

V3.1 – Natural Environment

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V3.1.1

REGIONAL MUNICIPALITY OF NIAGARA
SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS

Natural Environment

Natural Environment Baseline Report

TECHNICAL MEMORANDUM

DATE April 30, 2020

Project No. 18104462

TO Chris Campbell, Infrastructure Planning, Partner
GM BluePlan Engineering Limited

CC Danielle Mackinnon (GM BluePlan), Alyson Beal (Golder), Jean-Marc Crew (Golder)

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DESKTOP ASSESSMENT OF NATURAL ENVIRONMENT CONSTRAINTS FOR THE SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS SCHEDULE C CLASS ENVIRONMENTAL ASSESSMENT, NIAGARA FALLS, ONTARIO

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been retained by GM BluePlan (GMBP) on behalf of the Regional Municipality of Niagara (the Region) to conduct natural environment studies as part of the South Niagara Falls Wastewater Solutions Schedule C Class Environmental Assessment (the Project).

As part of the evaluation and selection of sites for the Project, a desktop assessment to identify potential natural environment constraints within the study area (as defined by GMBP) is required. The study area is shown on Figure 1 and is generally limited by the Niagara River in the east, the Welland Canal to the west, the existing Niagara Falls Wastewater Treatment Plant (WWTP) to the north, and Carl Road West in the south. Although the desktop assessment was conducted for the whole study area, there was a particular focus on the area around the ten Sites of Interest, which are centered around the Welland River in the southern portion of the study area (Figure 1).

This desktop-level report is intended to provide a preliminary assessment of potential natural features or functions in the study area that may present constraints for the proposed Project. A Natural Environmental Report, including the results of field surveys and an impact assessment, will be compiled and submitted following the completion of field work to be completed at the location of the preferred alternative.

2.0 POLICY CONTEXT

Potentially sensitive natural features considered for this Project include designated features (e.g., Provincially Significant Wetlands), species at risk (SAR), Niagara Peninsula Conservation Authority (NPCA) regulated areas, fish habitat, wildlife and significant wildlife habitat (SWH) as identified in the following Acts and policy documents:

- Provincial Policy Statement (PPS; MMAH 2014);
- *Endangered Species Act (ESA), 2007;*

- *Species at Risk Act* (SARA), 2002;
- *Fisheries Act*, 1985;
- Official Plan for the City of Niagara Falls (Niagara Falls 2017);
- Region of Niagara Official Plan (Region of Niagara 2015); and,
- O. Reg. 155/06 Niagara Peninsula Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses.

3.0 METHODS

3.1 Background Review

The investigation of existing conditions in the study area included a background information search and literature review to gather data about the local area and provide context for the evaluation of the natural features. A number of resources were used, including:

- Natural Heritage Information Centre (NHIC) database, maintained by the Ministry of Natural Resources and Forestry (MNRF) (NHIC 2019);
- Land Information Ontario (LIO) geospatial data (MNRF 2019a);
- Species at Risk Public Registry (ECCC 2019);
- Species at Risk in Ontario (SARO) List (MNRF 2019b);
- Breeding Bird Atlas of Ontario (OBBA) (Cadman et al. 2007);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2019);
- Bat Conservation International (BCI) range maps (BCI 2019);
- Ontario Butterfly Atlas (Jones et al. 2019);
- eBird species maps (eBird 2019);
- MNRF LIO Aquatic Resources Area Layer (MNRF 2019c);
- DFO Aquatic Species at Risk Maps (DFO 2019);
- City of Niagara Falls Official Plan (2017);
- Region of Niagara Official Plan (2015);
- Lower Welland River Characterization Report (NPCA 2011);
- South Niagara Falls Watershed Report (NPCA 2008); and,
- Aerial imagery.

To develop an understanding of the drainage patterns, ecological communities and potential natural heritage features that may be affected by the proposed Project, MNRF LIO data were used to create base layer mapping for the study area. A geographic query of the NHIC database was conducted to identify element occurrences of any natural heritage features, including wetlands, Areas of Natural and Scientific Interest (ANSI), life science sites, rare vegetation communities, rare species (i.e., species ranked S1-S3 by NHIC), species designated under the ESA or SARA, and other natural heritage features within the study area.

3.2 SAR Screening

Species at risk considered for this report include those species listed in the ESA and SARA. An assessment was conducted to determine which SAR had potential habitat in the study area. A screening of all SAR which have the potential to be found in the vicinity of the study area was conducted first as a desktop exercise using the sources listed in Section 3.1. Species with ranges overlapping the study area, or recent occurrence records in the vicinity, were screened by comparing their habitat requirements to habitat conditions in the study area.

The potential for the species to occur was determined through a probability of occurrence. A ranking of low indicates no suitable habitat availability for that species in the study area and no specimens identified. Moderate probability indicates more potential for the species to occur, as suitable habitat appeared to be present in the study area, but no occurrence of the species has been recorded. Alternatively, a moderate probability could indicate an observation of a species, but there is no suitable habitat on the site or in the study area. High potential indicates a known species record in the study area (including during the field surveys or background data review) and good quality habitat is present.

Searches will be conducted during future field surveys for suitable habitats and signs of all SAR identified through the desktop screening. If the potential for the species to occur in the study area was moderate or high in the desktop screening, the screening will be refined based on the results of the field surveys (i.e., habitat assessment completed between May and September). Any habitat identified during ground-truthing or other field surveys with potential to provide suitable conditions for additional SAR not already identified through the desktop screening will also be assessed and recorded.

4.0 PRELIMINARY CONSTRAINTS ANALYSIS

A desktop assessment was conducted to determine if any significant environmental features, species at risk, or other significant species exist, or have moderate or high potential to exist, in the study area.

4.1 Natural Areas

In addition to features noted under the various Official Plans (OP) and associated schedules, there are also features that have been designated provincially or federally based on their ecological importance and sensitivity. These include provincially significant wetlands (PSW) and provincially significant Areas of Natural and Scientific Interest (ANSI), as shown on Figure 1. Designated sensitive features occurring in the study area are described below.

With the exception of PSWs and provincially significant ANSIs, the City and Region may permit development of essential public uses of a linear nature (including utilities) within or adjacent to natural areas where the project is approved through the Municipal Class environmental assessment (EA) process (Niagara Falls 2017; Region of Niagara 2015).

4.1.1 Areas of Natural and Scientific Interest (ANSI)

ANSIs are designated by the province according to standardized evaluation procedures. ANSIs are ranked by the MNRF as being either provincially or regionally significant.

There are two provincially significant ANSIs within the study area, both along the Niagara River in the eastern portion of the study area (Figure 1): Niagara River Bedrock Gorge Earth Science ANSI, and the Niagara Gorge Life Science ANSI. Neither ANSI overlaps the Sites of Interest.

Development may be permitted within or adjacent (i.e., within 50 m) to a provincially significant ANSI where an assessment demonstrates that development will not adversely affect the feature or its ecological function.

4.1.2 Significant Wetlands

The MNRF designates PSWs. PSWs are determined based on a scientific point-based ranking system known as the Ontario Wetland Evaluation System (OWES). Wetlands are assessed based on a range of criteria, including biology, hydrology, societal value and special features (MNRF 2019d).

