Williamson
- ☑ EEPAC:
- ☑ Conservation Authority: Upper Thames River Conservation Authority (UTRCA)
- ☐ Ministry of Natural Resources:
- ☐ Ministry of Municipal Affairs and Housing:
- ☐ Ministry of Agriculture and food:
- ☑ Other Review Groups (e.g., Community Associations , Field Naturalists):

Ministry of the Environmental, Conservation and Parks (MECP)

1.0 DESCRIPTION OF THE ENVIRONMENT (FEATURES)

Purpose: To have a clear understanding of the current status of the land, and the proposed "development" or land use change.

1.1 Mapping (Location and Context)

Current Aerial Photography

- ☑ Land Use - Excerpts of the Official Plan for the City of London Ontario Schedule A, B, showing a 5-10 km radius of subject site
- ☑ Terrain setting @ 1:10,000 - 1:15,000 scale showing landscape features, subwatershed divides
- ☑ Existing Environmental Resources showing @1:2,000 - 1:5,000 showing Vegetation, Hydrology, contours, linages.
- ☑ Environmental Plan or Strategy from Subwatershed reports (tributary fact sheet), Community (Area) Plans, or other

1.2 Description of Site, Adjacent lands, Linage with Natural Heritage System

List all supporting studies and reports available to provide background summary (e.g. subwatershed, hydrological, geo-technical, natural heritage etc.).

Check the first box if the information is relevant and required as part of this study. Check the second box if sufficient data is available.

Final Report - Functional Design of the Tributary 'C' Storm Drainage and Stormwater Management Servicing Works Downstream Thames River Subwatershed (Matrix, 2015)

Eagle Ridge Subdivision Phase II Scoped Environmental Impact Study and Addendum (AECOM, 2016; AECOM 2017)

Municipal Class Environmental Study Report - Schedule 'C' - Storm/Drainage & Stormwater Management, Transportation & Sanitary Trunk Servicing Works for Tributary 'C', Downstream Thames Subwatershed (AECOM, 2013)

14 Gideon Drive and 2012 Oxford Street West Environmental Impact Study (MTE, 2020)

1.2.1 Terrain Setting

☑	☑	Soils (surface and subsurface)
☑	☑	Glacial geomorphology - landform type
☑	☑	Subwatershed
☑	☑	Topographic features
☐	☐	Ground water discharge
☐	☐	Shallow ground water/baseflo
☑	☑	Ground water discharge/aquifer
☐	☐	Aggregate resources

1.2.2 Hydrology

- ☑ ☑ Hydrological catchment boundary and of wetlands + determine the catchment areas of all wetlands
- ☑ ☑ Surface drainage pattern
- ☑ ☐ Watercourses (Permanent, Intermittent)
- ☑ ☑ Stream order (Headwater, 1st, 2nd, 3rd or higher)
- ☐ ☐ Agricultural Drains
- ☑ ☐ Downstream receiving watercourse (Trib C is a sensitive watercourse)
- ☑ ☑ Hazard Line (Map 6)

1.2.3 Natural Hazards

- ☐ ☐ 100 year Erosion Line
- ☑ ☑ Floodline mapping
- ☑ ☑ Max line mapping – UTRCA mapping + text based regulated areas

1.2.4 Vegetation

- ☑ ☐ Vegetation patch Number - GIS request
- ☑ ☑ System (Terrestrial, Wetland, Aquatic)
- ☑ ☑ Cover (Open, Shrub, Treed)
- ☑ ☑ Community Type(s)
- ☑ ☐ ELC Community Class (Bluff, Forest, Swamp, Tallgrass Prairie, Savannah & Woodland, Fen, Bog, Marsh, Open Water, Shallow Water)
  ELC Community Sites (review existing data, update and confirm)
- ☑ ☐ Rare Vegetation Communities

1.2.5 Flora

- ☑ ☐ Flora (Inventory dates, Source)

  2009 - Storm/Drainage & Stormwater Management, Transportation & Sanitary Trunk Servicing Works for Tributary ‘C’, Downstream Thames Subwatershed (AECOM, 2013)

  2018 - 14 Gideon Drive and 2012 Oxford Street West Environmental Impact Study (MTE, 2020)

- ☑ ☐ Rare Flora (National, Provincial, Regional)

  slender leaved mountain mint (Pycnanthemum tenuifolium) (S3; R2),
  marsh goldenrod (Solidago uliginosa) (R1)
  water avens (Geum rivale) (R1),
  marsh horsetail (Equisetum palustre) (R1),
  downy willow herb (Epilobium strictum) (R2)
  larger straw sedge (Carex normalis) (R)

1.2.6 Fauna

☑ ☐ Fauna (Inventory dates; sources) update and confirm with field work, 2021)

2009 - Storm/Drainage & Stormwater Management, Transportation & Sanitary Trunk Servicing Works for Tributary 'C', Downstream Thames Subwatershed (AECOM, 2013)
2018 - 14 Gideon Drive and 2012 Oxford Street West Environmental Impact Study (MTE, 2020)

☑ ☐ Breeding Birds (update with field work, 2021)

☐ ☐ Migratory Birds

☑ ☐ Amphibians - Incidental observations

☑ ☐ Reptiles - Incidental observations

☑ ☐ Mammals - Incidental observations

☑ ☐ Butterflies - Incidental observation

☑ ☐ Odonata - Incidental observation

☐ ☐ Other

☑ ☐ Partners In Flight (PIF) (update with field work, 2021)

Field Sparrow
Northern Flicker
Eastern Wood Pewee
incidental observations will be recorded in 2021

☑ ☐ Rare Fauna

1.2.7 Wildlife Habitat + as per MNRF 2015 Criteria, as amended from time to time, and all applicable Official Plan policies and In-force London Plan polici

☑ ☐ Species-At-Risk Regulated Habitat critical habitat mapping

☐ ☐ Winter habitat for deer, wild turkey

☐ ☐ Waterfowl Habitat (wetlands, poorly drained landscape - bottomlands, beaver ponds, seasonally flooded areas, staging areas, feeding areas

☐ ☐ Colonial Birds Habitat

☑ ☐ Hibernacula incidental obs.; note potential features during field work 2021

☐ ☐ Habitat for Raptors

☐ ☐ Forests with springs or seeps

Ephemeral ponds

☑ ☐ Wildlife trees (snags, cavities, x-large trees > 65 cm DBH)

☐ ☐ Forest Interior Birds

☑ ☐ Area-sensitive birds

confirmed / update -to be reviewed during 2021 field work

1.2.8 Aquatic Habitat

(SWS Aquatic Resource Management Reports)

☑ ☐ Fish Communities

☑ ☐ Fish spawning areas

☐ ☐ Fish migration routes

☑ ☐ Thermal refuge for fis

☐ ☐ Benthic inventory

☐ ☐ Substrate

☑ ☐ Riparian habitat (extent and type)

1.2.9 Linkages and Corridors

(The diversity of natural features in an area, and the natural connections between them should be maintained, and improved where possible. PPS 2.3.3)

- ☑ ☑ Valleylands
- ☑ ☑ Significant atercourses (Thames River, Stoney Creek, Medway Creek, Dingman Creek, Pottersburg Creek, Wabuno Creek, Mud Creek, Stanton Creek (Drain), Kelly Creek (Drain)

- ☑ ☐ Upland Corridors / species migration routes
- ☑ ☑ Big Picture Cores and Corridors
- ☑ ☐ Linkages between aquatic and terrestrial areas (riparian habitat, runoff
- ☐ ☐ Groundwater connections
- ☐ ☐ Patch clusters (mosaic of patches in the landscape)

review for potential for wildlife passage/culverts

1.3 Social Values

1.3.1 Human Use Values

- ☑ ☐ Recreational linkages for hiking, walking
- ☑ ☐ Nature appreciation, aesthetics (consider landscaping)
- ☐ ☐ Education, research
- ☐ ☐ Cultural / traditional heritage
- ☑ ☑ Social (parks and open space)
- ☐ ☐ Resources Products (e.g. timber, fish, furbearers, peat
- ☐ ☐ Aggregate Resources

1.3.2 Land Use - Cultural

- ☑ ☐ Archaeological (pre 1500)
- ☑ ☐ Historical (post 1500 - present)
- ☐ ☐ Adjacent historical and archeological
- ☑ ☑ Future

1.3.3 Land Use - Active

- ☑ ☐ Archaeological (pre 1500)

- ☑ ☐ Historical (post 1500 - present)
- ☐ ☐ Adjacent historical and archeological
- ☑ ☑ Future

1.3.4 Other

2.0 EVALUATION OF SIGNIFICANCE

Components of the Natural Heritage System
The policies in Section 15.4 apply to recognized and potential components of the natural heritage system as delineated on Schedule 'B' or features that may be considered for inclusion on Schedule 'S'. They also address the protection of environmental quality and ecological function with respect to water quality, fish habitat, groundwater recharge, headwaters and aquifers.

- ☐ **A component of a Subject Lands Status Report that is required to be included in the EIS is the evaluation of significance of all potential natura heritage features and areas recognized by In-force London Plan policies and/ or Official Plan policie**

- ☑ **A component of a Subject Lands Status Report that is required to be included in the EIS is the confirmation and mapping of boundaries of al natural heritage features and areas.**

2.1 Environmentally Significant Areas

- ☑ Identified Environmentally Significan Areas (ESA)
- ☑ Name none; PSW contributes ecologically to Kains Woods to the north
- ☑ Potential ESAs - Expansion of an Existing ESA
- ☐ Name
- ☐ Potential ESA - Area not associated with an existing ESA
- ☐ Name

2.2 Wetlands

- ☑ Provincially Significant etlands (noted in Trib C Report, 2013)
- ☐ Name
- ☐ Wetlands
- ☐ Name
- ☑ Unevaluated Wetlands (dug pond in easternmost section of SA)

2.3 Areas of Natural and Scientific Interes

- ☐ Provincial Life Science ANSI
- ☐ Regional Life Science ANSI

- ☐ Earth Science ANSI

2.4 Habitat of Species-At-Risk (SAR)

- ☑ Endangered
- ☑ Threatened
- ☑ Vulnerable / Special Concern

2.5 Woodlands and Vegetation Patches

- ☐ Significant oodlands
- ☑ Unevaluated Vegetation Patches and/ or other patches > 0.5ha

2.6 Corridors and Linkages

- ☑ River, Stream and Ravine Corridors
- ☐ Upland Corridors
- ☐ Naturalization and Anti-fragmentation Areas

3.0 IDENTIFICATION AND DESCRIPTION OF FUNCTIONS

Ecological Functions the natural processes, products or services that species and non-living environments provide or perform within or between ecosystems and landscapes. Check those functions that will be required to assess for the study (key and supporting functions).

3.1 Biological Functions

- ☑ Habitat (provision of food, shelter for species)
- ☑ Limiting habitat (potential hibernaculum, bat maternity roost, etc)
- ☐ Species life histories (reproduction and dispersal)
- ☐ Habitat guilds
- ☐ Indicator species
- ☐ Keystone species
- ☑ Introduced species (note Phragmites and others during 2021 field work)
- ☐ Predation / parasitism
- ☐ Population dynamics
- ☐ Vegetation structure, density and diversity
- ☐ Food chain support
- ☐ Productivity
- ☐ Diversity
- ☐ Carbon cycle
- ☐ Energy cycling
- ☐ Succession and disturbance processes
- ☐ Relationships between species and communities

3.2 Hydrological and Wetland Functions

- ☑ Groundwater recharge and discharge (hydrogeology)
- ☐ Water storage and release (fluvial geomorphology
- ☐ Maintaining water cycles (water balance)
- ☑ Water quality improvement (considered as part of stormwater)
- ☐ Flood damage reduction
- ☐ Shoreline stabilization / erosion control
- ☐ Sediment trapping
- ☐ Nutrient retention and removal / biochemical cycling
- ☑ Aquatic habitat (fish, macroinvertebrates) (contributing habitat to Trib C

3.3 Landscape Features and Functions

- ☐ Size
- ☑ Connections, corridors and linkages
- ☑ Proximity to other areas / natural heritage features (e.g. woodlands, wetlands, valleylands, water, etc.)
- ☐ Fragmentation

3.4 Functions, Benefits and alues of Importance to Humans

- ☑ Contributing to healthy and productive landscapes
- ☑ Improving air quality by supplying oxygen and absorbing carbon dioxide
- ☑ Converting and storing atmospheric carbon
- ☐ Providing natural resources for economic benefi
- ☐ Providing green space for human activities
- ☑ Aesthetic and quality-of-life benefi
- ☑ Environmental targets and/or environmental management strategies

  consider appropriate native plant species for landscaping and revegetation

4.0 ADDITIONAL COMPONENTS AND NOTES

- EIS to show and demonstrate conformity with the Provincial Policy Statement (2020), in-force London Plan (as of Nov. 2019) policies, and current Official Plan policies (1989), Environmental Management Guidelines (2006).
- EIS reporting to adhere to the reporting standards as outlined on page 38 of the Environmental Management Guidelines document (2007).
- RVA to look for opportunities to include wildlife passage, lighting to be bird friendly, invasive *Phragmites* to be mapped and managed prior to construction.
- London Invasive Plant Management Strategy will be used as a guideline for invasive species management recommendations.
- Aecom 2013 study will be reviewed for hydrogeological input.

Natasha Welch

From: Species at Risk (MECP) <SAROntario@ontario.ca>
Sent: June 18, 2021 2:06 PM
To: Paul Mikoda
Cc: Henry Huotari; Tisha Doucette; Courtney Beneteau; Connor MacIsaac
Subject: RE: 205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study

Hello Paul,

RE: Oxford Street West and Gideon Drive Intersection, City of London and the *Endangered Species Act, 2007*

I apologize for the delay in response. The Ministry of the Environment, Conservation and Parks (MECP) understands that RV Anderson Associates Ltd. is conducting an environmental assessment for improvements to the Oxford Street West and Gideon Drive intersection in the City of London, as identified in the information provided.

As requested, an initial species at risk (SAR) information screening has been completed under the *Endangered Species Act, 2007* (ESA) by MECP's Species at Risk Branch (SARB) for the above-noted project location with respect to endangered and threatened species in Ontario. There are known occurrences of the following SAR (in addition to the list provided by RVA) in the general area with potential to also occur at the project location:

- American Badger (endangered) – receives species and regulated habitat protection
- SAR bats (endangered) – receive species and general habitat protection
- Spiny Softshell (endangered) – receives species and general habitat protection

Please note that this is an initial screening for endangered and threatened SAR and the absence of an element occurrence does not indicate the absence of species. The province has not been surveyed comprehensively for the presence or absence of SAR and Ontario's data relies on observers to report sightings of SAR. Field assessments by a qualified professional may be necessary if there is a high likelihood for SAR species and/or habitat to occur within the project footprint and potentially be impacted.

The position of SARB is based on the information that has been provided by you on behalf of the proponent. Should information not have been made available and considered in our review, or new information comes to light, or if on-site conditions and circumstances change, please contact SARB as soon as possible (SAROntario@ontario.ca) to discuss next steps.

Regards,

Kathryn Markham
Management Biologist
Permissions and Compliance Section, Species at Risk Branch
Ministry of the Environment, Conservation and Parks

From: Paul Mikoda <pmikoda@rvanderson.com>
Sent: March 8, 2021 5:27 PM
To: Species at Risk (MECP) <SAROntario@ontario.ca>

Cc: Henry Huotari <HHuotari@rvanderson.com>; Tisha Doucette <TDoucette@rvanderson.com>; Courtney Beneteau <cbeneteau@rvanderson.com>
Subject: 205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study

To whom it may concern,

R.V. Anderson Associates (RVA) has been retained by the City of London to review options and complete the detailed design for improvements to the Oxford Street West and Gideon Drive Intersection. A map of the corresponding Study Area is attached (Study Area Map). The project falls within the jurisdiction of the Upper Thames River Conservation Authority (UTRCA) as well as the Ministry of the Environment, Conservation and Parks (MECP) London District, and the Ministry of Natural Resources and Forestry (MNRF) Aylmer District.

RVA has undertaken a desktop review of the following information sources as pertains to the Study Area, as per the Client's Guide to Preliminary Screening for SAR (MECP, May 2019) including:

- Natural Heritage Information Center database (accessed via MNRF's Make-a-Map: Natural Heritage Areas application (NAD83 Atlas 1km squares within the Study Area: 17MH6956, 17MH6957, 17MH7056, 17MH7057);
- Ontario Breeding Bird Atlas (OBBA) Archives (Atlas square: 17MH75; 17MH65);
- Ontario Reptile and Amphibian Atlas (ORAA) (Atlas square: 17MH75; 17MH65);
- Ontario Butterfly Atlas; Moth Atlas (Atlas square: 17MH75; 17MH65);
- Aquatic resource area (ARA) data (segments, points and polygons) (Ontario GeoHub);
- Department of Fisheries and Oceans Aquatic Species at Risk Map;
- eBird – Warbler Woods Hot Spot (2011-present); and
- iNaturalist.

Details regarding the records of Species at Risk (SAR) and rare species noted in the vicinity of the Study Area, including their associated S-ranks and status under the Endangered Species Act, are shown in Table 1 (attached).

The NHIC database indicated at least one Restricted Species in the vicinity of the Study Area. Based on a comparison of recognized Restricted Species, those in the general area and the local habitat, we suspect that some of these records are attributable to various at-risk reptile species known in the local area. If possible, can you please provide clarification on these Restricted Records?

At this time, we would like to request any additional/supplemental SAR information that may be available in addition to those sources, as well as any concerns with the proposed project as pertains to SAR and their habitats. RVA Staff have completed NHIC Data Sensitivity Training.

Please feel free to contact me if you have any questions or concerns with this request. A response to acknowledge your receipt of this email would be greatly appreciated.

Best regards,

Paul

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Paul Mikoda, B.Sc.
Terrestrial Ecologist

P: (519) 681-9916 ext. 5040
C: (905) 516-3132

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557 Southdale Road East, Suite 200, London, ON N6E 1A2

rvanderson.com

Figure 1 – Oxford Street West and Gideon Drive – Study Area

Table 1: Rare and At-Risk Species Potentially Present in the Vicinity of the Study Area

Common Name	Scientific Name	S-Rank	ESA/SARA Status	Source*	Last Observed (Year)
FLORA					
Hairy-fruited Sedge	*Carex trichocarpa*	S3	-/-	NHIC	-
Green Dragon	*Arisaema dracontium*	S3	SC/-	NHIC	-
American Chestnut	*Castanea dentata*	S1S2	END/END	NHIC	-
Eastern False Rue-anemone	*Enemion biternatum*	S2	THR/THR	NHIC	-
Striped Cream Violet	*Viola striata*	S3	-/-	NHIC	-
Blue Ash	*Fraxinus quadrangulata*	S2?	THR/SC	NHIC	-
Orange Coneflower	*Rudbeckia fulgida*	S1	-/-	INAT	2018
Trumpet Creeper	*Campsis radicans*	S2?	-/-	INAT	2020
Large Yellow Pond Lily	*Nuphar advena*	S3	-/-	INAT	2019
FUNGI AND LICHENS					
-					
BIRDS					
Bald Eagle	*Haliaeetus leucocephalus*	S2N, S4B	SC/-	OBBA; INAT	2021
Common Nighthawk	*Chordeiles minor*	S4B	SC/THR	OBBA	2005
Eastern Wood-pewee	*Contopus virens*	S4B	SC/SC	OBBA; eBird	2020
Wood Thrush	*Hylocichla mustelina*	S4B	SC/THR	OBBA; eBird	2016
Yellow-breasted Chat	*Icteria virens*	S1B	END/END	NHIC	-
Chimney Swift	*Chaetura pelagica*	S4B,S4N	THR/THR	OBBA; eBird	2020
Bank Swallow	*Riparia riparia*	S4B	THR/THR	OBBA; eBird	2016
Barn Swallow	*Hirundo rustica*	S5B	THR/THR	OBBA; eBird	2020
Bobolink	*Dolichonyx oryzivorus*	S4B	THR/THR	OBBA; NHIC	2005
Eastern Meadowlark	*Sturnella magna*	S4B	THR/THR	OBBA; NHIC; eBird	2016
Grasshopper Sparrow	*Ammodramus savannarum*	S4B	SC/SC	eBird	2011
Purple Martin	*Progne subis*	S3S4B	-/-	OBBA; eBird; INAT	2020
REPTILES AND AMPHIBIANS					
Snapping Turtle	*Chelydra serpentina*	S4	SC/SC	ORAA	2019
Blanding's Turtle	*Emydoidea blandingii*	S3	THR/THR	ORAA	2007
Northern Map Turtle	*Graptemys geographica*	S3	SC/SC	ORAA; NHIC	2018
Queensnake	*Regina septemvittata*	S2	END/END	ORAA	2004
Eastern Foxsnake	*Pantherophis gloydi*	S2	END/END	ORAA	2011

Common Name	Scientific Name	S-Rank	ESA/SARA Status	Source*	Last Observed (Year)
Eastern Hog-nosed Snake	*Heterodon platirhinos*	S3	THR/THR	ORAA	2019
Eastern Milksnake	*Lampropeltis Triangulum*	S4	-/SC	NHIC	-
INVERTEBRATES (excludes mussels)					
Monarch	*Danaus plexippus*	S2N,S4B	SC	INAT, OBA	2019
Sleepy Duskywing	*Erynnis brizo*	S1	-/-	OBA	1971
Hackberry Emperor	*Asterocampa celtis*	S3	-/-	OBA	2019
Tawny Emperor	*Asterocampa clyton*	S3	-/-	OBA	2018
Reversed Haploa	*Haploa reversa*	S1?	-/END	OMA	2019
Fraternal Potter Wasp	*Eumenes fraternus*	S3	-/-	INAT	2019
Differentiated Grasshopper	*Melanoplus differentialis*	S3	-/-	INAT	2020
FISH AND MUSSELS					
Eastern Sand Darter	*Ammocrypta pellucida*	S2	END/THR	ARA Poly DFO NHIC	-
Gravel Chub	*Erimystax x-punctatus*	SX	EXP/EXP	ARA Poly	-
Greenside Darter	*Etheostoma blennioides*	G4	-/SC	ARA Polygon	-
Silver Shiner	*Notropis photogenis*	S2S3	THR/-	ARA Polygon	-
Black Redhorse	*Moxostoma duquesnei*	S2	THR/THR	DFO	-
Fawnsfoot	*Truncilla donaciformis*	S2	END/END	DFO	-
Mapleleaf	*Quadrula quadrula*	S2	THR/SC	DFO NHIC	-
Pugnose Minnow	*Opsopoeodus emiliae*	S2	THR/THR	DFO	-
Spotted Sucker	*Minytrema melanops*	S2	SC/SC	DFO	-
Threehorn Wartyback	*Obliquaria reflexa*	S1	THR/THR	DFO	-
Purple Wartyback	*Cyclonaias tuberculata*	S3	-/-	NHIC	-
Lake Sturgeon (Great Lakes – Upper St. Lawrence River population)	*Acipenser fulvescens* pop. 3	S2	THR/-	NHIC	-

*Source Abbreviations:
INAT – iNaturalist.ca (filtered for Research Grade and Threatened)
NHIC – Natural Heritage Information Center
ARA – Aquatic Resource Area (OntarioGeoHub)
ORAA – Ontario Reptile and Amphibian Atlas (Ontario Nature)
OBA – Ontario Butterfly Atlas (Toronto Entomological Society)
OMA – Ontario Moth Atlas (Toronto Entomological Society)
OBBA – Ontario Breeding Bird Atlas (Birds Canada)
DFO – Department of Fisheries and Oceans Species at Risk Mapping Application
eBird – Warbler Woods Hot Spot (2021-2011)

Natasha Welch

From:	Webb, Jason (MNRF) <Jason.Webb@ontario.ca>
Sent:	April 13, 2021 9:14 AM
To:	Paul Mikoda
Subject:	FW: 205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study
Attachments:	Study Area Map - Oxford And Gideon Drive EA - 205505.pdf; Table 1 - Oxford and Gideon EA- 205505.pdf
Categories:	Filed by Newforma

[CAUTION EXTERNAL EMAIL] Make Sure that it is legitimate before Replying or Clicking on any links

Hi Paul,

Apologies for missing this one earlier. Hope all is well with you.

The Ministry of Natural Resources and Forestry has reviewed the attached and has no additional supplemental information to provide.

Thanks,

Jason Webb
Management Biologist
Ministry of Natural Resources and Forestry
Aylmer District
226-559-4906
Jason.webb@ontario.ca

Please Note: As part of providing accessible customer service, please let me know if you have any accommodation needs or require communication supports or alternate formats.

From: Paul Mikoda <pmikoda@rvanderson.com>
Sent: April-01-21 4:08 PM
To: MNRF Ayl Planners (MNRF) <MNRF.Ayl.Planners@ontario.ca>
Cc: Tisha Doucette <TDoucette@rvanderson.com>; Courtney Beneteau <cbeneteau@rvanderson.com>; Henry Huotari <HHuotari@rvanderson.com>
Subject: FW: 205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hello Karina,

I was forwarded your response to the Notice of Commencement for this project by Henry. I did submit material to MNRF (Jason Webb), and I have included that content here for your review.

R.V. Anderson Associates (RVA) has been retained by the City of London to review options and complete the detailed design for improvements to the Oxford Street West and Gideon Drive Intersection. A map of the corresponding Study Area is attached (Study Area Map). The project falls within the jurisdiction of the Upper Thames River Conservation Authority (UTRCA) as well as the Ministry of the Environment, Conservation and Parks (MECP) London District, and the Ministry of Natural Resources and Forestry (MNRF) Aylmer District.

RVA has undertaken a desktop review of the following information sources as pertains to the Study Area, as per the Client's Guide to Preliminary Screening for SAR (MECP, May 2019) including:

- Natural Heritage Information Center database (accessed via MNRF's Make-a-Map: Natural Heritage Areas application (NAD83 Atlas 1km squares within the Study Area: 17MH6956, 17MH6957, 17MH7056, 17MH7057);
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- eBird – Warbler Woods Hot Spot (2011-present); and
- iNaturalist.

Details regarding the records of Species at Risk (SAR) and rare species noted in the vicinity of the Study Area, including their associated S-ranks and status under the Endangered Species Act, are shown in Table 1 (attached).

The NHIC database indicates two Natural Areas within the squares reviewed, including the Dingman Creek Fen Wetland Complex (UT 2) and the Thames River.

At this time, we would like to request any additional/supplemental natural heritage information that may be available in addition to those sources, as well as any concerns with the proposed project as related to natural heritage.

In the future, for Natural Heritage Information Requests for projects in Aylmer District, should MNRF.Ayl.Planners@ontario.ca be my first point of contact?

Best regards,

Paul

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Paul Mikoda, B.Sc.
Terrestrial Ecologist

P: (519) 681-9916 ext. 5040
C: (905) 516-3132

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557 Southdale Road East, Suite 200, London, ON N6E 1A2

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Natasha Welch

From:	Paul Mikoda
Sent:	March 8, 2021 5:27 PM
To:	Webb, Jason (MNRF)
Cc:	Henry Huotari; Courtney Beneteau; Tisha Doucette
Subject:	205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study
Attachments:	Study Area Map - Oxford And Gideon Drive EA - 205505.pdf; Table 1 - Oxford and Gideon EA- 205505.pdf
Categories:	Filed by Newforma

Hello Jason,

I hope this email finds you well. R.V. Anderson Associates (RVA) has been retained by the City of London to review options and complete the detailed design for improvements to the Oxford Street West and Gideon Drive Intersection. A map of the corresponding Study Area is attached (Study Area Map). The project falls within the jurisdiction of the Upper Thames River Conservation Authority (UTRCA) as well as the Ministry of the Environment, Conservation and Parks (MECP) London District, and the Ministry of Natural Resources and Forestry (MNRF) Aylmer District.

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- eBird – Warbler Woods Hot Spot (2011-present); and
- iNaturalist.

Details regarding the records of Species at Risk (SAR) and rare species noted in the vicinity of the Study Area, including their associated S-ranks and status under the Endangered Species Act, are shown in Table 1 (attached).

The NHIC database indicates two Natural Areas within the squares reviewed, including the Dingman Creek Fen Wetland Complex (UT 2) and the Thames River.

At this time, we would like to request any additional/supplemental natural heritage information that may be available in addition to those sources, as well as any concerns with the proposed project as related to natural heritage.

Please feel free to contact me if you have any questions or concerns with this request. A response to acknowledge your receipt of this email would be greatly appreciated.

Best regards,

Paul

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Paul Mikoda, B.Sc.
Terrestrial Ecologist

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C: (905) 516-3132

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557 Southdale Road East, Suite 200, London, ON N6E 1A2

rvanderson.com

Figure 1 – Oxford Street West and Gideon Drive – Study Area

Table 1: Rare and At-Risk Species Potentially Present in the Vicinity of the Study Area

Common Name	Scientific Name	S-Rank	ESA/SARA Status	Source*	Last Observed (Year)
FLORA					
Hairy-fruited Sedge	*Carex trichocarpa*	S3	-/-	NHIC	-
Green Dragon	*Arisaema dracontium*	S3	SC/-	NHIC	-
American Chestnut	*Castanea dentata*	S1S2	END/END	NHIC	-
Eastern False Rue-anemone	*Enemion biternatum*	S2	THR/THR	NHIC	-
Striped Cream Violet	*Viola striata*	S3	-/-	NHIC	-
Blue Ash	*Fraxinus quadrangulata*	S2?	THR/SC	NHIC	-
Orange Coneflower	*Rudbeckia fulgida*	S1	-/-	INAT	2018
Trumpet Creeper	*Campsis radicans*	S2?	-/-	INAT	2020
Large Yellow Pond Lily	*Nuphar advena*	S3	-/-	INAT	2019
FUNGI AND LICHENS					
-					
BIRDS					
Bald Eagle	*Haliaeetus leucocephalus*	S2N, S4B	SC/-	OBBA; INAT	2021
Common Nighthawk	*Chordeiles minor*	S4B	SC/THR	OBBA	2005
Eastern Wood-pewee	*Contopus virens*	S4B	SC/SC	OBBA; eBird	2020
Wood Thrush	*Hylocichla mustelina*	S4B	SC/THR	OBBA; eBird	2016
Yellow-breasted Chat	*Icteria virens*	S1B	END/END	NHIC	-
Chimney Swift	*Chaetura pelagica*	S4B,S4N	THR/THR	OBBA; eBird	2020
Bank Swallow	*Riparia riparia*	S4B	THR/THR	OBBA; eBird	2016
Barn Swallow	*Hirundo rustica*	S5B	THR/THR	OBBA; eBird	2020
Bobolink	*Dolichonyx oryzivorus*	S4B	THR/THR	OBBA; NHIC	2005
Eastern Meadowlark	*Sturnella magna*	S4B	THR/THR	OBBA; NHIC; eBird	2016
Grasshopper Sparrow	*Ammodramus savannarum*	S4B	SC/SC	eBird	2011
Purple Martin	*Progne subis*	S3S4B	-/-	OBBA; eBird; INAT	2020
REPTILES AND AMPHIBIANS					
Snapping Turtle	*Chelydra serpentina*	S4	SC/SC	ORAA	2019
Blanding's Turtle	*Emydoidea blandingii*	S3	THR/THR	ORAA	2007
Northern Map Turtle	*Graptemys geographica*	S3	SC/SC	ORAA; NHIC	2018
Queensnake	*Regina septemvittata*	S2	END/END	ORAA	2004
Eastern Foxsnake	*Pantherophis gloydi*	S2	END/END	ORAA	2011

Common Name	Scientific Name	S-Rank	ESA/SARA Status	Source*	Last Observed (Year)
Eastern Hog-nosed Snake	*Heterodon platirhinos*	S3	THR/THR	ORAA	2019
Eastern Milksnake	*Lampropeltis Triangulum*	S4	-/SC	NHIC	-
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Monarch	*Danaus plexippus*	S2N,S4B	SC	INAT, OBA	2019
Sleepy Duskywing	*Erynnis brizo*	S1	-/-	OBA	1971
Hackberry Emperor	*Asterocampa celtis*	S3	-/-	OBA	2019
Tawny Emperor	*Asterocampa clyton*	S3	-/-	OBA	2018
Reversed Haploa	*Haploa reversa*	S1?	-/END	OMA	2019
Fraternal Potter Wasp	*Eumenes fraternus*	S3	-/-	INAT	2019
Differentiated Grasshopper	*Melanoplus differentialis*	S3	-/-	INAT	2020
FISH AND MUSSELS					
Eastern Sand Darter	*Ammocrypta pellucida*	S2	END/THR	ARA Poly DFO NHIC	-
Gravel Chub	*Erimystax x-punctatus*	SX	EXP/EXP	ARA Poly	-
Greenside Darter	*Etheostoma blennioides*	G4	-/SC	ARA Polygon	-
Silver Shiner	*Notropis photogenis*	S2S3	THR/-	ARA Polygon	-
Black Redhorse	*Moxostoma duquesnei*	S2	THR/THR	DFO	-
Fawnsfoot	*Truncilla donaciformis*	S2	END/END	DFO	-
Mapleleaf	*Quadrula quadrula*	S2	THR/SC	DFO NHIC	-
Pugnose Minnow	*Opsopoeodus emiliae*	S2	THR/THR	DFO	-
Spotted Sucker	*Minytrema melanops*	S2	SC/SC	DFO	-
Threehorn Wartyback	*Obliquaria reflexa*	S1	THR/THR	DFO	-
Purple Wartyback	*Cyclonaias tuberculata*	S3	-/-	NHIC	-
Lake Sturgeon (Great Lakes – Upper St. Lawrence River population)	*Acipenser fulvescens* pop. 3	S2	THR/-	NHIC	-

*Source Abbreviations:
INAT – iNaturalist.ca (filtered for Research Grade and Threatened)
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ORAA – Ontario Reptile and Amphibian Atlas (Ontario Nature)
OBA – Ontario Butterfly Atlas (Toronto Entomological Society)
OMA – Ontario Moth Atlas (Toronto Entomological Society)
OBBA – Ontario Breeding Bird Atlas (Birds Canada)
DFO – Department of Fisheries and Oceans Species at Risk Mapping Application
eBird – Warbler Woods Hot Spot (2021-2011)

Natasha Welch

From:	Cari Ramsey <ramseyc@thamesriver.on.ca>
Sent:	September 2, 2021 2:05 PM
To:	Paul Mikoda
Cc:	Jessica Schnaithmann
Subject:	Information request - Oxford and Gideon Drive
Attachments:	Oxford and Gideon MNHS.pdf; Oxford and Gideon.pdf; Fish Report - Oxford and Gideon.pdf; Benthic Report - Oxford and Gideon.pdf

Hi Paul;

Attached is the mapping for the subject area at Oxford and Gideon. One is all of our regulation mapping and the other is just the Middlesex Natural Heritage woodlots. The only additional information we have is the following:

1. There are ESA species within 1 km so you should contact MNRF for the most up to date information regarding that.
2. Fish and benthic data is attached…we do not have any mussel information for that area.

If you need anything else I may be able to assist with just let me know.

Thanks!
Cari

Cari Ramsey
Land Use Regulations Assistant
UTRCA
1424 Clarke Side Road
London, ON
N5V 5B9
(519)451-2800 ext. 289
ramseyc@thamesriver.on.ca

Notes:
Oxford Street and Gideon Drive

Created By: cr March 26, 2021

* Please note: Any reference to scale on this map is only appropriate when it is printed landscape on legal-sized (8.5" x 14") paper.

0 300 600 1,201
metres
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N

Regulation Limit

Regulation under s.28 of the *Conservation Authorities Act*

Development, interference with wetlands, and alterations to shorelines and watercourses. O.Reg 157/06, 97/04.

Legend

- UTRCA Watershed (1:10K)
- Assessment Parcel (MPAC)
- Watercourse (UTRCA, 2015)
  - Open
  - Tiled
- Wetland Hazard
- London Hazard
  - FLD250
  - Remnant Valley
  - Stable Slope
  - Toe Erosion - Stable Slope
  - Top of Slope
- Flooding Hazard
- Erosion Hazard
- Regulation Limit 2018

The Regulation Limit depicted on this map schedule is a representation of O.Reg 157/06 under O.Reg 97/04.

The Regulation Limit is a conservative estimation of the hazard lands within the UTRCA watershed. In the case of discrepancies between the mapping and the actual features on a property, the text of Ontario Regulation 157/06 prevails and the jurisdiction of the UTRCA may extend beyond areas shown on the maps.

The UTRCA disclaims explicitly any warranty, representation or guarantee as to the content, sequence, accuracy, timeliness, fitness for a particular purpose, merchantability or completeness of any of the data depicted and provided herein.

The UTRCA assumes no liability for any errors, omissions or inaccuracies in the information provided herein and further assumes no liability for any decisions made or actions taken or not taken by any person in reliance upon the information and data furnished hereunder.

This map is not a substitute for professional advice. Please contact UTRCA staff for any changes, updates and amendments to the information provided.

This document is not a Plan of Survey.

Sources: Base data, 2015 Aerial Photography used under licence with the Ontario Ministry of Natural Resources Copyright © Queen's Printer for Ontario; City of London.

UPPER THAMES RIVER CONSERVATION AUTHORITY

Regulation Limit

Regulation under s.28 of the Conservation Authorities Act

Development, interference with wetlands, and alterations to shorelines and watercourses. O.Reg 157/06, 97/04.

Legend

- UTRCA Watershed (1:10K)
- Assessment Parcel (MPAC)
- Watercourse (UTRCA, 2015)
  - Open
  - Tiled
- Middlesex NHSS Vegetation Patch (2
  - No Patch Criteria Met
  - 1+ Patch Criteria Met

The Regulation Limit depicted on this map schedule is a representation of O.Reg 157/06 under O.Reg 97/04.

The Regulation Limit is a conservative estimation of the hazard lands within the UTRCA watershed. In the case of discrepancies between the mapping and the actual features on a property, the text of Ontario Regulation 157/06 prevails and the jurisdiction of the UTRCA may extend beyond areas shown on the maps.

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This map is not a substitute for professional advice. Please contact UTRCA staff for any changes, updates and amendments to the information provided.

This document is not a Plan of Survey.

UPPER THAMES RIVER CONSERVATION AUTHORITY

Notes:
Oxford and Gideon MNHS

Created By: cr March 26, 2021

* Please note: Any reference to scale on this map is only appropriate when it is printed landscape on legal-sized (8.5" x 14") paper.

0 200 400 800
metres
1:10,000

N

UTRCA (DFO, ROM, MNRF) Fish Sampling Records

Thames River Tributary

Sampled: 29/09/1999 **Site Code: UT.RI106** Latitude: 42.964222

Agency: UTRCA Location: Thames River Tributary Commissioners Rd W Longitude: -81.375179

			Species at Risk (SAR) Status				Status in the Thames River Watershed	
			Provincial		Federal			
Common Name	Scientific Name	# Observed	ESA2017	Srank	SARA	COSEWIC	Abundance	Distribution
Brook Trout	Salvelinus fontinalis	Many	---	S5	---	---	Uncommon	localized

UTRCA (DFO, ROM, MNRF) Fish Sampling Records

Thames River Tributary

Sampled: 24/08/2010 **Site Code: UT.RI106** Latitude: 42.964222

Agency: UTRCA Location: Thames River Tributary Commissioners Rd W Longitude: -81.375179

			Species at Risk (SAR) Status				Status in the Thames River Watershed	
			Provincial		Federal			
Common Name	Scientific Name	# Observed	ESA2017	Srank	SARA	COSEWIC	Abundance	Distribution
Brook Trout	Salvelinus fontinalis	Abundant	---	S5	---	---	Uncommon	localized

COSEWIC Status: The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) asseses species for their consideration for legal protection and recover (or management) under the Species at Risk Act (SARA).

Extinct: A wildife species that no longer exists.

Extirpated: A wildlife species no longer existing in the wild in Canada, but exists elsewhere.

Endangered: A wildlife species facing imminent extirpation or extinction.

Threatened: A wildlife species likely to become endangered if limiting factors are not reversed.

Special Concern: A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

Not at Risk: A wildlife species that has been evaulated and found to be not at risk of extinction given the current cirumstances.

Data Deficient: A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.

Reference: www.cosewic.gc.ca (current to November 2011)

SARA Status: The federal at risk designation for species under the Species at Risk Act (SARA)

Reference: www.sararegistry.gc.ca (current to December 2011)

ESA 2007 / SARO Status: Species at Risk in Ontario (SARO) are designated be the Ontario Ministry of Natural Resources and Forestry (OMNRF) in accordance with the provincial Endangered Species Act (ESA) through the Committee on the Status of Species at Risk in Ontario (COSSARO).

Extirpated: A native species that no longer exists in the wild in Ontario but still occurs elsewhere.

Endangered: A native species facing imminent extirpation or extinction in Ontario.

Threatened: A native species that is at risk of becoming endangered in Ontario.

Special Concern: A native species that is sensitive to human activities or natural events which may cause it to become endangered or thereatened.

Reference: www.ontario.ca/speciesatrisk (current to Janurary 2012)

Provincial Rank (SRANK): Privincial (or Subnational) ranks are used by the Natural Hertiage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are assigned to consider only those factors within the political boundaries of Onatio.

SX Presumed Extirpated: Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and vitually no likelihood that it will be rediscovered.

SH Possibly Extirpated (Historical): Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurences.

S1 Critically imperiled: Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled: Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable: Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure: Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure: Common, widespread, and abundant in the nation or state/province.

SNR Unranked: Nation or state/province conservation status not yet assessed.

SU Unrankable: Currently unrankable due to lack of lack of information or substantially conflicting information about status or trends.

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

S#S# Range Rank: A numeric range rank (e.g. S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g. SU is used rather than S1S4).

Reference: http://nhci.mnr.gov.on.ca/MNR/nhic/nhic.cfm (current to March 2012)

Abundance: Referes to the relative abundance of the species found wihtin the waters of the Upper Thames River watershed based on sampling results. Some species may be underrepresented as they are difficult to capture with commonly used sampling methods.

Abundant: Occurred in >25% of the sampling records.

Common: Occurred in 10-25% of the sampling records.

Uncommon: Occurred in <10% of the sampling records.

Distribution: Based on the number of Upper Thames Watershed Report Card subwatersheds in which a species has been recorded.

Throughout: Recorded in >20 subwatersheds.

Widespread: Recorded in 10-20 subwatersheds.

Localized: Recorded in <10 subwatersheds.

UTRCA Benthic Sampling Data

Thames River Tributary

Sampled: 23/06/1999 **Location: Thames River Tributary Woodeden Camp** **Stream Health:** Fairly Poor

Site Code: UT.RI105 Latitude: 42.965794 Longitude: -81.381908 **Family Biotic Index:** 5.926470588

Scientific Name	Common Name (family/order)	Life Stage	# in Subsample	Biotic Index
Oligochaeta		ADULT	7	8
Gammaridae	Sideswimmer	ADULT	3	6
Elmidae	Riffle Beetle	ADULT	1	5
Elmidae	Riffle Beetle	LARVAE	4	5
Chironomidae	Midge	LARVAE	97	6
Chironomidae	Midge	PUPA	10	6
Simuliidae	Black Fly	LARVAE	3	5
Hydropsychidae	Net-spinning Caddisfly	LARVAE	2	5
Philopotamidae	Finger-net Caddisfly	LARVAE	7	4
Pisidiidae		ADULT	2	8

UTRCA Benthic Sampling Data

Thames River Tributary

Sampled: 05/11/2002 **Location: Thames River Tributary Woodeden Camp** **Stream Health:** Fair

Site Code: UT.RI105 Latitude: 42.965794 Longitude: -81.381908 **Family Biotic Index:** 5.13

Scientific Name	Common Name (family/order)	Life Stage	# in Subsample	Biotic Index
Physidae	Pouch Snail	ADULT	4	8
Acariformes		ADULT	1	4
Elmidae	Riffle Beetle	LARVAE	6	5
Hydrophilidae	Water Scavenger Beetle	LARVAE	1	5
Chrysomelidae	Leaf Beetle	ADULT	1	
Chironomidae	Midge	LARVAE	22	6
Hydropsychidae	Net-spinning Caddisfly	LARVAE	139	5
Empididae	Dance Fly	LARVAE	1	6
Limnephilidae	Northern Caddisfly	LARVAE	1	4
Philopotamidae	Finger-net Caddisfly	LARVAE	12	4
Stratiomyidae	Soldier Fly	LARVAE	1	7

UTRCA Benthic Sampling Data

Thames River Tributary

Sampled: 23/06/1999 **Location: Thames River Tributary Woodeden Camp** **Stream Health:** Fairly Poor

Site Code: UT.RI105 Latitude: 42.965794 Longitude: -81.381908 **Family Biotic Index:** 5.900990099

Scientific Name	Common Name (family/order)	Life Stage	# in Subsample	Biotic Index
Oligochaeta		ADULT	5	8
Gammaridae	Sideswimmer	ADULT	2	6
Elmidae	Riffle Beetle	LARVAE	4	5
Corixidae	Water Boatmen	ADULT	1	5
Chironomidae	Midge	LARVAE	64	6
Chironomidae	Midge	PUPA	14	6
Ceratopogonidae	Biting Midge	LARVAE	1	6
Hydropsychidae	Net-spinning Caddisfly	LARVAE	2	5
Philopotamidae	Finger-net Caddisfly	LARVAE	4	4
Tipulidae	Crane Fly	LARVAE	1	4
Baetidae	Small Mayfly	NYMPH	1	6
Capniidae	Stonefly	NYMPH	1	3
Pisidiidae		ADULT	1	8

UTRCA Benthic Sampling Data

Thames River Tributary

Sampled: 23/06/1999 **Location: Thames River Tributary Commissioners Rd W** **Stream Health:** Fair

Site Code: UT.RI106 Latitude: 42.964222 Longitude: -81.375179 **Family Biotic Index:** 5.661016949

Scientific Name	Common Name (family/order)	Life Stage	# in Subsample	Biotic Index
Gammaridae	Sideswimmer	ADULT	14	6
Acariformes		ADULT	2	4
Hydrophilidae	Water Scavenger Beetle	LARVAE	1	5
Chironomidae	Midge	LARVAE	46	6
Simuliidae	Black Fly	LARVAE	9	5
Empididae	Dance Fly	LARVAE	1	6
Limnephilidae	Northern Caddisfly	LARVAE	1	4
Polycentropodidae	Caddisfly	LARVAE	8	6
Baetidae	Small Mayfly	NYMPH	20	6
Capniidae	Stonefly	NYMPH	9	3
Nematoda		ADULT	1	---
Pisidiidae		ADULT	6	8

UTRCA Benthic Sampling Data

Thames River Tributary

Sampled: 20/06/2000 **Location: Thames River Tributary Commissioners Rd W** **Stream Health:** Fairly Poor

Site Code: UT.RI106 Latitude: 42.964222 Longitude: -81.375179 **Family Biotic Index:** 5.87

Scientific Name	Common Name (family/order)	Life Stage	# in Subsample	Biotic Index
Erpobdellidae	Leech	ADULT	1	8
Oligochaeta		ADULT	1	8
Gammaridae	Sideswimmer	ADULT	76	6
Acariformes		ADULT	1	4
Elmidae	Riffle Beetle	ADULT	2	5
Chironomidae	Midge	LARVAE	17	6
Simuliidae	Black Fly	LARVAE	3	5
Empididae	Dance Fly	LARVAE	1	6
Limnephilidae	Northern Caddisfly	LARVAE	1	4
Tipulidae	Crane Fly	LARVAE	2	4
Baetidae	Small Mayfly	NYMPH	3	6
Leuctridae	Stonefly	NYMPH	1	0
Nematoda		ADULT	1	---

UTRCA Benthic Sampling Data

Thames River Tributary

Sampled: 05/11/2002 **Location: Thames River Tributary Commissioners Rd W** **Stream Health:** Good

Site Code: UT.RI106 Latitude: 42.964222 Longitude: -81.375179 **Family Biotic Index:** 4.99

Scientific Name	Common Name (family/order)	Life Stage	# in Subsample	Biotic Index
Glossiphoniidae	Leech	ADULT	1	8
Oligochaeta		ADULT	1	8
Gammaridae	Sideswimmer	ADULT	100	6
Acariformes		ADULT	1	4
Elmidae	Riffle Beetle	ADULT	1	5
Elmidae	Riffle Beetle	LARVAE	7	5
Turbellaria		ADULT	4	4
Dytiscidae	Predacious Diving Beetle	LARVAE	1	5
Chironomidae	Midge	LARVAE	17	6
Ceratopogonidae	Biting Midge	LARVAE	1	6
Hydropsychidae	Net-spinning Caddisfly	LARVAE	20	5
Limnephilidae	Northern Caddisfly	LARVAE	1	4
Philopotamidae	Finger-net Caddisfly	LARVAE	2	4
Lepidostomatidae	Lepistomatid Caddisfly	LARVAE	1	1
Rhyacophilidae	Primative Caddisfly	LARVAE	1	1
Nemouridae	Stonefly	NYMPH	41	2
Pisidiidae		ADULT	2	8

Benthic samples were obtained using Rapid Bioassessment Protocol developed by the United States Environmental Protection Agency and modified by Dr. Robert Bailey of the University of Western Ontario Zoology Department. A representative section of stream is selected, incorporating a riffle if present, and sampled by oving upstream along a diagonal transect, dislodging and capturing invertebrates with a .5 mm mesh "D" - frame net. Samples are preserved in the field and analyzed in the lab to randomly select a 100 bug subsample which is identified to the Family taxonomic level.

The biotic index is a value assigned to benthic invertebrate taxa indicating their pollution sensitivity and tolerance on a scale from 10 to 10. Lower numbers indicate pollution sensitivity and high numbers tolerance. A value of -1 indicates that no biotic index value has been assigned to these taxa.

The Family Biotic Index is the weighted average of the biotic index and nuber of bugs in each taxa in the sample. The water quality ranges for the FBI values are as follows: <4.25 = Excellent; 4.25 - 5.00 = Good; 5.00 - 5.75 = Fair; 5.75 - 6.50 = Fairly Poor; 6.50 - 7.25 = Poor; and <7.25 = Very Poor.

Natasha Welch

From:	Paul Mikoda
Sent:	September 1, 2021 10:53 AM
To:	planning@thamesriver.on.ca; allainj@thamesriver.on.ca
Cc:	Tisha Doucette; Henry Huotari; Courtney Beneteau
Subject:	FW: 205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study
Attachments:	Study Area Map - Oxford And Gideon Drive EA - 205505.pdf; Table 1 - Oxford and Gideon EA- 205505.pdf
Categories:	Filed by Newforma

To whom it may concern,

As per the prior request below, we would like to confirm if the Upper Thames River Conservation Authority would like to provide any additional/supplemental natural heritage information or has any concerns with the proposed project as related to natural heritage or O.Reg 157/06.

Best regards,

Paul

rva

Paul Mikoda, B.Sc., CAN-CISEC
TERRESTRIAL ECOLOGIST

t 519 681 9916 ext. 5040 | m 905 516 3132
a 557 Southdale Road East, Suite 200, London, ON N6E 1A2

rvanderson.com

From: Paul Mikoda
Sent: Monday, March 8, 2021 5:27 PM
To: planning@thamesriver.on.ca
Cc: Annett@thamesriver.on.ca; Henry Huotari <HHuotari@rvanderson.com>; Tisha Doucette <TDoucette@rvanderson.com>; Courtney Beneteau <CBeneteau@rvanderson.com>
Subject: 205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study

To whom it may concern,

R.V. Anderson Associates (RVA) has been retained by the City of London to review options and complete the detailed design for improvements to the Oxford Street West and Gideon Drive Intersection. A map of the corresponding Study Area is attached (Study Area Map). The project falls within the jurisdiction of the Upper Thames River Conservation

Authority (UTRCA) as well as the Ministry of the Environment, Conservation and Parks (MECP) London District, and the Ministry of Natural Resources and Forestry (MNRF) Aylmer District.

RVA has undertaken a desktop review of the following information sources as pertains to the Study Area, as per the Client's Guide to Preliminary Screening for SAR (MECP, May 2019) including:

- Natural Heritage Information Center database (accessed via MNRF's Make-a-Map: Natural Heritage Areas application (NAD83 Atlas 1km squares within the Study Area: 17MH6956, 17MH6957, 17MH7056, 17MH7057);
- Ontario Breeding Bird Atlas (OBBA) Archives (Atlas square: 17MH75; 17MH65);
- Ontario Reptile and Amphibian Atlas (ORAA) (Atlas square: 17MH75; 17MH65);
- Ontario Butterfly Atlas; Moth Atlas (Atlas square: 17MH75; 17MH65);
- Aquatic resource area (ARA) data (segments, points and polygons) (Ontario GeoHub);
- Department of Fisheries and Oceans Aquatic Species at Risk Map;
- eBird – Warbler Woods Hot Spot (2011-present); and
- iNaturalist.

Details regarding the records of Species at Risk (SAR) and rare species noted in the vicinity of the Study Area, including their associated S-ranks and status under the Endangered Species Act, are shown in Table 1 (attached).

The NHIC database indicates two Natural Areas within the squares reviewed, including the Dingman Creek Fen Wetland Complex (UT 2) and the Thames River. City of London notes an Environmentally Significant Area (ESA – Kains Woods), two unevaluated vegetation patches (south of the intersection), and an unevaluated wetland and significant valley lands (associated with Tributary 'C' – a locally rare coldwater stream which flows to the Thames River). Portions of the Study Area in the vicinity of Tributary 'C' are regulated under Ontario Regulation 157/06.

At this time, we would like to request any additional/supplemental natural heritage information that may be available in addition to those sources, as well as any concerns with the proposed project as related to natural heritage or O.Reg 157/06.

Please feel free to contact me if you have any questions or concerns with this request. A response to acknowledge your receipt of this email would be greatly appreciated.

Best regards,

Paul

RVA IS GROWING!
Our NEW Halton and Halifax offices are now open.

Paul Mikoda, B.Sc.
Terrestrial Ecologist

P: (519) 681-9916 ext. 5040
C: (905) 516-3132

R.V. Anderson Associates Limited
557 Southdale Road East, Suite 200, London, ON N6E 1A2

rvanderson.com

Figure 1 – Oxford Street West and Gideon Drive – Study Area

Table 1: Rare and At-Risk Species Potentially Present in the Vicinity of the Study Area

Common Name	Scientific Name	S-Rank	ESA/SARA Status	Source*	Last Observed (Year)
FLORA					
Hairy-fruited Sedge	*Carex trichocarpa*	S3	-/-	NHIC	-
Green Dragon	*Arisaema dracontium*	S3	SC/-	NHIC	-
American Chestnut	*Castanea dentata*	S1S2	END/END	NHIC	-
Eastern False Rue-anemone	*Enemion biternatum*	S2	THR/THR	NHIC	-
Striped Cream Violet	*Viola striata*	S3	-/-	NHIC	-
Blue Ash	*Fraxinus quadrangulata*	S2?	THR/SC	NHIC	-
Orange Coneflower	*Rudbeckia fulgida*	S1	-/-	INAT	2018
Trumpet Creeper	*Campsis radicans*	S2?	-/-	INAT	2020
Large Yellow Pond Lily	*Nuphar advena*	S3	-/-	INAT	2019
FUNGI AND LICHENS					
-					
BIRDS					
Bald Eagle	*Haliaeetus leucocephalus*	S2N, S4B	SC/-	OBBA; INAT	2021
Common Nighthawk	*Chordeiles minor*	S4B	SC/THR	OBBA	2005
Eastern Wood-pewee	*Contopus virens*	S4B	SC/SC	OBBA; eBird	2020
Wood Thrush	*Hylocichla mustelina*	S4B	SC/THR	OBBA; eBird	2016
Yellow-breasted Chat	*Icteria virens*	S1B	END/END	NHIC	-
Chimney Swift	*Chaetura pelagica*	S4B,S4N	THR/THR	OBBA; eBird	2020
Bank Swallow	*Riparia riparia*	S4B	THR/THR	OBBA; eBird	2016
Barn Swallow	*Hirundo rustica*	S5B	THR/THR	OBBA; eBird	2020
Bobolink	*Dolichonyx oryzivorus*	S4B	THR/THR	OBBA; NHIC	2005
Eastern Meadowlark	*Sturnella magna*	S4B	THR/THR	OBBA; NHIC; eBird	2016
Grasshopper Sparrow	*Ammodramus savannarum*	S4B	SC/SC	eBird	2011
Purple Martin	*Progne subis*	S3S4B	-/-	OBBA; eBird; INAT	2020
REPTILES AND AMPHIBIANS					
Snapping Turtle	*Chelydra serpentina*	S4	SC/SC	ORAA	2019
Blanding's Turtle	*Emydoidea blandingii*	S3	THR/THR	ORAA	2007
Northern Map Turtle	*Graptemys geographica*	S3	SC/SC	ORAA; NHIC	2018
Queensnake	*Regina septemvittata*	S2	END/END	ORAA	2004
Eastern Foxsnake	*Pantherophis gloydi*	S2	END/END	ORAA	2011

Common Name	Scientific Name	S-Rank	ESA/SARA Status	Source*	Last Observed (Year)
Eastern Hog-nosed Snake	*Heterodon platirhinos*	S3	THR/THR	ORAA	2019
Eastern Milksnake	*Lampropeltis Triangulum*	S4	-/SC	NHIC	-
INVERTEBRATES (excludes mussels)					
Monarch	*Danaus plexippus*	S2N,S4B	SC	INAT, OBA	2019
Sleepy Duskywing	*Erynnis brizo*	S1	-/-	OBA	1971
Hackberry Emperor	*Asterocampa celtis*	S3	-/-	OBA	2019
Tawny Emperor	*Asterocampa clyton*	S3	-/-	OBA	2018
Reversed Haploa	*Haploa reversa*	S1?	-/END	OMA	2019
Fraternal Potter Wasp	*Eumenes fraternus*	S3	-/-	INAT	2019
Differentiated Grasshopper	*Melanoplus differentialis*	S3	-/-	INAT	2020
FISH AND MUSSELS					
Eastern Sand Darter	*Ammocrypta pellucida*	S2	END/THR	ARA Poly DFO NHIC	-
Gravel Chub	*Erimystax x-punctatus*	SX	EXP/EXP	ARA Poly	-
Greenside Darter	*Etheostoma blennioides*	G4	-/SC	ARA Polygon	-
Silver Shiner	*Notropis photogenis*	S2S3	THR/-	ARA Polygon	-
Black Redhorse	*Moxostoma duquesnei*	S2	THR/THR	DFO	-
Fawnsfoot	*Truncilla donaciformis*	S2	END/END	DFO	-
Mapleleaf	*Quadrula quadrula*	S2	THR/SC	DFO NHIC	-
Pugnose Minnow	*Opsopoeodus emiliae*	S2	THR/THR	DFO	-
Spotted Sucker	*Minytrema melanops*	S2	SC/SC	DFO	-
Threehorn Wartyback	*Obliquaria reflexa*	S1	THR/THR	DFO	-
Purple Wartyback	*Cyclonaias tuberculata*	S3	-/-	NHIC	-
Lake Sturgeon (Great Lakes – Upper St. Lawrence River population)	*Acipenser fulvescens* pop. 3	S2	THR/-	NHIC	-

*Source Abbreviations:
INAT – iNaturalist.ca (filtered for Research Grade and Threatened)
NHIC – Natural Heritage Information Center
ARA – Aquatic Resource Area (OntarioGeoHub)
ORAA – Ontario Reptile and Amphibian Atlas (Ontario Nature)
OBA – Ontario Butterfly Atlas (Toronto Entomological Society)
OMA – Ontario Moth Atlas (Toronto Entomological Society)
OBBA – Ontario Breeding Bird Atlas (Birds Canada)
DFO – Department of Fisheries and Oceans Species at Risk Mapping Application
eBird – Warbler Woods Hot Spot (2021-2011)

Appendix C

Photographic Record

Photo 1 - June 16, 2021
Trib. C, N of Gideon Dr., looking N (upstream). Creek flowing through MAM3-9 with view of MAM3-5 and SWD4 in background.

Photo 2 - June 16, 2021
Trib. C, N of Gideon Dr., looking S towards culvert inlet.

Photo 3 - September 8, 2021
Trib. C, N of Gideon Dr., looking S towards culvert inlet. Inlet is perched.

Photo 4 - September 8, 2021
Trib. C, S of Gideon Dr., looking S (downstream). Creek flowing through

Photo 5 - September 8, 2021
Trib. C, S of Gideon Dr., looking N towards culvert outlet. Outlet is perched and discharging into pool.

Photo 6 - June 16, 2021
N of Gideon Dr., looking NW, MAM3-9 and MAM3 vegetation communities within view.

Photo 7 - June 16, 2021
N side of Gideon Dr., looking NE, just E of culvert. MAM3-9 and SWM4-1 vegetation communities within view.

Photo 8 - June 16, 2021
N of Gideon Dr., looking E, CUM1-1 vegetation community within view.

Photo 9 - June 16, 2021
S of Gideon Dr., within ditch, looking SE. CUM1-1 vegetation community within view.

Photo 10 - June 2, 2021
Partial deer skeleton on S side of Oxford Street West, W of the intersection.

Photo 11 - June 16, 2021
Deer tracks in the E ditch along Oxford Street West, immediately S of Tributary C.

Photo 12 - June 16, 2021
Near NW limit of roundabout, looking N across Oxford Street West at 2085 Oxford Street West.

Photo 13 - June 16, 2021
Oxford Street West S roadside, looking W at CUM1 vegetation community, W of intersection.

Photo 14 - June 16, 2021
Oxford Street West S roadside, looking E at CUM1-1 vegetation community towards intersection.

Photo 15 - June 16, 2021
N side of Gideon Dr., looking S across road at CUM1-1 vegetation community.

Photo 16 - June 2, 2021
Recent re-vegetation of N Oxford Street West shoulder beside Eagle Ridge Subdivision.

Photo 17 - June 2, 2021
CUM1-1 community in SW corner of intersection, facing N from Gideon Drive shoulder.

Photo 18 - June 2, 2021
Oxford Street West and Gideon Drive intersection, looking N from Gideon Drive.

Photo 19 - June 2, 2021
Oxford Street West and Gideon Drive intersection, looking NE from W shoulder of Gideon Drive.

Photo 20 - June 16, 2021
Oxford Street West right-of-way E of intersection, facing W. Note Phragmites in ditch.

Photo 21 - June 16, 2021
Eagle Ridge Subdivision and right-of-way, looking NW from S side of Oxford Street West.

Photo 22 - June 16, 2021
E right-of-way, facing west from frontage of 1976 Oxford Street West. Note Phragmites in ditch.

Photo 23 -June 16, 2021
Eagle Ridge Subdivision and right-of-way, looking NE from S side of Oxford Street West.

Photo 24 - June 16, 2021
Monarch on milkweed E of the intersection, S roadside of Oxford Street West.

Appendix D

Field Sheets

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: OXFORD GIDEON 20555	POLYGON: CUM1-1
	SURVEYOR(S): P.M	DATE: JUNE 16/21
	TIME: start 10:00 finish 10.10	
	UTMZ:	UTME:
	UTMN:	

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☑ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☐ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☑ MINERAL SOIL	☐ RIVERINE	☑ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☑ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☐ VALLEY SLOPE		☐ FORB	☐ MARSH
	☐ CARB. BEDRK.	☑ TABLELAND		☐ LICHEN	☐ SWAMP
		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
		☐ CLIFF		☐ DECIDUOUS	☐ BOG
		☐ TALUS		☐ CONIFEROUS	☐ BARREN
		☐ CREVICE / CAVE		☐ MIXED	☑ MEADOW
		☐ ALVAR			☐ PRAIRIE
		☐ ROCKLAND			☐ THICKET
		☐ BEACH / BAR			☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

SITE	COVER
☐ OPEN WATER	☑ OPEN
☐ SHALLOW WATER	☐ SHRUB
☑ SURFICIAL DEP.	☐ TREED
☐ BEDROCK	

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	1	PIPdeH = ACEnegu = JUNvirg
2	SUB-CANOPY	3	1	RHAcath > MORalba > JUGnigr > ACEnegu
3	UNDERSTOREY	4.5	2	ELAumbe = JUNvirg > MORalba = RHAtyph
4	GRD. LAYER	6.7	4	FESrubr > LOLarun > DACglom > SOLalti

HT CODES: 1 = >25 m 2 = 10<HT≤25 m 3 = 2<HT≤10 m 4 = 1<HT≤2 m 5 = 0.5<HT≤1 m 6 = 0.2<HT≤0.5 m 7 = HT<0.2 m

CVR CODES 0= NONE 1= 0% < CVR ≤ 10% 2= 10 < CVR ≤ 25% 3= 25 < CVR ≤ 60% 4= CVR > 60%

STAND COMPOSITION:	BA:

SIZE CLASS ANALYSIS:	O	< 10	O	10 - 24	R	25 - 50	N	> 50
STANDING SNAGS:	R	< 10	N	10 - 24	N	25 - 50	N	> 50
DEADFALL / LOGS:	R	< 10	N	10 - 24	N	25 - 50	N	> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE :	✓	PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:	CULTURAL	CU
COMMUNITY SERIES:	CULTURAL MEADOW	CUM
ECOSITE:	MINERAL CULTURAL MEADOW	CUM1
VEGETATION TYPE:	DRY-MOIST OLD FIELD MEADOW TYPE	CUM1-1
☐ INCLUSION		
☐ COMPLEX		

Notes:

BREEDING BIRD FIELD SHEET

arva

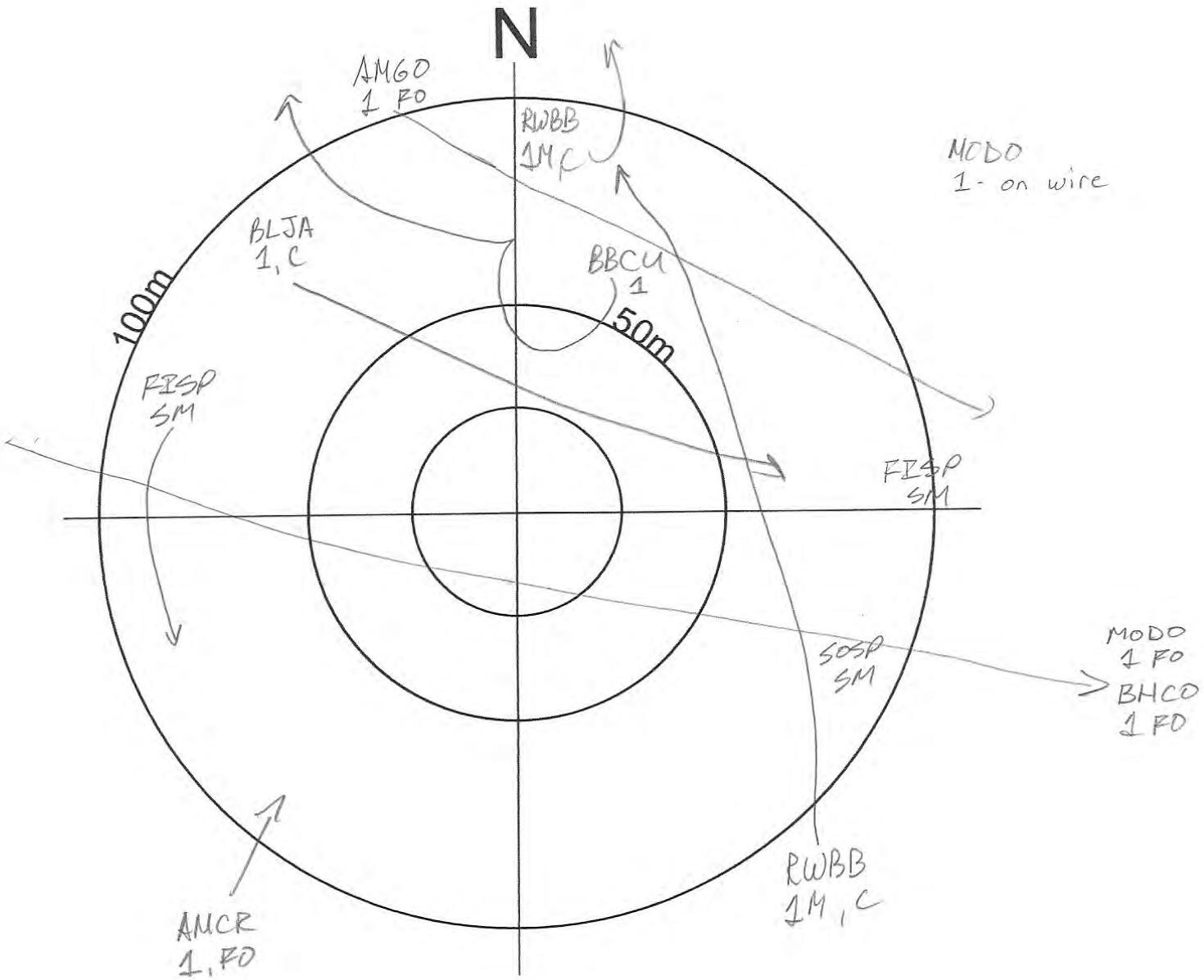
Project OXFORD GIDEON Date JUNE 2/21

Collector(s): P.M. Start: 6 : 39 End: 6 : 44 Total: 5 min

Temp: 9 Wind Direction & Speed: 5-8km/h NE Clouds (%): 60

Noise: 3 Location: BB1 Community: —

General Conditions: COOL, CALM



NOTES: _____

BREEDING BIRD FIELD SHEET

arva

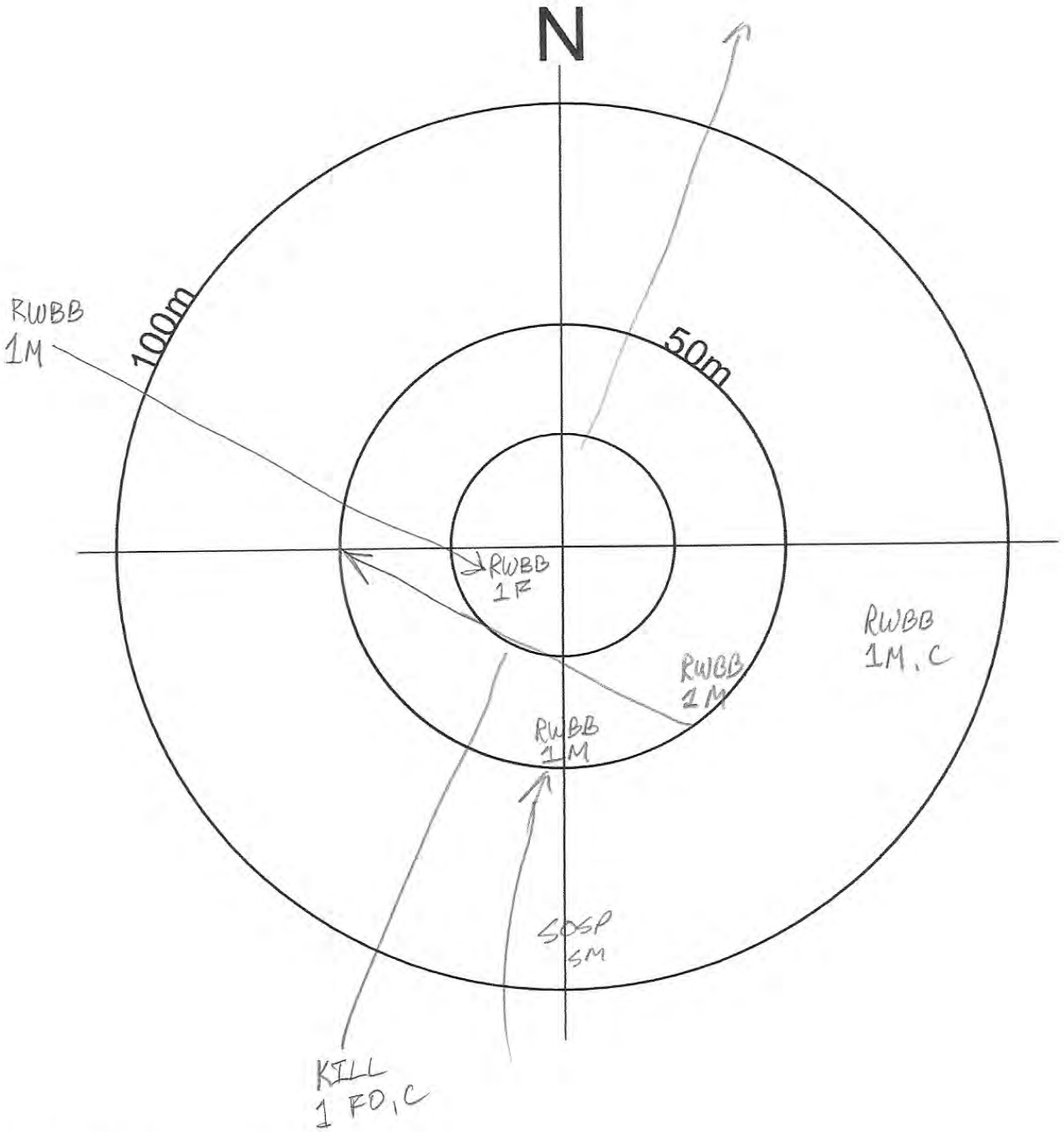
Project OXFORD GIDEON Date JUNE 2/21

Collector(s): P.M. Start: 6 : 51 End: 6 : 56 Total: 5min

Temp: 9 Wind Direction & Speed: 5-8km/h NE Clouds (%): 60

Noise: 3 Location: BB2 Community: /

General Conditions: COOL CALM



NOTES: RWBB - agitated

BREEDING BIRD FIELD SHEET

arva

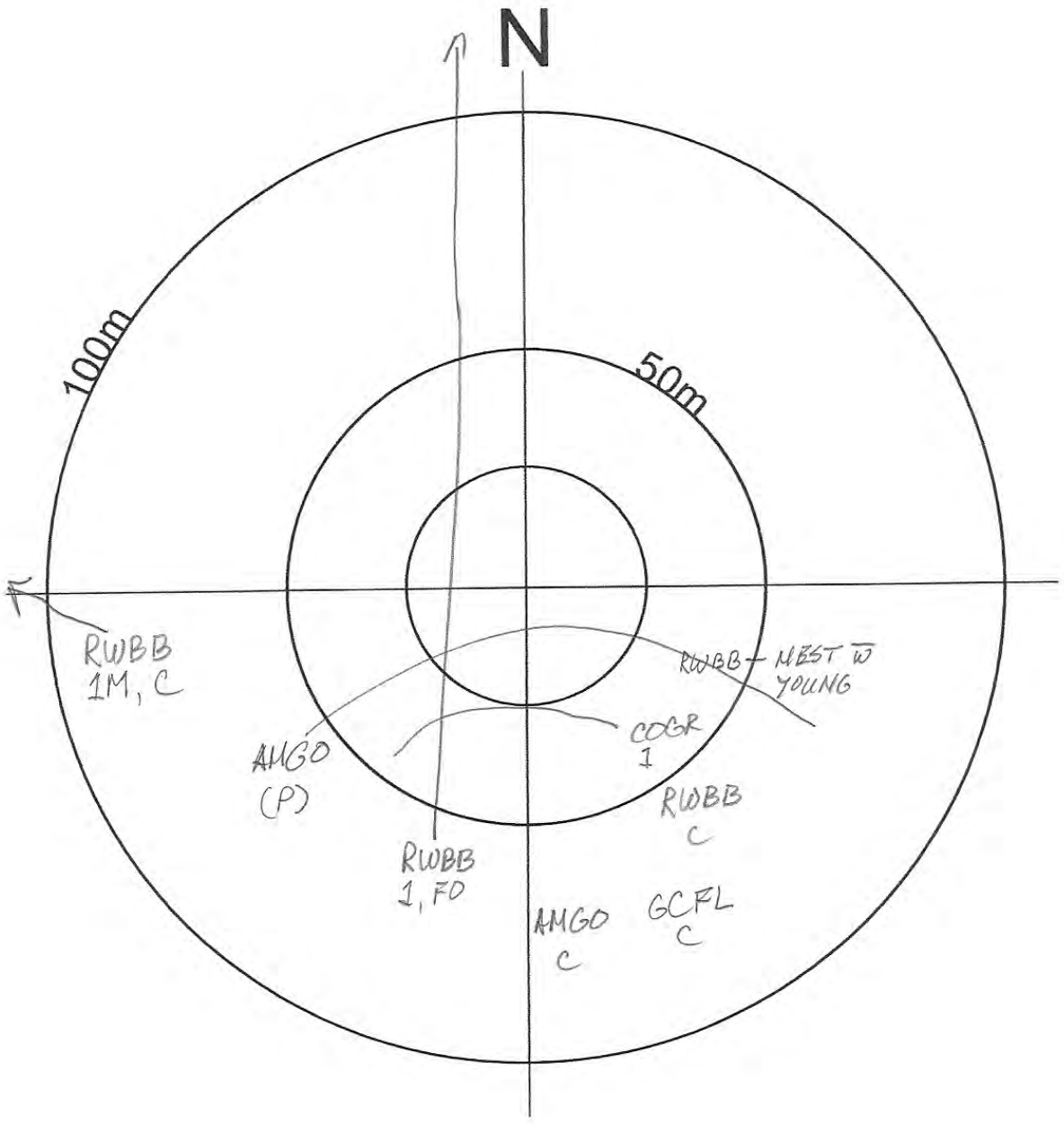
Project OXFORD GIDEON Date JUNE 2/21

Collector(s): P.M. Start: 7 : 00 End: 7 : 05 Total: 5min

Temp: 10 Wind Direction & Speed: 5-8km/h NE Clouds (%): 75

Noise: 3 Location: BB3 Community: /

General Conditions: COOL, CALM



NOTES: GCFC - walnut woodland
HOSP - roadside prior to survey

BREEDING BIRD FIELD SHEET

arva

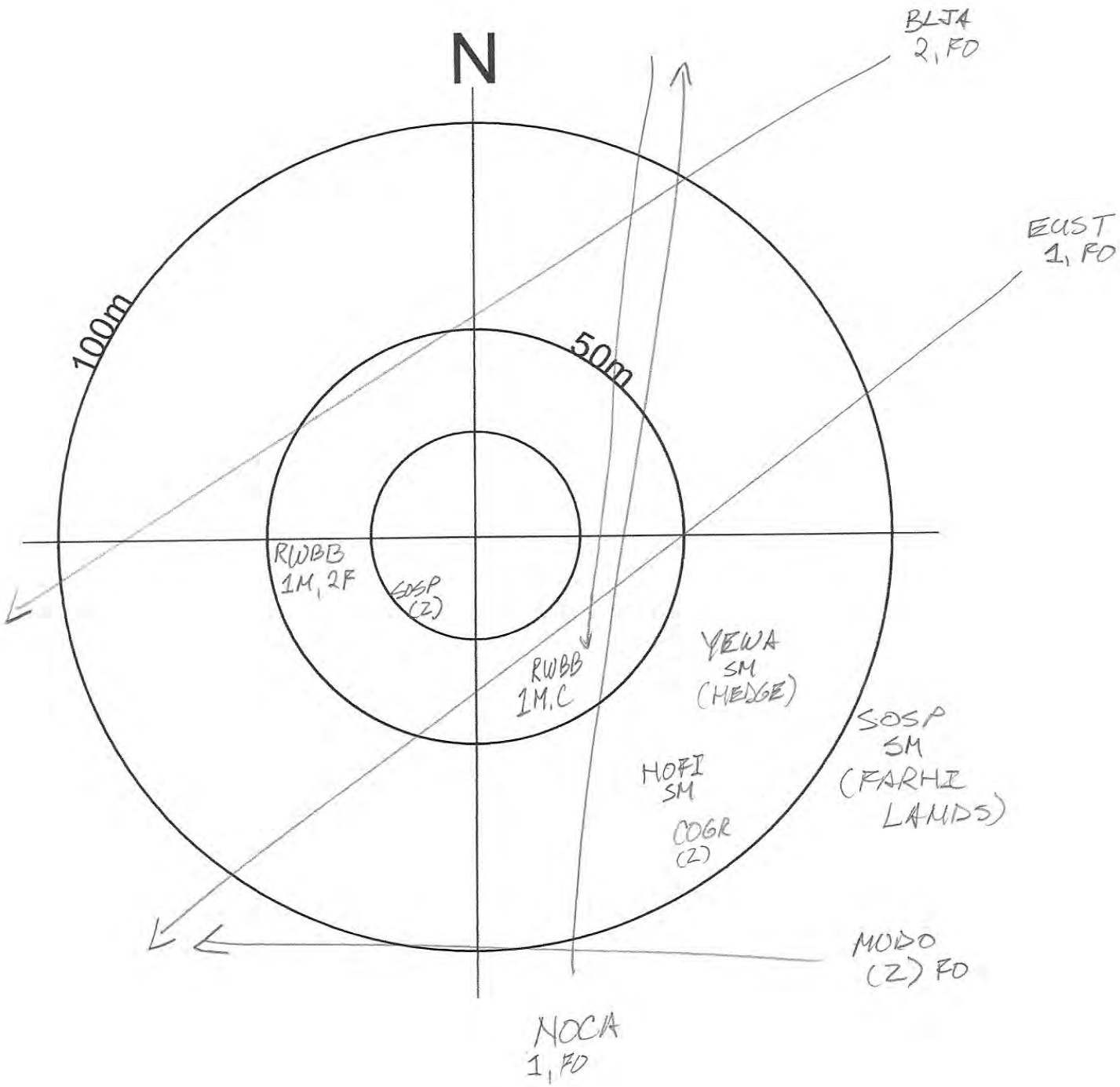
Project OXFORD GIDEON **Date** JUNE 2/21

Collector(s): F.M. **Start:** 7 : 10 **End:** 7 : 15 **Total:** 5min

Temp: 10 **Wind Direction & Speed:** 5-8km/h NE **Clouds (%):** 75

Noise: 3 **Location:** BB4 **Community:** -

General Conditions: COOL, CALM



NOTES:

BREEDING BIRD FIELD SHEET

arva

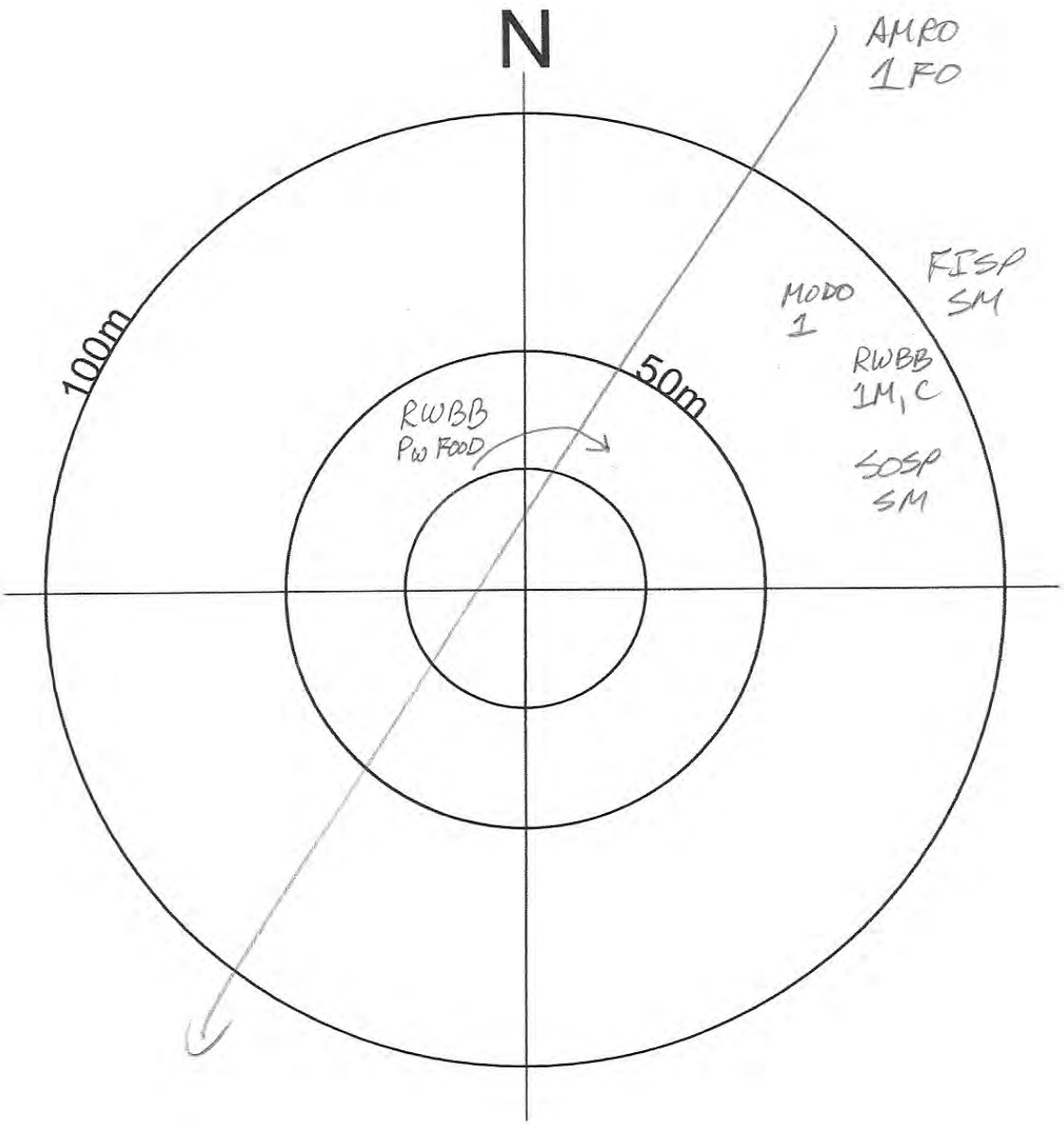
Project OXFORD GIDEON **Date** JUNE 16/21