Several PSWs are mapped within the southern portion of the study area, including Niagara Falls Slough Forest Wetland Complex, Lyons Creek Wetland Complex, Lower Grassy Brook Wetland Complex, Usshers Creek Wetland Complex, Welland River East Wetland Complex, Thompson Creek Wetland Complex, Warren Creek Wetland Complex, South Allanburg Slough Forest Wetland Complex, and Upper Grassie Brook Wetland Complex (Figure 1). Several of the Sites of Interest are also within or near to PSWs (Figure 2; Appendix B).

In addition to PSWs, there are other wetland areas mapped throughout the study area according to Appendices III-A and III-C of the City's OP (Niagara Falls 2017), including:

- Locally Significant Wetlands in the northwest portion of the study area;
- NPCA regulated wetlands greater than 2 ha in the northwest and southern portions of the study area; and,
- NPCA regulated wetlands less than 2 ha in the southern portion of the study area.

No Locally Significant Wetlands or NPCA regulated wetlands greater than 2 ha overlap the Sites of Interest. Although there are several NPCA regulated wetlands less than 2 ha that overlap the Sites of Interest, they all appear to be within PSW complexes. Therefore, these wetlands less than 2 ha will be considered under policies relating to PSWs.

Wetlands are dependent on surface water and groundwater on a seasonal or permanent basis to support their unique hydraulic and vegetation characteristics. Consequently, wetlands are sensitive to changes in hydrologic or hydrogeologic regimes. Such changes may impact the wetland hydroperiod or persistence of certain wetland types, such as bog or fen, with a low tolerance for water level fluctuations. PSWs are provided higher levels of protection based on policies of the PPS. In addition, all wetland types (i.e., significant and non-significant) are regulated by the local Conservation Authority (i.e., NPCA) and subject to common permitting policies.

Development is not permitted within a PSW according to provincial policies (MMAH 2014). Development may be permitted adjacent (i.e., within 120 m) to a significant wetland, or within or adjacent to NPCA regulated wetlands greater than 2 ha in size, where an assessment demonstrates that development will not adversely affect the feature or its ecological function.

Where development is proposed within or adjacent (i.e., within 30 m) to a NPCA regulated wetland less than 2 ha in size, or a locally significant wetland, an assessment must be completed to demonstrate that development will not adversely affect the feature or its ecological function.

4.1.3 Significant Woodlands

Significant woodlands are areas which are: 1) ecologically important in terms of features such as species composition, age of trees and stand history; 2) functionally important due to their contribution to the broader landscape because of their location, size or due to the amount of forest cover in the planning area; or 3) economically important due to site quality, species composition, or past management history (MMAH 2014).

The City has mapped significant woodlands within the municipality on Appendix III-C of the OP (Niagara Falls 2017). Based on this mapping, there are several significant woodlands throughout the study area. Significant woodlands are generally located outside of the urban core of the study area, with the exception of woodlands along watercourses, such as the Hydro Canal through the city center (Figure 1). Several of the Sites of Interest also contain significant woodlands according to City mapping (Appendix B).

The Region does not provide detailed mapping of significant woodlands, and defines significant woodlands as those that meet one or more of the following criteria (Region of Niagara 2015):

- contain threatened or endangered species, or a species of concern;
- meets site thresholds:
 - 2 ha (within or overlapping Urban Area Boundary); or
 - 4 ha (outside Urban Area and north of the Niagara Escarpment); or
 - 10 ha (outside Urban Area and south of the Niagara Escarpment).
- contains interior woodland habitat;
- contains old growth forest and is a minimum size of 2 ha;
- overlaps or contains one or more other significant natural heritage features; or
- abuts or is crossed by a watercourse or waterbody and is a minimum size of 2 ha.

Woodlands that are not already mapped as significant by the City should be evaluated for significance based on the Regional criteria.

Development may be permitted within or adjacent (i.e., within 120 m) to a significant woodland, where an assessment demonstrates that development will not adversely affect the feature or its ecological function (e.g., ability to provide wildlife habitat, structural stability on slopes, etc.). Where development is proposed within a significant woodland, efforts should be made to modify the design plan to minimize encroachment to the extent possible. An analysis of alternative options should also be incorporated into the assessment, including considerations of alternative locations, siting options and design plans. If development does require tree removal, compensation planting to offset or replace lost habitat may be required. A Tree Savings Plan may also be required as a condition of development approval (Niagara Falls 2017).

4.1.4 Significant Valleylands

General guidelines for determining significance of valleylands are presented in the Natural Heritage Reference Manual (NHRM) (MNR 2010). Recommended criteria for designating significant valleylands include prominence as a distinctive landform, degree of naturalness, importance of its ecological functions, restoration potential, and historical and cultural values.

Neither the City or Region provide detailed mapping of significant valleylands (Niagara Falls 2017; Region of Niagara 2015). However, it is likely that the majority of valleylands associated with permanent watercourses in the study area (Figure 1) are significant based on NHRM guidelines (MNR 2010). Several of the Sites of Interest are adjacent to, or contain, watercourses and are potentially within a significant valleyland (Figure 2; Appendix B).

Development may be permitted within or adjacent (i.e., within 50 m) to a significant valleyland, where an assessment demonstrates that development will not adversely affect the feature or its ecological function. Vegetated setbacks are also typically required from the top of bank of significant valleylands (Niagara Falls 2017). Where a valleyland coincides with NPCA regulated areas, development within the regulated area will also require a permit from the NPCA. A geotechnical investigation may also be required where development is proposed within erosion hazard areas (Niagara Falls 2017).

4.1.5 Significant Wildlife Habitat

Significant wildlife habitat (SWH) is one of the more complicated natural heritage features to identify and evaluate. SWH is evaluated and designated based on the criteria and guidelines contained in the NHRM (MNR 2010), as well as the Significant Wildlife Habitat Technical Guide (SWHTG) and the Significant Wildlife Habitat Mitigation Support Tool (SWHMIST) (MNR 2000 and MNR 2014). There are four general types of significant wildlife habitat: seasonal concentration areas, migration corridors, rare or specialized habitats, and species of conservation concern.

Significant wildlife habitat is typically identified on a site-specific basis and is therefore not often mapped at a landscape level in local OPs. According to LIO mapping, there are several deer wintering areas, a type of seasonal concentration area SWH, throughout the study area that overlap portions of the Sites of Interest (Figures 1 and 2; Appendix B).

Development may be permitted within or adjacent (i.e., within 120 m) to significant wildlife habitat, where an assessment demonstrates that development will not adversely affect the feature or its ecological function.

4.1.6 Official Plan Designated Features

Based on the City's and Region's OP mapping, corridors and linkages have also been mapped in the southern portion of the study area, which may include valleylands, contiguous woodlands and wetlands, creeks, hedgerows and service corridors. Official Plan policies state that new development should not interfere with the function of such features, and where possible, connections between natural features should be enhanced or rehabilitated (Niagara Falls 2017; Region of Niagara 2015).

The City also designates two other categories of natural heritage features including Environmental Protection Areas or Environmental Conservation Areas. Development is generally not permitted within these areas, with some exceptions for passive recreational or conservation projects.

Environmental Protection Areas include PSWs, NPCA regulated wetlands greater than 2 ha in size, provincially significant Life Science ANSIs, habitat of endangered and threatened species, floodways and erosion hazard areas, and environmentally sensitive areas (Niagara Falls 2017). Environmental Protection Areas, specifically including PSWs, NPCA regulated wetlands greater than 2 ha, habitat of endangered and threatened species, and floodways and erosion hazard areas, appear to overlap the Sites of Interest.