Collector(s): P.M. **Start:** 8 : 20 **End:** 8 : 25 **Total:** 5min

Temp: 10 **Wind Direction & Speed:** 3-5km/h N **Clouds (%):** 5%

Noise: 3 **Location:** BB1 **Community:** —

General Conditions: CLEAR, CALM



NOTES:

BREEDING BIRD FIELD SHEET

arva

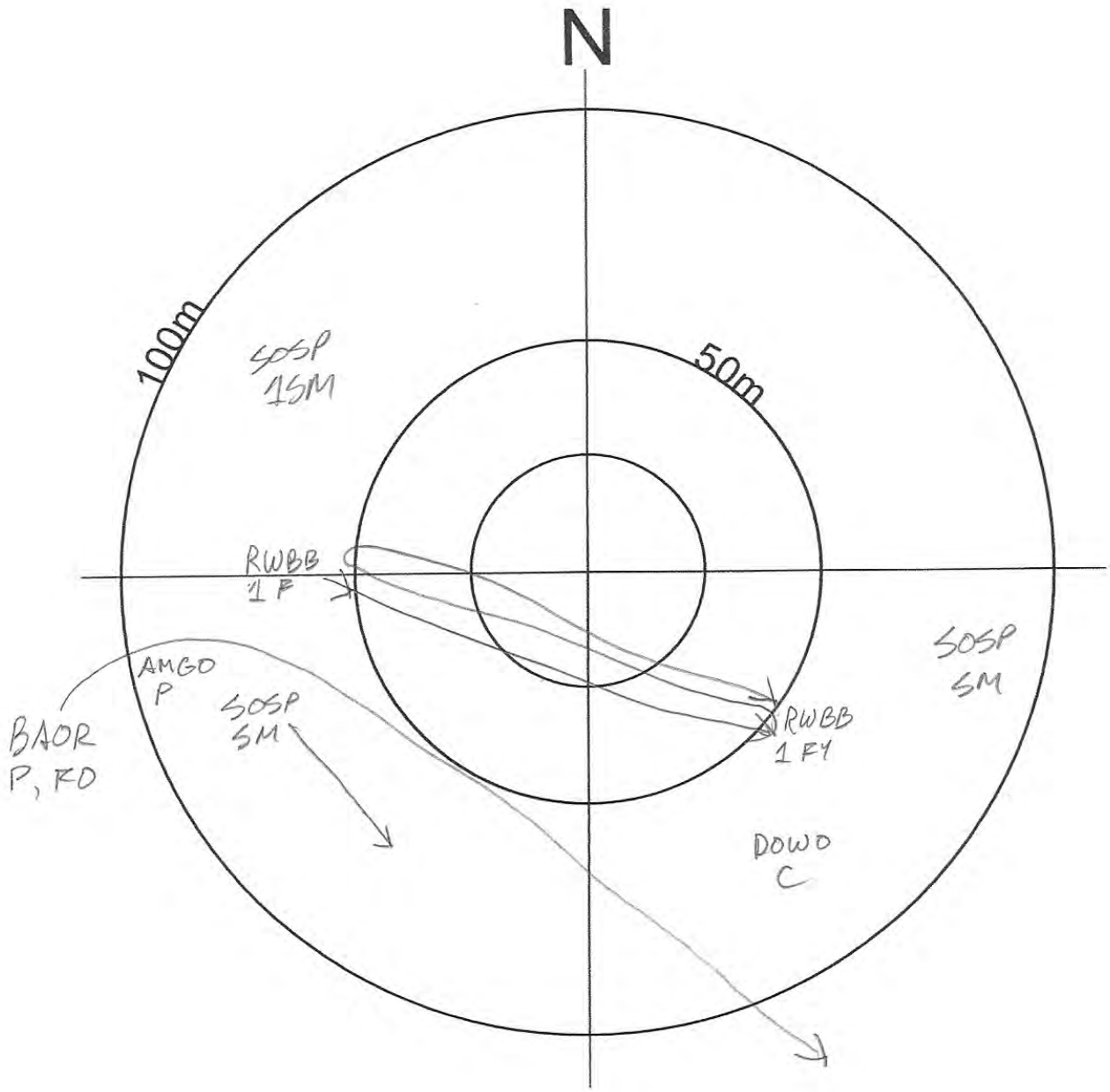
Project OXFORD GIDEON Date JUNE 16/21

Collector(s): P.M Start: 8 : 30 End: 8 : 35 Total: 5min

Temp: 11 Wind Direction & Speed: 2-12km/h NE Clouds (%): 10

Noise: 3 Location: BB2 Community: —

General Conditions: CLEAR, CALM



NOTES: HOFI - SM - Residence

RWBB - FEEDING YOUNG

BREEDING BIRD FIELD SHEET

arva

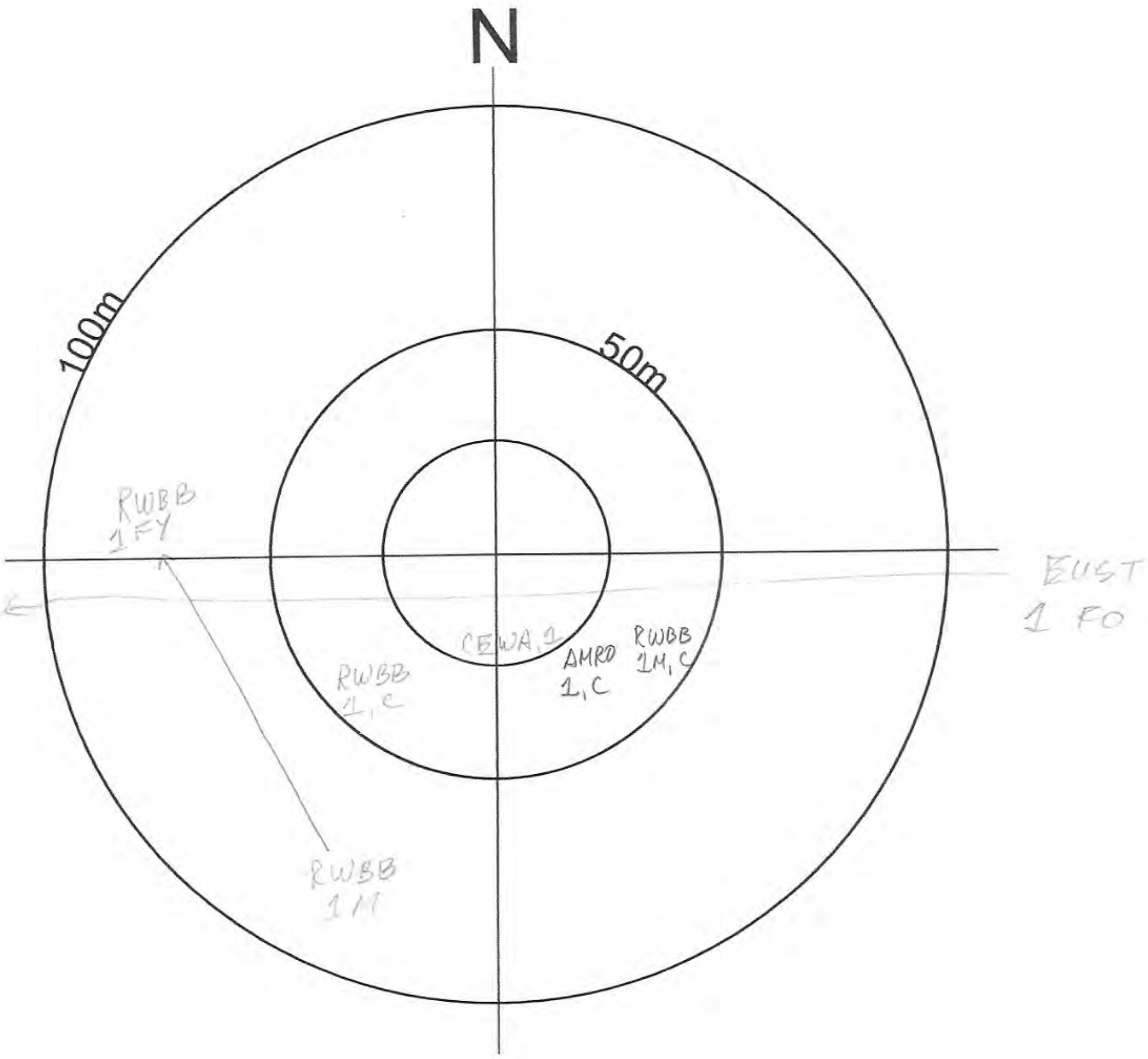
Project OXFORD GIDEON Date JUNE 16/21

Collector(s): P.M. Start: 8 : 41 End: 8 : 46 Total: 5 min

Temp: 13 Wind Direction & Speed: 2-12 km/h NE Clouds (%): 10

Noise: 3 Location: BB3 Community: —

General Conditions: CLEAR, CALM



NOTES:

BREEDING BIRD FIELD SHEET

arva

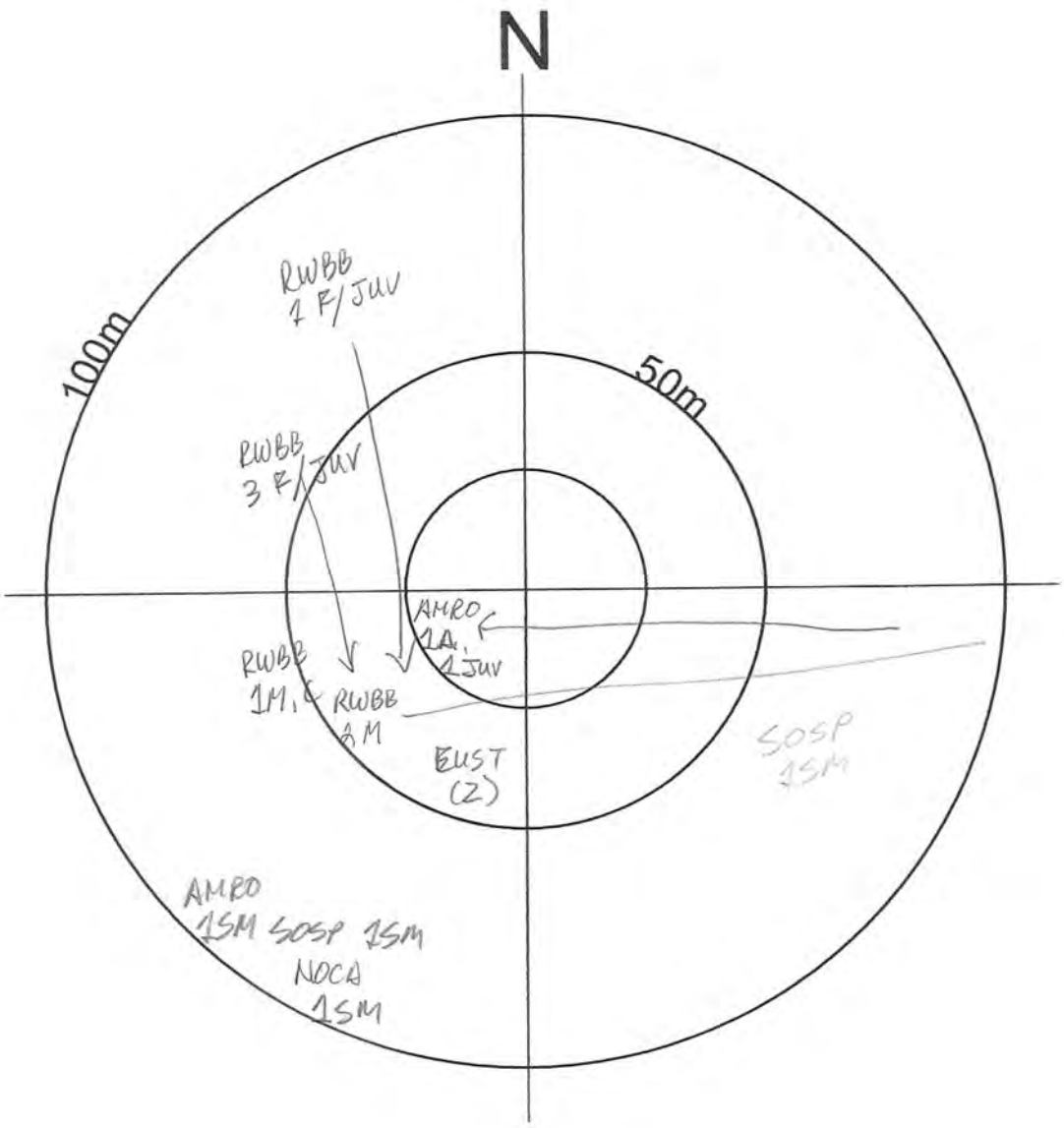
Project OXFORD GIDEON Date JUNE 16/21

Collector(s): P.M. Start: 8 : 53 End: 8 : 58 Total: 5 MIN

Temp: 13 Wind Direction & Speed: 2-12 KM/H NE Clouds (%): 10

Noise: 3 Location: BB4 Community: -

General Conditions: CLEAR CALM



NOTES: 1 RED SQU. DOR

Appendix E

Species Lists

Table 1 – Floral Inventory

Common Name	Scientific Name	Provincial Status (S Rank)*	Middlesex County Rank**
Manitoba Maple	*Acer negundo*	C	C
Common Yarrow	*Achillea millefolium*	SE5?	
Creeping Bentgrass	*Agrostis stolonifera*	SE5	IC
Garlic Mustard	*Alliaria petiolata*	SE5	IC
Grey Alder	*Alnus incana*	S5	U
Great Ragweed	*Ambrosia trifida*	S5	C
Hemp Dogbane	*Apocynum cannabinum*	S5	
Common Burdock	*Arctium minus*	SE5	IC
Common Milkweed	*Asclepias syriaca*	S5	C
Bitter Wintercress	*Barbarea vulgaris*	SE5	IC
Smooth Brome	*Bromus inermis*	SE5	IC
Yellow Marsh Marigold	*Caltha palustris*	S5	C
Pennsylvania Bittercress	*Cardamine pensylvanica*	S5	X
Woodland Sedge	*Carex blanda*	S5	C
Spiked Sedge	*Carex spicata*	SE5	IC
Fox Sedge	*Carex vulpinoidea*	S5	C
Bitternut Hickory	*Carya cordiformis*	S5	X
Spotted Knapweed	*Centaurea stoebe*	SE5	IX
Wild Chicory	*Cichorium intybus*	SE5	IC
Canada Thistle	*Cirsium arvense*	SE5	IC
Bull Thistle	*Cirsium vulgare*	SE5	IX
European Lily-of-the-valley	*Convallaria majalis*	SE5	IR
Field Bindweed	*Convolvulus arvensis*	SE5	IX
Alternate-leaved Dogwood	*Cornus alternifolia*	S5	X
Grey Dogwood	*Cornus racemosa*	S5	X
Red-osier Dogwood	*Cornus sericea*	S5	C
Dotted Hawthorn	*Crataegus punctata*	S5	C
Orchard Grass	*Dactylis glomerata*	SE5	IC
Wild Carrot	*Daucus carota*	SE5	IC
Common Teasel	*Dipsacus fullonum*	SE5	IC
Autumn Olive	*Elaeagnus umbellata*	SE3	IR
Red-stemmed Spikerush	*Eleocharis erythropoda*	S5	C
Slender Wildrye	*Elymus trachycaulus*	S5	
Meadow Horsetail	*Equisetum pratense*	S5	R

Common Name	Scientific Name	Provincial Status (S Rank)*	Middlesex County Rank**
Philadelphia Fleabane	*Erigeron philadelphicus*	S5	C
Robin's-plantain Fleabane	*Erigeron pulchellus*	S5	X
Red Fescue	*Festuca rubra*	S5	
Hard Fescue	*Festuca trachyphylla*	SE4	IX
Glossy Buckthorn	*Frangula alnus*	SE5	IU
White Ash	*Fraxinus americana*	S4	C
Canada Avens	*Geum canadense*	S5	X
Ground-ivy	*Glechoma hederacea*	SE5	IX
Honey Locust	*Gleditsia triacanthos*	S2?	IR
Fowl Mannagrass	*Glyceria striata*	S5	X
Orange Daylily	*Hemerocallis fulva*	SE5	IX
Spotted St. John's-wort	*Hypericum punctatum*	S5	X
Yellow Iris	*Iris pseudacorus*	SE4	IR
Harlequin Blue Flag	*Iris versicolor*	S5	X
Black Walnut	*Juglans nigra*	S4?	X
Soft Rush	*Juncus effusus*	S5	
Path Rush	*Juncus tenuis*	S5	X
Common Juniper	*Juniperus communis*	S5	R
Eastern Red Cedar	*Juniperus virginiana*	S5	X
Tamarack	*Larix laricina*	S5	X
Common Motherwort	*Leonurus cardiaca*	SE5	IC
Oxeye Daisy	*Leucanthemum vulgare*	SE5	IC
Butter-and-eggs	*Linaria vulgaris*	SE5	IC
Perennial Ryegrass	*Lolium perenne*	SE4	IX
Tatarian Honeysuckle	*Lonicera tatarica*	SE5	IX
Garden Bird's-foot Trefoil	*Lotus corniculatus*	SE5	IX
Purple Loosestrife	*Lythrum salicaria*	SE5	IC
Common Apple	*Malus pumila*	SE4	IX
Black Medick	*Medicago lupulina*	SE5	IC
Alfalfa	*Medicago sativa*	SE5	
White Sweet-clover	*Melilotus albus*	SE5	IC
Wild Bergamot	*Monarda fistulosa*	S5	
White Mulberry	*Morus alba*	SE5	IX
Mexican Muhly	*Muhlenbergia mexicana*	S5	C
Watercress	*Nasturtium officinale*	SE	IX
Common Evening-primrose	*Oenothera biennis*	S5	X

Common Name	Scientific Name	Provincial Status (S Rank)*	Middlesex County Rank**
Fall Panicgrass	*Panicum dichotomiflorum*	SE5	IC
Virginia Creeper	*Parthenocissus quinquefolia*	S4?	X
Reed Canarygrass	*Phalaris arundinacea*	S5	X
Common Timothy	*Phleum pratense*	SE5	IC
Common Reed	*Phragmites australis*	S4?	
Eastern Ninebark	*Physocarpus opulifolius*	S5	X
White Spruce	*Picea glauca*	S5	IR
Meadow Hawkweed	*Pilosella caespitosa*	SE5	IX
Eastern White Pine	*Pinus strobus*	S5	X
Scots Pine	*Pinus sylvestris*	SE5	IR
English Plantain	*Plantago lanceolata*	SE5	IC
Common Plantain	*Plantago major*	SE5	IC
Kentucky Bluegrass	*Poa pratensis*	S5	
Eastern Cottonwood	*Populus deltoides*	S5	
Trembling Aspen	*Populus tremuloides*	S5	X
Common Self-heal	*Prunella vulgaris*	S5	
Chokecherry	*Prunus virginiana*	S5	C
Common Pear	*Pyrus communis*	SE4	IX
Common Buttercup	*Ranunculus acris*	SE5	IC
European Buckthorn	*Rhamnus cathartica*	SE5	IC
Staghorn Sumac	*Rhus typhina*	S5	C
Black Locust	*Robinia pseudoacacia*	SE5	IC
Smooth Rose	*Rosa blanda*	S5	X
Multiflora Rose	*Rosa multiflora*	SE5	IX
Black Raspberry	*Rubus occidentalis*	S5	C
Curled Dock	*Rumex crispus*	SE5	IC
Sandbar Willow	*Salix interior*	S5	C
Black Willow	*Salix nigra*	S4	X
(Salix alba X Salix euxina)	*Salix x fragilis*	SNA	hyb
Common Elderberry	*Sambucus canadensis*	S5	X
Dark-green Bulrush	*Scirpus atrovirens*	S5	C
Purple Crown-vetch	*Securigera varia*	SE5	IX
Bladder Campion	*Silene vulgaris*	SE5	IX
Bittersweet Nightshade	*Solanum dulcamara*	SE5	IC
Tall Goldenrod	*Solidago altissima*	S5	
Canada Goldenrod	*Solidago canadensis*	S5	

Common Name	Scientific Name	Provincial Status (S Rank)*	Middlesex County Rank**
Field Sow-thistle	*Sonchus arvensis*	SE5	IX
Common Chickweed	*Stellaria media*	SE5	IC
White Heath Aster	*Symphyotrichum ericoides*	S5	
Panicled Aster	*Symphyotrichum lanceolatum*	S5	C
New England Aster	*Symphyotrichum novae-angliae*	S5	C
Old Field Aster	*Symphyotrichum pilosum*	S5	
Eastern Skunk Cabbage	*Symplocarpus foetidus*	S5	C
Common Dandelion	*Taraxacum officinale*	SE5	IC
Eastern White Cedar	*Thuja occidentalis*	S5	X
Basswood	*Tilia americana*	S5	C
Meadow Goatsbeard	*Tragopogon pratensis*	SE5	IX
White Clover	*Trifolium repens*	SE5	IX
Narrow-leaved Cattail	*Typha angustifolia*	SE5	IX
Broad-leaved Cattail	*Typha latifolia*	S5	X
Siberian Elm	*Ulmus pumila*	SE3	IR
Cranberry Viburnum	*Viburnum opulus*	S5	
Tufted Vetch	*Vicia cracca*	SE5	IX
Riverbank Grape	*Vitis riparia*	S5	C

** S Rank: S5 – Secure, S4 – Apparently secure, S3 – Vulnerable, S2 – Imperiled, S1 – Critically imperiled*
*** County Rank: I – Introduced, C – Common, U – Uncommon, R – Rare, H – Historic, X – Present, ? – Unconfirmed report, hyb - Hybrid*

Table 2 – Breeding Bird Data (Right-of-Way and Surrounding Area)

Common Name	Scientific Name	STATUS			Survey Point and Replicate								Max Breeding Potential
		S Rank	ESA	PIF	BB1		BB2		BB3		BB4		
				VISIT	1	2	1	2	1	2	1	2	
Mourning Dove	*Zenaida macroura*	S5B, SZN	-	-	1 FO 1 OB	1 OB	-	-	-	-	1 FO	-	Possible throughout site.
Black-billed Cuckoo	*Coccyzus erythropthalmus*	S4B, SZN	-	Reverse decline	1 OB	-	-	-	-	-	-	-	Possible in SWM4-1 and wooded habitats outside of the Study Area
Killdeer	*Charadrius vociferus*	S5B, SZN	-	-	-	-	1 FO	-	-	-	-	-	No breeding evidence
Belted Kingfisher	*Megaceryle alcyon*	S5B, SZN	-	-	-	1 OB º	-	-	-	-	-	-	Associated with Trib. C; possible.
Downy Woodpecker	*Dryobates pubescens*	S5	-	-	-	-	-	1 OB	-	-	-	-	Possible in treed habitats both within and outside of the Study Area.
Great Crested Flycatcher	*Myiarchus crinitus*	S5B, SZN	-	-	-	-	-	-	1 SM	-	-	-	Possible in the Cultural Woodland south of Oxford Street.
Eastern Kingbird	*Tyrannus tyrannus*	S5B, SZN	-	-	1 SM º	-	-	-	-	-	-	-	Possible in all treed habitats in the vicinity of Trib C.
Red-eyed Vireo	*Vireo olivaceus*	S5B, SZN	-	-		1 OB º	-	-	-	-		-	Possible in SWM4-1 and wooded habitats outside of the Study Area.
Blue Jay	*Cyanocitta cristata*	S5	-	-	1 OB	-	-	-	-	-	1 FO	-	Possible in treed habitats both within and outside of the Study Area.
American Crow	*Corvus brachyrhynchos*	S5B, SZN	-	-	1 FO	-	-	-	-	-		-	No breeding evidence.
Barn Swallow	*Hirundo rustica*	S5B, SZN	THR	-	-	-	-	-	-	1 OB º	-	-	No breeding evidence, though nesting is possible on nearby buildings.
House Wren	*Troglodytes aedon*	S5B, SZN	-	-	-	-	-	-	1 SM º	-	-	-	Possible in treed habitats or nest boxes throughout Study Area
American Robin	*Turdus migratorius*	S5B, SZN	-	-	-	1 FO	-	-	-	-	-	1 SM	Probable throughout Study Area; confirmed (fledgling).

Common Name	Scientific Name	STATUS			Survey Point and Replicate								Max Breeding Potential
		S Rank	ESA	PIF	BB1		BB2		BB3		BB4		
				VISIT	1	2	1	2	1	2	1	2	
												1 OB 1 FY	
European Starling	*Sturnus vulgaris*	SE	-	-	-	-	-	-	1 FO	1 FO	1 FO	2 OB	Probable throughout Study Area.
Cedar Waxwing	*Bombycilla cedrorum*	S5B, SZN	-	-	-	-	-	-	-	1 OB	-	-	Possible throughout Study Area.
House Sparrow	*Passer domesticus*	SE	-	-	-	-	-	-	1 OB	-	-	-	Possible throughout Study Area.
House Finch	*Haemorhous mexicanus*	SE	-	-	-	-	-	1SM	-	-	1SM	-	Possible throughout Study Area.
American Goldfinch	*Spinus tristis*	S5B, SZN	-	-	1 OB	-	-	1 P OB	1 P 1 OB	-	-	-	Probable in CUM1 and other open habitats throughout the Study Area.
Field Sparrow	*Spizella pusilla*	S5B, SZN	-	-	2 SM	1 SM	-	-	-	-	-	-	Probable in CUM1-1 east of Trib C.
Song Sparrow	*Melospiza melodia*	S5B, SZN	-	-	1 SM	1 SM	1 SM	3 SM	-	-	2 OB	2 SM	Probable in CUM1 and other open habitats throughout the Study Area.
Common Grackle	*Quiscalus quiscula*	S5B, SZN	-	-	-	-	-	-	1 OB	-	1 OB	-	Possible in treed habitats throughout Study Area.
Brown-headed Cowbird	*Molothrus ater*	S5B, SZN	-	-	1 FO	-	-	-	-	-	-	-	No breeding evidence.
Baltimore Oriole	*Icterus galbula*	S5B, SZN	-	-	-	-	-	1 P FO	-	-	-	-	Possible in treed habitats throughout Study Area.
Red-winged Blackbird	*Agelaius phoeniceus*	S5B, SZN	-	-	2 SM	P, CF 1 SM	3 SM 2 OB, A	1 OB 1 FY	NY 2 SM 1 OB	1 FY 2 SM 1 OB	1 SM 3 OB	1 SM 6 OB	Confirmed breeding in SWD4-1 and CUT1 habitats within Study Area.
Blue-winged Warbler	*Vermivora cyanoptera*	S4B, SZN	-	-	-	-	1 SM º	-	-	-	-	-	Possible in CUM1-1 east of Trib C.
Common Yellowthroat	*Geothlypis trichas*	S5B, SZN	-	-	1 SM º	-	-	-	-	-	-	-	Probable in wetland communities associated with Trib C.

Common Name	Scientific Name	STATUS			Survey Point and Replicate								Max Breeding Potential
		S Rank	ESA	PIF	BB1		BB2		BB3		BB4		
				VISIT	1	2	1	2	1	2	1	2	
Yellow Warbler	*Setophaga petechia*	S5B, SZN	-	-		-	-	-	-	-	1 SM	-	Possible in residential hedgerow at the eastern edge of Study Area
Northern Cardinal	*Cardinalis cardinalis*	S5	-	-	1 OB°	-	-	-	-	-	1 FO	1 SM	Possible throughout Study Area.

Visit 1 – June 2, 2021 – 9-10 °C, 5-8 km/hr NE wind, partly cloudy
Visit 2 – June 16, 2021 – 10-13 °C, 2-12 km/hr N/NE wind, mainly clear

PIF – Partners in Flight (2008)

OB – observed in habitat (called or visual)
SM – singing male
P – male/female pair
A – agitated behaviour
FY – fledged young
NY – nest with young
FO – fly over, foraging or moving
* – birds likely observed at a previous point
° – observation outside of dedicated survey

Table 3 – Incidental Terrestrial Wildlife

Common Name	Scientific Name	Provincial Status (S Rank)*
Mammals		
Red Squirrel	*Tamiasciurus hudsonicus*	S5
White-tailed Deer	*Odocoileus virginianus*	S5
Insects		
Monarch	*Danaus plexippus*	S2
Two-spotted bumblebee	*Bombus bimaculatus*	S5

** S Rank: S5 – Secure, S4 – Apparently secure, S3 – Vulnerable, S2 – Imperiled, S1 – Critically imperiled, SNA – Non-native*

Appendix F

Significant Wildlife Habitat Assessment

SWH Ecoregion 7E Criterion Schedule

Table 1.1 Seasonal Concentration Areas of Animals.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Waterfowl Stopover and Staging Areas (Terrestrial) **Rationale**: Habitat important to migrating waterfowl.	American Black Duck Northern Pintail Gadwall Blue-winged Teal Green-winged Teal American Wigeon Northern Shoveler Tundra Swan	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites. - Fields with seasonal flooding and waste grains in the Long Point, Rondeau, Lk. St. Clair, Grand Bend and Pt. Pelee areas may be important to Tundra Swans.	Fields with sheet water during Spring (mid- March to May). • Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available. Information Sources • Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. • Reports and other information available from Conservation Authorities (CAs). • Sites documented through waterfowl planning processes (eg. EHJV implementation plan). • Field Naturalist Clubs. • Ducks Unlimited Canada. • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • Any mixed species aggregations of 100 or more individuals required. • The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependent on local site conditions and adjacent land use is the significant wildlife habitat. • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • SWH MIST Index #7 provides development effects and mitigation measures.	**No** Habitats within and adjacent to the Study Area are unlikely to experience suitable flooding conditions.	**No** Candidate habitat was not identified.
Waterfowl Stopover and Staging Areas (Aquatic) **Rationale**: Important for local and migrant waterfowl populations during the spring	Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5	• Ponds, marshes, lakes, bays coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly	Studies carried out and verified presence of” • Aggregations of 100 or more of listed species for 7 days, results in >700 waterfowl use days • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH. • The combined area of the ELC ecosites and a 100m radius area is the SWH.	**No** No candidate communities were identified within the Study Area. Suitable communities on adjacent lands are not large enough to support large	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
or fall migration or	White-winged Scoter Black Scoter Ring-necked duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback Ruddy Duck	SWD6	aquatic invertebrates and vegetation in shallow water) Information Sources • Environment Canada. • Naturalist clubs often are aware of staging/stopover areas. • OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. • Sites documented through waterfowl planning processes (eg. EHJV implementation plan). • Ducks Unlimited projects. • Element occurrence. specification by Nature Serve: http://www.natureserve.org • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	• Wetland area and shorelines associated with sites identified within the SWHTG Appendix K are significant wildlife habitat. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • SWHMIST Index #7 provides development effects and mitigation measures.	numbers of waterfowl.	
Shorebird Migratory Stopover Area **Rationale**: High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird’s Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	• Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. • Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH. Information Sources • Western hemisphere shorebird reserve network. • Canadian Wildlife Service (CWS) Ontario Shorebird Survey. • Bird Studies Canada.	Studies confirming: • Presence of 3 or more of listed species and > 1000[1] shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100[1] Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • SWH MIST Index #8 provides development effects	**No** No shoreline habitat is present within the Study Area.	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
			• Ontario Nature. • Local birders and naturalist clubs. • NHIC Shorebird Migratory Concentration Area	and mitigation measures.		
Raptor Wintering Area **<u>Rationale</u>:** Sites used by multiple species, a high number of individuals and used annually are most significant.	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl **Special Concern:** Short-eared Owl Bald Eagle	**Hawks/Owls** Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM; CUT; CUS; CUW. **Bald Eagle:** Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or lakes with open water (hunting areas).	• The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. • Raptor wintering(hawk/owl) sites need to be > 20 ha with a combination of forest and upland. • Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent Woodlands. • Field area of the habitat is to be wind swept with limited snow depth or accumulation. • Eagle sites have open water and large trees and snags available for roosting. <u>Information Sources</u>: • OMNR Ecologist or Biologist. • Naturalist club. • Natural Heritage Information Center (NHIC) Raptor Winter Concentration Area. • Data from Bird Studies Canada, most notably for Short-eared Owls. • Results of Christmas Bird Counts. • Reports and other information available from Conservation Authorities.	Studies confirm the use of these habitats by: • One or more Short-eared Owls or; One of more Bald Eagles or; At least 10 individuals and two of listed hawk/owl species. • To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds. • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • SWH MIST Index #10 and #11 provides development effects and mitigation measures.	**Yes** Candidate ecosites are present within and beyond the Study Area. The Study Area composes a small fraction of qualifying CUM habitat, with the majority of the candidate habitat located to the north.	**No** Candidate habitat has not been confirmed and the vast majority is located on adjacent lands.
Bat Hibernacula **<u>Rationale</u>:** Bat hibernacula are rare habitats in all Ontario landscapes.	Big Brown Bat Tri-colored Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2	• Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. • Active mine sites should not be considered as	• All sites with confirmed hibernating bats are SWH. • The area includes 200m radius around the entrance of the hibernaculum for most development types.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
		(Note: buildings are not considered to be SWH)	SWH. • The locations of bat hibernacula are relatively poorly known. <u>Information Sources</u> • OMNR for possible locations and contact for local experts. • Natural Heritage Information Center (NHIC) Bat Hibernaculum. • Ministry of Northern Development and Mines for location of mine shafts. • Clubs that explore caves (eg. Sierra Club). • University Biology Departments with bat experts.	and 1000m for wind farms. • Studies are to be conducted during the peak swarming period (Aug. – Sept.). • Surveys should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”. • SWH MIST Index #1 provides development effect and mitigation measures.		
Bat Maternity Colonies **<u>Rationale</u>:** Known locations of forested bat maternity colonies is extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	• Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario • Maternity colonies located in Mature deciduous or mixed forest stands with >10/ha large diameter (>25cm dbh) wildlife trees. • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred. <u>Information Sources</u> • OMNR for possible locations and contact for local experts. • University Biology Departments with bat experts.	• Maternity Colonies with confirmed use by; – >10 Big Brown Bats – >5 Adult Female Silver-haired Bats • The area of the habitat includes the entire woodland or the forest stand ELC Ecosite containing the maternity colonies. • Evaluation methods for maternity colonies should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”. • SWH MIST Index #12 provides development effects and mitigation measures.	**No** Candidate ecosites are present within the Study Area but occupy very small areas and are not expected to meet the habitat criteria thresholds.	**No** Candidate habitat was not confirmed.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Turtle Wintering Areas **Rationale:** Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	Midland Painted Turtle **Special Concern:** Northern Map Turtle Snapping Turtle	Snapping and Midland Painted turtles; ELC Community Classes; SW, MA, OA and SA. ELC Community Series; FEO and BOO Northern Map; Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering	• For most turtles, wintering areas are in the same general area as their core habitat. • Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen. • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH. • EIS studies carried out by Conservation Authorities. • Field Naturalists Clubs. • OMNRF Ecologist or Biologist. • Natural Heritage Information Centre (NHIC).	• Presence of 5 over-wintering Midland Painted Turtles is significant • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant[i]. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over-wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May). Congregation of turtles is more common where wintering areas are limited and therefore significant. • SWH MIST Index #28 provides development effects and mitigation measures for turtle wintering habitat.	**Yes** Candidate habitat is present within the Study Area in the form of Tributary C, a cold-water, permanent watercourse.	**No** Candidate habitat was not confirmed.
Reptile Hibernaculum **Rationale:** Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	**Snakes:** Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake Milksnake **Special Concern:** Eastern Ribbonsnake	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats. Observations of congregations of snakes on sunny warm days in the spring or fall is a	• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line.	Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct)[i]. • Note: If there are Special Concern Species present, then site is SWH.	**No** Candidate habitat was not identified within the Study Area.	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
		good indicator.	• Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. Information Sources • In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g.old dug wells). • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs. • University herpetologists. • Natural Heritage Information Center (NHIC).	• Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population [i.e. strong hibernation site fidelity.]. Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30 m buffer is the SWH· • SWH MIST Index #13 provides development effects and mitigation measures for snake hibernacula.		
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff) **Rationale:** Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow population are declining in Ontario.	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies).	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles, cliff faces, bridge abutments, silos, barns (Cliff Swallows). Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation.	Studies confirming: • Presence of 1 or more nesting sites with 8 or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50m radius habitat area from the peripheral nests. • Field surveys to observe and count swallow nests are to be completed during the breeding season (May-June). Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • SWH MIST Index #4 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs) **<u>Rationale</u>:** Large colonies are important to local bird population, typically sites are only known.	Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree. <u>Information Sources</u> • Ontario Breeding Bird Atlas, colonial nest records. • Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF). • Natural Heritage Information Center (NHIC) Mixed Wader Nesting Colony. • Aerial photographs can help identify large heronries. • Reports and other information available from Conservation Authorities. • MNRF District Offices. • Local naturalist clubs.	Studies confirming: • Presence of 2 or more active nests of Great Blue Heron or other listed species. • The habitat extends from the edge of the colony and a minimum 300 m radius or extend of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH. • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells. • SWH MIST Index #5 provides development effects and mitigation measures.	**Yes** A small area of candidate ecosite is present within the Study Area.	**No** Candidate habitat was not confirmed.
Colonially - Nesting Bird Breeding Habitat (Ground) **<u>Rationale</u>:** Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1;50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird). MAM1 – 6; MAS1 – 3; CUM CUT	• Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. • Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands. <u>Information Sources</u> • Brewers Blackbird colonies • Ontario Breeding Bird Atlas, rare/colonial species records. • Canadian Wildlife Service. • Reports and other information available from Conservation	Studies confirming: • Presence of > 25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern. • Presence of 5 or more pairs for Brewer's Blackbird. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant. • The edge of the colony and a minimum 150m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH. • Studies would be done during	**No** Candidate habitat is not present within the Study Area.	**No** No candidate habitat was identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
		CUS	Authorities. • Natural Heritage Information Center (NHIC) Colonial Waterbird Nesting Area. • MNRF District Offices. • Field Naturalist Clubs.	May/June when actively nesting. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • SWH MIST Index #6 provides development effects and mitigation measures.		
Migratory Butterfly Stopover Areas **<u>Rationale</u>:** Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	Painted Lady Red Admiral <u>Special Concern</u> Monarch	Combination of ELC Community Series; need to have present one Community Series from each landclass Field: CUM CUT CUS Forest: FOC FOD FOM CUP Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.	• A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Erie and Ontario. • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat. • Stopover areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes. <u>Information Sources</u> • MNRF district Offices. • Natural Heritage Information Center (NHIC). • Agriculture Canada in Ottawa may have list of butterfly experts. • Field Naturalist Clubs. • Toronto Entomologists Association. • Conservation Authorities	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct). MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day significant variation can occur between years and multiple years of sampling should occur. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. • MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral’s is to be considered significant. • SWH MIST Index #16 provides development effects and mitigation measures.	**No** Candidate ecosites are present within and adjacent to the Study Area, however, it is > 5km from Lake Ontario or Erie.	**No** No candidate habitat was identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Landbird Migratory Stopover Areas **<u>Rationale</u>:** Sites with a high diversity of species as well as high numbers are most significant.	All migratory songbirds. Canadian Wildlife Service Ontario website: http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D-1 All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds.	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	• Woodlots need to be >5 ha in size and within 5 km of Lake Ontario and Erie. If woodlands are rare in an area of shoreline, woodland fragments 2-5ha can be considered for this habitat. • If multiple woodlands are located along the shoreline those Woodlands <2km from Lake Erie and Lake Ontario are more significant. • Sites have a variety of habitats; forest, grassland and wetland complexes. • The largest sites are more significant. • Woodlots and forest fragments are important habitats to migrating birds, these features located along the shore and located within 5km of Lake Erie and Lake Ontario are Candidate SWH.	Studies confirm: • Use of the woodlot by >200 birds/day and with >35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (March to May) and fall (Aug to Oct) migration using standardized assessment techniques. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • SWH MIST Index #9 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** No candidate habitat was identified.
Deer Winter Congregation Areas **<u>Rationale</u>:** Deer movement during winter in the southern areas of Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions.	White-tailed Deer	All Forested Ecosites with these ELC Community Series; FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50 ha may also be used.	• Woodlots >100 ha in size or if large woodlots are rare in a planning area woodlots>50ha. • Deer movement during winter in the southern areas Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands. • Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha. • Woodlots with high densities of deer due to artificial feeding are not significant. <u>Information Sources</u> • MNRF District Offices. • LIO/NRVIS.	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF. • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques, ground or road surveys, or a pellet count deer density survey. • SWH MIST Index #2 provides development effects and mitigation measures.	**No** Candidate habitat was not identified within the Study Area.	**No** No candidate habitat was identified.

Table 1.2.1 Rare Vegetation Communities.

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
	ELC Ecosite Codes	Habitat Criteria and Information Sources	Detailed Information and Sources	Defining Criteria		
Cliffs and Talus Slopes **<u>Rationale</u>:** Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.	Most cliff and talus slopes occur along the Niagara Escarpment. <u>Information Sources</u> • The Niagara Escarpment Commission has detailed information on location of these habitats. • OMNRF Districts. • Natural Heritage Information Centre (NHIC) has location information available on their website. • Field Naturalist Clubs. • Conservation Authorities.	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes. • SWH MIST Index #21 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.
Sand Barren **<u>Rationale</u>;** Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always <u>≤</u> 60%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.	A sand barren area >0.5ha in size. <u>Information Sources</u> • OMNRF Districts. • Natural Heritage Information Center (NHIC) has location information available on their website. • Field Naturalist Clubs. • Conservation Authorities.	• Confirm any ELC Vegetation Type for Sand Barrens. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWH MIST Index #20 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
	ELC Ecosite Codes	Habitat Criteria and Information Sources	Detailed Information and Sources	Defining Criteria		
Alvar **<u>Rationale</u>:** Alvars are extremely rare habitats in Ecoregion 7E.	ALO1 ALS1 ALT1 FOC1 CUW2 **Five Alvar Indicator Species:** 1)*Carex crawei* 2)*Panicum philadelphicum* 3)*Elocharis compressa* 4)*Scutellaria parvula* 5)*Trichostema brachiatum* These indicator species are very specific to Alvars within Ecoregion 7E.	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover.	An Alvar site > 0.5 ha in size Alvar is particularly rare in Ecoregion 7E where the only known sites are found in the western islands of Lake Erie. <u>Information Sources</u> • Alvars of Ontario (2000), Federation of Ontario Naturalists. • Ontario Nature – Conserving Great Lakes Alvars. • Natural Heritage Information Center (NHIC) has location information available on their website • OMNRF Staff. • Field Naturalist Clubs. • Conservation Authorities.	Field studies identify four of the five **Alvar Indicator Species** at a Candidate Alvar site is Significant. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses. • SWH MIST Index #17 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.
Old Growth Forest **<u>Rationale</u>:** Due to historic logging practices and land clearance for agriculture, old growth forest is rare in Ecoregion 7E.	Forest Community Series: FOD FOC FOM SWD SWC SWM	Old-growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in mosaic of gaps that encourage development of multi- layered canopy and an abundance of snags and downed woody debris.	• Woodland area is >0.5 ha. <u>Information Sources</u> • OMNRF Forest Resource Inventory mapping. • OMNRF Districts. • Field Naturalist Clubs. • Conservation Authorities. • Sustainable Forestry Licence (SFL) companies. will possibly know locations through field operations. • Municipal forestry departments.	Field Studies will determine: • If dominant trees species of the ecosite are >140 years old, then area containing these trees is Significant Wildlife Habitat . • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut steps will not be present). • The area of forest ecosites combined or an eco-element within an ecosite that contain the old growth characteristics is the SWH. • Determine ELC vegetation types For the forest area containing the old growth characteristics. • SWH MIST Index #23 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
	ELC Ecosite Codes	Habitat Criteria and Information Sources	Detailed Information and Sources	Defining Criteria		
Savannah **Rationale:** Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. In ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario).	No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • Natural Heritage Information Center (NHIC) has location data available on their website. • OMNRF Districts. • Field Naturalists Clubs. • Conservation Authorities.	Field studies confirm one or more of the Savannah indicator species listed in Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 7E should be used • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWH MISTcxlix Index #18 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.
Tallgrass Prairie **Rationale:** Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. In ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario).	No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • OMNRF Districts. • Natural Heritage Information Center (NHIC) has location data available on their website. • Field Naturalists Clubs. • Conservation Authorities.	Field studies confirm one or more of the Prairie indicator species listed in Appendix N should be present. Note: Prairie plant spp. list from Ecoregion 7E should be used. • Area of the ELC Ecosite is the SWH • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWH MIST Index #19 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Table 1.2.2 Specialized Habitats For Wildlife considered SWH.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Waterfowl Nesting Area **Rationale:** Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4 **Note: includes adjacency to Provincially Significant Wetlands**	A waterfowl nesting area extends 120 m cxdix from a wetland (> 0.5 ha) or a wetland (>0.5 ha) with small wetlands (<0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur. • Upland areas should be at least 120m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. Information Sources • Ducks Unlimited staff may know the locations of particularly productive nesting sites. • OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. • Reports and other information available from Conservation Authorities.	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards, or; • Presence of 10 or more nesting pairs for listed species including Mallards. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWH MIST Index #25 provides development effects and mitigation measures.	**Yes** Candidate ecosites are present within the Study Area but are likely too small to support defining wildlife species.	**No** Candidate habitat was not identified.
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat **Rationale:** Nest sites are fairly uncommon in Ecoregion 7E and are used annually by these species. Many suitable nesting locations may be lost due to	Osprey Special Concern Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands,	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree’s canopy. • Nests located on man-made objects are not to be included as SWH (e.g. telephone poles	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area. • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300 m radius	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
increasing shoreline development pressures and scarcity of habitat.			and constructed nesting platforms). <u>Information Sources</u> • Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario. • MNRF values information (LIO/NRVIS) will list know nesting locations, Note: data from NRVIS is provided as a point and does not represent all the habitat. • Nature Counts, Ontario Nest Records Scheme data. • OMNRF Districts. • Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in Ontario for species documented. • Reports and other information available from Conservation Authorities. • Field naturalist Clubs.	around the nest or the contiguous woodland stand is the SWH, maintaining undisturbed shorelines with large trees within this area is important. • For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. Area of the habitat from 400-800m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat. • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for ≥ 3 years or suspected of not being used for >5 years before being considered not significant. • Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • SWH MIST Index #26 provides development effects and mitigation measures.		

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Woodland Raptor Nesting Habitat **<u>Rationale</u>:** Nests sites for these species are rarely identified; these area sensitive habitats are often used annually by these species.	Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3.	All natural or conifer plantation woodland/forest stands combined >30ha or with >4 ha of interior habitat. Interior habitat determined with a 200m buffer. • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. <u>Information Sources</u> • OMNRF Districts. • Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada. • Reports and other information available from Conservation Authorities.	Studies confirm: • Presence of 1 or more active nests from species list is considered significant. • Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest). • Barred Owl – A 200m radius around the nest is the SWH. • Broad-winged Hawk and Coopers Hawk, – A 100m radius around the nest is the SWH. • Sharp-Shinned Hawk – A 50m radius around the nest is the SWH. • Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWH MIST Index #27 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Turtle Nesting Areas **<u>Rationale</u>:** These habitats are rare and when identified will often be the only breeding site for local populations of turtles.	Midland Painted Turtle <u>Special Concern Species</u> Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100m) cxlviii or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. <u>Information Sources</u> • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). • Check the Ontario Herpetofaunal Atlas records (or other similar atlases) for uncommon turtles; location information may help to find potential nesting habitat for them. • Natural Heritage Information Center (NHIC). • Field Naturalist Clubs.	Studies confirm: • Presence of 5 or more nesting Midland Painted Turtles. • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH. • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH. • Travel routes from wetland to nesting area are to be considered within the SWH as a part of the 30-100m area of habitat. • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method. • SWH MIST Index #28 provides development effects and mitigation measures for turtle nesting habitat.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.
Seeps and Springs **<u>Rationale</u>:** Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system. • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species. <u>Information Sources</u> • Topographical Map.	Field Studies confirm: • Presence of a site with 2 or more seeps/springs should be considered SWH. • The area of a ELC forest ecosite or ecoelement within ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
			• Thermography. • Hydrological surveys conducted by Conservation Authorities and MOE. • Field Naturalists Clubs and landowners. • Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped.	condition need to be considered in delineation the habitat. • SWH MIST Index #30 provides development effects and mitigation measures.		
Amphibian Breeding Habitat (Woodland). **<u>Rationale</u>:** These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations.	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	• Presence of a wetland, pond woodland pool (including vernal pools) >500m^2 within or adjacent (within 120m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat. <u>Information Sources</u> • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records. • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • OMNRF Districts and wetland Evaluations. • Field Naturalist Clubs • Canadian Wildlife Service Amphibian Road Call Survey. • Ontario Vernal Pool Association: http://www.ontariovernalpools.org	Studies confirm; • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults juveniles, larva or eggs masses) or 2 or more of the listed frog species with Call Level Codes of 3. • A combination of observation study and call count survey will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the wetland area plus a 230m radius of area. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. • SWH MIST Index #14 provides development effects and mitigation measures.	**Yes** Candidate habitat is present within the Study Area.	**Yes** Candidate habitat was confirmed in ecosites within Study Area during prior investigations (AECOM, 2016).

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Amphibian Breeding Habitat (Wetlands) **<u>Rationale</u>:** Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Central Ontario landscapes.	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	ELC Community Classes SW, MA, FE, BO, OA and SA. Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands.	• Wetlands>500m^2 (about 25m diameter), supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats. • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. • Bullfrogs require permanent water bodies with abundant emergent vegetation. <u>Information Sources</u> • Ontario Herpetofaunal Summary Atlas (or other similar atlases). • Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. • OMNRF Districts and wetland evaluations. • Reports and other information available from Conservation Authorities.	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3 or; Wetland with confirmed breeding Bullfrogs are significant. • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWH MIST Index #15 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.
Woodland Area-Sensitive Bird Breeding Habitat **<u>Rationale</u>:** Large, natural blocks of mature woodland habitat within the settled areas of	Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha. • Interior forest habitat is at least 200 m from forest edge habitat. <u>Information Sources</u>	Studies confirm: • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. • Note: any site with breeding Cerulean Warblers or Canada Warbler is to be considered SWH. • Conduct field investigations	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Southern Ontario are important habitats for area sensitive interior forest song birds.	Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren Pileated Woodpecker <u>Special Concern:</u> Cerulean Warbler Canada Warbler	SWD	• Local birder clubs. • Canadian Wildlife Service (CWS) for the location of forest bird monitoring . • Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species. • Reports and other information available from Conservation Authorities.	in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • SWH MIST Index #34 provides development effects and mitigation measures.		

Table 1.3. Habitats of Species of Conservation Concern considered SWH

Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Marsh Breeding Bird Habitat **Rationale:** Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Green Heron Trumpeter Swan **Special Concern:** Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	• Nesting occurs in wetlands. • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present. • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. Information Sources • OMNRF District and wetland evaluations. • Field Naturalist clubs. • Natural Heritage Information Centre (NHIC) Records. • Reports and other information available from Conservation Authorities. • Ontario Breeding Bird Atlas.	Studies confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of 4 or more of the listed species. • Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH. • Area of the ELC ecosite is the SWH. • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • SWH MIST Index #35 Provides development effects and mitigation measures.	**Yes** Candidate ecosites are present within the Study Area.	**No** Candidate habitat was not identified.
Open Country Bird Breeding Habitat **Rationale:** This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow **Special Concern** Short-eared Owl	CUM1 CUM2	• Large grassland areas (includes natural and cultural fields and meadows) >30 ha. • Grasslands not Class 1 or Class 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years). • Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. • The Indicator bird species are area sensitive requiring larger	Field Studies confirm: • Presence of nesting or breeding of 2 or more of the listed species. • A field with 1 or more breeding Short-eared Owls is to be considered SWH. • The area of SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird	**No** Candidate ecosites are present within the Study Area however do not meet the size criteria.	**No** Candidate habitat was not confirmed; no defining wildlife species were observed during field investigations.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
			grassland areas than the common grassland species. Information Sources • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs. • Ontario Breeding Bird Atlas • EIS Reports and other information available from Conservation Authorities.	Habitats: Guidelines for Wind Power Projects". • SWH MIST Index #32 provides development effects and mitigation measures.		
Shrub/Early Successional Bird Breeding Habitat **Rationale** This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS.	Indicator Spp: Brown Thrasher Clay-coloured Sparrow Common Spp. Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher **Special Concern:** Yellow-breasted Chat Golden-winged Warbler	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species.	Large field areas succeeding to shrub and thicket habitats >10ha in size. • Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years). • Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species. • Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. Information Sources • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs. • Ontario Breeding Bird Atlas • Reports and other information available from Conservation Authorities.	Field Studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species. • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects". • SWH MIST Index #33 provides development effects and mitigation measures.	**No** Candidate ecosites are present within the Study Area however do not meet the size criteria.	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Terrestrial Crayfish; **Rationale:** Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare.	Chimney or Digger Crayfish; (*Fallicambarus fodiens*) Devil Crawfish or Meadow Crayfish; (*Cambarus Diogenes*)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM	Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can't found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. Information Sources • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998.	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites. • Area of ELC ecosite or an Habitat ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult. • SWH MIST Index #36 provides development effects and mitigation measures.	**Yes** Candidate ecosites are present within the Study Areas.	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Special Concern and Rare Wildlife Species **<u>Rationale</u>:** These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre (NHIC).	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.	• When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites. • <u>Information Sources</u> • Natural Heritage Information Centre (NHIC) will have Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data. • NHIC Website “Get Information” : http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas• • Expert advice should be sought as many of the rare spp. have little information available about their requirements.	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat. • SWH MIST Index #37 provides development effects and mitigation measures.	**Yes** Both this and prior studies within the Study Area (AECOM, 2013, MTE, 2020) have identified candidate habitats within and adjacent to the Study Area.	**Yes** Monarch (Special Concern), as well as forage and host plant species were recorded within the Study Area during 2021 field investigations. MTE (2020) confirmed Eastern Wood Pewee breeding within the Study Area in 2018 and as that habitat appears present in 2021, we assume this habitat is also present.

Table 1.4.1 Animal Movement Corridors

Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Amphibian Movement Corridors **<u>Rationale</u>;** Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	Corridors may be found in all ecosites associated with water. • Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1	Movement corridors between breeding habitat and summer habitat • Movement corridors must determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule. <u>Information Sources</u> • MNRF District Office. • Natural Heritage Information Centre (NHIC). • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs.	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant. • Corridors should have at least 15m of vegetation on both sides of waterway [cxlix] or be up to 200m wide cxlix of woodland habitat and with gaps <20m. • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat. • SWH MIST Index #40 provides development effects and mitigation measures.	**Yes** Breeding of multiple amphibian species was confirmed in prior studies (AECOM, 2016) in ecosites within and adjacent to the Study Area.	**No** Candidate habitat was identified, however the breeding habitat abuts summer habitat, so travel between the habitats is not limited and no specific corridors are present.

Table 1.5.1 Significant Wildlife Habitat Exceptions for Ecodistricts within EcoRegion 7E

EcoDistrict	Wildlife Habitat and Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
7E-2	**Bat Migratory Stopover Area** **Rationale**: Stopover areas for long distance migrant bats are important during fall migration. Hoary Bat Eastern Red Bat Silver-haired Bat	No specific ELC types	• Long distance migratory bats typically migrate during late summer and early fall from summer breeding habitats throughout Ontario to southern wintering areas. Their annual fall migration may concentrate these species of bats at stopover areas. • This is the only known bat migratory stopover habitats based on current information. Information Sources • OMNRF for possible locations and contact for local experts. • Western University Biology Department.	• Long Point (42°35'N, 80°30'E, to 42°33'N, 80°03'E) has been identified as a significant stop-over habitat for fall migrating Silver-haired Bats, due to significant increases in abundance, activity and feeding that was documented during fall migration. • The confirmation criteria and habitat areas for this SWH are still being determined. • SWH MIST Index #38 provides development effects and mitigation measures.	**No** The Study Areas are not within the region considered for SWH.	**No** Candidate habitat was not identified.

Appendix G

Tree Assessment Reports

RON KOUDYS LANDSCAPE ARCHITECTS INC

GIDEON DRIVE & OXFORD STREET WEST INTERSECTION IMPROVEMENTS LONDON ONTARIO

TREE ASSESSMENT REPORT

PREPARED BY:	RON KOUDYS LANDSCAPE ARCHITECTS INC
DATE:	SEPTEMBER 2021
RKLA PROJECT #:	21-117

CERTIFIED ARBORIST ISA TM

Michelle Peeters
ON 2129A

MICHELLE PEETERS
LANDSCAPE ARCHITECT
BLA, DIP. HORT. TECH, OALA, ISA CERTIFIED ARBORIST

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1.0 Introduction and Executive Summary

1.1 Introduction

Ron Koudys Landscape Architects Inc. (RKLA) was retained RV Anderson Associates Ltd. to conduct a tree inventory and assessment in conjunction with the proposed intersection improvements at Gideon Drive and Oxford Street West in London Ontario. The proposed improvements will include a new round about and associated sidewalks, street lights, etc. This report outlines the expected impacts of the proposed work on trees within or in proximity to the limits of disturbance and makes recommendations for tree removal and preservation based both tree health and construction impacts.

1.2 Executive Summary

The inventory captured 64 individual trees. Trees were identified within the City ROW and on private properties adjacent to the proposed construction. No tree species listed as endangered or threatened under O. Reg. 230/08: Species at Risk in Ontario List under Endangered Species Act, 2007, S.O. 2007, c. 6 were observed during the tree inventory. The construction limits do not conflict with a City of London Tree Protection Area. All trees observed are common and typical of the current land uses.

1.2.1 Tree Species Composition

The following chart outlines the breakdown of tree species included in this inventory.

%	Qty	Common Name
39%	25	Black Walnut
9%	6	Manitoba Maple
8%	5	Juniper
8%	5	Mulberry
6%	4	Trembling Aspen
5%	3	Basswood
5%	3	Bitternut Hickory
3%	2	Cottonwood
3%	2	Freeman Maple

%	Qty	Common Name
2%	1	Hawthorn
2%	1	Honeylocust
2%	1	Maple
2%	1	Royal Red Norway Maple
2%	1	Scotch Pine
2%	1	Unknown deciduous tree
2%	1	White Pine
2%	1	White Spruce
2%	1	Willow
100%	64	Total

1.2.2 Tree Removal and Preservation Recommendation Summary

The following chart summarizes trees recommended for removal and preservation categorized by location/ownership.

	City Right-of-Way		Privately Owned Land		TOTAL
	Quantity	Tree ID #'s	Quantity	Tree ID #'s	
Trees to be removed	19	13, 14, 17, 18, 20, 21, 22, 25, 26, 27, 43, 45, 48, 49, 51, 52, 53, 54 & 64	0		19
Trees to be preserved	20	10, 12, 15, 16, 19, 23, 24, 28, 29, 31, 32, 40, 42, 44, 50, 55, 56, 57, 58 & 59	25	1 - 9, 11, 30, 33 - 39, 41, 46, 47, 60, 61, 62 & 63	45

1.2.3 Tree Removal and Preservation Recommendations.

1. 19 trees are recommended for removal from the City ROW due to conflict with the proposed road construction.
2. Tree preservation fencing is to be installed as noted on the tree preservation drawings and as per the tree preservation barrier detail.
3. Follow the pre-construction, construction process, and post construction recommendations listed in this report.
4. Follow all City of London tree protection guidelines and by-laws.

2.0 Scope of Tree Inventory

Trees within the City ROW of Oxford Street West and Gideon Drive and approximately 3m beyond the ROW were included in the tree inventory and assessment. See Figure 1 for scope of tree inventory.

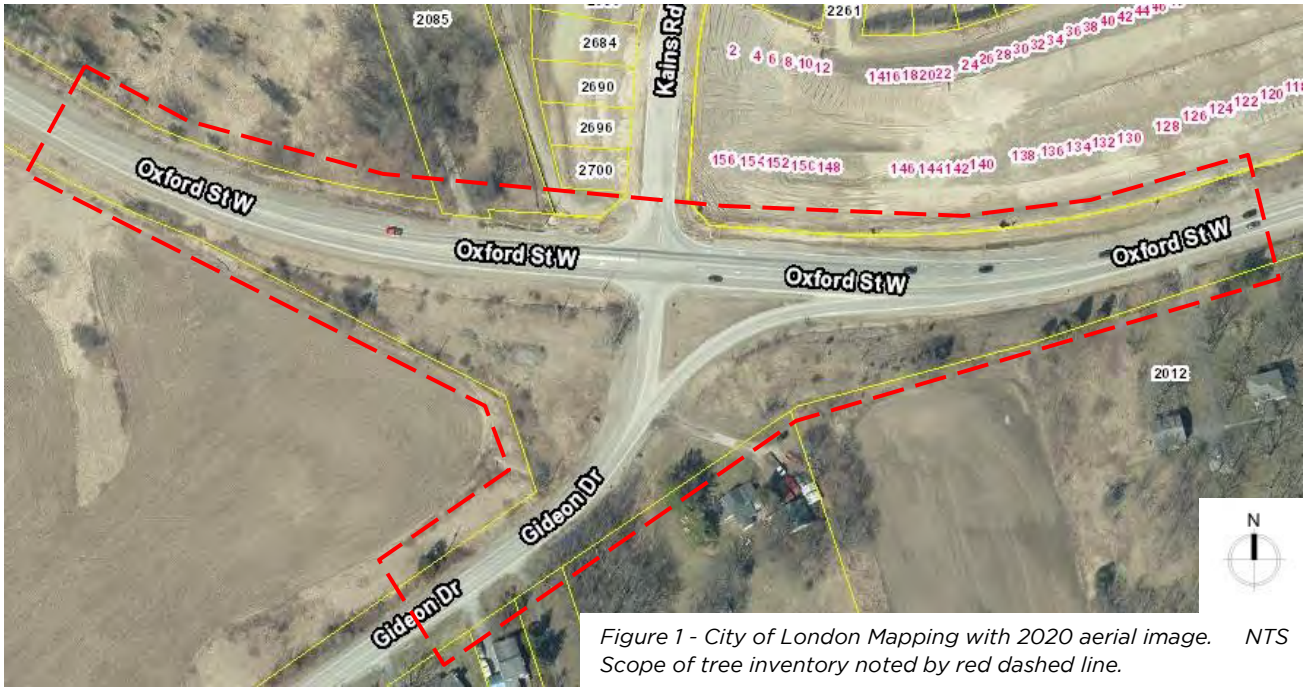

Figure 1 - City of London Mapping with 2020 aerial image. NTS
Scope of tree inventory noted by red dashed line.

3.0 Methodology

Field work was completed on August 12, 2021 by RKLA staff member Michelle Peeters, ISA certified arborist ON 2129A. A topographic survey supplied by RV Anderson was used as a base for the field work. Trees within the given scope with a diameter at breast height (DBH) of ≥10cm were identified and assessed as individuals. Significant hedges or groups of immature trees were not assessed, but their locations are noted on the tree preservation drawing. Trees were NOT tagged in the field. Each tree was assigned a number which are identified on the tree data table and on the tree preservation drawings. Individual tree identification numbers include 1 - 64.

The following information was recorded for each individual tree:

Genus + specific epithet (tree species)
Diameter at breast height (DBH) (centimetres)
Crown radius (metres)
Crown Condition (overall general vigour of crown)
Structural Form (excellent, good, fair, poor)
Structural Condition (good, fair, poor, hazard)
General Comments

3.1 Health Assessment

Trees were assessed following accepted arboricultural techniques and best practices using a limited visual inspection. The inspection included a 360 degree (where possible) visual examination of the above-ground parts of each tree for structural defects including cavities, wounds, scars, external indicators of internal decay, evidence of insect presence, discoloured or deformed foliage, canopy and root distribution, and the overall condition of the tree. Evaluation of tree health was based on visible tree health indicators including live buds, foliage condition, deadwood, structural defects, form, and signs of disease or insect infestation. Field observations were reviewed against available online imagery of the trees to assist in determining tree canopy health. Quantified health assessments included in the inventory are explained here:

Crown Condition Assessment

5 Healthy: less than 10% crown decline
4 Slight decline: 11% - 30% crown decline
3 Moderate decline: 31% - 60% crown decline
2 Severe decline: 61% - 90% crown decline
1 Dead - No visible indication of living foliage or buds in crown

Structural Form Assessment

Excellent: An ideal expression of a specific tree species, true to form, balanced canopy, good flare, typical internode length, full crown, etc.
Good: A satisfactory and generally expected expression of a specific tree species, with only minor or typical variances from an ideal form.
Fair: Nearly satisfactory, with defects or a combination of defects such as codominant leaders, unbalanced crown, poor/no flare, shortened internodes, has been poorly pruned, etc.
Poor: Significantly flawed expression of a specific tree species

Structural Integrity Assessment

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).
Hazard: Defects are severe and acute; defective part or collective defective parts render the tree a high risk threat to potential targets.

3.2 Critical Root Zones and Tree Preservation Barriers

The critical root zone of a tree is the portion of the root system that is the minimum necessary to maintain tree vitality and stability. Critical root zones are commonly prescribed by municipal bylaws based solely on DBH and/or drip line, and are typically expressed as a circular shape around the tree. There are a number of other factors, however, that should be considered when establishing a critical root zone, particularly in a streetscape setting where there are physical barriers such as sidewalks and curbs that have shaped and limited typical root development patterns.

Factors that inform location and extent of a tree preservation barriers to protect the critical root zone include: species tolerance to root loss and other construction impacts (as established by authoritative resources and professional experience), tree trunk size (DBH), tree health and vigour, structural condition, landscape context, soil type, moisture availability, topography, ground cover, crown size and balance (drip line), current physical root restrictions, visible root arrangement, relationship to neighbouring trees, relationship between tree and proposed construction, type of proposed construction, etc.

Critical root zones will be protected in the field with tree preservation barriers.

4.0 Tree Inventory Data and Recommendations

The following recommendations are based on a combination of tree species tree health/condition and requirements of the proposed street reconstruction.

4.1 Tree Data Table

Grey indicates recommended removal.

GENERAL INFORMATION				SIZE		HEALTH & CONDITION				IMPACTS & RECOMMENDATIONS	
ID #	BOTANICAL NAME	COMMON NAME	LOCATION	DBH (cm)	CANOPY RADIUS (m)	CROWN CONDITION	STRUCTURAL FORM	STRUCTURAL INTEGRITY	COMMENTS	EXPECTED CONSTRUCTION IMPACTS	PRESERVE / REMOVE / IMPACT MITIGATION
1	*Carya cordiformis*	Bitternut Hickory	2085 Oxford St. W	89	7	4	fair	fair	Codominant leaders with included bark and bulging seam, gall through crown, Buckthorn understory, grapevine through bottom third of canopy	none	preserve
2	*Juglans nigra*	Black Walnut	2085 Oxford St. W	8	2.5	5	good	good	Low branched, on slope	none	preserve
3	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	32	5	4	fair	good	Buckthorn understory, grapevine through crown	none	preserve
4	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	19	4	4	good	good	Dense Buckthorn understory, canopy heavy with grapevine	none	preserve
5	*Acer negundo*	Manitoba Maple	2265 Oxford St. W	23, 22	6	4	fair	poor	Multistem 2, supressed, large branch cavities, grapevine, 1 stem bend and lean SW	none	preserve
6	*Juglans nigra*	Black Walnut	2265 Oxford St. W	11	1.5	5	fair	good	Low crown, several Black Walnut saplings nearby	none	preserve
7	*Juniperus spp*	Juniper	2265 Oxford St. W	11	3	4	fair	good	Unbalanced crown, limbed up approx. 2m	none	preserve
8	*Crataegus spp*	Hawthorn	2265 Oxford St. W	~25, 20, 20, 10	7	4	fair	fair	Multistem 4, minor dead wood	none	preserve
9	*Pinus*	Scotch Pine	2265 Oxford St. W	15	2.5	1	good	fair	Dead	none	preserve

	sylvestris										
10	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	~13	3.5	5	fair	good	Low branched, scrubby form, grapevine through crown	adjacent to proposed s/w,	preserve, tree protection barrier
11	*Acer negundo*	Manitoba Maple	2166 Oxford St. W	~70, 65	8	5	poor	poor	Multistem 2, included bark at primary union and seam to base	adjacent to proposed s/w,	preserve, tree protection barrier
12	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	2	4	good	good	Canopy covered in grapevine	adjacent to proposed s/w,	preserve, tree protection barrier
13	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 9, 6	2.5	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
14	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 5, 4	2	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
15	*Unknown deciduous tree*	*Unknown deciduous tree*	City ROW Oxford St. W	~15	3	-	fair	fair	Canopy completely covered in grapevine and virginia creeper	none	preserve
16	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	3	5	fair	good	Low branched	none	preserve
17	*Morus alba*	Mulberry	City ROW Oxford St. W	19	4	5	fair	fair	Included bark at primary union, oozing seam, squat form	direct conflict with proposed road construction	remove
18	*Morus alba*	Mulberry	City ROW Oxford St. W	20	4	4	fair	fair	Dead lower branches, squat form	direct conflict with proposed road construction	remove
19	*Morus alba*	Mulberry	City ROW Oxford St. W	11	3	4	poor	fair	Disfigured form, leader bends and twists, dead wood	none	preserve
20	*Morus alba*	Mulberry	City ROW Oxford St. W	8, 8, 7	3	5	fair	fair	Multistem 3, primary union at grade, dead lower branches	direct conflict with proposed road construction	remove
21	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	42	6	5	good	good	Low branched	direct conflict with proposed road construction	remove
22	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	46, 35	6	5	fair	fair	Multistem 2, included bark and seam at primary union, low branched	direct conflict with proposed road construction	remove
23	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Canopy heavy with grapevine	none	preserve
24	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	15	3	5	good	good	Grapevine into lower half of crown	none	preserve
25	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	3	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed road construction	remove
26	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	12	2	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed road construction	remove
27	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Supressed	direct conflict with proposed road construction	remove
28	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	4	5	good	good	Supressed	no conflict with critical root zone	preserve, tree protection barrier
29	*Morus alba*	Mulberry	City ROW Gideon Dr.	18, 17	7	4	fair	fair	Multistem 2, tight unions, scrubby form, grapevine into crown	no conflict with critical root zone	preserve, tree protection barrier
30	*Juglans nigra*	Black Walnut	2166 Oxford St. W	12	3	5	good	good	Low branched, full form	none	preserve
31	*Juniperus spp*	Juniper	City ROW Gideon Dr.	~30	4	3	good	good	Covered in vines, dense understory	none	preserve
32	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	~15	3	3	good	good	Covered in vines	none	preserve
33	*Gleditsia triacanthos var. inermis*	Honeylocust	44 Gideon Dr.	~40	8	5	good	good	Minor hydro line clearance pruning, otherwise full form	none	preserve

34	*Picea glauca*	White Spruce	36 Gideon Dr.	~15	2	5	good	good	Branched to grade	none	preserve
35	*Juglans nigra*	Black Walnut	36 Gideon Dr.	85, 79	9	5	good	good	Multistem 2, large lovely specimen, supressed on East side, elevated at base, tight unions	none	preserve
36	*Tilia americana*	Basswood	14 Gideon Dr.	26, 18	6	5	good	good	Multistem 2, in wooded area, low branched	none	preserve
37	*Tilia americana*	Basswood	14 Gideon Dr.	19, 13, 9	5	5	good	good	Multistem 3, in wooded area, metal tag #s 200 &201	none	preserve
38	*Tilia americana*	Basswood	14 Gideon Dr.	31, 30, 13	5	5	good	fair	Multistem 3, in wooded area, metal tag #277, included bark at primary union	none	preserve
39	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	In wooded area, metal tag #270, low branches, on slope, supressed, grapevine into crown	none	preserve
40	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	19	4.5	5	good	good	Metal tag #269, grapevine into crown, on slope	no conflict with critical root zone	preserve, tree protection barrier
41	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	Metal tag #267, supressed	none	preserve
42	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	25	5	5	good	good	Metal tag #268, minor vines into crown	no conflict with critical root zone	preserve, tree protection barrier
43	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	32	5	5	good	good	Metal tag #266, low branched, on slope	adjacent to proposed s/w, impact to critical root zone expected	remove
44	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	13, 11, 7	4	5	good	fair	Multistem 3, metal tag #265, included bark at primary union	no conflict with critical root zone	preserve, tree protection barrier
45	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	20	4.5	5	good	good	Metal tag #264, branched to grade, dead lower branches	direct conflict with proposed s/w construction	remove
46	*Pinus strobus*	White Pine	14 Gideon Dr.	39	5.5	5	good	good	Metal tag #259, limbed up approx. 4m, Northern edge of loose hedge row	none	preserve
47	*Acer platanoides 'Royal Red'*	Royal Red Norway Maple	14 Gideon Dr.	~60	4.5	5	good	good	Significant prune cuts	none	preserve
48	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	15	3	5	good	fair	Significant vertical trunk wounds, full crown	direct conflict with proposed s/w construction	remove
49	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	13	3	5	good	good	Full form	direct conflict with proposed s/w construction	remove
50	*Salix spp*	Willow	City ROW Gideon Dr.	48, 11	5	3	poor	poor	Multistem 2, significant dead wood and trunk rot, loose open crown	none	preserve
51	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
52	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	1.5	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
53	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	1	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
54	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
55	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	26	4	5	good	good	Metal tag #213, thin crown	none	preserve
56	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	42	6.5	5	good	good	Metal tag #212, low branched, large broad crown	none	preserve
57	*Juniperus spp*	Juniper	City ROW Oxford St. W	10	2	5	good	good	Branched to grade	none	preserve

58	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	3	5	good	good	Branched to grade	none	preserve
59	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	2	5	good	good	At fence line	none	preserve
60	*Juglans nigra*	Black Walnut	2012 Oxford St. W	~30	5	5	good	good	Branched to grade	none	preserve
61	*Acer spp*	Maple	2012 Oxford St. W	~30, 30	5	3	poor	poor	Multistem 2, rot at base, significant dead wood	none	preserve
62	*Juglans nigra*	Black Walnut	2012 Oxford St. W	32	6	5	good	good	Under hydro lines	none	preserve
63	*Juglans nigra*	Black Walnut	2012 Oxford St. W	30	6	5	good	good	Metal tag #198, under hydro lines	none	preserve
64	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	58	6	3	poor	hazard	North half of tree torn off, leaving large wound, canopy heavy south, dead wood	Indirect conflict with proposed road construction & hazardous tree condition	remove

5.0 Potential Construction Impacts on Trees

Some trees have been recommended for preservation. Trees to be preserved may be affected by the construction process, or by the construction itself. It is imperative that the design team and the construction crew understand the potential for, and the causes of tree damage. Trees recommended for preservation may experience some or all of the following potential construction impacts. Strategies and methods to avoid these impacts are outlined in the Construction Impact Mitigation Recommendations section of this report.

5.1 Soil Compaction

Soil compaction is caused by heavy or repeated compression or vibration of the soil around the tree. Soil compaction reduces the amount and size of macro and micro pore space that is vital for subsurface movement of air and water. The harmful effects of soil compaction include, but are not limited to: slower water infiltration, poor aeration, reduced root growth and an overall increased susceptibility to biotic and abiotic stressors.

5.2 Root Loss

Root loss occurs when roots are severed. The majority of roots are typically located within the top 60cm of soil and can extend outward up to three times the extent of the tree drip line. Excavation of any kind within the critical root zone* can sever roots. Two categories of roots need to be considered when evaluating impacts of root loss - small, fibrous absorbing roots, and large structural roots. Significant loss of either or both of these functions can cause stress and/or affect the structural stability of the tree. Note, however, that it is commonly accepted that healthy trees can typically tolerate and recover from the removal of approximately 33% (up to a maximum of 50%) of their root mass. Thorough consideration regarding extent of acceptable root removal is dependent on individual species characteristics, root loss distribution, and site specific conditions *(ref. Trees and Development: A Technical Guide to Preservation of Trees During Land Development by Nelda Matheny and James R. Clark, 1998. Pg 72)*.

* Refer to 'Critical Root Zones and Tree Preservation Barriers" in this report for definition.

5.3 Grade Changes

Lowering of the grade around trees has immediate and long term effects on trees. Lowering of grade requires immediate root loss from cutting the roots which results in water stress from the root removal and potential reduced structural stability.

Raising the grade around a tree can be equally damaging. The addition of fill over the root zone of a tree alters the roots' ability for normal water and gas exchange that is necessary for healthy root growth and stability. Fill essentially suffocates the roots and can lead to the slow and eventual decline of the tree.

5.4 Mechanical Damage

Mechanical damage is caused by physical contact with a tree that damages the tree to any degree. During land development and construction activities, there is an increased risk of both minor and fatal mechanical damage to trees from construction equipment. Minor damage can create entry points for insects and pathogens, and fatal damage can cause irreparable structural damage.

5.5 Changes to Exposure - Sun and Wind

Trees can be negatively affected by increased exposure to sun or wind when neighbouring trees are removed. This can be of particular concern when 'interior trees' (trees that have developed surrounded by other trees) are suddenly exposed to forest edge conditions. These trees may experience higher intensity of direct sunlight resulting in leaf scald, and instability due to increased wind and snow loads.

Trees can be negatively affected by decreased exposure to sunlight. Proposed development that includes tall buildings located to the south and west of mature existing trees can greatly reduce the amount of daily direct sunlight. While this change in environment may not cause the immediate or eventual death of a tree, it can certainly slow development and alter growing habits and patterns, and must therefore be a consideration when evaluating trees for potential preservation.

5.6 Soil Contamination

Soil health around a tree can be compromised by contamination from spills or leaks of fuels, solvents, or other construction related fluids.

5.7 Water Availability

Grading and servicing requirements for development can affect water availability for trees. Trees may experience a loss of available water due to a lowered water table or the capture or redirection of subsurface and/or overland flow. Conversely, trees may experience an increase of available water due to changes in site grading and storm water retention efforts.

The successful survival of the trees to be preserved is largely dependent on adhering to the construction impact mitigation recommendations that follow.

6.0 Construction Impact Mitigation Recommendations

The following recommendations are provided to guide the removal process, mitigate construction impacts, and ensure compliance with provincial, federal, and municipal regulatory requirements. Some of the recommendations listed below are noted to be undertaken by an ISA certified arborist.

6.1 Pre-construction recommendations

a) Prior to any construction activity, tree preservation fencing is to be installed as per the attached tree preservation drawings and details and to be reviewed/accepted by the consulting arborist PRIOR to the commencement of construction.
b) Trees to be removed must be clearly marked via spray paint or other agreed upon method prior to removal. Tree marking can be completed by project arborist, City of London construction administrator, or approved appointee.
c) Where high quality specimens to be preserved are adjacent to areas subject to intensive construction activities, these trees are to have additional protection measures implemented to protect their trunks from mechanical damage. These measures may include surrounding the trunk with wood planks (trunk armour). Trees that require additional protection will be clearly identified on the tree preservation plan with detailed information on specific protection measures.
d) In accordance with the Migratory Birds Convention Act, 1994, all removals must take place between September 1st and March 31st to avoid disturbing nesting migratory birds. If tree removal occurs between April 1st and August 31st, a biologist is required to complete a search for nests. Once cleared, the contractor has 48 hours to remove. If removal does not occur within 48 hours, another search will be required.
e) Care should be taken during the felling operation to avoid damaging the branches, stems, trunks, and roots of nearby trees to be preserved. Where possible, all trees are to be felled towards the construction zone to minimize impacts on adjacent vegetation. All removals to be undertaken by an ISA certified arborist.
f) Final site grading plans should ensure that the existing soil moisture conditions are maintained.
g) Some trees may be candidates for pre-construction root pruning to help reduce stress and prepare the tree for nearby construction activity. These trees are to be identified on the tree preservation plan along with root pruning specifications. To be undertaken by an ISA certified arborist.

6.2 Recommendations related to the construction process

a) Tree preservation fencing is to be maintained in good condition and effective for the duration of construction until all construction activity is complete or as per the project arborist or contract administrator.

b) Tree preservation fencing is to remain intact as per the tree preservation drawings. Should tree preservation fencing need to be temporarily relocated or moved to facilitate construction, the project arborist and City of London Forestry Operations are to be immediately informed. Fencing is to be reinstated as per the tree preservation plans as soon as possible.
c) No construction, excavation, adding of fill, stockpiling of construction material, or heavy equipment is permitted within the tree protection zone.
d) When excavation near a tree is required, and it is anticipated that roots will be severed and exposed, duration of exposure is to be minimized to prevent root desiccation.
e) During the excavation process, roots 25mm or larger that are severed and exposed should be hand pruned to leave a clean-cut surface. To be undertaken by an ISA certified arborist. Exposed severed roots that cannot be covered in soil on the same day as the cuts are made are to be kept moist. Exposed roots are to be kept moist by covering them with water soaked burlap or any other means available to prevent them from drying out. Adequate moisture levels are to be maintained until such time as topsoil has been replaced satisfactorily or as otherwise directed by the contract administrator.
f) Avoid idling heavy equipment under or within close proximity to trees to be preserved to prevent canopy damage from exposure to the heat of the exhaust.
g) Should branches on City owned trees be damaged by or during construction, the contractor is to notify City of London Forestry Operations as soon as possible. No person(s) other than City staff or the City's designated contractor may perform work on any City tree.
h) Open trenching within a critical root zone is prohibited. Alternative excavation methods such as horizontal boring and vacuum excavation are required where proposed services or installation requirements conflict with critical root zones.
i) The existing ground-layer vegetation at the base of trees MUST remain intact within the critical root zone so as not to disturb the soil around the base of the existing trees. This includes the practice of NOT replacing existing turf with new sod. A heavy application of seed in these instances is preferred.
j) Regular communication with the site supervisor and regular monitoring of the site by the project arborist or landscape architect is recommended to ensure proper procedures are followed and protection barriers are maintained.
It is the responsibility of the site supervisor to promptly contact the project arborist if any concerns or questions arise regarding trees.

6.3 POST-CONSTRUCTION RECOMMENDATIONS

a) Avoid discharging rain water leaders adjacent to retained trees, as this may result in an overly moist environment which can cause root rot.
b) After all work is completed, tree preservation fences and any other impact mitigation paraphernalia must be removed under the direction of the consulting arborist or construction administrator.

c) A final review must be undertaken by the project arborist to ensure that all mitigation measures as described above have been met.
d) Post construction monitoring of trees may be required. Monitoring schedule to be determined with design team and City consensus.

7.0 City of London Tree Protection By-laws & Specifications

Note that this project is located in the City of London. It follows therefore, that all applicable City of London rules, regulations, and by laws are to be respected. The City of London has several by-laws and specifications related to trees that must be understood and followed by the design team, the contractor, and all sub-contractors working on projects within the City.

All project parties to be aware of and familiar with the following City of London documents in their entirety and potential penalties noted therein for noncompliance:

City of London - Boulevard Tree Protection By-law
CP-22 - in force and effect March 5, 2019

City of London 2019 Design Specifications and Requirements Manual (updated August 2019) Section 12 - Tree Planting and Protection Guidelines

Standard Contract Documents for Municipal Construction (2020 Edition)
Section B - Part 5 - Tree Planting and Protection Guidelines (TPP)

8.0 Disclaimer

The assessment of the trees presented within this report has been made using accepted arboricultural techniques. These include a visual examination of the above-ground parts of each tree for structural defects, scars, external indications of decay, evidence of insect presence, discoloured foliage, the general condition of the trees and the surrounding site, as well as the proximity of property and people. None of the trees examined were dissected, cored, probed, or climbed, and detailed root crown examinations involving excavation were not undertaken.

Notwithstanding the recommendations and conclusions made in this report, it must be realized that trees are living organisms and their health and vigour is constantly changing. They are not immune to changes in site conditions or seasonal variations in the weather.

While reasonable efforts have been made to ensure the trees recommended for retention are healthy, no guarantees are offered or implied, that these trees or any part of them will remain standing.

Note that this arborist report has been prepared using the latest drawings and information provided by the client. Any subsequent design or site plan changes affecting trees may require revisions to this report. Any new information or drawings are to be provided to RKLA prior to report submission to planning authorities.