Environmental Conservation Areas include significant woodlands, significant valleylands, SWH, fish habitat, significant Life and Earth Science ANSIs, sensitive groundwater areas (as identified by relevant natural environment study), and locally significant wetlands or NPCA regulated wetlands less than 2 ha in size (Niagara Falls 2017). Environmental Conservation Areas, specifically including significant woodlands, significant valleylands, SWH, fish habitat, and NPCA regulated wetlands less than 2 ha in size, appear to overlap the Sites of Interest. According to NPCA watershed reports (NPCA 2008; 2011), there are also areas of moderate and high groundwater vulnerability, which may be considered as sensitive groundwater areas, that overlap the Sites of Interest (Figure 3).

Development proposed within or adjacent to an Environmental Protection Area or Environmental Conservation Area requires completion of an impact assessment. Adjacent lands are defined separately for each applicable feature and are discussed in the relevant sections above and in Table 1 (Section 5.0).

4.2 Species at Risk

Based on the desktop assessment, 62 species designated as special concern, threatened or endangered under the ESA or SARA were assessed to have moderate potential to occur within the study area (Appendix A). Of these, 41 are designated as threatened or endangered under the ESA and receive individual and habitat protection. The other species with moderate potential, as indicated in Appendix A, do not have regulatory protection under the ESA. However, habitat for these species must still be considered under the SWH criteria of the PPS in the impact assessment for the Schedule C Class EA. Threatened or endangered species with moderate potential to occur in the study area include:

- Eleven (11) birds (Acadian flycatcher, bank swallow, barn owl, barn swallow, bobolink, cerulean warbler, chimney swift, eastern meadowlark, eastern whip-poor-will, least bittern, Louisiana waterthrush);
- Four (4) mammals (small-footed myotis, little brown myotis, northern myotis, and tri-colored bat);
- Three (3) amphibians (Allegheny mountain dusky salamander, Jefferson salamander, and northern dusky salamander);
- Three (3) reptiles (Blanding's turtle, eastern hog-nosed snake, and five-lined skink);
- Three (3) fish (American eel, lake chubsucker, and lake sturgeon);
- Two (2) molluscs (kidneyshell and round hickorynut);
- One (1) moss (Spoon-leaved moss); and,
- Fourteen (14) vascular plants (American chestnut, American columbo, American ginseng, American water-willow, butternut, cherry birch, cucumber tree, deerberry, eastern flowering dogwood, red mulberry, round-leaved greenbrier, spotted wintergreen, Virginia mallow, and white wood aster).

The majority of potential suitable habitat for these SAR is concentrated in the PSWs and large woodlands in the southern portion of the study area, in addition to other areas of woodland, riparian habitat, and waterbodies in the study area (Figure 1). Some species, such as chimney swift and little brown myotis, may also use anthropogenic structures for habitat. Several of these habitat types overlap the Sites of Interest (Appendix A).

Further assessment for potential SAR or their habitat will be conducted during field surveys completed during the core growing season and active wildlife season for southern Ontario (i.e., May – September). Direct effects (i.e., removal of habitat or harm to individuals) and indirect effects (i.e., changes to habitat form or function) on SAR and/or SAR habitat will be considered in the Schedule C Class EA. Where impacts cannot be avoided, consultation with the Ministry of Environment, Conservation and Parks (MECP) may be required to determine if a permit is required.

4.3 Aquatic Features and Fish Habitat

4.3.1 Surface Water

Watercourses and waterbodies occurring within the study area are components of the Lower Welland River and South Niagara Falls watershed (NPCA 2012). There are several watercourses and waterbodies in the study area (Figure 1), including some major surface water features such as:

- Niagara River;
- Welland River;
- Hydro Canal;
- Lyon's Creek East;
- Beaver Dams Creek;
- Thompsons Creek;
- Grassy Brook; and
- Usshers Creek.

The majority of the major watercourses and waterbodies in the study area are considered warm water features. Warm water aquatic features are generally considered to be more robust and tolerant to external effects. Fish species occupying warm water are likewise considered to be more tolerant to changes in groundwater discharge. In contrast, cold water systems are supported by groundwater inputs and are considered to be capable of supporting cold water fish species, which may be sensitive to reductions in groundwater discharge. Many cold water systems contain transitional coolwater areas that often support both cold water and warmwater species. Coolwater features and fish species are generally considered similarly to those designated cold water.

The NPCA regulates watercourses, waterbodies and wetlands within the study area. Any development proposed within these features or the regulated limits may require a permit from the NPCA.

4.3.2 Fish Habitat

There are numerous native and non-native fish species present in watercourses and waterbodies of the Lower Welland River and South Niagara Falls watershed, including top predator warm species such as largemouth bass (*Micropterus salmoides*), and northern pike (*Esox Lucius*) and baitfish (i.e., minnows) (NPCA 2008; 2011).

Where development is proposed within or adjacent (i.e., within 30 m) to fish habitat, an assessment must be completed to demonstrate that development will not adversely affect the feature or its ecological function. In general, development should be designed to avoid or minimize adverse impacts to fish and fish habitat. Development and site alteration within fish habitat may be permitted in accordance with provincial and federal requirements (i.e., *Fisheries Act*). Where impacts to fish or fish habitat cannot be avoided, consultation with Fisheries and Oceans Canada (DFO) may be required to determine if an authorization under the Act is required.

5.0 SUMMARY AND CONCLUSIONS

Based on the results of the natural environment screening assessment, there are locally and provincially important natural features within the study area and Sites of Interest. The desktop assessment has identified evaluated non-significant wetlands, PSWs, provincially significant ANSIs, fish habitat, features protected under the PPS and OPs, as well as waterbodies and watercourses under the regulation of the NPCA. A summary of the identified features, recommended setbacks and other mitigation measures are provided in Table 1.

The locally and provincially important natural features in the study area will be verified during field surveys, where possible, and assessed for potential impacts as part of the Schedule C Class EA. These features should be considered in the assessment of potential effects associated with the siting of all surface facilities, excavation areas, access roads and temporary construction infrastructure.