9.0 Contact Information

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N6A 1V7
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Fax: 519-645-2474

Staff:

Field work and report author
Michelle Peeters - michelle@rkla.ca
Qualifications ISA Certified Arborist ON-2129A
ISA Tree Risk Assessment Qualified
Qualified Butternut Health Assessor BHA #710
OALA full member - landscape architect

10.0 Appendix A - Tree Preservation Drawings

GROUP OF SCOTCH PINE
(Pinus sylvestris) SAPLINGS

SUMAC (Rhus typhina) COLONY

TREE PROTECTION BARRIER

2265 OXFORD ST W

2085 OXFORD ST W

2700 KAINS RD

1959 C

EX. ROAD ALIGNMENT

PROPOSED ROAD ALIGNMENT

PROPOSED PAVEMENT MARKINGS

2166 OXFORD ST W

EX. LIGHT STANDARD

PROPOSED SIDEWALK

ACTIVE AGRICULTURE FIELD

TREE PROTECTION BARRIER

TREE PROTECTION BARRIER

FUTURE EASTBOUND LANE

FUTURE STREET CONNECTION

14 GIDEON DR

FUTURE DEVELOPMENT

14 GIDEON DR

FUTURE ROAD

WOODED AREA

36 GIDEON DR

52 GIDEON DR

44 GIDEON DR

MATCH LINE - SEE T-2

TREE PRESERVATION PLAN 'A'

SCALE = 1:400

REFER TO TREE ASSESSMENT REPORT FOR ADDITIONAL INFORMATION

KEY MAP

RON KOUDYS LANDSCAPE ARCHITECTS INC

Ronald H. Koudys, O.A.L.A. C.S.L.A. DATE

DATE	DESCRIPTION	No.
2021Ø92Ø	ISSUED FOR REVIEW	1

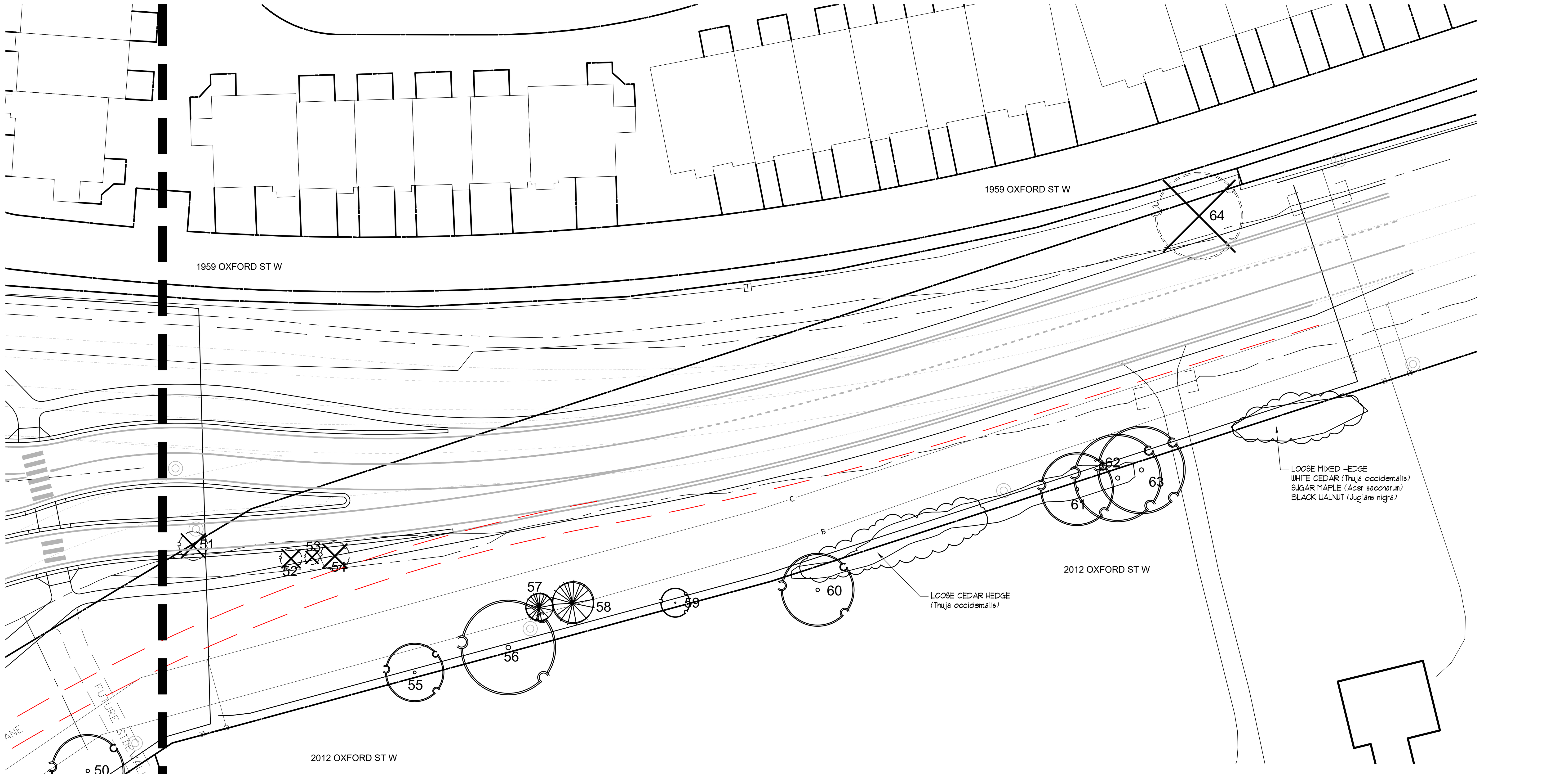
PLOTTING INFORMATION:
PLOTTED DATE = 2021Ø92Ø
PLOTTED SCALE = 1:1

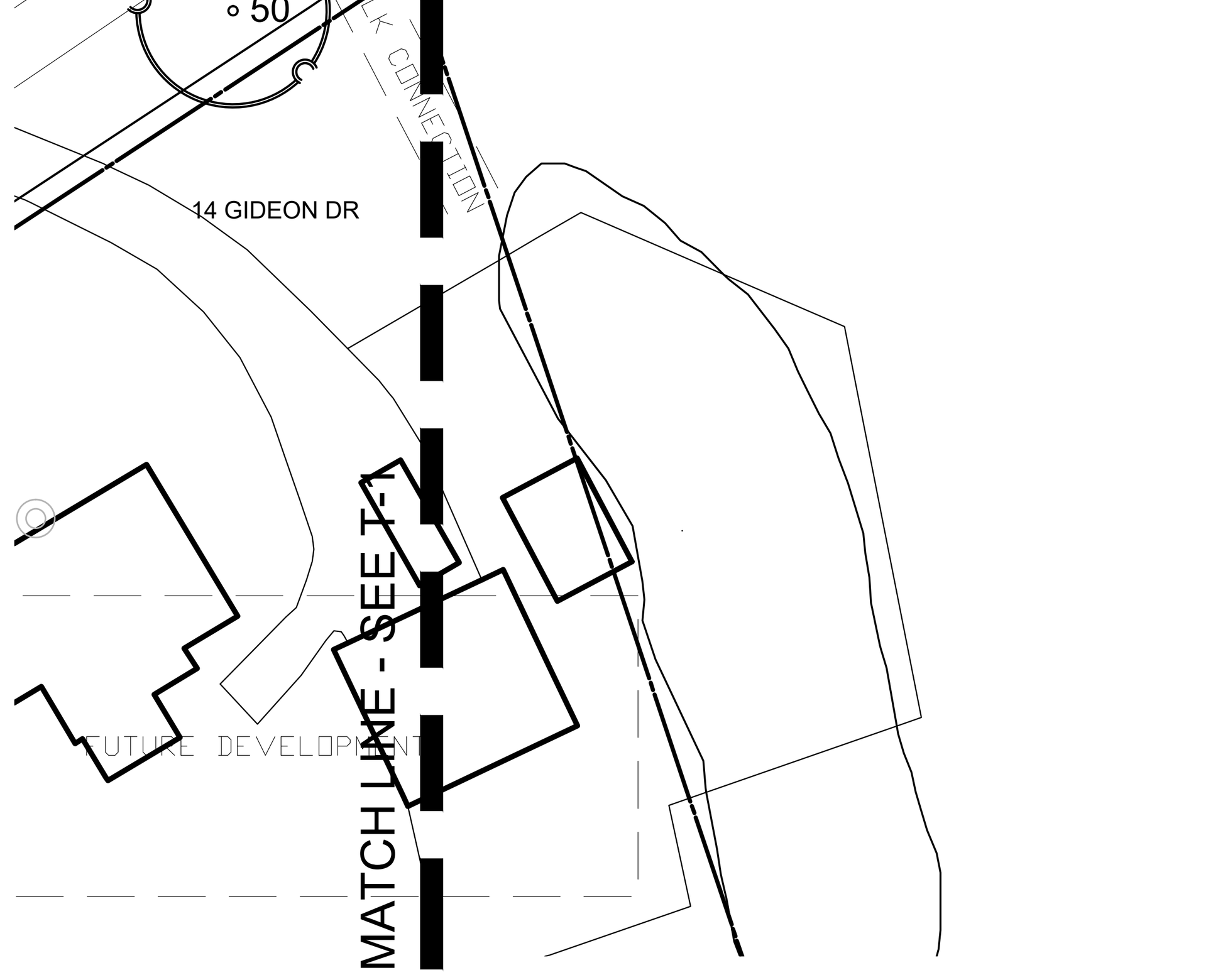
ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS — RONALD H. KOUDYS — OALA MEMBER

PROJECT TITLE:
OXFORD ST &
GIDEON DR INTERSECTION
LONDON, ONTARIO

DRAWING TITLE:
TREE PRESERVATION
PLAN 'A'

DATE:	SCALE:	DRAWING No.
AUGUST 2021	AS NOTED	T-1
DRAWN: RKLA Inc.	CHECKED BY: R.H.K.	
PROJECT No. 21-117Lb		





TREE PRESERVATION PLAN 'B'

SCALE = 1:400

CONSTRUCTION IMPACT MITIGATION RECOMMENDATIONS

PRE-CONSTRUCTION RECOMMENDATIONS

a) PRIOR TO ANY CONSTRUCTION ACTIVITY, TREE PRESERVATION FENCING IS TO BE INSTALLED AS PER THE ATTACHED TREE PRESERVATION DRAWINGS AND DETAILS AND TO BE REVIEWED/ACCEPTED BY THE CONSULTING ARBORIST PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

b) TREES TO BE REMOVED MUST BE CLEARLY MARKED VIA SPRAY PAINT OR OTHER AGREED UPON METHOD PRIOR TO REMOVAL. TREE MARKING CAN BE COMPLETED BY PROJECT ARBORIST, CITY OF LONDON CONSTRUCTION ADMINISTRATOR, OR APPROVED APPOINTEE.

c) WHERE HIGH QUALITY SPECIMENS TO BE PRESERVED ARE ADJACENT TO AREAS SUBJECT TO INTENSIVE CONSTRUCTION ACTIVITIES, THESE TREES ARE TO HAVE ADDITIONAL PROTECTION MEASURES IMPLEMENTED TO PROTECT THEIR TRUNKS FROM MECHANICAL DAMAGE. THESE MEASURES MAY INCLUDE SURROUNDING THE TRUNK WITH WOOD PLANKS (TRUNK ARMOUR). TREES THAT REQUIRE ADDITIONAL PROTECTION WILL BE CLEARLY IDENTIFIED ON THE TREE PRESERVATION PLAN WITH DETAILED INFORMATION ON SPECIFIC PROTECTION MEASURES.

d) IN ACCORDANCE WITH THE MIGRATORY BIRDS CONVENTION ACT, 1994, ALL REMOVALS MUST TAKE PLACE BETWEEN SEPTEMBER 1ST AND MARCH 31ST TO AVOID DISTURBING NESTING MIGRATORY BIRDS. IF TREE REMOVAL OCCURS BETWEEN APRIL 1ST AND AUGUST 31ST, A BIOLOGIST IS REQUIRED TO COMPLETE A SEARCH FOR NESTS. ONCE CLEARED, THE CONTRACTOR HAS 48 HOURS TO REMOVE. IF REMOVAL DOES NOT OCCUR WITHIN 48 HOURS, ANOTHER SEARCH WILL BE REQUIRED.

e) CARE SHOULD BE TAKEN DURING THE FELLING OPERATION TO AVOID DAMAGING THE BRANCHES, STEMS, TRUNKS, AND ROOTS OF NEARBY TREES TO BE PRESERVED. WHERE POSSIBLE, ALL TREES ARE TO BE FELLED TOWARDS THE CONSTRUCTION ZONE TO MINIMIZE IMPACTS ON ADJACENT VEGETATION. ALL REMOVALS TO BE UNDERTAKEN BY AN ISA CERTIFIED ARBORIST.

f) FINAL SITE GRADING PLANS SHOULD ENSURE THAT THE EXISTING SOIL MOISTURE CONDITIONS ARE MAINTAINED.

g) SOME TREES MAY BE CANDIDATES FOR PRE-CONSTRUCTION ROOT PRUNING TO HELP REDUCE STRESS AND PREPARE THE TREE FOR NEARBY CONSTRUCTION ACTIVITY. THESE TREES ARE TO BE IDENTIFIED ON THE TREE PRESERVATION PLAN ALONG WITH ROOT PRUNING SPECIFICATIONS. TO BE UNDERTAKEN BY AN ISA CERTIFIED ARBORIST.

RECOMMENDATIONS RELATED TO THE CONSTRUCTION PROCESS

a) TREE PRESERVATION FENCING IS TO BE MAINTAINED IN GOOD CONDITION AND EFFECTIVE FOR THE DURATION OF CONSTRUCTION UNTIL ALL CONSTRUCTION ACTIVITY IS COMPLETE OR AS PER THE PROJECT ARBORIST OR CONTRACT ADMINISTRATOR.

b) TREE PRESERVATION FENCING IS TO REMAIN INTACT AS PER THE TREE PRESERVATION DRAWINGS. SHOULD TREE PRESERVATION FENCING NEED TO BE TEMPORARILY RELOCATED OR MOVED TO FACILITATE CONSTRUCTION, THE PROJECT ARBORIST AND CITY OF LONDON FORESTRY OPERATIONS ARE TO BE IMMEDIATELY INFORMED. FENCING IS TO BE REINSTATED AS PER THE TREE PRESERVATION PLANS AS SOON AS POSSIBLE.

c) NO CONSTRUCTION, EXCAVATION, ADDING OF FILL, STOCKPILING OF CONSTRUCTION MATERIAL, OR HEAVY EQUIPMENT IS PERMITTED WITHIN THE TREE PROTECTION ZONE.

d) WHEN EXCAVATION NEAR A TREE IS REQUIRED, AND IT IS ANTICIPATED THAT ROOTS WILL BE SEVERED AND EXPOSED, DURATION OF EXPOSURE IS TO BE MINIMIZED TO PREVENT ROOT DESICCATION.

e) DURING THE EXCAVATION PROCESS, ROOTS 25MM OR LARGER THAT ARE SEVERED AND EXPOSED SHOULD BE HAND PRUNED TO LEAVE A CLEAN-CUT SURFACE. TO BE UNDERTAKEN BY AN ISA CERTIFIED ARBORIST. EXPOSED SEVERED ROOTS THAT CANNOT BE COVERED IN SOIL ON THE SAME DAY AS THE CUTS ARE MADE ARE TO BE KEPT MOIST. EXPOSED ROOTS ARE TO BE KEPT MOIST BY COVERING THEM WITH WATER SOAKED BURLAP OR ANY OTHER MEANS AVAILABLE TO PREVENT THEM FROM DRYING OUT. ADEQUATE MOISTURE LEVELS ARE TO BE MAINTAINED UNTIL SUCH TIME AS TOPSOIL HAS BEEN REPLACED SATISFACTORILY OR AS OTHERWISE DIRECTED BY THE CONTRACT ADMINISTRATOR.

f) AVOID IDLING HEAVY EQUIPMENT UNDER OR WITHIN CLOSE PROXIMITY TO TREES TO BE PRESERVED TO PREVENT CANOPY DAMAGE FROM EXPOSURE TO THE HEAT OF THE EXHAUST.

g) SHOULD BRANCHES ON CITY OWNED TREES BE DAMAGED BY OR DURING CONSTRUCTION, THE CONTRACTOR IS TO NOTIFY CITY OF LONDON FORESTRY OPERATIONS AS SOON AS POSSIBLE. NO PERSON(S) OTHER THAN CITY STAFF OR THE CITY'S DESIGNATED CONTRACTOR MAY PERFORM WORK ON ANY CITY TREE.

h) OPEN TRENCHING WITHIN A CRITICAL ROOT ZONE IS PROHIBITED. ALTERNATIVE EXCAVATION METHODS SUCH AS HORIZONTAL BORING AND VACUUM EXCAVATION ARE REQUIRED WHERE PROPOSED SERVICES OR INSTALLATION REQUIREMENTS CONFLICT WITH CRITICAL ROOT ZONES.

i) THE EXISTING GROUND-LAYER VEGETATION AT THE BASE OF TREES MUST REMAIN INTACT WITHIN THE CRITICAL ROOT ZONE SO AS NOT TO DISTURB THE SOIL AROUND THE BASE OF THE EXISTING TREES. THIS INCLUDES THE PRACTICE OF NOT REPLACING EXISTING TURF WITH NEW SOD. A HEAVY APPLICATION OF SEED IN THESE INSTANCES IS PREFERRED.

j) REGULAR COMMUNICATION WITH THE SITE SUPERVISOR AND REGULAR MONITORING OF THE SITE BY THE PROJECT ARBORIST OR LANDSCAPE ARCHITECT IS RECOMMENDED TO ENSURE PROPER PROCEDURES ARE FOLLOWED AND PROTECTION BARRIERS ARE MAINTAINED.

IT IS THE RESPONSIBILITY OF THE SITE SUPERVISOR TO PROMPTLY CONTACT THE PROJECT ARBORIST IF ANY CONCERNS OR QUESTIONS ARISE REGARDING TREES.

POST-CONSTRUCTION RECOMMENDATIONS

a) AVOID DISCHARGING RAIN WATER LEADERS ADJACENT TO RETAINED TREES, AS THIS MAY RESULT IN AN OVERLY MOIST ENVIRONMENT WHICH CAN CAUSE ROOT ROT.

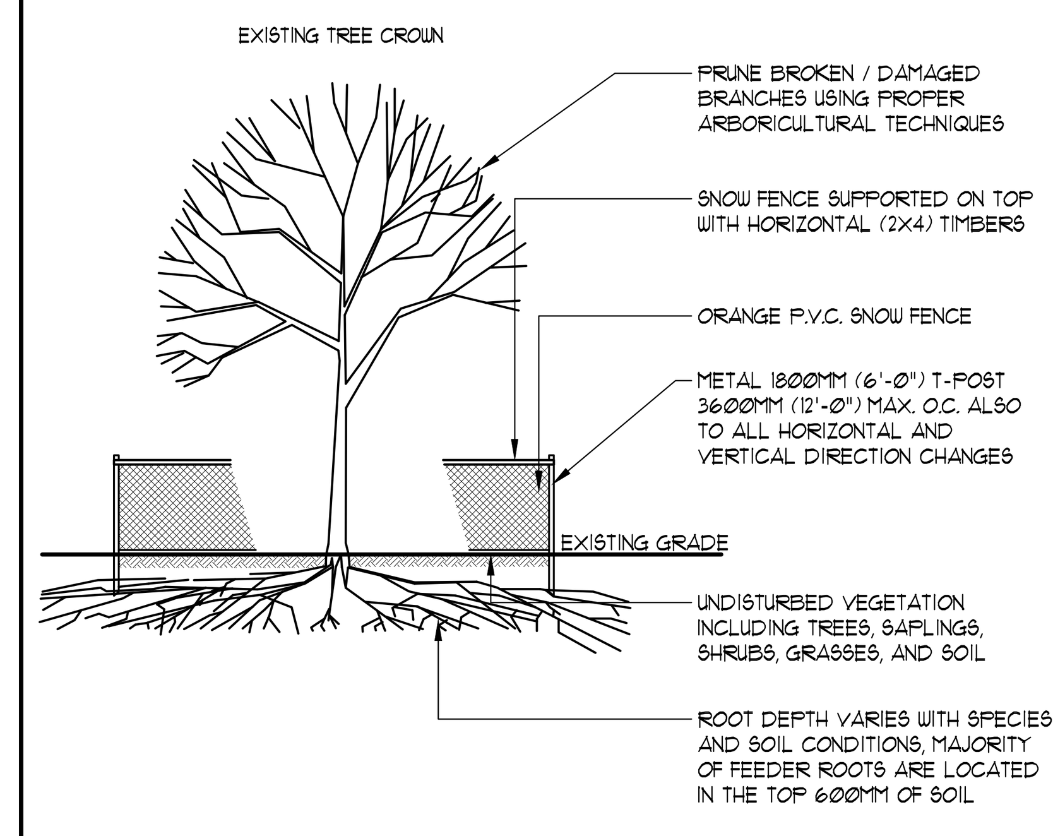
b) AFTER ALL WORK IS COMPLETED, TREE PRESERVATION FENCES AND ANY OTHER IMPACT MITIGATION PARAPHERNALIA MUST BE REMOVED UNDER THE DIRECTION OF THE CONSULTING ARBORIST OR CONSTRUCTION ADMINISTRATOR.

c) A FINAL REVIEW MUST BE UNDERTAKEN BY THE PROJECT ARBORIST TO ENSURE THAT ALL MITIGATION MEASURES AS DESCRIBED ABOVE HAVE BEEN MET.

d) POST CONSTRUCTION MONITORING OF TREES MAY BE REQUIRED. MONITORING SCHEDULE TO BE DETERMINED WITH DESIGN TEAM AND CITY CONSENSUS.

TREES RECOMMENDED FOR REMOVAL (19)

GENERAL INFORMATION				SIZE		HEALTH & CONDITION				IMPACTS & RECOMMENDATIONS	
ID #	BOTANICAL NAME	COMMON NAME	LOCATION	DBH (cm)	CANOPY RADIUS (m)	CROWN CONDITION	STRUCTURAL FORM	STRUCTURAL INTEGRITY	COMMENTS	EXPECTED CONSTRUCTION IMPACTS	PRESERVE / REMOVE / IMPACT MITIGATION
13	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 9, 6	2.5	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
14	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 5, 4	2	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
17	*Morus alba*	Mulberry	City ROW Oxford St. W	19	4	5	fair	fair	Included bark at primary union, oozing seam, squat form	direct conflict with proposed road construction	remove
18	*Morus alba*	Mulberry	City ROW Oxford St. W	20	4	4	fair	fair	Dead lower branches, squat form	direct conflict with proposed road construction	remove
20	*Morus alba*	Mulberry	City ROW Oxford St. W	8, 8, 7	3	5	fair	fair	Multistem 3, primary union at grade, dead lower branches	direct conflict with proposed road construction	remove
21	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	42	6	5	good	good	Low branched	direct conflict with proposed road construction	remove
22	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	46, 35	6	5	fair	fair	Multistem 2, induced bark and seam at primary union, low branched	direct conflict with proposed road construction	remove
25	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	15	3	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed road construction	remove
26	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	12	2	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed road construction	remove
27	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Supressed	direct conflict with proposed road construction	remove
43	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	32	5	5	good	good	Metal tag #266, low branched, on slope	adjacent to proposed s/w, impact to critical root zone expected	remove
45	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	20	4.5	5	good	good	Metal tag #264, branched to grade, dead lower branches	direct conflict with proposed s/w construction	remove
48	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	15	3	5	good	fair	Significant vertical trunk wounds, full crown	direct conflict with proposed s/w construction	remove
49	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	13	3	5	good	good	Full form	direct conflict with proposed s/w construction	remove
51	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
52	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	1.5	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
53	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	1	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
54	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
64	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	58	6	3	poor	hazard	North half of tree torn off, leaving large wound, canopy heavy south, dead wood	Indirect conflict with proposed road construction & hazardous tree condition	remove



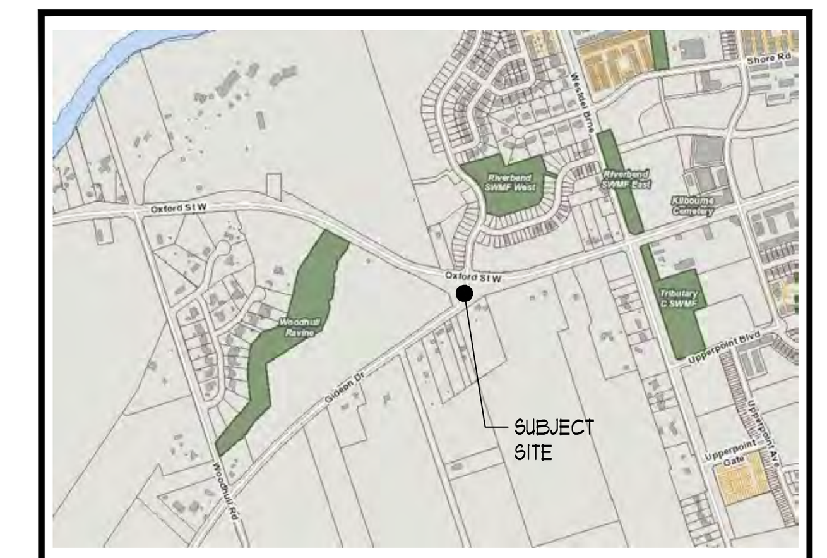
NOTES:

1. EXISTING TREES ARE TO BE PROTECTED FROM CONSTRUCTION WITH THE INSTALLATION OF A 1200MM (4'-0") HIGH SNOW FENCE, HELD IN PLACE WITH 1800MM (6'-0") 'T-BAR'.
2. THE BARRIER IS TO BE INSTALLED PRIOR TO ANY CONSTRUCTION AND MUST REMAIN IN PLACE UNTIL ALL CONSTRUCTION IS COMPLETED.
3. ALL SUPPORTS AND BRACING SHOULD BE INSIDE THE TREE PROTECTION ZONE. ALL SUCH SUPPORTS SHOULD MINIMIZE DAMAGING ROOTS IN THE TREE PROTECTION ZONE.
4. NO CONSTRUCTION ACTIVITY, GRADE CHANGES, SURFACE TREATMENT, OR EXCAVATION OF ANY KIND IS PERMITTED WITHIN THE TREE PROTECTION ZONE.
5. NO MOVEMENT OF EQUIPMENT, STORAGE OF BUILDING SUPPLIES, CLEANING OR EQUIPMENT, OR DUMPING OF SOLVENTS, GASOLINE, ETC., MAY OCCUR WITHIN THIS FENCE LINE.
6. WHERE HIGH QUALITY SPECIMENS OCCUR ADJACENT TO AREAS SUBJECTED TO INTENSIVE CONSTRUCTION ACTIVITY, WOODEN CRIBBING SHOULD BE INSTALLED TO PROTECT TRUNKS FROM DAMAGE IN THE EVENT THAT HEAVY EQUIPMENT BREAKS DOWN THE SNOW FENCING.
7. FENCE TO BE INSPECTED BY ENVIRONMENTAL CONSULTANT ON A REGULAR BASIS AND BE MAINTAINED BY THE SUBDIVIDER / BUILDER.

TEMP. TREE PROTECTION BARRIER - N.T.S.

TREES RECOMMENDED FOR PRESERVATION (45)

GENERAL INFORMATION				SIZE		HEALTH & CONDITION				IMPACTS & RECOMMENDATIONS	
ID #	BOTANICAL NAME	COMMON NAME	LOCATION	DBH (cm)	CANOPY RADIUS (m)	CROWN CONDITION	STRUCTURAL FORM	STRUCTURAL INTEGRITY	COMMENTS	EXPECTED CONSTRUCTION IMPACTS	PRESERVE / REMOVE / IMPACT MITIGATION
1	*Carya cordiformis*	Bitternut Hickory	2085 Oxford St. W	89	7	4	fair	fair	Codominant leaders with included bark and bulging seam, gall through crown, Buckthorn understory, grapevine through bottom third of canopy	none	preserve
2	*Juglans nigra*	Black Walnut	2085 Oxford St. W	8	2.5	5	good	good	Low branched, on slope	none	preserve
3	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	32	5	4	fair	good	Buckthorn understory, grapevine through crown	none	preserve
4	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	19	4	4	good	good	Dense Buckthorn understory, canopy heavy with grapevine	none	preserve
5	*Acer negundo*	Manitoba Maple	2265 Oxford St. W	23, 22	6	4	fair	poor	Multistem 2, supressed, large branch cavities, grapevine, 1 stem bend and lean SW	none	preserve
6	*Juglans nigra*	Black Walnut	2265 Oxford St. W	11	1.5	5	fair	good	Low crown, several Black Walnut saplings nearby	none	preserve
7	*Juniperus spp*	Juniper	2265 Oxford St. W	11	3	4	fair	good	Unbalanced crown, limbed up approx. 2m	none	preserve
8	*Crataegus spp*	Hawthorn	2265 Oxford St. W	~25, 20, 20, 10	7	4	fair	fair	Multistem 4, minor dead wood	none	preserve
9	*Pinus sylvestris*	Scotch Pine	2265 Oxford St. W	15	2.5	1	good	fair	Dead	none	preserve
10	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	~13	3.5	5	fair	good	Low branched, scrubby form, grapevine through crown	adjacent to proposed s/w.	preserve, tree protection barrier
11	*Acer negundo*	Manitoba Maple	2166 Oxford St. W	~70, 65	8	5	poor	poor	Multistem 2, included bark at primary union and seam to base	adjacent to proposed s/w.	preserve, tree protection barrier
12	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	2	4	good	good	Canopy covered in grapevine	adjacent to proposed s/w.	preserve, tree protection barrier
15	*Unknown deciduous tree*	*Unknown deciduous tree*	City ROW Oxford St. W	~15	3	-	fair	fair	Canopy completely covered in grapevine and virginia creeper	none	preserve
16	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	3	5	fair	good	Low branched	none	preserve
19	*Morus alba*	Mulberry	City ROW Oxford St. W	11	3	4	poor	fair	Disfigured form, leader bends and twists, dead wood	none	preserve
23	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Canopy heavy with grapevine	none	preserve
24	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	15	3	5	good	good	Grapevine into lower half of crown	none	preserve
28	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	4	5	good	good	Supressed	no conflict with critical root zone	preserve, tree protection barrier
29	*Morus alba*	Mulberry	City ROW Gideon Dr.	18, 17	7	4	fair	fair	Multistem 2, tight unions, scrubby form, grapevine into crown	no conflict with critical root zone	preserve, tree protection barrier
30	*Juglans nigra*	Black Walnut	2166 Oxford St. W	12	3	5	good	good	Low branched, full form	none	preserve
31	*Juniperus spp*	Juniper	City ROW Gideon Dr.	~30	4	3	good	good	Covered in vines, dense understory	none	preserve
32	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	~15	3	3	good	good	Covered in vines	none	preserve
33	*Gleditsia triacanthos var. inermis*	Honeylocust	44 Gideon Dr.	~40	8	5	good	good	Minor hydro line clearance pruning, otherwise full form	none	preserve
34	*Picea glauca*	White Spruce	36 Gideon Dr.	~15	2	5	good	good	Branched to grade	none	preserve
35	*Juglans nigra*	Black Walnut	36 Gideon Dr.	85, 79	9	5	good	good	Multistem 2, large lovely specimen, supressed on East side, elevated at base, tight unions	none	preserve
36	*Tilia americana*	Basswood	14 Gideon Dr.	26, 18	6	5	good	good	Multistem 2, in wooded area, low branched	none	preserve
37	*Tilia americana*	Basswood	14 Gideon Dr.	19, 15, 9	5	5	good	good	Multistem 3, in wooded area, metal tag #s 200 & 201	none	preserve
38	*Tilia americana*	Basswood	14 Gideon Dr.	31, 30, 13	5	5	good	fair	Multistem 3, in wooded area, metal tag #277, included bark at primary union	none	preserve
39	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	In wooded area, metal tag #270, low branches, on slope, supressed, grapevine into crown	none	preserve
40	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	19	4.5	5	good	good	Metal tag #269, grapevine into crown, on slope	no conflict with critical root zone	preserve, tree protection barrier
41	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	Metal tag #267, supressed	none	preserve
42	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	25	5	5	good	good	Metal tag #268, minor vines into crown	no conflict with critical root zone	preserve, tree protection barrier
44	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	13, 11, 7	4	5	good	fair	Multistem 3, metal tag #265, included bark at primary union	no conflict with critical root zone	preserve, tree protection barrier
46	*Pinus strobus*	White Pine	14 Gideon Dr.	39	5.5	5	good	good	Metal tag #259, limbed up approx. 4m, Northern edge of loose hedge row	none	preserve
47	*Acer platanoides 'Royal Red'*	Royal Red Norway Maple	14 Gideon Dr.	~60	4.5	5	good	good	Significant prune cuts	none	preserve
50	*Salix spp*	Willow	City ROW Gideon Dr.	48, 11	5	3	poor	poor	Multistem 2, significant dead wood and trunk rot, loose open crown	none	preserve
55	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	26	4	5	good	good	Metal tag #213, thin crown	none	preserve
56	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	42	6.5	5	good	good	Metal tag #212, low branched, large broad crown	none	preserve
57	*Juniperus spp*	Juniper	City ROW Oxford St. W	10	2	5	good	good	Branched to grade	none	preserve
58	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	3	5	good	good	Branched to grade	none	preserve
59	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	2	5	good	good	At fence line	none	preserve
60	*Juglans nigra*	Black Walnut	2012 Oxford St. W	~30	5	5	good	good	Branched to grade	none	preserve
61	*Acer spp*	Maple	2012 Oxford St. W	~30, 30	5	3	poor	poor	Multistem 2, rot at base, significant dead wood	none	preserve
62	*Juglans nigra*	Black Walnut	2012 Oxford St. W	32	6	5	good	good	Under hydro lines	none	preserve
63	*Juglans nigra*	Black Walnut	2012 Oxford St. W	30	6	5	good	good	Metal tag #198, under hydro lines	none	preserve



KEY MAP

RON KOUDYS LANDSCAPE ARCHITECTS INC

Ronald H. Koudys, O.A.L.A. C.S.L.A. DATE

DATE	DESCRIPTION	No.
2021.09.20	ISSUED FOR REVIEW	1.

PLOTTING INFORMATION:
PLOTTED DATE = 2021.09.20
PLOTTED SCALE = 1:1

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS — RONALD H. KOUDYS — OALA — MEMBER

PROJECT TITLE:

OXFORD ST & GIDEON DR INTERSECTION
LONDON, ONTARIO

DRAWING TITLE:

TREE PRESERVATION PLAN 'B'

DATE:	SCALE:	DRAWING No.
AUGUST 2021	AS NOTED	T-2
DRAWN: RKLA Inc.	CHECKED BY: R.H.K.	
PROJECT No. 21-117Lb		

RON KOUDYS LANDSCAPE ARCHITECTS INC

GIDEON DRIVE & OXFORD STREET WEST INTERSECTION IMPROVEMENTS LONDON ONTARIO

TREE ASSESSMENT REPORT

PREPARED BY:	RON KOUDYS LANDSCAPE ARCHITECTS INC
DATE:	SEPTEMBER 2021
REVISED:	NOVEMBER 2021
RKLA PROJECT #:	21-117

CERTIFIED ARBORIST ISA TM

Michelle Peeters
ON 2129A

MICHELLE PEETERS
LANDSCAPE ARCHITECT
BLA, DIP. HORT. TECH, OALA, ISA CERTIFIED ARBORIST

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1.0 Introduction and Executive Summary

1.1 Introduction

Ron Koudys Landscape Architects Inc. (RKLA) was retained RV Anderson Associates Ltd. to conduct a tree inventory and assessment in conjunction with the proposed intersection improvements at Gideon Drive and Oxford Street West in London Ontario. The proposed improvements will include a new round about and associated sidewalks, street lights, etc. This report outlines the expected impacts of the proposed work on trees within or in proximity to the limits of disturbance and makes recommendations for tree removal and preservation based both tree health and construction impacts.

1.2 Executive Summary

The inventory captured 64 individual trees. Trees were identified within the City ROW and on private properties adjacent to the proposed construction. No tree species listed as endangered or threatened under O. Reg. 230/08: Species at Risk in Ontario List under Endangered Species Act, 2007, S.O. 2007, c. 6 were observed during the tree inventory. The construction limits do not conflict with a City of London Tree Protection Area. All trees observed are common and typical of the current land uses.

1.2.1 Tree Species Composition

The following chart outlines the breakdown of tree species included in this inventory.

%	Qty	Common Name
39%	25	Black Walnut
9%	6	Manitoba Maple
8%	5	Juniper
8%	5	Mulberry
6%	4	Trembling Aspen
5%	3	Basswood
5%	3	Bitternut Hickory
3%	2	Cottonwood
3%	2	Freeman Maple

%	Qty	Common Name
2%	1	Hawthorn
2%	1	Honeylocust
2%	1	Maple
2%	1	Royal Red Norway Maple
2%	1	Scotch Pine
2%	1	Unknown deciduous tree
2%	1	White Pine
2%	1	White Spruce
2%	1	Willow
100%	64	Total

1.2.2 Tree Removal and Preservation Recommendation Summary

The following chart summarizes trees recommended for removal and preservation categorized by location/ownership.

	City Right-of-Way		Privately Owned Land		TOTAL
	Quantity	Tree ID #'s	Quantity	Tree ID #'s	
Trees to be removed	20	13, 14, 17, 18, 20, 21, 22, 25, 26, 27, 29, 43, 45, 48, 49, 51, 52, 53, 54 & 64	0		20
Trees to be preserved	19	10, 12, 15, 16, 19, 23, 24, 28, 31, 32, 40, 42, 44, 50, 55, 56, 57, 58 & 59	25	1 - 9, 11, 30, 33 - 39, 41, 46, 47, 60, 61, 62 & 63	44

1.2.3 Tree Removal and Preservation Recommendations.

1. 20 trees are recommended for removal from the City ROW due to conflict with the proposed road construction.
2. Tree preservation fencing is to be installed as noted on the tree preservation drawings and as per the tree preservation barrier detail.
3. Follow the pre-construction, construction process, and post construction recommendations listed in this report.
4. Follow all City of London tree protection guidelines and by-laws.

2.0 Scope of Inventory

Trees and woody vegetation (shrubs) within the City ROW of Oxford Street West and Gideon Drive and approximately 3m beyond the ROW were included in the inventory and assessment. See Figure 1 for scope of inventory.

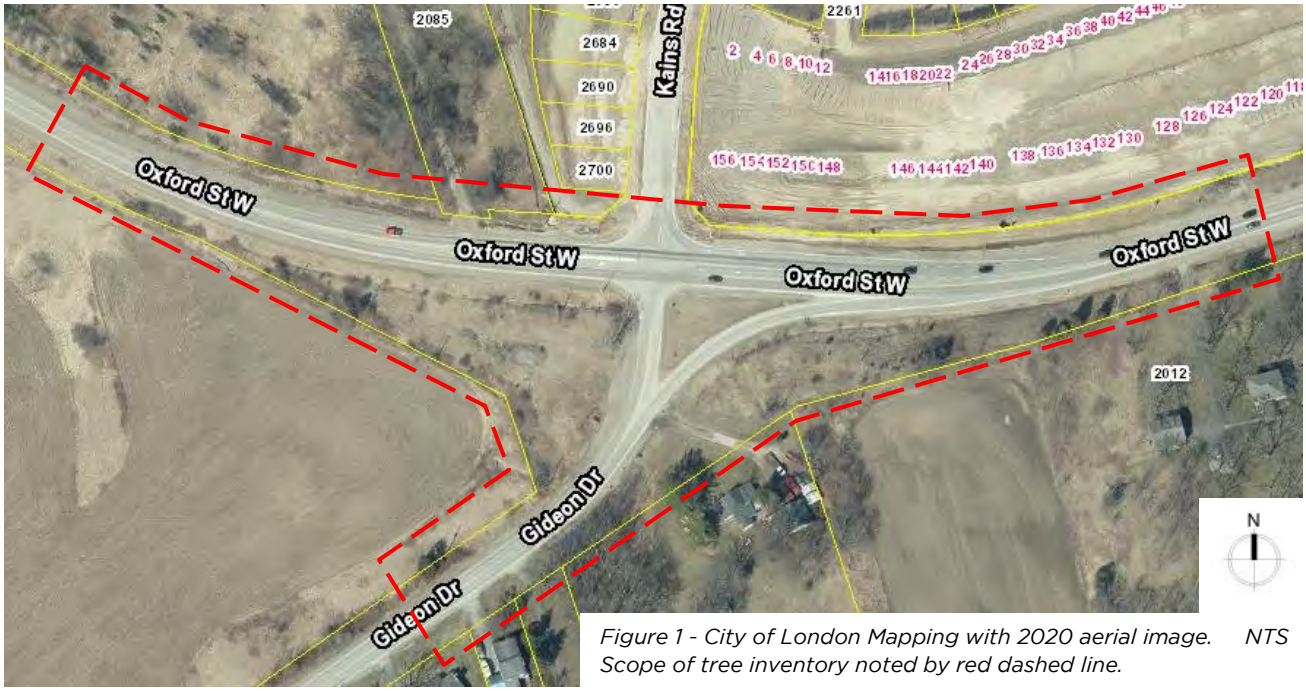


Figure 1 - City of London Mapping with 2020 aerial image. NTS
Scope of tree inventory noted by red dashed line.

3.0 Methodology

Field work was completed on August 12, 2021 by RKLA staff member Michelle Peeters, ISA certified arborist ON 2129A. A topographic survey supplied by RV Anderson was used as a base for the field work. Trees within the given scope with a diameter at breast height (DBH) of ≥10cm were identified and assessed as individuals. Significant hedges or groups of immature trees were not assessed, but their locations are noted on the tree preservation drawing. Trees were NOT tagged in the field. Each tree was assigned a number which are identified on the tree data table and on the tree preservation drawings. Individual tree identification numbers include 1 - 64 - refer to section 4.1 of this report.

The following information was recorded for each individual tree:

- Genus + specific epithet (tree species)
- Diameter at breast height (DBH) (centimetres)
- Crown radius (metres)
- Crown Condition (overall general vigour of crown)
- Structural Form (excellent, good, fair, poor)
- Structural Condition (good, fair, poor, hazard)
- General Comments

Field work was conducted again on November 20, 2021 to observe and tally existing trees and woody vegetation with a DBH of less than 10cm within the scope of inventory. This group of plant material is not graphically included on the tree preservation drawings. The tally was prepared to provide a more complete understanding of the existing woody plant material on site to inform future restoration efforts. A list of this plant material is included in section 4.2 of this report.