Table 1: Summary of Natural Heritage Constraints and Typical Setbacks

Natural Environment Feature	Responsible Agency ¹	Development Constraint	Setback ²	Setback Flexibility ³	Mitigation
Areas of Natural and Scientific Interest	City of Niagara Falls	Development within or adjacent (i.e., within 50 m) requires impact assessment	None	n/a	<ul style="list-style-type: none"> ■ Must demonstrate no adverse impacts to feature or function
Provincially Significant Wetland	NPCA and MNRF	Development within 120 m requires impact assessment	30 m	Negotiable	<ul style="list-style-type: none"> ■ No development permitted within Provincially Significant Wetland ■ Must demonstrate no adverse impacts to feature or function ■ Development proposed within 30-120 m may require a permit from the NPCA
NPCA Regulated Wetland (greater than 2 ha)	NPCA	Development within 120 m requires impact assessment	30 m	Negotiable	<ul style="list-style-type: none"> ■ Must demonstrate no adverse impacts to feature or function ■ Development proposed within wetland or regulated limits may require a permit from the NPCA
Locally Significant Wetland	NPCA	Development within 30 m requires impact assessment	30 m	Negotiable	<ul style="list-style-type: none"> ■ Must demonstrate no adverse impacts to feature or function ■ Development proposed within wetland or regulated limits may require a permit from the NPCA
NPCA Regulated Wetland (less than 2 ha)	NPCA	Development within 30 m requires impact assessment	30 m	Negotiable	<ul style="list-style-type: none"> ■ Must demonstrate no adverse impacts to feature or function ■ Development proposed within wetland or regulated limits may require a permit from the NPCA
Significant Woodland	City of Niagara Falls	Development within or adjacent (i.e., within 120 m) requires impact assessment	10 to 50 m	Negotiable	<ul style="list-style-type: none"> ■ Must demonstrate no adverse impacts to feature or function ■ Vegetated setback varies based on location (i.e., within or outside an area with a completed Watershed Plan)
Significant Valleyland	City of Niagara Falls	Development within or adjacent (i.e., within 50 m) requires impact assessment	7.5 m	Absolute	<ul style="list-style-type: none"> ■ Must demonstrate no adverse impacts to feature or function ■ Vegetated setback required from stable the top of bank
Significant Wildlife Habitat	City of Niagara Falls	Development within or adjacent (i.e., within 120 m) requires impact assessment	Varies	Negotiable	<ul style="list-style-type: none"> ■ Must demonstrate no adverse impacts to feature or function
Species at Risk - Endangered or Threatened Species	MECP	Development within or adjacent (i.e., within 120 m) requires impact assessment	Varies	Absolute	<ul style="list-style-type: none"> ■ No development permitted within habitat for endangered or threatened species ■ Must demonstrate no adverse impacts to species or its habitat ■ If species or habitat will be impacted, permitting under the <i>Endangered Species Act</i> may be required
NPCA Regulated Areas (watercourse or waterbody)	NPCA	Development within or adjacent (i.e., within 30 m) requires impact assessment	5 m	Absolute	<ul style="list-style-type: none"> ■ Development proposed within regulated limits may require a permit from the NPCA

Natural Environment Feature	Responsible Agency ¹	Development Constraint	Setback ²	Setback Flexibility ³	Mitigation
Fish Habitat	DFO	Development within or adjacent (i.e., within 30 m) requires impact assessment	10 m (warm/cool water) 15 m (coldwater)	Absolute	<ul style="list-style-type: none"> ■ Must demonstrate no adverse impacts to fish or fish habitat ■ If fish or fish habitat will be impacted, permitting under the <i>Fisheries Act</i> may be required

¹ NPCA = Niagara Peninsula Conservation Authority; MNR = Ministry of Natural Resources and Forestry (MNR); MECP = Ministry of Environment, Conservation and Parks; DFO = Fisheries and Oceans Canada

² Setbacks as recommended according to the following documents:

Niagara Peninsula Conservation Authority. 2018. NPCA Policy Document: Policies for the Administration of Ontario Regulation 155/06 and the Planning Act.

Niagara Falls, City of. 2017. City of Niagara Falls Official Plan.

³ Setback flexibility is defined as follows:

Negotiable – reduced setbacks may be negotiated with the responsible agency, typically through completion of an environmental impact study

Absolute – setbacks are generally not subject to negotiation, except where the proponent obtains appropriate permits from the responsible agency. Permits may not be available for all features.

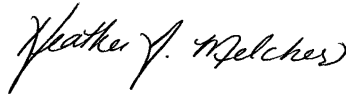
6.0 CLOSURE

We trust this report meets your current needs. If you have any questions, please contact the undersigned.



Amber Sabourin, HBSc (Env)
Ecologist

AVS/HM/mp



Heather Melcher, MSc
Principal, Senior Ecologist

Attachments: Figure 1 - Preliminary Natural Environment Constraints
Figure 2 – Sites of Interest Location Plan
Figure 3 – Land Use
Appendix A – Species at Risk Screening
Appendix B – Natural Environment Constraints for Sites of Interest

[https://golderassociates.sharepoint.com/sites/29902g/technical work/02_environmental/05_natural environment/constraints tech memo/final/18104462-tm-rev0-niagara wwtp-nat env constraints-30apr2020.docx](https://golderassociates.sharepoint.com/sites/29902g/technical%20work/02_environmental/05_natural%20environment/constraints%20tech%20memo/final/18104462-tm-rev0-niagara%20wwtp-nat%20env%20constraints-30apr2020.docx)

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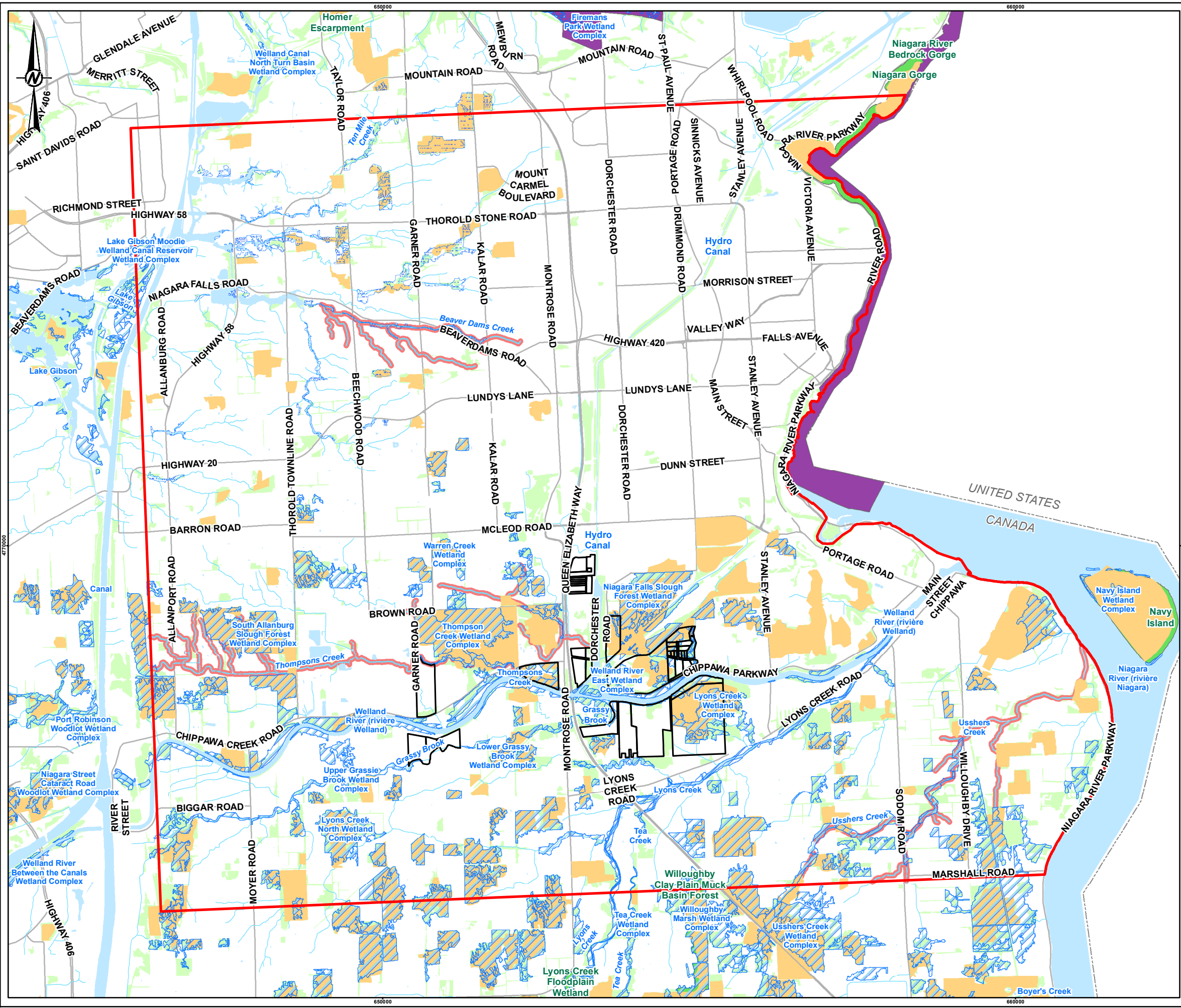
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FIGURES