3.1 Health Assessment

Trees were assessed following accepted arboricultural techniques and best practices using a limited visual inspection. The inspection included a 360 degree (where possible) visual examination of the above-ground parts of each tree for structural defects including cavities, wounds, scars, external indicators of internal decay, evidence of insect presence, discoloured or deformed foliage, canopy and root distribution, and the overall condition of the tree. Evaluation of tree health was based on visible tree health indicators including live buds, foliage condition, deadwood, structural defects, form, and signs of disease or insect infestation. Field observations were reviewed against available online imagery of the trees to assist in determining tree canopy health. Quantified health assessments included in the inventory are explained here:

Crown Condition Assessment

5 Healthy: less than 10% crown decline
4 Slight decline: 11% - 30% crown decline
3 Moderate decline: 31% - 60% crown decline
2 Severe decline: 61% - 90% crown decline
1 Dead - No visible indication of living foliage or buds in crown

Structural Form Assessment

Excellent: An ideal expression of a specific tree species, true to form, balanced canopy, good flare, typical internode length, full crown, etc.

Good: A satisfactory and generally expected expression of a specific tree species, with only minor or typical variances from an ideal form.

Fair: Nearly satisfactory, with defects or a combination of defects such as codominant leaders, unbalanced crown, poor/no flare, shortened internodes, has been poorly pruned, etc.

Poor: Significantly flawed expression of a specific tree species

Structural Integrity Assessment

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).

Hazard: Defects are severe and acute; defective part or collective defective parts render the tree a high risk threat to potential targets.

3.2 Critical Root Zones and Tree Preservation Barriers

The critical root zone of a tree is the portion of the root system that is the minimum necessary to maintain tree vitality and stability. Critical root zones are commonly prescribed by municipal bylaws based solely on DBH and/or drip line, and are typically expressed as a circular shape around the tree. There are a number of other factors, however, that should be considered when establishing a critical root zone, particularly in a streetscape setting where there are physical barriers such as sidewalks and curbs that have shaped and limited typical root development patterns.

Factors that inform location and extent of a tree preservation barriers to protect the critical root zone include: species tolerance to root loss and other construction impacts (as established by authoritative resources and professional experience), tree trunk size (DBH), tree health and vigour, structural condition, landscape context, soil type, moisture availability, topography, ground cover, crown size and balance (drip line), current physical root restrictions, visible root arrangement, relationship to neighbouring trees, relationship between tree and proposed construction, type of proposed construction, etc.

Critical root zones will be protected in the field with tree preservation barriers.

4.0 Tree Inventory Data and Recommendations

The following recommendations are based on a combination of tree species tree health/condition and requirements of the proposed street reconstruction.

4.1 Assessed Tree Data Table

Grey indicates recommended removal.

GENERAL INFORMATION				SIZE		HEALTH & CONDITION				IMPACTS & RECOMMENDATIONS	
ID #	BOTANICAL NAME	COMMON NAME	LOCATION	DBH (cm)	CANOPY RADIUS (m)	CROWN CONDITION	STRUCTURAL FORM	STRUCTURAL INTEGRITY	COMMENTS	EXPECTED CONSTRUCTION IMPACTS	PRESERVE / REMOVE / IMPACT MITIGATION
1	*Carya cordiformis*	Bitternut Hickory	2085 Oxford St. W	89	7	4	fair	fair	Codominant leaders with included bark and bulging seam, gall through crown, Buckthorn understory, grapevine through bottom third of canopy	none	preserve
2	*Juglans*	Black	2085 Oxford St.	8	2.5	5	good	good	Low branched, on slope	none	preserve

	nigra	Walnut	W								
3	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	32	5	4	fair	good	Buckthorn understory, grapevine through crown	none	preserve
4	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	19	4	4	good	good	Dense Buckthorn understory, canopy heavy with grapevine	none	preserve
5	*Acer negundo*	Manitoba Maple	2265 Oxford St. W	23, 22	6	4	fair	poor	Multistem 2, supressed, large branch cavities, grapevine, 1 stem bend and lean SW	none	preserve
6	*Juglans nigra*	Black Walnut	2265 Oxford St. W	11	1.5	5	fair	good	Low crown, several Black Walnut saplings nearby	none	preserve
7	*Juniperus spp*	Juniper	2265 Oxford St. W	11	3	4	fair	good	Unbalanced crown, limbed up approx. 2m	none	preserve
8	*Crataegus spp*	Hawthorn	2265 Oxford St. W	~25, 20, 20, 10	7	4	fair	fair	Multistem 4, minor dead wood	none	preserve
9	*Pinus sylvestris*	Scotch Pine	2265 Oxford St. W	15	2.5	1	good	fair	Dead	none	preserve
10	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	~13	3.5	5	fair	good	Low branched, scrubby form, grapevine through crown	none	preserve, tree protection barrier
11	*Acer negundo*	Manitoba Maple	2166 Oxford St. W	~70, 65	8	5	poor	poor	Multistem 2, included bark at primary union and seam to base	none	preserve, tree protection barrier
12	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	2	4	good	good	Canopy covered in grapevine	none	preserve, tree protection barrier
13	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 9, 6	2.5	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
14	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 5, 4	2	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
15	*Carya cordiformis*	*Bitternut Hickory*	City ROW Oxford St. W	~15	3	4	fair	fair	Canopy completely covered in grapevine and virginia creeper	none	preserve
16	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	3	5	fair	good	Low branched	none	preserve
17	*Morus alba*	Mulberry	City ROW Oxford St. W	19	4	5	fair	fair	Included bark at primary union, oozing seam, squat form	direct conflict with proposed road construction	remove
18	*Morus alba*	Mulberry	City ROW Oxford St. W	20	4	4	fair	fair	Dead lower branches, squat form	direct conflict with proposed road construction	remove
19	*Morus alba*	Mulberry	City ROW Oxford St. W	11	3	4	poor	fair	Disfigured form, leader bends and twists, dead wood	none	preserve
20	*Morus alba*	Mulberry	City ROW Oxford St. W	8, 8, 7	3	5	fair	fair	Multistem 3, primary union at grade, dead lower branches	direct conflict with proposed road construction	remove
21	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	42	6	5	good	good	Low branched	direct conflict with proposed road construction	remove
22	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	46, 35	6	5	fair	fair	Multistem 2, included bark and seam at primary union, low branched	direct conflict with proposed road construction	remove
23	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Canopy heavy with grapevine	none	preserve
24	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	15	3	5	good	good	Grapevine into lower half of crown	none	preserve
25	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	3	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed s/w construction	remove
26	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	12	2	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed s/w construction	remove

27	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Supressed	direct conflict with proposed s/w construction	remove
28	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	4	5	good	good	Supressed	no conflict with critical root zone	preserve, tree protection barrier
29	*Morus alba*	Mulberry	City ROW Gideon Dr.	18, 17	7	4	fair	fair	Multistem 2, tight unions, scrubby form, grapevine into crown	direct conflict with proposed s/w construction	remove
30	*Juglans nigra*	Black Walnut	2166 Oxford St. W	12	3	5	good	good	Low branched, full form	none	preserve
31	*Juniperus spp*	Juniper	City ROW Gideon Dr.	~30	4	3	good	good	Covered in vines, dense understory	none	preserve
32	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	~15	3	3	good	good	Covered in vines	none	preserve
33	*Gleditsia triacanthos var. inermis*	Honeylocust	44 Gideon Dr.	~40	8	5	good	good	Minor hydro line clearance pruning, otherwise full form	none	preserve
34	*Picea glauca*	White Spruce	36 Gideon Dr.	~15	2	5	good	good	Branched to grade	none	preserve
35	*Juglans nigra*	Black Walnut	36 Gideon Dr.	85, 79	9	5	good	good	Multistem 2, large lovely specimen, supressed on East side, elevated at base, tight unions	none	preserve
36	*Tilia americana*	Basswood	14 Gideon Dr.	26, 18	6	5	good	good	Multistem 2, in wooded area, low branched	minor impact adjacent to critical root zone	preserve, tree protection barrier
37	*Tilia americana*	Basswood	14 Gideon Dr.	19, 13, 9	5	5	good	good	Multistem 3, in wooded area, metal tag #s 200 &201	minor impact adjacent to critical root zone	preserve, tree protection barrier
38	*Tilia americana*	Basswood	14 Gideon Dr.	31, 30, 13	5	5	good	fair	Multistem 3, in wooded area, metal tag #277, included bark at primary union	minor impact adjacent to critical root zone	preserve, tree protection barrier
39	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	In wooded area, metal tag #270, low branches, on slope, supressed, grapevine into crown	minor impact adjacent to critical root zone	preserve, tree protection barrier
40	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	19	4.5	5	good	good	Metal tag #269, grapevine into crown, on slope	minor impact adjacent to critical root zone	preserve, tree protection barrier
41	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	Metal tag #267, supressed	minor impact adjacent to critical root zone	preserve, tree protection barrier
42	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	25	5	5	good	good	Metal tag #268, minor vines into crown	minor impact adjacent to critical root zone	preserve, tree protection barrier
43	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	32	5	5	good	good	Metal tag #266, low branched, on slope	adjacent to proposed s/w, impact to critical root zone expected	remove
44	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	13, 11, 7	4	5	good	fair	Multistem 3, metal tag #265, included bark at primary union	no conflict with critical root zone	preserve, tree protection barrier
45	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	20	4.5	5	good	good	Metal tag #264, branched to grade, dead lower branches	direct conflict with proposed s/w construction	remove
46	*Pinus strobus*	White Pine	14 Gideon Dr.	39	5.5	5	good	good	Metal tag #259, limbed up approx. 4m, Northern edge of loose hedge row	none	preserve
47	*Acer platanoides 'Royal Red'*	Royal Red Norway Maple	14 Gideon Dr.	~60	4.5	5	good	good	Significant prune cuts	none	preserve
48	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	15	3	5	good	fair	Significant vertical trunk wounds, full crown	direct conflict with proposed s/w construction	remove
49	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	13	3	5	good	good	Full form	direct conflict with proposed s/w construction	remove

50	*Salix spp*	Willow	City ROW Gideon Dr.	48, 11	5	3	poor	poor	Multistem 2, significant dead wood and trunk rot, loose open crown	none	preserve
51	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
52	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	1.5	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
53	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	1	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
54	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
55	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	26	4	5	good	good	Metal tag #213, thin crown	none	preserve
56	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	42	6.5	5	good	good	Metal tag #212, low branched, large broad crown	none	preserve
57	*Juniperus spp*	Juniper	City ROW Oxford St. W	10	2	5	good	good	Branched to grade	none	preserve
58	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	3	5	good	good	Branched to grade	none	preserve
59	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	2	5	good	good	At fence line	none	preserve
60	*Juglans nigra*	Black Walnut	2012 Oxford St. W	~30	5	5	good	good	Branched to grade	none	preserve
61	*Acer spp*	Maple	2012 Oxford St. W	~30, 30	5	3	poor	poor	Multistem 2, rot at base, significant dead wood	none	preserve
62	*Juglans nigra*	Black Walnut	2012 Oxford St. W	32	6	5	good	good	Under hydro lines	none	preserve
63	*Juglans nigra*	Black Walnut	2012 Oxford St. W	30	6	5	good	good	Metal tag #198, under hydro lines	none	preserve
64	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	58	6	3	poor	hazard	North half of tree torn off, leaving large wound, canopy heavy south, dead wood	Indirect conflict with proposed road construction & hazardous tree condition	remove

4.1 SHRUBS & TREES WITH DBH <10CM

The following list of woody plant material was observed within the scope of inventory. This plant material may or may not be impacted by the proposed road reconstruction.

OBSERVED SHRUBS AND TREES WITH DBH <10cm LOCATIONS NOT NOTED ON THE TREE PRESERVATION DRAWINGS						
BOTANICAL NAME	COMMON NAME	APPROX. QUANTITY OBSERVED WITHIN SCOPE OF INVENTORY		BOTANICAL NAME	COMMON NAME	APPROX. QUANTITY OBSERVED WITHIN SCOPE OF INVENTORY
Acer negundo	Manitoba Maple	1		*Pinus sylvestris*	Scotch Pine	1
Cornus alternifolia	Pagoda Dogwood	1		*Populus tremuloides*	Trembling Aspen	4
Cornus racemosa	Gray Dogwood	2 colonies		*Prunus spp*	Cherry	1
Cornus sericea	Red Osier Dogwood	1 colony		*Pyrus spp*	Pear	3
Elaeagnus umbellata	Autumn Olive	25		*Rhamnus spp*	Buckthorn	22
Juglans nigra	Black Walnut	26		*Rhus typhina*	Staghorn Sumac	3 colonies
Juniperus spp	Juniper	80		*Rubus spp*	Raspberry	1 colony
Malus spp	Apple	1		*Salix spp*	Willow	2
				Ulmus pumila	Siberian Elm	6

5.0 Potential Construction Impacts on Trees

Trees that are not in conflict with the proposed construction have been recommended for preservation. Trees to be preserved may be affected by the construction process or by the construction itself. It is imperative that the design team and the construction crew understand the potential for, and the causes of tree damage. Trees recommended for preservation may experience some or all of the following potential construction impacts. Strategies and methods to avoid these impacts are outlined in the Construction Impact Mitigation Recommendations section of this report.

5.1 Soil Compaction

Soil compaction is caused by heavy or repeated compression or vibration of the soil around the tree. Soil compaction reduces the amount and size of macro and micro pore space that is vital for subsurface movement of air and water. The harmful effects of soil compaction include, but are not limited to: slower water infiltration, poor aeration, reduced root growth and an overall increased susceptibility to biotic and abiotic stressors.

5.2 Root Loss

Root loss occurs when roots are severed. The majority of roots are typically located within the top 60cm of soil and can extend outward up to three times the extent of the tree drip line. Excavation of any kind within the critical root zone* can sever roots. Two categories of roots need to be considered when evaluating impacts of root loss - small, fibrous absorbing roots, and large structural roots. Significant loss of either or both of these functions can cause stress and/or affect the structural stability of the tree. Note, however, that it is commonly accepted that healthy trees can typically tolerate and recover from the removal of approximately 33% (up to a maximum of 50%) of their root mass. Thorough consideration regarding extent of acceptable root removal is dependent on individual species characteristics, root loss distribution, and site specific conditions *(ref. Trees and Development: A Technical Guide to Preservation of Trees During Land Development by Nelda Matheny and James R. Clark, 1998. Pg 72)*.

* Refer to 'Critical Root Zones and Tree Preservation Barriers" in this report for definition.

5.3 Grade Changes

Lowering of the grade around trees has immediate and long term effects on trees. Lowering of grade requires immediate root loss from cutting the roots which results in water stress from the root removal and potential reduced structural stability.

Raising the grade around a tree can be equally damaging. The addition of fill over the root zone of a tree alters the roots' ability for normal water and gas exchange that is necessary for healthy root growth and stability. Fill essentially suffocates the roots and can lead to the slow and eventual decline of the tree.

5.4 Mechanical Damage

Mechanical damage is caused by physical contact with a tree that damages the tree to any degree. During land development and construction activities, there is an increased risk of both minor and fatal mechanical damage to trees from construction equipment. Minor damage can create entry points for insects and pathogens, and fatal damage can cause irreparable structural damage.

5.5 Changes to Exposure - Sun and Wind

Trees can be negatively affected by increased exposure to sun or wind when neighbouring trees are removed. This can be of particular concern when 'interior trees' (trees that have developed surrounded by other trees) are suddenly exposed to forest edge conditions. These trees may experience higher intensity of direct sunlight resulting in leaf scald, and instability due to increased wind and snow loads.

Trees can be negatively affected by decreased exposure to sunlight. Proposed development that includes tall buildings located to the south and west of mature existing trees can greatly reduce the amount of daily direct sunlight. While this change in environment may not cause the immediate or eventual death of a tree, it can certainly slow development and alter growing habits and patterns, and must therefore be a consideration when evaluating trees for potential preservation.

5.6 Soil Contamination

Soil health around a tree can be compromised by contamination from spills or leaks of fuels, solvents, or other construction related fluids.

5.7 Water Availability

Grading and servicing requirements for development can affect water availability for trees. Trees may experience a loss of available water due to a lowered water table or the capture or redirection of subsurface and/or overland flow. Conversely, trees may experience an increase of available water due to changes in site grading and storm water retention efforts.

The successful survival of the trees to be preserved is largely dependent on adhering to the construction impact mitigation recommendations that follow.

6.0 Construction Impact Mitigation Recommendations

The following recommendations are provided to guide the removal process, mitigate construction impacts, and ensure compliance with provincial, federal, and municipal regulatory requirements. Some of the recommendations listed below are noted to be undertaken by an ISA certified arborist.

6.1 Pre-construction recommendations

a) Prior to any construction activity, tree preservation fencing is to be installed as per the attached tree preservation drawings and details and to be reviewed/accepted by the consulting arborist PRIOR to the commencement of construction.
b) Trees to be removed must be clearly marked via spray paint or other agreed upon method prior to removal. Tree marking can be completed by project arborist, City of London construction administrator, or approved appointee.
c) In accordance with the Migratory Birds Convention Act, 1994, all removals must take place between September 1st and March 31st to avoid disturbing nesting migratory birds. If tree removal occurs between April 1st and August 31st, a biologist is required to complete a search for nests. Once cleared, the contractor has 48 hours to remove. If removal does not occur within 48 hours, another search will be required.
d) Care should be taken during the felling operation to avoid damaging the branches, stems, trunks, and roots of nearby trees to be preserved. Where possible, all trees are to be felled towards the construction zone to minimize impacts on adjacent vegetation. All removals to be undertaken by an ISA certified arborist.
e) Final site grading plans should ensure that the existing soil moisture conditions are maintained.

6.2 Recommendations related to the construction process

a) Tree preservation fencing is to be maintained in good condition and effective for the duration of construction until all construction activity is complete or as per the project arborist or contract administrator.
b) Tree preservation fencing is to remain intact as per the tree preservation drawings. Should tree preservation fencing need to be temporarily relocated or moved to facilitate construction, the project arborist and City of London Forestry Operations are to be immediately informed. Fencing is to be reinstated as per the tree preservation plans as soon as possible.
c) No construction, excavation, adding of fill, stockpiling of construction material, or heavy equipment is permitted within the tree protection zone.
d) When excavation near a tree is required, and it is anticipated that roots will be severed and exposed, duration of exposure is to be minimized to prevent root desiccation.
e) During the excavation process, roots 25mm or larger that are severed and exposed should be hand pruned to leave a clean-cut surface. To be undertaken by an ISA certified arborist. Exposed severed roots that cannot be covered in soil on the same day as the cuts are made are to be kept moist.

Exposed roots are to be kept moist by covering them with water soaked burlap or any other means available to prevent them from drying out. Adequate moisture levels are to be maintained until such time as topsoil has been replaced satisfactorily or as otherwise directed by the contract administrator.

f) Avoid idling heavy equipment under or within close proximity to trees to be preserved to prevent canopy damage from exposure to the heat of the exhaust.
g) Should branches on City owned trees be damaged by or during construction, the contractor is to notify City of London Forestry Operations as soon as possible. No person(s) other than City staff or the City's designated contractor may perform work on any City tree.
h) Open trenching within a critical root zone is prohibited. Alternative excavation methods such as horizontal boring and vacuum excavation are required where proposed services or installation requirements conflict with critical root zones.
i) The existing ground-layer vegetation at the base of trees MUST remain intact within the critical root zone so as not to disturb the soil around the base of the existing trees. This includes the practice of NOT replacing existing turf with new sod. A heavy application of seed in these instances is preferred.
j) Regular communication with the site supervisor and regular monitoring of the site by the project arborist or landscape architect is recommended to ensure proper procedures are followed and protection barriers are maintained.
It is the responsibility of the site supervisor to promptly contact the project arborist if any concerns or questions arise regarding trees.

6.3 Post-construction recommendations

a) Avoid discharging rain water leaders adjacent to retained trees, as this may result in an overly moist environment which can cause root rot.
b) After all work is completed, tree preservation fences and any other impact mitigation paraphernalia must be removed under the direction of the consulting arborist or construction administrator.
c) A final review must be undertaken by the project arborist to ensure that all mitigation measures as described above have been met.
d) Post construction monitoring of trees may be required. Monitoring schedule to be determined with design team and City consensus.

7.0 City of London Tree Protection By-laws & Specifications

Note that this project is located in the City of London. It follows therefore, that all applicable City of London rules, regulations, and by laws are to be respected. The City of London has several by-laws and specifications related to trees that must be understood and followed by the design team, the contractor, and all sub-contractors working on projects within the City.

All project parties to be aware of and familiar with the following City of London documents in their entirety and potential penalties noted therein for noncompliance:

8.0 DISCLAIMER

The assessment of the trees presented within this report has been made using accepted arboricultural techniques. These include a visual examination of the above-ground parts of each tree for structural defects, scars, external indications of decay, evidence of insect presence, discoloured foliage, the general condition of the trees and the surrounding site, as well as the proximity of property and people. None of the trees examined were dissected, cored, probed, or climbed, and detailed root crown examinations involving excavation were not undertaken.

Notwithstanding the recommendations and conclusions made in this report, it must be realized that trees are living organisms and their health and vigour is constantly changing. They are not immune to changes in site conditions or seasonal variations in the weather.

While reasonable efforts have been made to ensure the trees recommended for retention are healthy, no guarantees are offered or implied, that these trees or any part of them will remain standing.

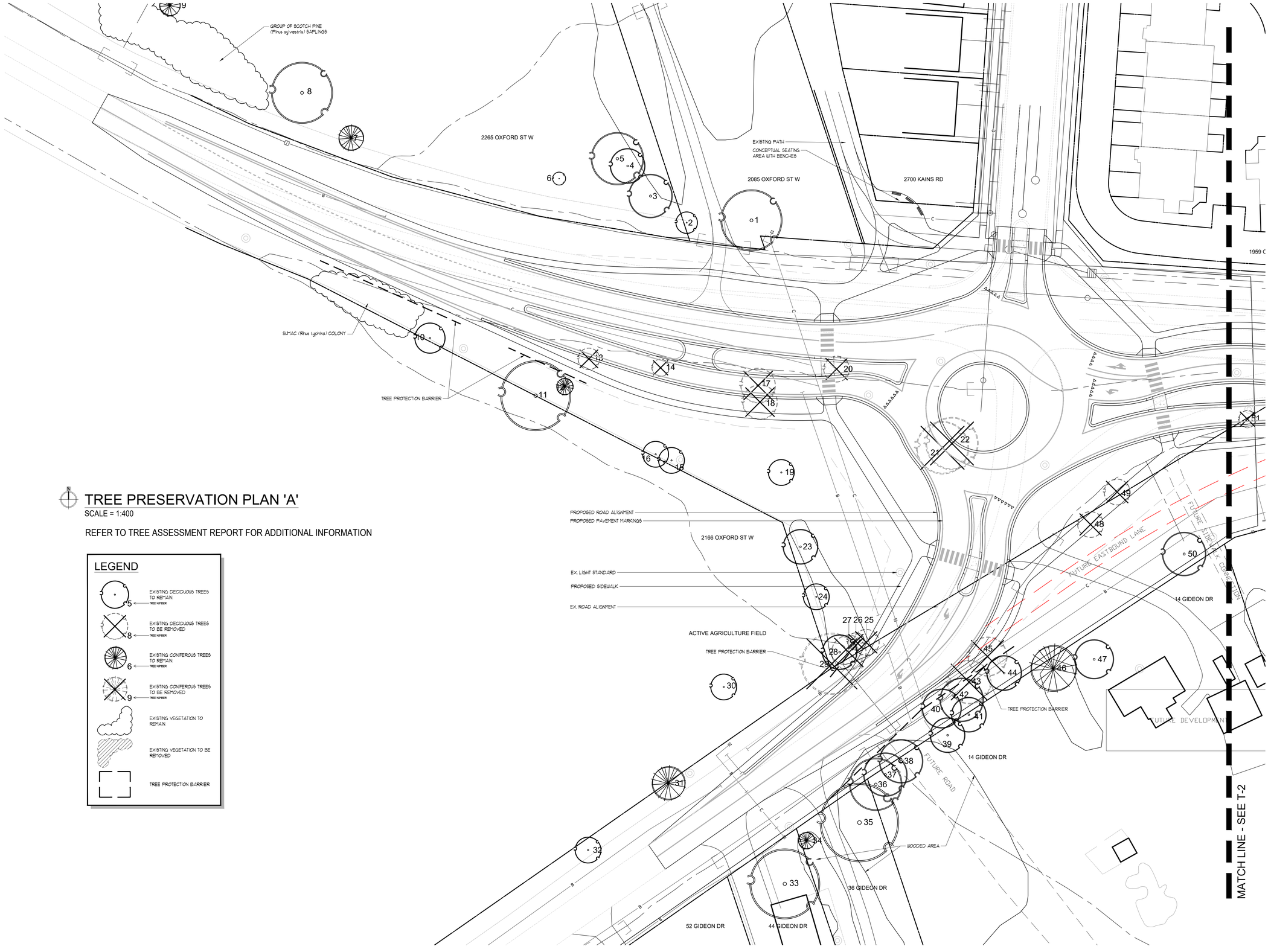
Note that this arborist report has been prepared using the latest drawings and information provided by the client. Any subsequent design or site plan changes affecting trees may require revisions to this report. Any new information or drawings are to be provided to RKLA prior to report submission to planning authorities.

9.0 CONTACT INFORMATION

Office:
Ron Koudys Landscape Architects Inc.
368 Oxford Street East
London, Ontario
N6A 1V7
Ph: 519-667-3322
Fax: 519-645-2474

Staff:
Field work and report author
Michelle Peeters - michelle@rkla.ca
Qualifications ISA Certified Arborist ON-2129A
ISA Tree Risk Assessment Qualified
Qualified Butternut Health Assessor BHA #710
OALA full member - landscape architect

10.0 Appendix A - Tree Preservation Drawings



TREE PRESERVATION PLAN 'A'

SCALE = 1:400

REFER TO TREE ASSESSMENT REPORT FOR ADDITIONAL INFORMATION

LEGEND

- EXISTING DECIDUOUS TREES TO REMAIN (TREE NUMBER)
- EXISTING DECIDUOUS TREES TO BE REMOVED (TREE NUMBER)
- EXISTING CONIFEROUS TREES TO REMAIN (TREE NUMBER)
- EXISTING CONIFEROUS TREES TO BE REMOVED (TREE NUMBER)
- EXISTING VEGETATION TO REMAIN
- EXISTING VEGETATION TO BE REMOVED
- TREE PROTECTION BARRIER

KEY MAP

RON KOUDYS LANDSCAPE ARCHITECTS INC

Ronald H. Koudys, O.A.L.A. C.S.L.A. DATE

2021.11.26	ISSUED FOR 100% SUBMISSION	4.
2021.11.24	ISSUED FOR REVIEW	3.
2021.09.07	ISSUED FOR REVIEW	2.
2021.09.20	ISSUED FOR REVIEW	1.
DATE	DESCRIPTION	No.

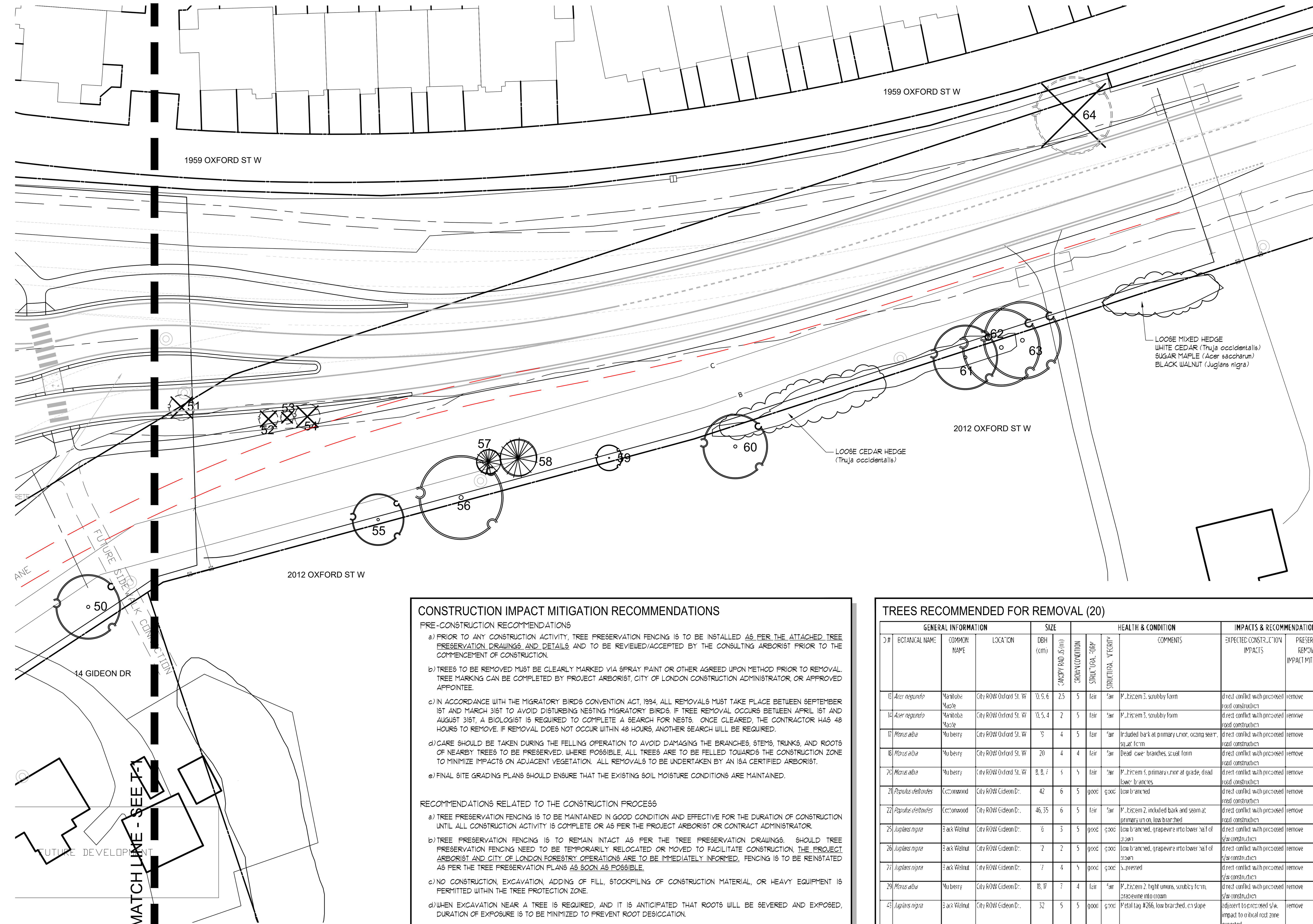
PLOTTING INFORMATION:
PLOTTED DATE = 2021.11.26
PLOTTED SCALE = 1:1

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS — RONALD H. KOUDYS — OALA — MEMBER

PROJECT TITLE:
OXFORD ST & GIDEON DR INTERSECTION
LONDON, ONTARIO

DRAWING TITLE:
TREE PRESERVATION PLAN 'A'

DATE: AUGUST 2021	SCALE: AS NOTED	DRAWING No. T-1
DRAWN: RKLA Inc.	CHECKED BY: R.H.K.	
PROJECT No. 21-117Le		



TREE PRESERVATION PLAN 'B'

SCALE = 1:400

LEGEND

- EXISTING DECIDUOUS TREES TO REMAIN (TREE NUMBER)
- EXISTING DECIDUOUS TREES TO BE REMOVED (TREE NUMBER)
- EXISTING CONIFEROUS TREES TO REMAIN (TREE NUMBER)
- EXISTING CONIFEROUS TREES TO BE REMOVED (TREE NUMBER)
- EXISTING VEGETATION TO REMAIN
- EXISTING VEGETATION TO BE REMOVED
- TREE PROTECTION BARRIER

CONSTRUCTION IMPACT MITIGATION RECOMMENDATIONS

PRE-CONSTRUCTION RECOMMENDATIONS

a) PRIOR TO ANY CONSTRUCTION ACTIVITY, TREE PRESERVATION FENCING IS TO BE INSTALLED AS PER THE ATTACHED TREE PRESERVATION DRAWINGS AND DETAILS AND TO BE REVIEWED/ACCEPTED BY THE CONSULTING ARBORIST PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

b) TREES TO BE REMOVED MUST BE CLEARLY MARKED VIA SPRAY PAINT OR OTHER AGREED UPON METHOD PRIOR TO REMOVAL. TREE MARKING CAN BE COMPLETED BY PROJECT ARBORIST, CITY OF LONDON CONSTRUCTION ADMINISTRATOR, OR APPROVED APPOINTEE.

c) IN ACCORDANCE WITH THE MIGRATORY BIRDS CONVENTION ACT, 1994, ALL REMOVALS MUST TAKE PLACE BETWEEN SEPTEMBER 1ST AND MARCH 31ST TO AVOID DISTURBING NESTING MIGRATORY BIRDS. IF TREE REMOVAL OCCURS BETWEEN APRIL 1ST AND AUGUST 31ST, A BIOLOGIST IS REQUIRED TO COMPLETE A SEARCH FOR NESTS. ONCE CLEARED, THE CONTRACTOR HAS 48 HOURS TO REMOVE. IF REMOVAL DOES NOT OCCUR WITHIN 48 HOURS, ANOTHER SEARCH WILL BE REQUIRED.

d) CARE SHOULD BE TAKEN DURING THE FELLING OPERATION TO AVOID DAMAGING THE BRANCHES, STEMS, TRUNKS, AND ROOTS OF NEARBY TREES TO BE PRESERVED. WHERE POSSIBLE, ALL TREES ARE TO BE FELLED TOWARDS THE CONSTRUCTION ZONE TO MINIMIZE IMPACTS ON ADJACENT VEGETATION. ALL REMOVALS TO BE UNDERTAKEN BY AN ISA CERTIFIED ARBORIST.

e) FINAL SITE GRADING PLANS SHOULD ENSURE THAT THE EXISTING SOIL MOISTURE CONDITIONS ARE MAINTAINED.

RECOMMENDATIONS RELATED TO THE CONSTRUCTION PROCESS

a) TREE PRESERVATION FENCING IS TO BE MAINTAINED IN GOOD CONDITION AND EFFECTIVE FOR THE DURATION OF CONSTRUCTION UNTIL ALL CONSTRUCTION ACTIVITY IS COMPLETE OR AS PER THE PROJECT ARBORIST OR CONTRACT ADMINISTRATOR.

b) TREE PRESERVATION FENCING IS TO REMAIN INTACT AS PER THE TREE PRESERVATION DRAWINGS. SHOULD TREE PRESERVATION FENCING NEED TO BE TEMPORARILY RELOCATED OR MOVED TO FACILITATE CONSTRUCTION, THE PROJECT ARBORIST AND CITY OF LONDON FORESTRY OPERATIONS ARE TO BE IMMEDIATELY INFORMED. FENCING IS TO BE REINSTATED AS PER THE TREE PRESERVATION PLANS AS SOON AS POSSIBLE.

c) NO CONSTRUCTION, EXCAVATION, ADDING OF FILL, STOCKPILING OF CONSTRUCTION MATERIAL, OR HEAVY EQUIPMENT IS PERMITTED WITHIN THE TREE PROTECTION ZONE.

d) WHEN EXCAVATION NEAR A TREE IS REQUIRED, AND IT IS ANTICIPATED THAT ROOTS WILL BE SEVERED AND EXPOSED, DURATION OF EXPOSURE IS TO BE MINIMIZED TO PREVENT ROOT DESICCATION.

e) DURING THE EXCAVATION PROCESS, ROOTS 25MM OR LARGER THAT ARE SEVERED AND EXPOSED SHOULD BE HAND PRUNED TO LEAVE A CLEAN-CUT SURFACE. TO BE UNDERTAKEN BY AN ISA CERTIFIED ARBORIST. EXPOSED SEVERED ROOTS THAT CANNOT BE COVERED IN SOIL ON THE SAME DAY AS THE CUTS ARE MADE ARE TO BE KEPT MOIST. EXPOSED ROOTS ARE TO BE KEPT MOIST BY COVERING THEM WITH WATER SOAKED BURLAP OR ANY OTHER MEANS AVAILABLE TO PREVENT THEM FROM DRYING OUT. ADEQUATE MOISTURE LEVELS ARE TO BE MAINTAINED UNTIL SUCH TIME AS TOPSOIL HAS BEEN REPLACED SATISFACTORILY OR AS OTHERWISE DIRECTED BY THE CONTRACT ADMINISTRATOR.

f) AVOID IDLING HEAVY EQUIPMENT UNDER OR WITHIN CLOSE PROXIMITY TO TREES TO BE PRESERVED TO PREVENT CANOPY DAMAGE FROM EXPOSURE TO THE HEAT OF THE EXHAUST.

g) SHOULD BRANCHES ON CITY OWNED TREES BE DAMAGED BY OR DURING CONSTRUCTION, THE CONTRACTOR IS TO NOTIFY CITY OF LONDON FORESTRY OPERATIONS AS SOON AS POSSIBLE. NO PERSON(S) OTHER THAN CITY STAFF OR THE CITY'S DESIGNATED CONTRACTOR MAY PERFORM WORK ON ANY CITY TREE.

h) OPEN TRENCHING WITHIN A CRITICAL ROOT ZONE IS PROHIBITED. ALTERNATIVE EXCAVATION METHODS SUCH AS HORIZONTAL BORING AND VACUUM EXCAVATION ARE REQUIRED WHERE PROPOSED SERVICES OR INSTALLATION REQUIREMENTS CONFLICT WITH CRITICAL ROOT ZONES.

i) THE EXISTING GROUND-LAYER VEGETATION AT THE BASE OF TREES MUST REMAIN INTACT WITHIN THE CRITICAL ROOT ZONE SO AS NOT TO DISTURB THE SOIL AROUND THE BASE OF THE EXISTING TREES. THIS INCLUDES THE PRACTICE OF NOT REPLACING EXISTING TURF WITH NEW SOD. A HEAVY APPLICATION OF SEED IN THESE INSTANCES IS PREFERRED.

j) REGULAR COMMUNICATION WITH THE SITE SUPERVISOR AND REGULAR MONITORING OF THE SITE BY THE PROJECT ARBORIST OR LANDSCAPE ARCHITECT IS RECOMMENDED TO ENSURE PROPER PROCEDURES ARE FOLLOWED AND PROTECTION BARRIERS ARE MAINTAINED.

IT IS THE RESPONSIBILITY OF THE SITE SUPERVISOR TO PROMPTLY CONTACT THE PROJECT ARBORIST IF ANY CONCERNS OR QUESTIONS ARISE REGARDING TREES.

POST-CONSTRUCTION RECOMMENDATIONS

a) AVOID DISCHARGING RAIN WATER LEADERS ADJACENT TO RETAINED TREES, AS THIS MAY RESULT IN AN OVERLY MOIST ENVIRONMENT WHICH CAN CAUSE ROOT ROT.

b) AFTER ALL WORK IS COMPLETED, TREE PRESERVATION FENCES AND ANY OTHER IMPACT MITIGATION PARAPHERNALIA MUST BE REMOVED UNDER THE DIRECTION OF THE CONSULTING ARBORIST OR CONSTRUCTION ADMINISTRATOR.

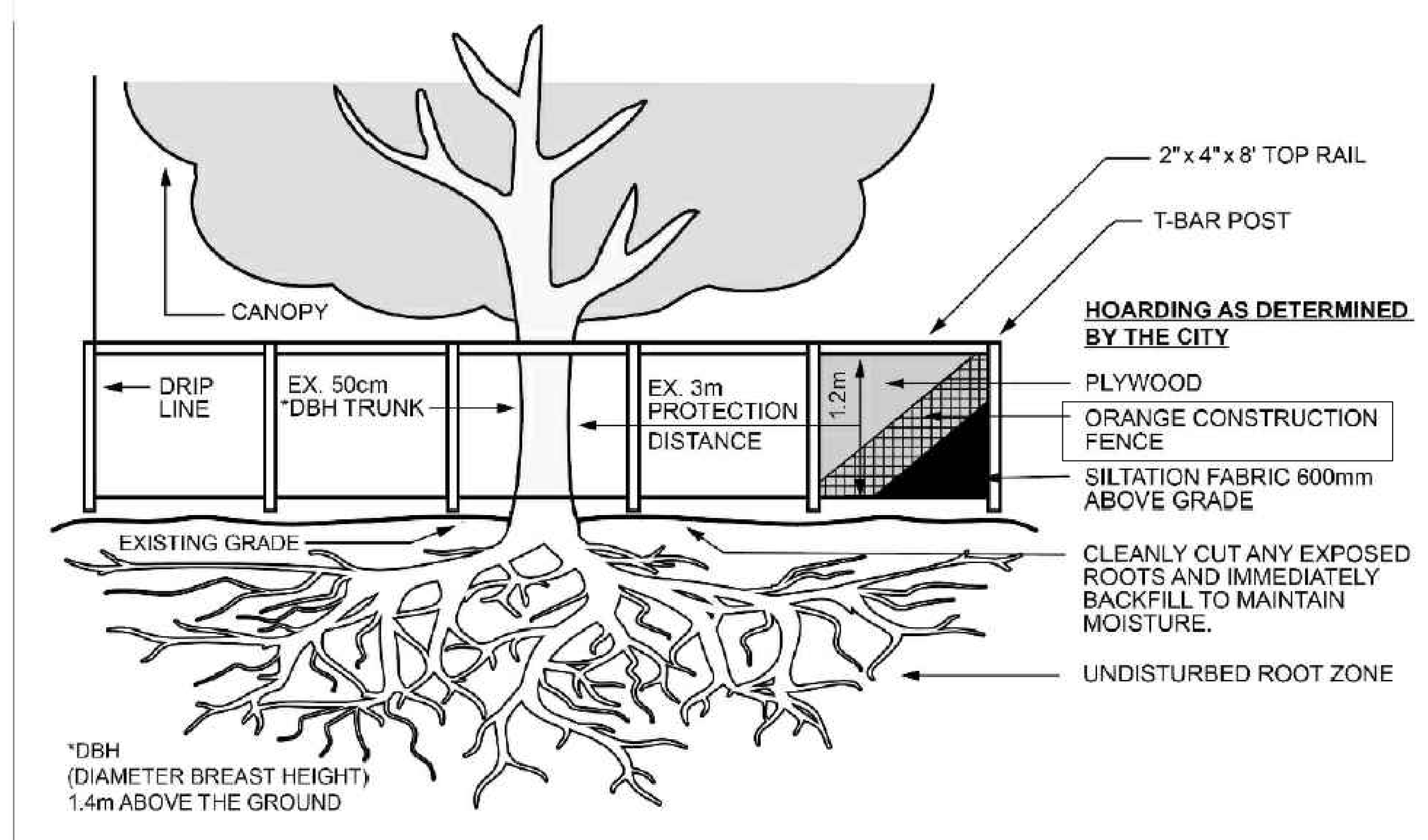
c) A FINAL REVIEW MUST BE UNDERTAKEN BY THE PROJECT ARBORIST TO ENSURE THAT ALL MITIGATION MEASURES AS DESCRIBED ABOVE HAVE BEEN MET.

d) POST CONSTRUCTION MONITORING OF TREES MAY BE REQUIRED. MONITORING SCHEDULE TO BE DETERMINED WITH DESIGN TEAM AND CITY CONSENSUS.