LEGEND

- ROAD
- WATERCOURSE
- WARM WATER THERMAL REGIME
- SITES OF INTEREST
- REGIONAL STUDY AREA
- ANSI, EARTH SCIENCE
- ANSI, LIFE SCIENCE
- DEER WINTERING AREA
- WATERBODY
- WETLAND
- PROVINCIALY SIGNIFICANT WETLAND
- WOODED AREA



REFERENCE(S)

1. BASE DATA - MNRF LIO, OBTAINED 2019
2. PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY. © QUEENS PRINTER 2019
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
REGIONAL MUNICIPALITY OF NIAGARA

PROJECT
SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS
SCHEDULE C CLASS ENVIRONMENTAL ASSESSMENT

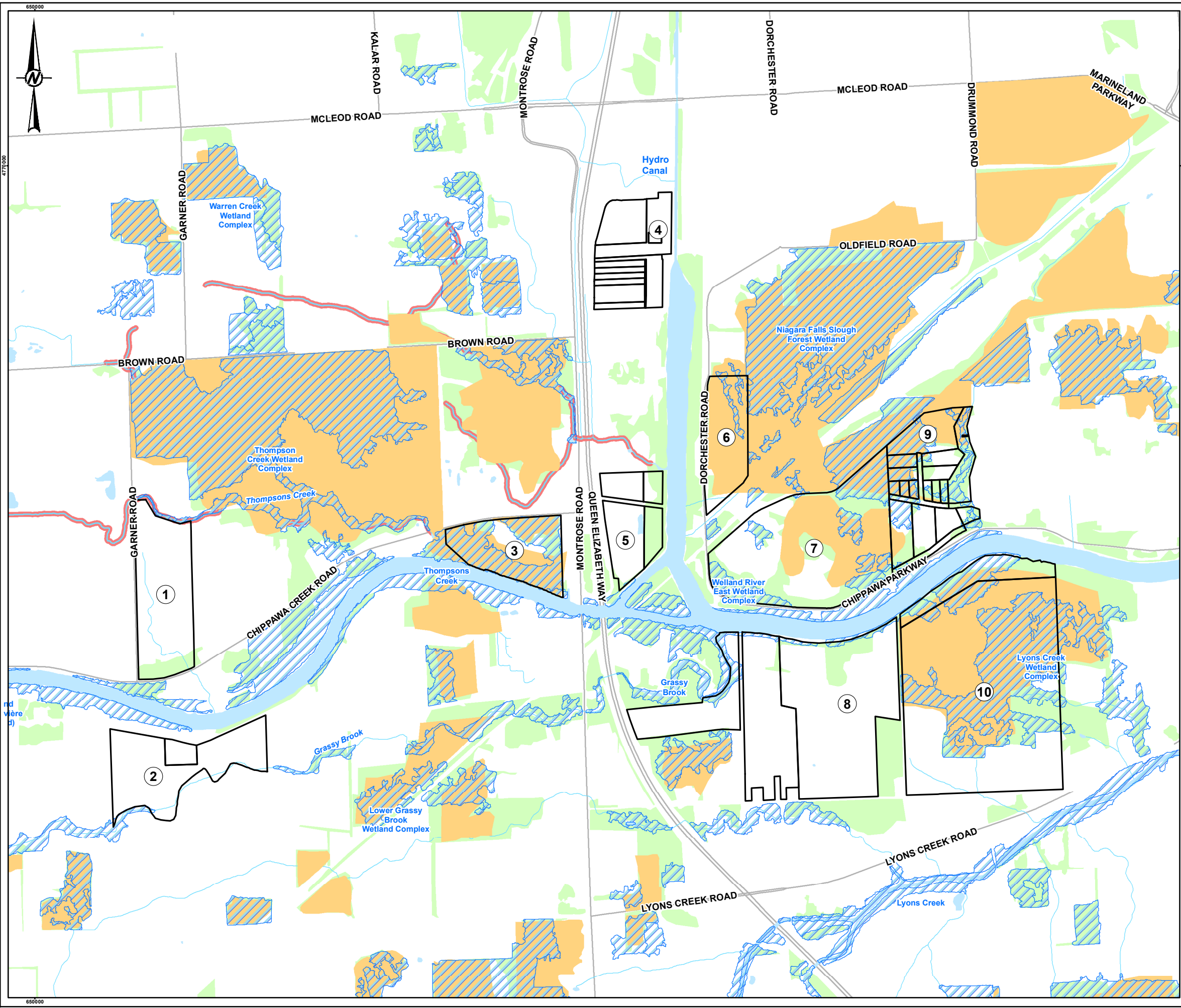
TITLE
PRELIMINARY NATURAL ENVIRONMENT CONSTRAINTS

CONSULTANT	DATE
DESIGNED	2020-04-27
PREPARED	PR
REVIEWED	AS
APPROVED	HM

PROJECT NO. 18104462 CONTROL 0001 REV. 0.0 FIGURE 1

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LEGEND

- ROAD
- WATERCOURSE
- WARM WATER THERMAL REGIME
- SITES OF INTEREST
- REGIONAL STUDY AREA
- DEER WINTERING AREA
- WATERBODY
- PROVINCIALY SIGNIFICANT WETLAND
- WOODED AREA



REFERENCE(S)

1. BASE DATA - MNRF LIO, OBTAINED 2019
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3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