REFER TO TREE ASSESSMENT REPORT FOR ADDITIONAL INFORMATION

TREES RECOMMENDED FOR REMOVAL (20)

GENERAL INFORMATION				SIZE		HEALTH & CONDITION				IMPACTS & RECOMMENDATIONS	
ID #	BOTANICAL NAME	COMMON NAME	LOCATION	DBH (cm)	CANOPY RADIUS (m)	CROWN CONDITION	STRUCTURAL FORM	STRUCTURAL INTEGRITY	COMMENTS	EXPECTED CONSTRUCTION IMPACTS	PRESERVE / REMOVE / IMPACT MITIGATION
13	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 9, 6	2.5	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
14	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 5, 4	2	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
17	*Morus alba*	Mulberry	City ROW Oxford St. W	19	4	5	fair	fair	Included bark at primary union, oozing seam, squat form	direct conflict with proposed road construction	remove
18	*Morus alba*	Mulberry	City ROW Oxford St. W	20	4	4	fair	fair	Dead lower branches, squat form	direct conflict with proposed road construction	remove
20	*Morus alba*	Mulberry	City ROW Oxford St. W	8, 8, 7	6	5	fair	fair	Multistem 3, primary union at grade, dead lower branches	direct conflict with proposed road construction	remove
21	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	42	6	5	good	good	Low branched	direct conflict with proposed road construction	remove
22	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	46, 35	6	5	fair	fair	Multistem 2, included bark and seam at primary union, low branched	direct conflict with proposed road construction	remove
25	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	3	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed s/w construction	remove
26	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	12	2	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed s/w construction	remove
27	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Supressed	direct conflict with proposed s/w construction	remove
29	*Morus alba*	Mulberry	City ROW Gideon Dr.	18, 17	7	4	fair	fair	Multistem 2, tight unions, scrubby form, grapevine into crown	direct conflict with proposed s/w construction	remove
43	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	32	5	5	good	good	Metal tag #266, low branched, on slope	adjacent to proposed s/w, impact to critical root zone expected	remove
45	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	20	4.5	5	good	good	Metal tag #264, branched to grade, dead lower branches	direct conflict with proposed s/w construction	remove
48	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	15	6	5	good	fair	Significant vertical trunk wounds, full crown	direct conflict with proposed s/w construction	remove
49	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	13	3	5	good	good	Full form	direct conflict with proposed s/w construction	remove
51	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
52	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	1.5	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
53	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	1	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
54	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
64	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	58	6	3	poor	hazard	North half of tree torn off, leaving large wound, canopy heavy south, dead wood	Indirect conflict with proposed road construction & hazardous tree condition	remove



CITY OF LONDON STANDARD DRAWING

TREE PRESERVATION DETAILS

DWG TPP-1 | DATE 2020-09-29 | APPROVED BY:

TREE PROTECTION ZONE

No grade change, storage of materials or equipment is permitted within this TPZ. Tree protection barrier must not be moved or altered in any way without the written authorization from the City.

For information contact City of London at: (519) 661-2500 ext ????

London CANADA

TREES RECOMMENDED FOR PRESERVATION (44)

GENERAL INFORMATION				SIZE		HEALTH & CONDITION				IMPACTS & RECOMMENDATIONS	
ID #	BOTANICAL NAME	COMMON NAME	LOCATION	DBH (cm)	CANOPY RADIUS (m)	CROWN CONDITION	STRUCTURAL FORM	STRUCTURAL INTEGRITY	COMMENTS	EXPECTED CONSTRUCTION IMPACTS	PRESERVE / REMOVE / IMPACT MITIGATION
1	*Carya cordiformis*	Bitternut Hickory	2065 Oxford St. W	89	7	4	fair	fair	Codominant leaders with included bark and bulging seam, gall through crown, Buckthorn understory, grapevine through bottom third of canopy	none	preserve
2	*Juglans nigra*	Black Walnut	2065 Oxford St. W	8	2.5	5	good	good	Low branched, on slope	none	preserve
3	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	32	5	4	fair	good	Buckthorn understory, grapevine through crown	none	preserve
4	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	19	4	4	good	good	Dense Buckthorn understory, canopy heavy with grapevine	none	preserve
5	*Acer negundo*	Manitoba Maple	2265 Oxford St. W	23, 22	6	4	fair	poor	Multistem 2, supressed, large branch cavities, grapevine, 1stem bend and lean SW	none	preserve
6	*Juglans nigra*	Black Walnut	2265 Oxford St. W	11	1.5	5	fair	good	Low crown, several Black Walnut saplings nearby	none	preserve
7	*Juniperus spp*	Juniper	2265 Oxford St. W	11	3	4	fair	good	Unbalanced crown, limbed up approx. 2m	none	preserve
8	*Crataegus spp*	Hawthorn	2265 Oxford St. W	~25, 20, 20, 10	7	4	fair	fair	Multistem 4, minor dead wood	none	preserve
9	*Pinus sylvestris*	Scotch Pine	2265 Oxford St. W	15	2.5	1	good	fair	Dead	none	preserve
10	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	~13	3.5	5	fair	good	Low branched, scrubby form, grapevine through crown	none	preserve, tree protection barrier
11	*Acer negundo*	Manitoba Maple	2165 Oxford St. W	~70, 65	8	5	poor	poor	Multistem 2, included bark at primary union and seam to base	none	preserve, tree protection barrier
12	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	2	4	good	good	Canopy covered in grapevine	none	preserve, tree protection barrier
15	*Carya cordiformis*	*Bitternut Hickory*	City ROW Oxford St. W	~15	3	4	fair	fair	Canopy completely covered in grapevine and virginia creeper	none	preserve
16	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	3	5	fair	good	Low branched	none	preserve
19	*Morus alba*	Mulberry	City ROW Oxford St. W	11	3	4	poor	fair	Disfigured form, leader bends and twists, dead wood	none	preserve
23	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Canopy heavy with grapevine	none	preserve
24	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	15	3	5	good	good	Grapevine into lower half of crown	none	preserve
28	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	4	5	good	good	Supressed	no conflict with critical root zone	preserve, tree protection barrier
30	*Juglans nigra*	Black Walnut	2165 Oxford St. W	12	3	5	good	good	Low branched, full form	none	preserve
31	*Juniperus spp*	Juniper	City ROW Gideon Dr.	~30	4	3	good	good	Covered in vines, dense understory	none	preserve
32	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	~15	3	3	good	good	Covered in vines	none	preserve
33	*Gleditsia triacanthos var. inermis*	Honeylocust	44 Gideon Dr.	~40	8	5	good	good	Minor hydro line clearance pruning, otherwise full form	none	preserve
34	*Picea glauca*	White Spruce	36 Gideon Dr.	~15	2	5	good	good	Branched to grade	none	preserve
35	*Juglans nigra*	Black Walnut	36 Gideon Dr.	85, 79	9	5	good	good	Multistem 2, large lovely specimen, supressed on East side, elevated at base, tight unions	none	preserve
36	*Tilia americana*	Basswood	14 Gideon Dr.	26, 18	6	5	good	good	Multistem 2, in wooded area, low branched	minor impact adjacent to critical root zone	preserve, tree protection barrier
37	*Tilia americana*	Basswood	14 Gideon Dr.	19, 13, 9	5	5	good	good	Multistem 3, in wooded area, metal tag #s 200&201	minor impact adjacent to critical root zone	preserve, tree protection barrier
38	*Tilia americana*	Basswood	14 Gideon Dr.	31, 30, 13	5	5	good	fair	Multistem 3, in wooded area, metal tag #277, included bark at primary union	minor impact adjacent to critical root zone	preserve, tree protection barrier
39	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	In wooded area, metal tag #270, low branches, on slope, supressed, grapevine into crown	minor impact adjacent to critical root zone	preserve, tree protection barrier
40	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	19	4.5	5	good	good	Metal tag #269, grapevine into crown, on slope	minor impact adjacent to critical root zone	preserve, tree protection barrier
41	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	Metal tag #267, supressed	minor impact adjacent to critical root zone	preserve, tree protection barrier
42	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	25	5	5	good	good	Metal tag #268, minor vines into crown	minor impact adjacent to critical root zone	preserve, tree protection barrier
44	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	13, 11, 7	4	5	good	fair	Multistem 3, metal tag #265, included bark at primary union	no conflict with critical root zone	preserve, tree protection barrier
46	*Pinus strobus*	White Pine	14 Gideon Dr.	39	5.5	5	good	good	Metal tag #259, limbed up approx. 4m, Northern edge of loose hedge row	none	preserve
47	*Acer platanoides 'Royal Red'*	Royal Red Norway Maple	14 Gideon Dr.	~60	4.5	5	good	good	Significant prune cuts	none	preserve
50	*Salix spp*	Willow	City ROW Gideon Dr.	48, 11	5	3	poor	poor	Multistem 2, significant dead wood and trunk rot, loose open crown	none	preserve
55	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	26	4	5	good	good	Metal tag #213, thin crown	none	preserve
56	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	42	5.5	5	good	good	Metal tag #212, low branched, large spread crown	none	preserve
57	*Juniperus spp*	Juniper	City ROW Oxford St. W	10	2	5	good	good	Branched to grade	none	preserve
58	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	6	5	good	good	Branched to grade	none	preserve
59	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	2	5	good	good	At fence line	none	preserve
60	*Juglans nigra*	Black Walnut	2012 Oxford St. W	~30	5	5	good	good	Branched to grade	none	preserve
61	*Acer spp*	Maple	2012 Oxford St. W	~30, 30	5	3	poor	poor	Multistem 2, rot at base, significant dead wood	none	preserve
62	*Juglans nigra*	Black Walnut	2012 Oxford St. W	32	6	5	good	good	Under hydro lines	none	preserve
63	*Juglans nigra*	Black Walnut	2012 Oxford St. W	30	6	5	good	good	Metal tag #198, under hydro lines	none	preserve

KEY MAP

RON KOUDYS LANDSCAPE ARCHITECTS INC

Ronald H. Koudys, O.A.L.A. C.S.L.A. DATE

DATE	DESCRIPTION	No.
2021.11.26	ISSUED FOR 100% SUBMISSION	4.
2021.11.24	ISSUED FOR REVIEW	3.
2021.10.07	ISSUED FOR REVIEW	2.
2021.09.20	ISSUED FOR REVIEW	1.

PLOTTING INFORMATION:
PLOTTED DATE = 2021.11.26
PLOTTED SCALE = 1:1

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS — RONALD H. KOUDYS — OALA — MEMBER

PROJECT TITLE:
OXFORD ST & GIDEON DR INTERSECTION
LONDON, ONTARIO

DRAWING TITLE:
TREE PRESERVATION PLAN 'B'

DATE: AUGUST 2021	SCALE: AS NOTED	DRAWING No. T-2
DRAWN: RKLA Inc.	CHECKED BY: R.H.K.	
PROJECT No. 21-117Le		

Appendix H

Resumes

PAUL MIKODA

staff member of R.V. Anderson Associates Limited

education

B.Sc., (Ecology), University of Guelph, Guelph, Ontario, Canada, 2003

registrations

Natural Sciences, MTO RAQS

additional education/certifications

Canadian Certified Inspector of Sediment and Erosion Control (CAN-CISEC #0765)
Ontario Freshwater Mussel Identification Workshop, Dept. of Fisheries and Oceans, 2019
Ontario Wetland Evaluation System, Ministry of Natural Resources and Forestry, 2017
Class 2 Electrofishing Certification, 2017
Reptile and Amphibian Training Course for Conservation Partners, Ministry of Natural Resources and Forestry, 2013
Ecological Land Classification for Southern Ontario Training Course, Ministry of Natural Resources, 2011
MED-A3 and SVOP Training, Georgian College, Barrie, Ontario, Canada, 2011
Aquatic Renewal Workshop, Trout Unlimited, Ontario, Canada, 2010
Introductory Bioengineering Course, American Fisheries Society, Ontario Chapter, Canada, 2009
Understanding Construction Activities and Impacts to Fish Habitat, Dept. of Fisheries and Oceans, Canada, 2007
Newbury Stream Restoration Course (Level I), Bob Newbury, Burlington, Ontario, Canada. 2006
Class 1 Electrofishing Certification, Institute for Watershed Science, Peterborough, Ontario, Canada, 2005
Pleasurecraft Operator Card, 2004

professional activities

Paul is a Terrestrial Ecologist with more 18 years of experience providing technical, field and writing support to academic, infrastructure and development projects across the province, including general ecological condition and habitat surveys, targeted species surveys and studies, and authoring environmental impact reports. He has a solid understanding of ecological process and principles and a strong attention to detail. Paul is adept at designing and carrying out field surveys, particularly for reptiles, and has extensive experience mitigating impacts to wildlife and habitat during construction activities. He is well-versed in the provincial Endangered Species Act, including working with regulators to determine appropriate mitigation measures to avoid contravention of the Act and to create overall benefit permits when impacts cannot be avoided. Paul is certified to carry out Ecological Land Classification (ELC) in Southern Ontario and is a certified wetland evaluator, having completed the Ontario Wetland Evaluation System Course.

projects

infrastructure projects

- Oxford Street West and Gideon Drive Intersection EA – City of London: Compiled existing natural heritage data to scope field investigations. Completed breeding bird survey, floral inventory, and vegetation community classification to assess the potential impacts of design alternatives for the intersection upgrades. Upon selection of a preferred alternative, the natural heritage data, assessment of potential impacts and proposed mitigation plan will be documented in an EIS. (2021 – present)

- Highway 401 Expansion, Grand River – MTO: Environmental monitoring specialist responsible for on-site monitoring during construction. (2021 – present)
- Springbank Res #1 and #3 Refurbishment – City of London: To support the rehabilitation of two existing drinking water reservoirs, including Preliminary and Detailed Design, as well as Tender Support and Contract Administration services. Extensive existing site-specific background documentation was reviewed and will be confirmed in the field. This information will be used to create an Environmental Impact Mitigation and Protection Plan to manage soil removal, movement and stockpiling to minimize potential environmental impacts within the work area and beyond. Species at risk (SAR) protected under the Endangered Species Act (ESA) are present within and adjacent to the Study Area and will require additional consideration if impacts to protected habitat prescribed under the ESA are contemplated. (2020-2023)
- Gully Creek Culvert Replacement – Ministry of Transportation Ontario (MTO): Environmental monitoring specialist responsible for on-site erosion and sediment control monitoring for the removal and replacement of the Gully Creek crossing. (2020 – present)
- Caledon Growth-Related Roads Class Environmental Assessments - Town of Caledon: Detailed design, permitting approvals and submission of tender-ready packages to support repairs and upgrades to six (6) road sections within the Town of Caledon. Reviewed and compiled existing background data and completed terrestrial field investigations of vegetation communities, wetlands, and documented rare and at-risk species and other wildlife habitats potentially impacted by the project. This data will be used to guide design and to complete a Natural Environment Inventory Memo for incorporation into the larger EA document. Correspondence with various agencies (Conservation Authorities, relevant provincial and federal ministries/departments) will determine the need and requirements for permits which may be required to support the roadworks. (2020 – 2021)
- Colgan Water Distribution System – Town of Adjala-Torsoronito: Consulted with Ministry of Environment Conservation and Parks (MECP) regarding Species at Risk (SAR) and site-specific surveys. Completed all field surveys which was summarized in a Natural Heritage Assessment Report in support of a water storage infrastructure project in the hamlet of Colgan. (2020 – 2021)
- Labatt Siphon Replacement – City of London: Detailed design and Contract Administration to replace an existing sanitary sewage siphon under the Thames River. Compiled existing natural heritage data and will complete terrestrial field investigations of vegetation communities, wildlife and their habitats to create a site-specific update to an existing EIS of a larger study area. Upon selection of a preferred alternative, the updated data in the EIS will be used to create an Impact Assessment and Mitigation Plan which will evaluate the potential impacts to the natural environment and recommend appropriate mitigation measures. (2020-2022)
- Pentecostal Camp Sanity Servicing Review – Installation of sanitary forcemain and watermain to upgrade existing services at the Lakeshore Pentecostal Camp, as well as a gravel access/emergency evacuation route with passage over two (2) watercourses. Terrestrial site investigations were completed to assess existing site conditions and determine the presence of sensitive terrestrial habitats and Species At Risk (SAR), as well as appropriate mitigation measures to reduce the potential for environmental impacts, including impacts to potentially present SAR, migratory birds and notable vegetation communities. (2020 – 2022)
- Cross Street Culvert Repair – City of Hamilton: Repair of a concrete culvert which conveys Sydenham Creek to the Desjardins Canal. Completed a tree inventory and a field review of the study area for significant wildlife habitat as well as rare or at-risk species and terrestrial features and functions. This information will be used to support required permitting from the Conservation Authority and to guide staging of materials and equipment during repair to minimize impacts to the natural environment. (2020-2021)
- Columbia Way Environmental Assessment (EA) Study – Town of Caledon: Preliminary design to urbanize and improve rural settings of Columbia Way in Bolton. Compiled existing natural heritage data and completed terrestrial

field investigations of vegetation communities, wildlife habitats and a tree inventory to produce an existing conditions summary and constraints map. Upon selection of a preferred alternative, an Impact Assessment and Mitigation Summary Report will be completed, assessing the impacts to the natural environment and appropriate mitigation measures. (2020-2021)

- Cainsville Water and Wastewater Servicing – County of Brant: Preliminary design for both water and wastewater servicing to meet the needs of the community to 2050. Compiled existing natural heritage data to produce an existing conditions summary and constraints map. Guided by the proposed project scope, terrestrial field investigations were completed to fill data gaps. Summarized the results of those investigations, along with potential impacts to the natural environment and proposed mitigations in an Environmental Impact Assessment. (2020)
- Bayly Street East – Town of Ajax: Completed tree inventory to evaluate condition of trees slated for removal to support construction of a multi-use pathway. (2020)
- King Street Reconstruction – Municipality of Thames Center: Assisted with tree inventory to evaluate condition of trees potentially impacted by construction and determine tree protection measures. (2020)
- Kenilworth Reservoir Rehabilitation – City of Hamilton: To support reservoir roof rehabilitation, including earthworks, near regulated habitat of endangered Butternut trees. Through correspondence with the Ministry of Environment, Conservation and Parks (MECP), determined details required to inform regulators if regulated habitat was present within the work area. Obtained opinion that existing site conditions precluded regulated habitat from existing within the project area. (2020)
- Gordie Howe Bridge Early Works – City of Windsor: Worked in conjunction with on-site staff to manage and mitigate against impacts to terrestrial and aquatic wildlife as the both the Reptile Specialist and Aquatic Specialist. Completed site-wide snake salvages utilizing coverboards and visual encounter surveys. Completed multiple fish salvages within the Broadway and McKee Drains, as well as the Detroit River shoreline. Advised client on mitigation and site management measures to reduce human/wildlife conflict for entire site as well as specific cases. Supervised construction activities in areas/features with the potential to contain at-risk snakes and monitored construction of a jetty in the Detroit River. Provided additional guidance throughout project on an as-needed basis. (2015-2020)
- Bayfield River Highway 4 Bridge Rebuild – Town of Clinton: Conducted fish and at-risk mussel salvage within the defined work area. Provided guidance to contractor on best management practices regarding works near habitat for sensitive aquatic species. (2019)
- Kent Breeze Wind Facility – Thamesville: Coordinated and conducted bird and bat mortality monitoring surveys to comply with Renewable Energy Approval, including study design. Organized searchers and trials, analyzed data, wrote monitoring reports, corresponded with regulators and obtained necessary wildlife permits. (2011-2014)
- Kenilworth Reservoir Rehabilitation – City of Hamilton: To support reservoir roof rehabilitation, including earthworks, near regulated habitat of endangered Butternut trees. Through correspondence with the Ministry of Environment, Conservation and Parks (MECP), determined details required to inform regulators if regulated habitat was present within the work area. Obtained opinion that existing site conditions precluded regulated habitat from existing within the project area. (2020)

development projects

- Hospice – Municipality of Leamington: Completed ELC delineations and habitat assessment for Eastern Foxsnake for development of a hospice facility. Liaised with the client and provincial government to acquire an overall benefit permit under the Endangered Species Act and assisted in the implementation of the benefit measures. (2014)
- Wallace Woods Secondary Plan – Town of Lakeshore: Conducted coverboard surveys for snakes, amphibian monitoring and aquatic habitat surveys and sampling to support and Issues Scoping Report (ISR) for the Wallace Woods Secondary Plan. Compiled all relevant data and authored the ISR. (2015-2018)

- Boblo Island – Town of Amherstburg: Conducted ELC delineations, surveys for breeding birds and amphibians, targeted surveys for snakes, turtles and wildlife habitats. Authored the Environmental Impact Assessment for site, including detailed analysis of the results of snake surveys. Liaised with client and provincial government to obtain an overall benefit permit under the Endangered Species Act to support infill development on the island. (2013 – 2017)
- St. Clair College – City of Windsor: Supervised vegetation clearing and site preparation to mitigate against incidental impacts to at-risk snakes. Led the overall benefit permit process for impacts to an at-risk plant, including planting, monitoring and reporting. (2013-2015)
- Timberwalk Subdivision – Village of Ilderton: Completed breeding amphibian monitoring of a pond to be lost to development. Planned and implemented construction of compensatory ponds on adjacent lands, including native plant salvage to increase ecological function. Completed multi-year monitoring of compensatory ponds for evidence of amphibian breeding and presence of invasive plant species. Authored monitoring reports and proposed adaptive management strategies. (2016 – 2019)
- California Avenue – City of Windsor: Completed ELC and surveys for individuals and habitat for at-risk plants and wildlife, including snakes. (2018)
- Goosemarsh Line – The Municipality of Lambton Shores: Conducted habitat and presence/absence surveys for at-risk plants and wildlife, including reptile surveys and ELC assessments across multiple properties. Liaised with the province regarding presence of individuals and habitat protected under the Endangered Species Act to guide development activities on select properties, including acquiring an overall benefit permit. (2014-2019)
- Queen Valley Estates – Town of Kingsville: Conducted surveys for individuals and assessment of habitat for at-risk species to support development proposal. Authored the Environmental Impact Assessment and various reports to obtain approvals under the Endangered Species Act. (2013 – 2016)
- Kingsbridge Subdivision – Town of Amherstburg: Conducted breeding bird and amphibian surveys, ELC delineations, reptile habitat assessment and targeted surveys. Obtained an overall benefit permit under the Endangered Species Act and assisted with its implementation over multiple years, including construction supervision, client and regulator liaison and authoring annual reports. (2014 – 2020)
- Huron Shores Investments Inc. – Village of Grand Bend: Completed surveys for the presence of and habitat for at-risk reptiles and plants and potential habitat for bats. Authored the Environmental Impacts Statement for the proposal and submitted documentation for compliance with the Endangered Species Act. (2018-2019)
- Lighthouse Cove Residence – Municipality of Tilbury: Completed targeted surveys for at-risk turtles and general habitat assessment for reptiles. Worked with the client and province to draft and implement an overall benefit permit under the Endangered Species Act. Assisted with permit implementation and construction supervision. (2017-2020)
- Gianni Estates – Town of Essex: Carried out ELC evaluations, assessment of habitat features for and presence of at-risk snakes, authored supporting Issues Scoping Report and documentation for compliance with the Endangered Species Act. (2015-2016)

research projects

- University of Guelph Marten Project – University of Guelph: Head field technician carrying out trapping and tracking of pine marten inhabiting managed clay belt forest in Kapuskasing Ontario. Included various related habitat assessments, including prey availability, vegetation characterization, coarse woody debris surveys and winter community wildlife inventories. Managed the day to day components of field camp and research tasks, communicated with remote supervisors to manage changes and challenges, taught new field staff operation of equipment and camp. Assisted in project design utilizing forestry data polygons and ARCView software. (2003-2005)

- Chemical Management Plan – Canadian Wildlife Service: Assisted Canadian Wildlife Service scientists to conduct sampling of wildlife with funding from the Chemicals Management Plan. Included capturing and collecting biological samples from Snapping Turtles and American Kestrels to test for PCB's and residual DDT, respectively. Also completed intense monitoring and biological sampling of Tree Swallows for presence and potential endocrine-disrupting effects of poly-brominated diphenyl ethers. (2007-2009)
- At-Risk Moss Species Surveys – Niagara Peninsula Conservation Authority: As part of a team, completed detailed transect surveys for at-risk moss species within a Conservation Area. Described and evaluated the biotic and abiotic characteristics of the new populations, then used this information and orthoimage interpretation to identify other suitable habitats, which were confirmed through field surveys. Co-authored a report on the study results and wrote an article summarizing the survey season for an online newsletter. (2008)

memberships

- Society for Ecological Restoration – Ontario Chapter (SER)

committees + special undertakings

- Conservation Committee Member of the Canadian Herpetological Society (CHS)

presentations

- Martin PA., de Solla SR., Mikoda P., Palonen KE., Toxicity and absorption of pesticides and fertilizers to snapping turtle eggs (*Chelydra serpentina*), Presentation, IAGLR, 2010
- Weseloh D.V., Mikoda P., Pekarik C., Satellite tracking of breeding Great Black-backed Gulls from eastern Lake Ontario, Presentation, Waterbird Society, 2008
- de Solla DR., Fernie K., Martin PA., Mayne G., Letcher RJ., Havelka T., Barrett G., Mikoda P., Organohalogen contaminants and trophic level in snapping turtles from Cootes Paradise, Presentation, Researching and Monitoring Workshop hosted by Project Paradise, 2008
- de Solla DR., Martin PA., Mikoda P., Toxicity of nitrogenous fertilizers to eggs of snapping turtles (*Chelydra serpentina*) in field and laboratory settings, Presentation, Understanding Agriculture's Effects on Amphibians and Reptiles in a Changing World, 2007
- de Solla DR., Martin PA., McDaniel TV., Pettit KE., Mikoda P., Struger J., Bishop CA., Elliot JE., Direct and indirect impacts of nutrient enrichment on amphibians and reptiles, Presentation, Understanding Agriculture's Effects on Amphibians and Reptiles in a Changing World, 2006
- de Solla DR., Martin PA., McDaniel TV., Pettit KE., Mikoda P., Struger J., Bishop CA., Elliot JE., Direct and indirect impacts of nutrient enrichment on amphibians and reptiles, Presentation, Eleventh annual meeting of the Canadian Amphibian and Reptile Conservation Network 409(20):4306-11, 2007

publications + papers

- de Solla SR., Martin PA., Mikoda P., Toxicity of pesticide and fertilizer mixture stimulating corn production to eggs of snapping turtles (*Chelydra serpentina*), Sci Total Environ, 2011
- Mikoda P., Woodward P., A Carolinian Setting for a Rare "Cutlery" Moss, Species and Habitats at Risk Special Edition Newsletter, 2010

employment record

2020 to date	Terrestrial Ecologist, R.V. Anderson Associates Limited, London, Ontario, Canada
2011 to 2020	Biologist, BioLogic Incorporated / MTE Consultants, London, Ontario Canada
2010 to 2011	Environmental Biologist, Tarandus Associates Limited, Brampton, Ontario, Canada
2009 to 2010	Protected Areas Technician, Environment Canada, London Ontario, Canada
2009	Biological Technician, Environment Canada, Burlington, Ontario, Canada
2008	Species at Risk / Land Stewardship Technician, Niagara Peninsula Conservation Authority, Welland, Ontario, Canada
2007 to 2008	Technologist / Wildlife Intern, Environment Canada, Burlington, Ontario, Canada
2006	Fisheries Management Planning Assistant, Upper Thames River Conservation Authority, London, Ontario, Canada
2005	Field Supervisor, University of Guelph Marten Project, Kapuskasing, Ontario, Canada
2003 to 2005	Head Biological Field Technician, University of Guelph Marten Project, Kapuskasing, Ontario, Canada
2003, 2005	Woodpecker Survey Technician, Canadian Forest Service, Espanola, Ontario, Canada
2003	Wildlife Technician, Canadian Ecology Centre, Kapuskasing, Ontario, Canada

COURTNEY BENETEAU

staff member of R.V. Anderson Associates Limited

education

M.Sc., (Environmental Science), University of Windsor, Windsor, Ontario, Canada, 2007
B.Sc., (Biology – Honours Genetics), University of Western Ontario, London, Ontario, 2005

registrations

Fisheries Assessment, MTO RAQS
Fisheries Compliance During Contracts, MTO RAQS
Environmental Inspection During Construction, MTO RAQS

certifications

Canadian Certified Inspector of Sediment and Erosion Control (CAN-CISEC #0754)
Class 1 Electrofishing
DFO Freshwater Mussel Identification
Erosion and Sediment Control Practitioner (ESCP)
Marine Emergency Duties (MED A3)
MTO/DFO/MNR Fisheries Protocol Training
Ontario Stream Assessment Protocol (OSAP)
ROM Fish Identification
ROM Species at Risk Identification
Pleasurecraft Operator

professional activities

Courtney is a Fisheries Biologist and Freshwater Mussel Specialist with over 13 years of experience conducting fisheries and aquatic habitat assessments throughout Ontario. She is proficient at preparing reports and studies including thorough descriptions of fish habitat and community inventories, impact assessment, mitigation measures, compensation plans, and enhancement opportunities. Courtney has demonstrated experience with the federal and provincial SAR permitting processes in Ontario and has completed several freshwater fish and mussel SAR surveys, relocations and post-relocation monitoring. In addition to her work as an aquatic ecologist, Courtney has provided extensive onsite environmental monitoring and reporting during construction for a variety of projects.

projects – municipal

- Oxford Street West and Gideon Drive Intersection EA – City of London: Compiled existing natural heritage data and completed EIS scoping checklist. Field investigations including visual fish habitat assessment to determine potential impacts to nearby coldwater 'Tributary C'. This data will be used in the assessment of design alternatives for the intersection upgrades. Upon selection of a preferred alternative, the natural heritage data, assessment of potential impacts and proposed mitigation plan will be documented in an EIS. (2021 – present)
- Colgan Water Distribution System – Town of Adjala-Torsoronito: Compiled existing natural heritage data and completed agency correspondence and SAR screening in support of the water storage infrastructure project in the hamlet of Colgan. (2020 – 2021)

- Labatt Siphon Replacement Detailed Design – City of London: Compiled existing natural heritage data and completed EIS scoping checklist. Conducting field investigations including visual fish habitat mapping. This data will be used in the assessment of design alternatives for the replacement of an existing sanitary sewage siphon under the Thames River. Upon selection of a preferred alternative, the natural heritage data, assessment of potential impacts and proposed mitigation plan will be documented in an EIS update document. (2020 – present)
- Mississauga Road Widening and Huttonville Creek Restoration – Region of Peel: Project oversight during construction to monitor mitigation measures, including erosion and sediment controls, and ensure compliance with the federal and provincial SAR environmental permits for Redside Dace. (2020 – present)
- Caledon Growth-Related Roads Detailed Design – Town of Caledon: Compiled existing natural heritage data and undertaking fisheries field investigations including fish community sampling and fish habitat mapping, and SAR screening in support of the acquisition of environmental permits and approvals for the rehabilitation of six sections of roads within the Town of Caledon. (2020 – present)
- Lakeshore Pentecostal Camp Sanitary Servicing Detailed Design – Gathered existing natural heritage data for the study area, including contact with the conservation authority. Completed field studies examining fish habitat in Coverts Creek and tributaries, in support of the detailed design for the installation of sanitary forcemain and watermain to upgrade existing services at the Lakeshore Pentecostal Camp, as well as a gravel access/emergency evacuation route which included one new culvert. (2020 – 2021)
- Cross Street Culvert Repair – City of Hamilton: Completed a review of fish and potential mussel habitat field review of the study area for significant wildlife habitat as well as rare or at-risk species and terrestrial features and functions. This information will be used to support required permitting from the Conservation Authority and to guide staging of materials and equipment during repair of a concrete culvert which conveys Sydenham Creek to the Desjardins Canal. (2020 – 2021)
- Columbia Way Environmental Assessment (EA) Study – Town of Caledon: Preliminary design for road improvements to urbanize and improve rural settings of Columbia Way in Bolton. Compiled existing natural heritage data and completed field investigations of fish community and fish habitat to produce an existing conditions summary and constraints map. Upon selection of the preferred alternative, assessment of the impacts to the natural environment, determine appropriate mitigation, and preparation of an Impact Assessment and Mitigation Summary Report. (2020 – 2021)
- Cainsville Water and Wastewater Servicing EA – County of Brant: Preliminary design for both water and wastewater servicing to meet the needs of the community to 2050. Compiled existing natural heritage data to produce an existing conditions summary and constraints map. Guided by the proposed project scope she completed fisheries field investigations to fill data gaps and summarized the results, potential impacts, and proposed mitigations to the natural environment in an Environmental Impact Assessment. (2020 – 2021)
- Church Street Bridge Replacement – Town of Ajax: Post-Construction monitoring at Remnar Bridge over the East Duffins Creek to satisfy Toronto Region Conservation Authority (TRCA). The stability and condition of the creek banks and abutment slopes, success of vegetative plantings and cuttings, and fish community will be assessed annually for two years following restoration works. Three additional years of slope monitoring will be conducted. (2020 – 2024)
- Highbury Avenue South and the Wenige Expressway Bridge Rehabilitation – City of London: Preliminary and detailed design and tendering services for rehabilitation of the Wenige Expressway Bridge and detailed design for rehabilitation of Highbury Avenue pavement and related corridor infrastructure. Courtney assisted with aquatic field investigations, preparing the Ecological Memo, identifying environmental features and potential impacts and recommending appropriate mitigation. She also reviewed the contract special provisions, drawings and Request for Review submitted to DFO. (2019 – 2020)

- Long Point Causeway Reconstruction – Norfolk County: Courtney was responsible for providing aquatic input to the Natural Ecosystems Report and design to minimize impacts of the road reconstruction and widening. (2018 – 2020)
- South Boundary Road and Franklin Boulevard Extension Detailed Design – Region of Waterloo: Under a retainer contract with the Region of Waterloo, provided detailed design services for the South Boundary Road corridor from Water Street (Hwy 24) to Dundas Street (Hwy 8) in addition to the Franklin Boulevard Extension. Following detailed design, provided contract administration services for Phase 1A, and currently Phase 1B. Courtney was responsible for overseeing the environmental component of the Phase 1B project and Phase 2 Environmental Impact Study (EIS). (2018 – 2020)
- Adelaide Street North Widening Environmental Assessment – City of London: Courtney was responsible for the aquatic component of the environmental assessment for widening Adelaide Street North from Fanshawe Park Road East to Sunningdale Road East. She contributed to the preparation of the EIS, including characterizing the aquatic habitat and fish communities within the study area. (2017 – 2019)
- Bostwick Road Class Environmental Assessment – City of London: Performed fish community and aquatic habitat surveys to establish the existing conditions. Identified and assessed impacts to the aquatic ecosystem of the proposed road realignment project and mitigation measures for inclusion into the Environmental Impact Study and Environmental Study Report. (2016 – 2019)
- Dingman Creek Erosion Control Wetland – City of London: Post-construction monitoring of fish communities and constructed fish habitats for the Erosion Control Wetland constructed adjacent to Dingman Creek. Preparation of technical memos to provide environmental updates and recommendations for improvement. (2013 – 2017)
- Stoney Creek Erosion Control Wetland, Stormwater Management Facility – City of London: Monitored environmental protection measures for the creation of an erosion control wetland. Ensured compliance with contract environmental requirements including groundwater monitoring, ESC measures, the installation of fishways, turtle nesting mounds, landscaping and native vegetation salvage. Post-construction monitoring of wetland. Courtney organized the emergency relocation of the Rainbow mussel following a bank washout of Stoney Creek which included commercial divers, completed follow-up post relocation monitoring, data collection and analysis, and report preparation and submission. (2012 – 2014)
- Green Valley Drive – City of London: Collected fisheries data and performed onsite assessment to determine constraints and opportunities for design of a stormwater outlet storage system. Post-construction monitoring of fish communities and constructed fish habitats. (2015 – 2017)
- Mud Creek Subwatershed Study Update – City of London: Collected and amalgamated existing study information on aquatic habitat features within the Mud Creek Subwatershed, and completed additional field surveys (fisheries surveys, aquatic habitat assessments) to address data gaps. Prepared a summary of existing conditions and ecological constraints for inclusion in the final project report. Assisted with base-flow monitoring. (2012 – 2014)
- Central Thames River Subwatershed Study – City of London: Collected and amalgamated existing data concerning aquatic features within the Central Thames Subwatershed in the City of London. Prepared a summary of existing conditions and ecological constraints. (2012 – 2014)
- Sunningdale Stormwater Management Facility #4 and Compensation Area – City of London: Monitoring environmental protection measures for the creation of a storm water management facility and compensation area adjacent to Medway Creek. Ensuring compliance with contract environmental requirements including groundwater monitoring (piezometers and staff gauges), ESC measures and landscaping. Post-construction monitoring of compensation wetland. (2012 – 2014)

- Creek Road EA and Preliminary Design – Niagara Region: Completed fish and fish habitat field surveys to permit impact assessment of the proposed project and mitigation measures for inclusion into the Environmental Impact Study and Environmental Study Report. (2015)
- West Vaughan Sewer Servicing – Region of York: Completed fish habitat and water quality assessments at 18 watercourse crossings of proposed pipeline. Redside Dace habitat mapping at one crossing. Liaison with MNRF and DFO to confirm Redside Dace Species at Risk (SAR) permitting/exemption requirements. Input into sewer alignment and above-ground tunneling shaft locations to avoid impacts to SAR (Redside Dace) and minimize impacts to fish and fish habitat. Preparation of a Natural Environment Summary and numerous risk and mitigation tables. (2017 – 2019)
- Beaverdams Road Stormwater Management – Niagara Region: Completed an assessment of aquatic environmental features on a proposed SWM lot in the City of Niagara Falls. Included fish habitat assessment, Species at Risk review, and consultation with government agencies. (2015)
- Fountain Street Bridge Rehabilitation – Region of Waterloo: Completed a natural environment review of the study area surrounding the Fountain Street Bridge over the Grand River. Included extensive background information review, assessment of fish and mussel habitat around the bridge structure and within Blair Creek. (2014 – 2016)

projects – provincial

- Grand River Species at Risk (SAR) Mussel Relocation, Highway 401, Kitchener – Ministry of Transportation (MTO) West Region: Leading the SAR mussel relocations and post-relocation monitoring for a multi-year construction project. Performing post-relocation monitoring, data collection and analysis, and report preparation and submission. Ensuring compliance with all *Endangered Species Act* (ESA), *Fisheries Act*, and *Species at Risk Act* (SARA) permits and authorizations. Also performing erosion and sediment control (ESC) inspections. (2021 – present)
- Gully Creek Bridge Replacement, Highway 21, Bayfield – MTO West Region: SAR Fisheries Biologist responsible for fish salvage (Redside Dace - SAR), relocation, monitoring of fish habitat restoration, and reporting as well as ESC monitoring for the removal and replacement of the Gully Creek structure. (2020 – present)
- Speed River SAR Mussel Relocation, Highway 401, Cambridge – MTO, West Region: Led the SAR mussel relocations and post-relocation monitoring for a multi-year construction project. Habitat enhancement measures for additional project impact mitigation for the SAR mussel included: improved host fish species habitat, extended SAR mussel surveys, and increased Contractor awareness. Performed post-relocation monitoring, data collection and analysis, and report preparation and submission. Ensured compliance with all Endangered Species Act (ESA) Permit stipulations including design and execution of a semi-quantitative mussel survey in the Speed River. (2015 – 2019)
- Natural Science Retainer Assignments (three consecutive awards) – MTO, West Region: Providing environmental services to the Ministry of Transportation of Ontario on an assignment basis at various locations in southwest Ontario. Projects consisted of fish and fish habitat assessments, bird assessments, vegetation assessments, and turtle surveys and required Species at Risk review, Licence to Collect Fish permit applications and consultation with government agencies. Prepared environmental contracts requirements. The Craig Street Culvert Replacement and Heyrock Creek Fish Ladder assignments were included among the many successful and unique projects under these retainers. (2012 – 2020)
- Highway 401 Widening and Speed River Bridge Replacements – MTO, West Region: Completed fisheries existing conditions and impact assessment for the Speed River Bridge replacements and eight culvert crossings. Developed mitigation measures and provided notification to DFO for anticipated construction works at all locations. Discovered SAR freshwater mussel (Wavyrayed Lampmussel) in the river; prepared ESA Information Gathering Form, Avoidance Alternatives Form, and Overall Benefit Application Form for the mussel SAR. The Overall Benefit application included a detailed mussel relocation plan, and subsequent monitoring. (2011 – 2014)

- Highway 401 Expansion, Credit River to Regional Road 25 – MTO, Central Region: This project is a fully integrated design-build joint venture, is widening approximately 18 km of Highway 401 from 6 lanes to 10 to 12 lanes to facilitate high-occupancy vehicle median lanes. The expansion is from the Credit River in Mississauga to Regional Road 25 in Milton, Ontario. As the Fisheries Assessment Specialist, Courtney updated impact assessments for work related to fish and fish habitat, prepared and submitted applications for agency permits related to SAR and the Fisheries Act. (2019 – 2020)
- Highway 401 Rehabilitation, Elgin County – MTO, West Region: Provided oversight of environmental monitoring during construction. Conducted fish salvage operations, water control measures and by-pass monitoring, ESC and bird nesting preventative measures monitoring. (2018 – 2019)
- Highway QEW/Walkers Line – MTO, Central Region: Provided environmental inspection during construction. This project included the rehabilitation of the Dorval Drive and Walkers Line structures over the QEW Highway, and the rehabilitation of several structural culverts conveying fish bearing watercourses, two of which required SAR permitting for Redside Dace, and Silver Shiner. (2017 – 2018)
- McGregor Creek SAR Mussel Relocation, Highway 401 – MTO, West Region: Led SAR permit and approval acquisition with provincial and federal agencies. Completed the SAR mussel relocation, post-relocation monitoring, data collection, analysis, and reporting. (2017 – 2019)
- Highway and Bridge Design Retainer – MTO, East Region: Projects included various levels of highway reconstruction, bridge and culvert work, and all related disciplines to complete the detailed designs. Courtney was responsible for the aquatic ecology components of the projects, including completing fieldwork, fish habitat assessments, and species-at-risk screening and preparing the fish and fish habitat existing conditions and impact assessment reports. (2017 – 2020)
- Welland River Bridges Design-Build Replacement and Rehabilitation of Three Structural Culverts, St. Catharines – MTO, Central Region: Replacement of the existing twin Welland River Bridges and rehabilitation of three structural culverts (Warren Creek, Grassy Brook, Ussher's Creek culverts). Considerations for SAR mussels in the Welland River and at one of the culverts. Courtney was responsible for fisheries input in advance of construction and leading the mussel relocation. (2019 – 2020)
- Highway 401/Highway 40 Interchange Reconstruction – MTO, West Region: Monitored environmental protection measures including, erosion and sediment controls; vegetation clearing and in-water work. Ensured compliance with contract environmental requirements including in-water timing restrictions; reviewed contractor temporary water passage proposals; and reviewed and provided on-site supervision of de-fishing operations. Reviewed and submitted weekly environmental construction monitoring reports. (2017 – 2018)
- Highway 24 Reconstruction and Whitemans Creek Bridge Replacement – MTO, West Region (Contract 2010-3016): Monitored environmental protection measures including bridge replacement over a coldwater stream with sensitive trout spawning habitats. Ensuring compliance with contract environmental requirements including in-water timing restrictions, reviewing contractor ESC proposals for groundwater management. (2011 – 2012)
- Highway 24 Reconstruction and Whitemans Creek Bridge Replacement – MTO, West Region (GWP 336-97-00): Conducted fisheries and aquatic habitat assessments to confirm species composition and habitat sensitivities in Whitemans Creek, a coldwater stream with trout spawning habitat, and associated groundwater tributaries. Prepared Impact Assessment Report for MTO including the design of a groundwater transfer compensation plan. Completed No HADD Forms and supporting documentation for submission to DFO. (2008 – 2010)
- Highway 7 Rehabilitation, Stratford – MTO, West Region: Completed an aquatic environmental review of the Highway 7 corridor between Perth Line 9 and the City of Stratford. Fisheries inventories and aquatic habitat assessments were completed. Impact assessment and mitigation measures were determined, including re-creating enhanced fish habitat to compensate for loss in design. (2015 – 2018)

- Highway 7 Reconstruction and Culvert and Bridge Rehabilitation, St. Mary's – MTO, West Region (GWP-361-98-00): Conducted fisheries and aquatic habitat assessments to determine species composition and habitat sensitivities of 27 culvert and 8 bridge crossings. Prepared Fish and Fish Habitat Existing Conditions Report for MTO. Completed No HADD Forms and supporting documentation for submission to DFO. Courtney was instrumental in acquiring the ESA Overall Benefit permit for relocation of the SAR mussels and performed relocation and follow-up population monitoring services. (2013 – 2015)
- Highway 3, Cayuga – MTO, West Region (Advanced Contract 2013-3007): Supervised in-water work including caisson and cofferdam installation in the Grand River from a barge. Prepared a Mitigation Plan requesting an in-water timing extension on behalf of the MTO, which was supported by the DFO. Maintained daily MTO Construction Inspection Checklists. (2015)
- Highway 40, Chatham to Wallaceburg – MTO, West Region (Contract 2011-3015): Monitored environmental protection measures for the rehabilitation of seven structures along Highway 40. This project dealt with SAR fish and DFO recommendations at two of the watercourses as well as SAR reptiles including Eastern Foxsnake and MNR Letter of Advice. Mitigation measures in addition to the Contract were implemented to protect the SAR. Ensuring compliance with contract environmental requirements including in-water timing restrictions, ESC measures and bird nesting restrictions. (2013)
- Highway 402, Sarnia – MTO, West Region (Contract 2009-3001): Monitored environmental protection measures for the Highway 402 widening, SWMPs construction and structure replacements. Ensured compliance with contract environmental requirements including in-water timing restrictions, groundwater monitoring, air quality monitoring during fly ash handling, ESC measures and bird nesting restrictions. (2009 – 2010)
- Highway 3 Canfield Drainage Improvements and Rehabilitation/Replacement of One Structural Culvert – MTO, West Region (GWP 3507-02-00): Conducted fisheries and aquatic habitat assessment to determine species composition and habitat sensitivities of one culvert crossing. Prepared Fish and Fish Habitat Existing Conditions Report for MTO. (2011)
- Highway 23 Structure Replacements and Rehabilitation – MTO, West Region (GWP 3043-06-00): Conducted fisheries and aquatic habitat assessments to determine species composition and habitat sensitivities in four watercourse crossings. Prepared Fish and Fish Habitat Existing Conditions and Impact Assessment Report for MTO. Completed No HADD Forms and supporting documentation for submission to DFO. Completed freshwater mussel SAR surveys under ESA permit at two locations. (2011)
- Highway 8, Replacement of Structural Culvert at Fairchild Creek, City of Hamilton – MTO, West Region: Completed fisheries inventories and agency correspondence for the for the assessment of impacts and development of environmental mitigation measures and contract specifications during the Class EA Study. Provided environmental monitoring services during construction. (2010 – 2011)
- Highway 3 Improvements and Black Creek and Catfish Creek Culvert Replacements and Stream Realignments – MTO, West Region (Contract 2009-3024): Supervised in-water work including cofferdam construction, dewatering activities, and fish habitat restoration. Conducted fish salvage operations including freshwater mussel relocations prior to in-water construction. Maintained daily MTO Construction Inspection Checklists and Environmental Monitoring Reports. Prepared a Final Environmental Monitoring for submission to the MTO Report and Fish Collection Report for submission to the MNRF. (2010)
- Highway 21 & 9 Rehabilitation and Culvert and Bridge Replacements – MTO, West Region (GWP 136-98-00): Conducted fisheries and aquatic habitat assessments to determine species composition and habitat sensitivities of 42 culvert and 5 bridge crossings, including several coldwater systems. Prepared Fish and Fish Habitat Existing Conditions and Impact Assessment Report for MTO. Completed No HADD Forms and supporting documentation for submission to DFO. (2010)

- Pelee Island, Kingsville and Leamington Ferry Dock Rehabilitation – MTO, West Region (Contract 2007-3410): Monitored environmental protection measures including turbidity curtain placement during underwater construction activities such as excavation, concrete pouring and rock placement for the Leamington Ferry Dock rehabilitation. Ensured compliance with contract environmental requirements including in-water timing restrictions. (2010)
- Highway 401/Provincial Road, Windsor – MTO, West Region (Contract 2007-3043): Monitored environmental protection measures including major watercourse re-alignment, concrete culvert rehabilitations and culvert extensions. Ensured compliance with contract environmental requirements including in-water timing restrictions, reviewing contractor temporary water passage proposals and reviewing and supervision of de-fishing operations. (2009 – 2011)

publications + papers

- Ginson R., Walter R.P., Mandrak N.E., Beneteau C.L., Heath D.D., Hierarchical analysis of genetic structure in the habitat-specialist Eastern Sand Darter (Ammocrypta pellucida), Ecology and Evolution, 2014
- Beneteau C.L., Walter R.P., Mandrak N.E., Heath D.D., Range expansion by invasion: genetic characterization of invasion of the greenside darter (Etheostoma blennioides) at the northern edge of its distribution, Biological Invasions, 2011
- Pitcher T.E., Beneteau C.L., Walter R.P., Wilson C.C., Mandrak N.E., Heath D.D., Isolation and characterization of microsatellite loci in the Redside dace Clinostomus elongates, Conservation Genetics Resources, 2009
- Beneteau C.L., Mandrak N.E., Heath D.D., The effects of river barriers and range expansion of the population genetic structure and stability in Greenside Darter (Etheostoma blennioides) populations, Conservation Genetics, 2008
- Beneteau C.L., Mandrak N.E., Heath D.D., Characterization of eight polymorphic microsatellite DNA markers for the greenside darter, Eheostoma blennioides (Percidae), Molecular Ecology Notes, 2006

employment record

2020 to date	Fisheries Biologist and Freshwater Mussel Specialist, R.V. Anderson Associates Limited, London, Ontario, Canada
2009 to 2020	Fisheries Biologist and Freshwater Mussel Specialist, Parsons Inc., London, Ontario, Canada
2007 to 2009	Field Coordinator and Lab Technician, Great Lakes Institute for Environmental Research, Windsor, Ontario, Canada
2008 to 2009	Field Assistant, Leadley Environmental, Essex, Ontario, Canada
2005 to 2007	Teaching Assistant, University of Windsor and Great Lakes Institute for Environmental Research (GLIER), Windsor, Ontario, Canada

Natasha M. Welch

staff member of R.V. Anderson Associates Limited

education

Grad.Cert., (Ecosystem Restoration), Niagara College, Niagara-on-the-lake, Ontario, Canada, 2017
B.Sc., (Wildlife Biology and Conservation – Honours Program), University of Guelph, Guelph, Ontario, 2016

additional education

4-day Workshop on the Identification of Ontario Fish, Royal Ontario Museum, Guelph, Ontario, Canada, 2018
3-day Workshop on the Identification of Ontario Minnows, Royal Ontario Museum, Guelph, Ontario, Canada, 2019
2-day Workshop on the Identification of Ontario Fishes at Risk, Royal Ontario Museum, Guelph, Ontario, Canada, 2019

certifications

Canadian Certified Inspector of Sediment and Erosion Control (CAN-CISEC #0804)
Class 2 Backpack Electrofishing Crew Leader
Ontario Benthos Biomonitoring Network (OBBN) Participant
Ontario Stream Assessment Protocol (OSAP) Crew Leader
Pleasure Craft Operator

professional activities

Natasha is an Aquatic Biologist of the firm with over 4 years of environmental consulting experience. Her capabilities include fish inventories, aquatic habitat and impact assessments and reporting, desktop background reviews, data analysis and management, species-at-risk screening, agency consultation, environmental permit acquisition, and onsite construction and post construction regulatory compliance monitoring with respect to transportation, infrastructure, urban development, and renewable energy projects. In addition to her work as an aquatic ecologist, Natasha assists with terrestrial field investigations and is proficient with geographic information system (GIS) software, such as ArcGIS.

projects

infrastructure & transportation

- Oxford Street West and Gideon Drive Intersection EA – City of London: Undertook field investigations including visual fish habitat assessment to determine potential impacts to nearby coldwater ‘Tributary C’. This data will be used in the assessment of design alternatives for the intersection upgrades. Upon selection of a preferred alternative, the natural heritage data, assessment of potential impacts and proposed mitigation plan will be documented in an EIS. (2021 – present)
- Caledon Growth-Related Roads Detailed Design – Town of Caledon: Aquatic biologist responsible for characterizing existing aquatic habitat to identify potential impacts, as well as environmental permit and approval requirements associated with the rehabilitation of six sections of roads within the Town of Caledon. As part of this project, Natasha carried out fish habitat assessments and a SAR screening to inform the design. (2021 – present)
- Church Street Bridge Replacement – Town of Ajax: Post-Construction monitoring at Remnar Bridge over the East Duffins Creek to satisfy TRCA. Aquatic biologist responsible for assessing the stability and condition of the creek banks and abutment slopes, the success of vegetative plantings and cuttings, and undertaking annual fish sampling

to assess the fish community for two years following restoration works. Three additional years of slope monitoring will be conducted. (2021 – present)

- Grand River Species at Risk (SAR) Mussel Relocation, Highway 401, Kitchener – Ministry of Transportation (MTO) West Region: Assisting with the SAR mussel relocations and post-relocation monitoring for a multi-year construction project to comply with all *Endangered Species Act* (ESA), *Fisheries Act*, and *Species at Risk Act* (SARA) permits and authorizations. Also performing erosion and sediment control (ESC) inspections. (2021 – present)
- Glenwood Crescent Slope and Road Restoration – City of Toronto: Detailed design services for emergency slope remediation and road reconstruction along Glenwood Crescent for a slope failure that occurred during a large storm event. Natasha was the Aquatic Biologist responsible for the characterization of Taylor-Massy Creek, down slope of the road failure, in support of a scoped Environmental Impact Study (EIS) prepared for the Toronto and Region Conservation Authority. This characterization included reviewing and compiling background data, as well as completing an aquatic habitat assessment. (2017 – 2018)
- Baycliffe Stormwater Management (SWM) Pond Cleanout – Baycliffe Homes Inc. Aquatic biologist for the Baycliffe SWM Pond Cleanout, undertaken adjacent to Redside Dace habitat, in anticipation of City assumption of infrastructure, in Whitby, Ontario. Responsible for the collection and relocation of fish and wildlife from pond in preparation for cleanout, as well as the continuous water quality monitoring completed during the dewatering of the SWM pond to ensure the resulting discharge did not impair Redside Dace habitat. Monitoring was carried out in accordance with the MNRF requirements for preserving aquatic species at risk regulated habitat. As part of this project, Natasha obtained scientific collector permits from MNRF in preparation for field work and prepared the MNRF mandatory collection reports per permit conditions. (2017)
- Elkford Stormwater Management (SWM) Pond Cleanout – Elkford Investments Inc. Aquatic biologist for the Elkford SWM Pond Cleanout, undertaken in anticipation of City assumption of infrastructure, in Milton, Ontario. Responsible for the collection and relocation of fish and wildlife from pond during dewatering, obtaining scientific collector permits in preparation for field work, and preparing the MNRF mandatory collection reports per permit conditions. (2017)
- MTO Central Region, Two Contract Packages for Seven Culverts, Simcoe Region, York Region, and Durham Region, Ontario, Canada. – Ministry of Transportation of Ontario. Detailed design services and preparation of two contract packages to repair, reline, or replace seven nonstructural culverts along Highway 400 in Simcoe Region, Highway 9 in York Region, and Highway 12 in Durham Region. The scope of work also included undertaking a Group C Class Environmental Assessment, coordinating utilities, reviewing sign and pavement marking upgrades, and providing roadside safety upgrades. Natasha was the fisheries biologist responsible for undertaking field investigations to address data gaps identified during the background review. She also prepared the fisheries memo summarizing existing conditions and ecological constraints at the seven culvert locations, assessing the potential impacts of the proposed design, and preparing the Ministry of Transportation notification package. (2020 – 2021)
- Natural Sciences Services Retainer No. 3, Assignments 1–27 (3016-E-0013), London, Ontario, Canada – Ministry of Transportation of Ontario. Fisheries biologist for a natural sciences retainer agreement with the Ministry of Transportation of Ontario Southwestern Region, various environmental services were provided to MTO. Assignments 1–27 included performing terrestrial field investigations, preparing condition and impact assessment reports, and conducting aquatic habitat and fish community surveys. Natasha was responsible for collecting and compiling background information to identify data gaps, obtaining licences to collect fish for scientific purposes in preparation for fieldwork, conducting fisheries surveys and aquatic habitat assessments, assisting with post-relocation mussel monitoring programs, preparing existing condition and impact assessment reports, consulting with government agencies, and preparing the Ministry of Transportation notification form and environmental contract special provisions for the client. (2019 – 2021)
- Welland River Twin Bridge Replacement and Structural Culvert Rehabilitation, Engineering Services During Construction, St. Catharines, Ontario, Canada – Ministry of Transportation of Ontario. Fisheries biologist for the twin

bridge replacement design-build project. Responsibilities included assisting with species-at-risk mussel relocations and fish salvages in advance of cofferdam installation and existing pier removal work. (2019 – 2021)

- Long Point Causeway Bridge Rehabilitation and Replacement, Long Point, Ontario, Canada. – Norfolk County. Detailed design services for rehabilitating Long Point Causeway from Lakeshore Road to Erie Boulevard and replacing the Long Point Causeway Bridge over Big Creek. The scope of work includes reconstructing and widening Long Point Road with two 3.5m wide lanes, 1.5m wide paved shoulders to accommodate cyclists, and 1.0m wide gravel shoulders; replacing the existing timber pile bridge over Big Creek with a new precast hollow-core concrete girder bridge to the west of the existing bridge; providing environmental services, including permitting and approvals; and overseeing stakeholder engagement. Natasha assisted with fish habitat assessments and fisheries inventories within species-at-risk habitat. These studies were required to obtain regulatory approvals for Fisheries Act, Species at Risk Act, and Endangered Species Act permitting in support of the bridge rehabilitation and causeway improvement construction works. (2020)
- Eglinton West Light Rail Transit Extension, Greater Toronto Area, Ontario, Canada. – Metrolinx. The Eglinton West Light Rail Transit Extension project is an approximately 9.4 km long light rail extension running west along Eglinton Avenue from Mount Dennis Station to the Toronto Pearson International Airport, including eight underground stations. The line is a direct extension of the Eglinton Crosstown Light Rail Transit, which consists of 19 km of new light rail alignment from Kennedy Road in Scarborough to Mount Dennis Station in Toronto. As one of the project biologists, Natasha conducted a desktop review to identify data gaps and to scope fieldwork by collecting and assessing existing information. After identifying data gaps, undertook field investigations to assess existing conditions and coauthored the natural environment summary report detailing the ecological constraints within the project area for inclusion in the environmental project report. Responsibilities included completing an assessment of aquatic conditions, assisting with the assessment of terrestrial environmental features, performing a species-at-risk review, and consulting with government agencies. (2019 -2020)
- Highway 401 Widening from Highway 8 to Highway 24 and Bridge Rehabilitation and Replacement, Kitchener, Waterloo, and Cambridge, Ontario, Canada. – Ministry of Transportation of Ontario. Detailed design for widening 5.5 km of Highway 401 from 6 to 10 lanes, from Highway 8 to Highway 24. The design included alignment improvements, two underpass bridge replacements, two rail crossing bridge widenings and rehabilitation, four bridge replacements over the Speed River, retaining walls, an advanced traffic management system, high-mast lighting, drainage, construction staging, and environmental mitigation. Natasha assisted with species-at-risk mussel post-relocation monitoring for this multiyear highway construction project, which included monitoring habitat enhancement measures installed to mitigate project impacts by improving host fish species habitat. (2019 – 2020)
- MTO Northeastern Region Retainer, Highway 129 Phase 2 Culvert Replacements, Work Order No. 9, Sudbury, Ontario, Canada. – Ministry of Transportation of Ontario. As part of the Ministry of Transportation of Ontario's five-year Northeastern Retainer Contract. Natasha was a fisheries biologist for the Highway 129 in Sudbury culvert replacement project. Her responsibilities included collecting and compiling existing study information and undertaking fisheries surveys and aquatic habitat assessments to address data gaps. She also prepared a summary of existing conditions and ecological constraints for inclusion in the final project report, the Ministry of Transportation notification form, and environmental contract special provisions. (2019 – 2020)

urban development – institutional and residential

- Lakeshore Pentecostal Camp Sanitary Servicing Detailed Design – Completed field studies examining fish habitat in Coverts Creek and tributaries, in support of the detailed design for the installation of sanitary forcemain and watermain to upgrade existing services at the Lakeshore Pentecostal Camp, as well as a gravel access/emergency evacuation route which included one new culvert. Findings were documented in a natural heritage memo. (2021 – present)

- Redside Dace Habitat Restoration – Stouffville Grace Baptist Church: Aquatic Biologist responsible for the preparation of an Information Gathering Form in support of a church development within the regulated habitat of the endangered Redside Dace, which included undertaking background literature review, aquatic field investigations, and agency consultation. (2018 – 2019)
- Sycamore II & Elliot Lands Townhouses – ARG Group Inc.: Aquatic Biologist for the environmental assessment of impacts associated with a new housing development in Schomberg, Ontario. Contributed to an Environmental Impact Study (EIS) in support of a proposed residential development through the characterization of the aquatic habitat and on-site fisheries significance. Field work results were used to identify project impacts and develop recommendations concerning habitat enhancement and restoration of surface water features. (2017 – 2018)
- West Whitby Holdings Small Pond Decommissioning – West Whitby Holdings Inc. Aquatic biologist for the West Whitby Holdings pond decommissioning undertaken in support of a new housing development in Whitby, Ontario. Responsible for the collection and relocation of fish and wildlife from pond during dewatering, obtaining scientific collector permits in preparation for field work, and preparing the MNRF mandatory collection reports per permit conditions. (2017)

energy – renewable

- St. Columban Wind Facility Post-Construction Bird and Bat Mortality Monitoring – BluEarth Renewables Inc.: Field Ecologist for the post-construction monitoring of the 32.98-Megawatt St. Columban Wind Facility in St. Columban, Ontario. Responsible for the post-construction bird and bat mortality monitoring and compliance reporting, including regular mortality surveys, scavenger impact trials, and searcher efficiency trials involving the collection, identification, and organization of bird and bat specimens, and data analysis. (2017 – 2019)
- K2 Wind Energy Facility Post-Construction Bird and Bat Mortality Monitoring – Pattern Energy Group Ltd.: Field Ecologist for the post-construction monitoring of the 270-Megawatt K2 Wind Energy Facility located between Kincardine and Goderich, Ontario. Responsible for the post-construction bird and bat mortality monitoring, including regular mortality surveys, scavenger impact trials, and searcher efficiency trials involving the collection, identification, and organization of bird and bat specimens and data analysis. (2017)

committees + special undertakings

- Council-appointed Member of the City of Markham's Environmental Advisory Committee
- Volunteer with Trout Unlimited – Greg Clark Chapter Working Group

presentations

- Garrido Cortes C., Welch N., Is Forestry Impacting Dipteran Communities in Algonquin Park? Part II: Body Size, Presentation, Entomological Society of Ontario Annual General Meeting, 2015.

publications + papers

- Smith M. A., Boyd A., Chan A., Cloutt S., Brisa P., Dolson S., Eagalle T., Espinola S., Fairweather A., Frank S., Fruetel C., Garrido Cortes C., Hall J., Ho C., Matczak E., McCubbin S., McPhee M., Pare K., Paris K., Richard E., Roblin M., Russell C., Snyder R., Solecki A., Schmitt T., Trombley C., Vandermeer C., Warne C., Welch N., Xavier-Blower C., Investigating the effect of forestry on leaf-litter arthropods (Algonquin Park, Ontario, Canada). PLoS ONE, 2017.

safety training

- RVA Safe Work Practices and Procedures

- RVA Confined Space Entry Policy and Procedures
- WHMIS
- Safe Practices for Trenching and Shoring
- AODA Compliance

employment record

2021 to date	Aquatic Biologist, R.V. Anderson Associates Limited, Burlington, Ontario, Canada
2019 to 2021	Fisheries Biologist, Parsons Inc., Markham, Ontario, Canada
2019	Arboriculture Intern, Aboud & Associates Inc., Guelph, Ontario, Canada
2017 to 2019	Aquatic Biologist, COLE Engineering Group Ltd., Markham, Ontario, Canada
2017	Contract Field Ecologist, Colville Consulting Inc., St. Catharines, Ontario, Canada

TISHA DOUCETTE

staff member of R.V. Anderson Associates Limited

education

B. Sc., (Ecology & Evolution), Western University, London, Ontario, Canada.
Diploma, (Environmental Technology), Fanshawe College, London, Ontario, Canada

registrations

Class EA Process, MTO RAQS
Fisheries Assessment, MTO RAQS
Fisheries Compliance During Construction Specialist, MTO RAQS
Natural Sciences, MTO RAQS
Environmental Inspection During Construction Registered, MTO RAQS

certifications

Certified Environmental Professional, Canadian Environmental Certifications Approvals Board (CECAB)
GGHACA ESC for Urban Construction (9aa89736)
Certified Inspector of Sediment and Erosion Control (CAN-CISEC #0796)
Temperate Wetland Restoration, Ministry of Natural Resources and Forestry (OMNRF)

professional activities

Tisha is a Certified Environmental Professional (EP) and Project Manager with more than 20 years of experience leading provincial and municipal infrastructure projects through the Class Environmental Assessment (EA) process, coordinating ecological inventories, impact assessments, and acquiring environmental permits and approvals. She has a broad-based knowledge and understanding of a wide variety of natural environmental disciplines as well as current environmental issues. Tisha has a proven ability to coordinate a multidisciplinary team of experts and specialists pertaining to aquatic and terrestrial impact assessments, wildlife habitat management, and species at risk. She is particularly practiced in the development of environmental mitigation measures and habitat enhancement / compensation plans. She offers the technical expertise as well as the management capability to coordinate the environmental services required to meet legislative requirements and to obtain environmental approvals pertinent to a project.

Projects

provincial projects

- Natural Science Services on Retainer– Ministry of Transportation: Management of all assignments related to this three-year natural sciences services retainer. The ecological services group, led by Tisha, was awarded, for a third term, a retainer assignment to provide natural sciences services for projects throughout MTO's West Region. One of these assignments included a Feasibility Assessment for the provisions of wildlife culverts and fencing along Highway 6 near Owen Sound. (2017-2020)
- Multi Services Retainer for Detail Design Services, Work Order No. 7– Ministry of Transportation: Environmental Lead responsible for the coordination of the Class EA process, ecological inventories and archaeology for the rehabilitation of two structures on Highway 17 in the Municipality of Markstay. (2018-2023)
- Replacement of Deception Creek and Smith Creek Bridges on Highway 668 and Replacement of Gilles Creek Bridge on Highway 579 (Detail Design), Region, G.W.P. 5267-11-00 – Ministry of Transportation: Environmental Lead responsible for the coordination of the Class EA process, ecological inventories, acquisition of pertinent environmental approvals and development of environmental mitigation and contract preparation.

- Large Value Retainer, Mega 12, Work Order No. 1 & 2 – Ministry of Transportation: Natural Environment Discipline Lead for work order assignments. Assignments thus far include ecological inventories and documentation of 16.3 km of Highway 17 and ecological inventories for the replacement of two bridge structures on Highway 62 and Highway 7. (2018-2021)
- Highway 69 Naiscoot Lake Bridge Replacement (Detail Design), G.W.P. 5145-16-00 – Ministry of Transportation: Environmental Lead responsible for the coordination of the Class EA process, ecological inventories, acquisition of pertinent environmental approvals and development of environmental mitigation and contract preparation. (2017-2018)
- Natural Science Services on Retainer– Ministry of Transportation: Management of 65 separate work order assignments under this three-year natural sciences service's retainer. Assignments included: ecological inventories; assessment of potential project impacts; Species at Risk (SAR) surveys; design and monitoring of a concrete fish ladder; development of environmental mitigation measures; acquisition of required environmental permits; environmental monitoring during construction and post-construction environmental monitoring. (2014-2017)
- Highway 7 Rehabilitation, Perth County G.W.P. 3058-14-00 – Ministry of Transportation: Environmental lead for the Preliminary/ Detailed Design and Class EA Study for the rehabilitation of Highway 7 including culvert replacement, roundabout construction, ecological inventories and impact assessment. This project is classified as a Group B project including the preparation of a Transportation Environmental Study Report (TESR). Consultation has included two Public Information Centres and several property owner meetings. (2015-2018)
- Highway 3 West Bundle, Kingsville, W.P. 7-96-00 and St. Thomas W. P 3075-12-00 – Ministry of Transportation: Environmental Lead for the Detail Design and Class EA Study for the pavement reconstruction of Highway 3 from 0.6 km west of Essex Road 276 to Essex Road 34 in Kingsville and Highway 3 from Highway 4 Talbotville to Centennial Ave, City of St. Thomas. These projects were both initiated as Group B projects and were subsequently stepped down to Group C projects. (2014-2015)
- Natural Science Services on Retainer (2012-2014) – Ministry of Transportation: Management of 25 separate work assignments under a two-year natural sciences retainer assignment with MTO West Region. Assignments included aquatic and terrestrial inventories and impact assessment, the development of mitigation measures and acquisition of agency approvals. Other services have included post-construction environmental monitoring and reporting in accordance with agency permits and approvals. (2012-2014)
- Highway 7 Reconstruction, GWP 361-98-00 – Ministry of Transportation: Lead Environmental Planner responsible for the coordination of the Class EA process including public consultation, ecological inventories, assessment of ecological impacts and the development of environmental mitigation measures. This Preliminary and Detailed Design and Class EA study included highway reconstruction and rehabilitation of five bridge structures The EA process adhered to the process for a Group B project in accordance with the requirements of the Class EA for Provincial Transportation Facilities (MTO 2000). This project included the acquisition of an ESA overall Benefit permit. (2012-2013)
- Highway 21 Rehabilitation, County of Huron G.W.P. 136-98-00 – Ministry of Transportation: Coordination of the Class EA process and environmental specialties ensuring that inventories are completed within the appropriate season, assessments and reporting are as per Ministry protocols and applicable approvals are attained within in a timely fashion. (2008–2009)
- Highway 402 and County Road 79 – County of Lambton and Ontario Ministry of Transportation: Coordination of the Provincial Class EA process as a Group B project for the detailed design of new interchange ramps, structure rehabilitation, and roadway improvements. This included a PIC and preparation of a Design and Construction Report (DCR). (2007 – 2008)

- Highway 401 Widening (Detail Design) – Region of Waterloo: Lead Environmental Planner coordinating the Class EA Study and natural environmental inventories for the reconstruction and widening of Highway 401 from 0.5 km west of Regional Road 8 easterly to 0.5 km east of Regional Road 24. This project included the widening of the existing Highway 401 6 lane cross section to 10 lanes including the replacement and widening of the Speed River bridges. Public consultation was throughout the Detailed Design including two Public Information Centres. This project included the design of wildlife crossing under the Speed River bridges, and acquisition of the following environmental permits: Navigation Protection Act, Endangered Species Act (Wavy-rayed lampmussel, Barn Swallow), Noise Bylaw exemptions, DFO Support as per the MTO/DFO/OMNRF Fisheries Protocol. (2011–2014)
- Highway 24 Reconstruction and Replacement of the Whitemans Creek Bridge (Preliminary and Detail Design), GWP 336-97-00 – Ministry of Transportation: Lead Environmental Planner responsible for the coordination of the environmental assessment study including natural resource inventories and impact assessments for this assignment. Environmental considerations for the study area included the presence of several Species At Risk (SAR), a Provincially Significant Wetland (PSW), a cold water Provincial Fish Sanctuary, numerous groundwater seeps, highly erodible soils and a wildlife linkage /corridor area. Federal approvals (Fisheries Act, Navigable Waters Protection Act) were required for this project, and an Environmental Screening Report pursuant to the Canadian Environmental Assessment Act (CEAA) was prepared and all approvals were obtained. At the completion of the design phase, the ecological services team, led by Tisha, was retained to undertake on–site environmental monitoring services to oversee the environmental protection measures. (2008-2012)
- Highway 3 Reconstruction (Preliminary and Detail Design), Canfield, Haldimand County GWP 3507-02-00 – Ministry of Transportation: Lead Environmental Planner responsible for the coordination of the Class EA Study and natural environmental inventories for the assessment of drainage improvement alternatives within the community of Canfield. This assignment was classified as a Group 'B' project in accordance with the Class EA for Provincial Transportation Facilities (MTO 2000). Public consultation was continuous throughout the Preliminary and Detailed Design phases and includes three Public Information Centres (PICs). (2010-2013)
- Highway 23 Structure Replacements and Rehabilitation, County of Huron, County of Perth GWP 3043-06-00 – Ministry of Transportation: Lead Environmental Planner responsible for the coordination of the Class EA Study and management of ecological inventories for fish and fish habitat, botanical inventories and community classification, dedicated avian surveys as well as incidental wildlife surveys were key components to this study. Background investigations noted Black Redhorse (*Moxostoma duquesnei*), a provincially and nationally listed Threatened species as a documented species with the study area. An OMNR Permit for Species Protection and Recovery Clause 17(2)(b) was acquired therefore to undertake a fisheries assessment. The field studies confirmed the species was not present and further permitting was not required. This project illustrates Ms. Doucette's ability to lead a team of technical specialists to complete a comprehensive study that meets legislative requirements and is on schedule. (2010–2011)

design-build assignments

- Highway 401 Reconstruction, Elgin County – Ministry of Transportation: Environmental Lead responsible for the Class EA process, acquisition of environmental permits and approvals, development of an Environmental Management Plan (EMP), and oversight of environmental monitoring during construction. (2017 – 2019)
- Highway 596, Alice Creek Culvert Replacement – Ministry of Transportation: Development and administration of the Environmental Management System (EMS) and Environmental Management Plan (EMP) for the replacement of the Alice Creek culvert on Highway 596, including the development of environmental mitigation measures and oversight and monitoring during construction. (2016-2017)
- Highway 61, Replacement of Three Structures, Manitouwadge – Ministry of Transportation: Development and administration of the Environmental Management System (EMS) and Environmental Management Plan (EMP) for the

replacement of three structural culverts along Highway 614, Manitouwadge, including the development of environmental mitigation measures and oversight and monitoring during construction. (2013 – 2015)

- Highway 12, Replacement of the CNR Overhead Structure, Midland – Ministry of Transportation: Preparation and administration of an Environmental Management Plan (EMP) including development of environmental mitigation measures and contract specifications. Coordination of Environmental Monitoring / Inspection services during construction. (2012-2013)
- Highway 12, Replacement of the CNR Overhead, Orillia – Ministry of Transportation: Preparation and administration of an Environmental Management Plan, including the coordination of the Class EA Study and ecological inventories for the assessment of impacts and development of environmental mitigation measures including contract specifications. Provided Environmental Monitoring / Inspection services during construction. (2012-2012)
- Highway 8, Replacement of Structural Culvert at Fairchild Creek, City of Hamilton – Ministry of Transportation: Preparation of an Environmental Management Plan and coordination of the Class EA Study and ecological inventories for the assessment of impacts and development of environmental mitigation measures and contract specifications. Provided Environmental Monitoring / Inspection services during construction. (2010-2011)

environmental monitoring

Provided oversight and on-site monitoring for numerous provincial highway and municipal projects:

- MTO Gully Creek Culvert Replacement, Bayfield, ON
  - Project Manager responsible for the administration of on-site environmental monitoring specialty services for the removal and replacement of the Gully Creek crossing on Highway 21. Gully Creek provides habitat for two at-risk fish: Redside Dace and Black Redhorse. An MECP Endangered Species Act permit, DFO Species At Risk Act Permit and a Letter of Advice guided the environmental specialist oversight, monitoring and reporting.
- MTO Highway 401, Grand River, Kitchener, ON
  - Project Manager responsible for the administration of the freshwater mussel SAR relocation within the Grand River, fisheries contracts oversight and erosion and sediment control monitoring.
- Highway 401 10-lane widening and Bridge Rehabilitation and Replacements, Cambridge, ON
  - Project Manager responsible for the administration of the freshwater mussel SAR relocation within the Speed Rivers, fisheries contracts oversight and erosion and sediment control monitoring.
- Highway 401 Bridge over Ojibway Park, Windsor, MTO
- Highway 7 Rehabilitation, Rockwood, ON - MTO
- Highway 40 Rehabilitation and Intersection Improvements, Sarnia, ON, MTO
- Highway 401 – Provincial Road, Windsor ON, MTO Contract 2007-3043
- Highway 401 – Belle River Road, MTO Contract 2008-3003
- Highway 401 – Wellington Road, MTO Contract 2006-3034
- Highway 402 – Mandaumin Road to Oil Heritage Road, MTO Contract 2006-3029
- Highway 401 – French Line, MTO Contract 2005-3046
- Highway 6 - Fergus, MTO Contract 2006-3032
- Highway 401, Tilbury – Contract 2004-3002
- Highway 402, Warwick – Contract 2003-3019
- Highway 401, Kitchener – Contract 2002-3001
- Highway 403 and Highway 24 Interchange
- Highway 3 – St. Thomas, Contract 2000-48
- Highway 21 – Forest, Contract 2000-43 Stoney Creek Erosion Control Wetland, London, ON - City of London

- Airport Road Widening (formerly Highway 100), City of London
- Sunningdale Storm Water Management Pond, London, ON - City of London
- Kilally Retaining Wall Repair, London, ON - City of London

municipal projects

- Replacement of the Labatt Sanitary Siphon at the Forks of the Thames, Detailed Design – City of London: Natural Heritage Lead responsible for the oversight and management of the ecological inventory, impact assessment and documentation in a Scope Environmental Impact Study (EIS) report. (2020-2022)
- Caledon Growth-Related Roads Detailed Design – Town of Caledon: Natural Heritage lead responsible for the oversight and management of the ecological inventory, impact assessment, development of mitigation measures and acquisition of environmental permits and approvals. The ecological assessment will be documented into a Natural Heritage Assessment report. This assignment includes road and drainage improvements for Kennedy, Main, Humber Station Road, Mountainview Road, Mill Street and Willoughby roads. This detailed design assignment will be completed as six separate contracts following a Schedule A+ and Schedule B EA process. (2020-2022)
- Cainsville Water and Wastewater Servicing Environmental Assessment – County of Brant: Natural Heritage Lead for the Preliminary design for both water and wastewater servicing to meet the needs of the community to 2050. Tisha was responsible for coordinating the ecological inventory, impact assessment and reporting. (current project)
- Columbia Way Environmental Assessment (EA) Study – Town of Caledon: Tisha was the natural heritage lead for the Preliminary design for road improvements to urbanize and improve rural settings of Columbia Way in Bolton. Responsible for oversight and coordination of the compilation of existing ecological data, field investigations, assessment of impacts and development of potential mitigation measures. All of which will be documented in an Environmental Impact Study (EIS). (current project)
- Church Street Bridge Replacement – Town of Ajax: Providing oversight and coordination for the post-Construction monitoring at Remnar Bridge over the East Duffins Creek to meet Toronto Region Conservation Authority (TRCA) approval commitments. Post-construction monitoring will include: stability and condition of the creek banks and abutment slopes, success of vegetative plantings and cuttings, and fish community will be assessed annually for two years following restoration works. Three additional years of slope monitoring will also be conducted. (current project)
- Hyde Park Road Widening Phase 1, Oxford Street to South Carriage Road - City of London: Detailed design assignment consisting of widening Hyde Park Road from two to five lanes, sidewalks, bike paths, noise wall, retaining wall, storm sewers, local and deep trunk sanitary sewers, forcemain, local and trunk watermain, traffic signals, illumination and new bridge over CN Rail. Tisha was responsible for providing environmental mitigation measures for incorporation into the construction contract. This included the provision of a wildlife culvert and fencing to connect two stormwater management ponds on either side of Hyde Park Road. Post construction monitoring including the installation of a wildlife camera was also completed. Photos of turtles, the target species using the culvert were captured. (2017- 2019)
- Adelaide Street North Widening Environmental Assessment Study – City of London: Project Manager and Environmental Lead responsible for the coordination of a Schedule ‘C’ EA to identify the preferred roadway widening alternatives on Adelaide Street from Fanshawe Park Road to Sunningdale Road including provisions for a wildlife culvert next to an existing drainage culvert. (2017- 2019)
- Whiteoak / Dingman Secondary Plan, Natural Heritage Features and Subject Land Status Report – City of London: Project Manager for the inventory of natural heritage features and components of the Whiteoak and Dingman secondary plan study area including preparation of a Subject Lands Status Report. (2018 – 2019)
- Environmental Assessment Study of Bostwick Road, including the extension of Bradley Avenue Assistant – City of London: Project Manager and Environmental lead responsible for the coordination of a Schedule ‘C’ EA to identify

the preferred alignment for Bostwick Road west of Wharncliffe Road and the Bradley Avenue extension where it intersects Bostwick Road in support of the implementation strategy of the Southwest Area plan (SWAP), including the management of the Environmental Impact Study (EIS). (2016- 2019)

- Green Valley Drain Storm/ Drainage Remediation Works – City of London: Environmental lead for the oversight and coordination of the ecological assessment, development of mitigation measures and two-year post-construction monitoring. (2015-2017)
- Dingman Creek Erosion Control Wetland – City of London: Provided peer review of environmental components during the preparation of the functional design. Coordinated post-construction monitoring of fish communities and constructed fish habitats for the Erosion Control Wetland constructed adjacent to Dingman Creek. Preparation of technical memos to provide environmental updates and recommendations for improvement. (2013-2017)
- Dingman B-4 Stormwater Management Facility – City of London: Management and coordination of the Class Environmental Assessment and Scoped Environmental Impact Study for stormwater servicing. Ecological investigations included three-season vegetation surveys, breeding bird and amphibian surveys; Ecological Land Classification, wildlife surveys, fisheries and aquatic habitat assessment including benthic invertebrate sampling. Consultation included one Public Information Centre (PIC), agency and Indigenous communities engagement. (2014-2016)
- Central Thames River Subwatershed Study – City of London: Coordination of ecological services including the collection of and amalgamation of existing aquatic and terrestrial data features within the Central Thames Subwatershed in the City of London. (2012-2014)
- Mud Creek Subwatershed Study Update – City of London: Coordination of ecological services including the collection and summary of existing aquatic and terrestrial habitat features within the Mud Creek Subwatershed in the City of London. (2012-2014)
- Old Victoria Storm Water Management Facility #2 – City of London: Coordination of the Environmental Impact Study associated with the creation of a SWM pond adjacent to the Thames River. (2012-2014)
- Stoney Creek Erosion Control Wetland – Stormwater Management Facility – City of London: Oversight and coordination of environmental monitoring during and post construction. Monitoring efforts confirmed compliance with contract environmental requirements including groundwater monitoring, ESC measures, the installation of fishways, turtle nesting mounds, landscaping and native vegetation salvage. Post-construction monitoring of wetland units. (2011-2014)
- Twinning of the Thames River Bridge, Veterans Memorial Parkway – City of London: Managed the ecological services for the twinning of the Thames River Bridge. Three (3) new in-water bridge piers were required for the widening which resulted in the requirement for Fisheries Act authorization. The Wavy-rayed Lampmussel, an Endangered SAR listed on Schedule 1 of the Species at Risk Act (SARA) was confirmed present within the impacted area. Both a compensation plan for loss of fish habitat and location and monitoring plan for the displaced freshwater mussels was prepared. (2003-2006)

employment record

2019 to date	R.V. Anderson Associates Limited, Toronto, Ontario, Canada
2003 to 2019	Parsons Inc., London, Ontario, Canada
2001 to 2003	Ministry of Natural Resources and Forestry, Ontario, Canada