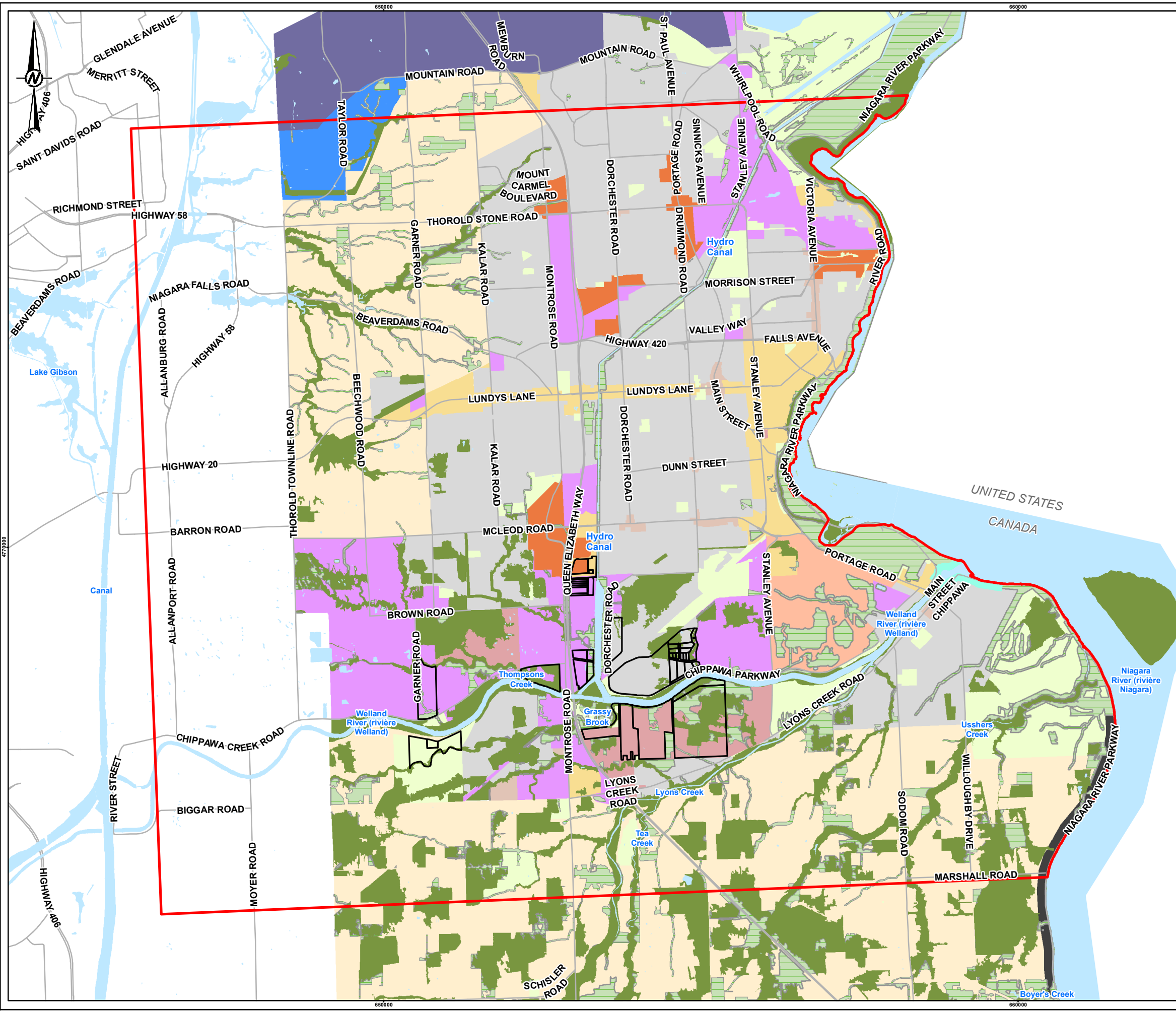
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REGIONAL MUNICIPALITY OF NIAGARA

PROJECT
SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS
SCHEDULE C CLASS ENVIRONMENTAL ASSESSMENT

TITLE
SITES OF INTEREST LOCATION PLAN

CONSULTANT	DATE	REVISION
GOLDER	2020-04-27	
DESIGNED		PR
PREPARED		PR
REVIEWED		AS
APPROVED		HM

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LEGEND

- ROAD
- SITES OF INTEREST
- REGIONAL STUDY AREA
- WATERBODY

LAND USE DESIGNATION

- ENVIRONMENTAL CONSERVATION AREA
- ENVIRONMENTAL PROTECTION AREA
- EXTRACTIVE INDUSTRIAL
- GOOD GENERAL AGRICULTURE
- INDUSTRIAL
- INTAKE PROTECTION ZONE IPZ-1
- MAJOR COMMERCIAL
- MINOR COMMERCIAL
- NIAGARA ESCARPMENT PLAN AREA
- OPEN SPACE
- PARKWAY RESIDENTIAL
- RESIDENTIAL
- RESORT COMMERCIAL
- THEME PARK MARINELAND
- TOURIST COMMERCIAL



REFERENCE(S)

1. BASE DATA - MNRF LIO, OBTAINED 2019
2. PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY. © QUEENS PRINTER 2019
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
REGIONAL MUNICIPALITY OF NIAGARA

PROJECT
SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS
SCHEDULE C CLASS ENVIRONMENTAL ASSESSMENT

TITLE
LAND USE

CONSULTANT	YYYY-MM-DD	2020-04-27
DESIGNED	PR	
PREPARED	PR	
REVIEWED	AS	
APPROVED	HM	

PROJECT NO. 18104462 CONTROL 0001 REV. 0.0 FIGURE 3

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APPENDIX A

Species at Risk Screening

Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Potential to Occur in the Study Area (Desktop)	Rationale for Potential to Occur in the Study Area (Desktop)	Survey Window
Allegheny mountain dusky salamander	<i>Desmognathus ochrophaeus</i>	END	END	END	S1	In Ontario, Allegheny mountain dusky salamander has only been found in the Niagara River gorge, so it is at the edge of its range in Ontario. This salamander species is generally found near forested brooks, gorge cascades, springs, or seeps. It uses this habitat to forage, as well as for overwintering and brooding. In winter they seek out flowing water where they remain active as long as the substrate is unfrozen (Markle et al. 2013).	Moderate	Forested streams and seeps associated with the Whirlpool of the Niagara River gorge at the northeastern edge of the study area, may provide suitable breeding, foraging and overwintering habitat for this species. There is a recent NHIC occurrence record (2011) within 1 km of the study area.	May - Sep
Jefferson salamander	<i>Ambystoma jeffersonianum</i>	END	END	END	S2	In Ontario, Jefferson salamander is found only in southern Ontario, along southern portions of the Niagara Escarpment and western portions of the Oak Ridges Moraine. Jefferson salamander prefers moist, well-drained deciduous and mixed forests with a closed canopy. It overwinters underground in mammal burrows and rock fissures, and moves to vernal pools and ephemeral wetlands in the early spring to breed. Breeding ponds are typically located in or near to forested habitats, and contain submerged debris (i.e. sticks, vegetation) for egg attachment sites. Ephemeral breeding pools need to have water until at least mid-summer (mid to late July) (Jefferson Salamander Recovery Team 2010).	Moderate	Wetlands and ponds in or adjacent to forests within the study area may provide suitable breeding habitat for this species, including around the Sites of Interest (i.e., 3). Mammal burrows and rock fissures in forests within the study area may provide suitable overwintering habitat, including around the Sites of Interest.	May - Sep
Northern dusky salamander	<i>Desmognathus fuscus</i>	END	END	END	S1	In Ontario, northern dusky salamander is restricted to two sites a few kilometres apart in streams in the Niagara Gorge, downstream of Niagara Falls. Adults are terrestrial and inhabit wooded or partly wooded terrain, but are always found in very close proximity to streams or seepage areas. They inhabit damp areas under leaves, rocks, and logs near streams. They can remain active all winter where moving water prevents freezing of the substrate (Markle et al. 2013).	Moderate	Forested streams and seeps associated with Niagara River gorge at the northeast corner of the study area, may provide suitable breeding, foraging and overwintering habitat for this species.	May - Sep
Monarch	<i>Danaus plexippus</i>	SC	SC	END	S2N, S4B	In Ontario, monarch is found throughout the northern and southern regions of the province. This butterfly is found wherever there are milkweed (<i>Asclepias</i> spp.) plants for its caterpillars and wildflowers that supply a nectar source for adults. It is often found on abandoned farmland, meadows, open wetlands, prairies and roadsides, but also in city gardens and parks. Important staging areas during migration occur along the north shores of the Great Lakes (COSEWIC 2010).	Moderate	Farmland, meadows, open wetlands, roadsides, and urban gardens within the study area may provide suitable breeding and foraging habitat for this species, including around the Sites of Interest (i.e., 1-3, 5, 7, 8, 10, 11).	May - Sep
Mottled duskywing	<i>Erynnis martialis</i>	END	—	END	S2	In Ontario, the mottled duskywing is found in the same habitat as its food plant <i>Ceanothus</i> spp. open or partially open, dry, sandy areas, or limestone alvars. These habitats are relatively uncommon and include dry open pine and pine oak woodland, other open dry woodlands, alvars, savannah and other dry open sandy habitats. Usually seen nectaring on wildflowers, or on wet sandy roads in the company of other duskywing species (Linton 2015).	Low	There are only historical records for this species in the vicinity of the study area (Butterfly Atlas 2019).	n/a

Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Potential to Occur in the Study Area (Desktop)	Rationale for Potential to Occur in the Study Area (Desktop)	Survey Window
Rusty-patched bumble bee	<i>Bombus affinis</i>	END	END	END	S1	In Ontario, rusty-patched bumble bee is found in areas from the southern Great Lakes – St. Lawrence forest region southwards into the Carolinian forest. It is a habitat generalist, but it is typically found in open habitats, such as mixed farmland, savannah, marshes, sand dunes, urban and lightly wooded areas. It is cold – tolerant and can be found at high elevations. Most recent sightings in Ontario have been in oak savannah habitat with well-drained, sandy soils and moderately open canopy. It requires an abundance of flowering plants for forage. This species most often builds nests underground in old rodent burrows, but also in hollow tree stumps and fallen dead wood (Colla and Taylor-Pindar 2011). The only recent sightings in Ontario are from the Pinery Provincial Park.	Low	The only recent sightings in Ontario are from the Pinery Provincial Park.	n/a
Yellow-banded bumble bee	<i>Bombus terricola</i>	SC	SC	SC	S2	This species is a forage and habitat generalist. Mixed woodlands are commonly used for nesting and overwintering, but it also occupies various open habitats including native grasslands, farmlands and urban areas. It is an early emerging species, making it likely an important pollinator of early blooming wild flowering plants (e.g. wild blueberry) and agricultural crops (e.g., apple). Nest sites are mostly abandoned rodent burrows (COSEWIC 2015).	Moderate	Mixed woodlands, grasslands, farmlands, and urban areas may provide suitable nesting and overwintering habitat for this species, including on the Sites of Interest (i.e., 1-3, 5-11)	May - Sep
Acadian flycatcher	<i>Empidonax virescens</i>	END	END	END	S2S3B	In Ontario, Acadian flycatcher breeds in the understory of large, mature, closed-canopy forests, swamps and forested ravines. This bird prefers forests greater than 40 ha in size, and exhibits edge sensitivity preferring the deep interior of the forest. Its nest is loosely woven and placed near the tip of branch in a small tree or shrub often, but not always, near water (Whitehead and Taylor 2002).	Moderate	Large forest blocks within the study area and on the Sites of Interest (i.e., 3, 5-7, 9-11) may provide suitable nesting habitat for this species.	May - Sep
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC	—	NAR	S2N,S4B	In Ontario, bald eagle nests are typically found near the shorelines of lakes or large rivers, often on forested islands. The large, conspicuous nests are typically found in large super-canopy trees along water bodies (Buehler 2000).	Moderate	Super-canopy trees along the Niagara Gorge and along the Niagara River or Welland River (adjacent to several Sites of Interest) may provide suitable nesting habitat for this species.	May - Sep
Bank swallow	<i>Riparia riparia</i>	THR	THR	THR	S4B	In Ontario, bank swallow breeds in a variety of natural and anthropogenic habitats, including lake bluffs, stream and river banks, sand and gravel pits, and roadcuts. Nests are generally built in a vertical or near-vertical bank. Breeding sites are typically located near open foraging sites such as rivers, lakes, grasslands, agricultural fields, wetlands and riparian woods. Forested areas are generally avoided (Garrison 1999).	Moderate	Stream and river banks, sand and gravel pits, and roadcuts within the study area may provide suitable habitat for this species. There appears to be low potential for nesting features on the Sites of Interest based on aerial imagery.	May - Sep
Barn owl	<i>Tyto alba</i>	END	END	END	S1	In Ontario, barn owl breeding habitat consists of open countryside, with a preference for pastures, hayfields, marshes and grassy roadsides. Suitable habitat contains suitable nesting sites and adequate mice and vole populations. Nesting occurs in a wide variety of human made structures including barns and nest boxes, as well as natural sites such as hollow trees and cavities in cliffs and riverbanks (Marti et al. 2005). In Ontario, anthropogenic nest sites such as barns may be preferred (COSEWIC 2010).	Moderate	Barns, grasslands, and marshes within the study area and on the Sites of Interest (1, 2, 4, 5, 8) may provide suitable nesting habitat for this species.	May - Sep

Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Potential to Occur in the Study Area (Desktop)	Rationale for Potential to Occur in the Study Area (Desktop)	Survey Window
Barn swallow	<i>Hirundo rustica</i>	THR	THR	THR	S4B	In Ontario, barn swallow breeds in areas that contain a suitable nesting structure, open areas for foraging, and a body of water. This species nests in human made structures including barns, buildings, sheds, bridges, and culverts. Preferred foraging habitat includes grassy fields, pastures, agricultural cropland, lake and river shorelines, cleared right-of-ways, and wetlands (COSEWIC 2011). Mud nests are fastened to vertical walls or built on a ledge underneath an overhang. Suitable nests from previous years are reused (Brown and Brown 1999).	Moderate	Barns, buildings, sheds, bridges, and culverts within the study area and on the Sites of Interest (1, 2, 4, 5, 8) may provide suitable nesting habitat for this species.	May - Sep
Bobolink	<i>Dolichonyx oryzivorus</i>	THR	THR	THR	S4B	In Ontario, bobolink breeds in grasslands or graminoid dominated hayfields with tall vegetation (Gabhauer 2007). Bobolink prefers grassland habitat with a forb component and a moderate litter layer. They have low tolerance for presence of woody vegetation and are sensitive to frequent mowing within the breeding season. They are most abundant in established, but regularly maintained, hayfields, but also breed in lightly grazed pastures, old or fallow fields, cultural meadows and newly planted hayfields. Their nest is woven from grasses and forbs. It is built on the ground, in dense vegetation, usually under the cover of one or more forbs (Renfrew et al. 2015).	Moderate	Grasslands with tall vegetation, particularly hayfields, within the study area and on the Sites of Interest (i.e., 1, 2, 8, 10) may provide suitable nesting habitat for this species.	May - Sep
Canada warbler	<i>Cardellina canadensis</i>	SC	THR	THR	S4B	In Ontario, breeding habitat for Canada warbler consists of moist mixed forests with a well-developed shrubby understory. This includes low-lying areas such as cedar and alder swamps, and riparian thickets (McLaren 2007). It is also found in densely vegetated regenerating forest openings. Suitable habitat often contains a developed moss layer and an uneven forest floor. Nests are well concealed on or near the ground in dense shrub or fern cover, often in stumps, fallen logs, overhanging stream banks or mossy hummocks (Reitsma et al. 2010).	Moderate	Swamps and riparian thickets within the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable nesting habitat for this species.	May - Sep
Cerulean warbler	<i>Setophaga cerulea</i>	THR	END	END	S3B	In Ontario, breeding habitat of cerulean warbler consists of second-growth or mature deciduous forest with a tall canopy of uneven vertical structure and a sparse understory. This habitat occurs in both wet bottomland forests and upland areas, and often contains large hickory and oak trees. This species may be attracted to gaps or openings in the upper canopy. The cerulean warbler is associated with large forest tracks, but may occur in woodlots as small as 10 ha (COSEWIC 2010). Nests are usually built on a horizontal limb in the mid-story or canopy of a large deciduous tree (Buehler et al. 2013).	Moderate	Large forest blocks within the study area and on the Sites of Interest (i.e., 3, 5-11) may provide suitable nesting habitat for this species.	May - Sep
Chimney swift	<i>Chaetura pelagica</i>	THR	THR	THR	S4B, S4N	In Ontario, chimney swift breeding habitat is varied and includes urban, suburban, rural and wooded sites. They are most commonly associated with towns and cities with large concentrations of chimneys. Preferred nesting sites are dark, sheltered spots with a vertical surface to which the bird can grip. Unused chimneys are the primary nesting and roosting structure, but other anthropogenic structures and large diameter cavity trees are also used (COSEWIC 2007).	Moderate	Open chimneys within the study area may provide suitable anthropogenic nesting areas, while large diameter cavity trees within large forest blocks in the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable natural nesting habitat.	May - Sep
Common nighthawk	<i>Chordeiles minor</i>	SC	THR	SC	S4B	In Ontario, these aerial foragers require areas with large open habitat. This includes farmland, open woodlands, clearcuts, burns, rock outcrops, alvars, bogs, fens, prairies, gravel pits and gravel rooftops in cities (Sandilands 2007)	Moderate	Open areas such as farmland, open woodlands, rock outcrops, wetlands, and gravel-covered surfaces in the study area and on the Sites of Interest (i.e., 1, 3, 7, 11) may provide suitable nesting habitat.	May - Sep

Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Potential to Occur in the Study Area (Desktop)	Rationale for Potential to Occur in the Study Area (Desktop)	Survey Window
Eastern meadowlark	<i>Sturnella magna</i>	THR	THR	THR	S4B	In Ontario, eastern meadowlark breeds in pastures, hayfields, meadows and old fields. Eastern meadowlark prefers moderately tall grasslands with abundant litter cover, high grass proportion, and a forb component (Hull 2003). They prefer well drained sites or slopes, and sites with different cover layers (Roseberry and Klimstra 1970).	Moderate	Grasslands with tall vegetation, particularly hayfields, within the study area and on the Sites of Interest (i.e., 1, 2, 8, 10) may provide suitable nesting habitat for this species. There is a recent NHIC occurrence record (2008) within 1 km of the study area.	May - Sep
Eastern whip-poor-will	<i>Antrostomus vociferus</i>	THR	THR	THR	S4B	In Ontario, whip-poor-will breeds in semi-open forests with little ground cover. Breeding habitat is dependent on forest structure rather than species composition, and is found on rock and sand barrens, open conifer plantations and post-disturbance regenerating forest. Territory size ranges from 3 to 11 ha (COSEWIC 2009). No nest is constructed and eggs are laid directly on the leaf litter (Mills 2007).	Moderate	Rock and sand barrens, conifer plantations and regenerating forest within the study area and on the Sites of Interest (i.e., 7, 9, 11) may provide suitable nesting habitat.	May - Sep
Eastern wood-pewee	<i>Contopus virens</i>	SC	SC	SC	S4B	In Ontario, eastern wood-pewee inhabits a wide variety of wooded upland and lowland habitats, including deciduous, coniferous, or mixed forests. It occurs most frequently in forests with some degree of openness. Intermediate-aged forests with a relatively sparse midstory are preferred. In younger forests with a relatively dense midstory, it tends to inhabit the edges. Also occurs in anthropogenic habitats providing an open forested aspect such as parks and suburban neighborhoods. Nest is constructed atop a horizontal branch, 1-2 m above the ground, in a wide variety of deciduous and coniferous trees (COSEWIC 2012).	Moderate	Forest blocks and treed urban and rural areas within the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable nesting habitat for this species.	May - Sep
Golden-winged warbler	<i>Vermivora chrysoptera</i>	SC	THR	THR	S4B	In Ontario, golden-winged warbler breeds in regenerating scrub habitat with dense ground cover and a patchwork of shrubs, usually surrounded by forest. Their preferred habitat is characteristic of a successional landscape associated with natural or anthropogenic disturbance such as rights-of-way, and field edges or openings resulting from logging or burning. The nest of the golden-winged warbler is built on the ground at the base of a shrub or leafy plant, often at the shaded edge of the forest or at the edge of a forest opening (Confer et al. 2011).	Low	Although scrub habitat in the study area may provide suitable habitat for this species, there are no recent occurrence records in the vicinity of the study area (eBird 2019).	n/a
Grasshopper sparrow <i>pratensis</i> subspecies	<i>Ammodramus savannarum</i> (<i>pratensis</i> subspecies)	SC	SC	SC	S4B	In Ontario, grasshopper sparrow is found in medium to large grasslands with low herbaceous cover and few shrubs. It also uses a wide variety of agricultural fields, including cereal crops and pastures. Close-grazed pastures and limestone plains (e.g. Carden and Napanee Plains) support highest density of this bird in the province (COSEWIC 2013).	Moderate	Grasslands with low herbaceous cover within the study area and on the Sites of Interest (i.e., 1, 2, 8, 10) may provide suitable nesting habitat for this species.	May - Sep
Henslow's sparrow	<i>Ammodramus henslowii</i>	END	END	END	SHB	In Ontario, Henslow's sparrow breeds in large grasslands with low disturbance, such as lightly grazed and ungrazed pastures, fallow hayfields, grassy swales in open farmland, and wet meadows. Preferred habitat contains tall, dense grass cover, typically over 30 cm high, with a high percentage of ground cover, and a thick mat of dead plant material. Henslow's sparrow generally avoids areas with emergent woody shrubs or trees, and fence lines. Areas of standing water or ephemerally wet patches appear to be important. This species breeds more frequently in patches of habitat greater than 30 ha and preferably greater than 100 ha (COSEWIC 2011).	Low	Although grasslands in the study area may provide suitable habitat for this species, there are no recent occurrence records in the vicinity of the study area (eBird 2019).	n/a

Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Potential to Occur in the Study Area (Desktop)	Rationale for Potential to Occur in the Study Area (Desktop)	Survey Window
Least bittern	<i>Ixobrychus exilis</i>	THR	THR	THR	S4B	In Ontario, least bittern breeds in marshes, usually greater than 5 ha, with emergent vegetation, relatively stable water levels and areas of open water. Preferred habitat has water less than 1 m deep (usually 10 – 50 cm). Nests are built in tall stands of dense emergent or woody vegetation (Woodliffe 2007). Clarity of water is important as siltation, turbidity, or excessive eutrophication hinders foraging efficiency (COSEWIC 2009).	Moderate	Large marshes in the study area may provide suitable nesting habitat. There does not appear to be any suitable marsh habitat on or around the Sites of Interest.	May - Sep
Louisiana waterthrush	<i>Parkesia motacilla</i> (formerly <i>Seiurus motacilla</i>)	THR	THR	THR	S3B	In Ontario, Louisiana waterthrush inhabits mature forests along steeply sloped ravines adjacent to running water. It prefers clear, cold streams and densely wooded swamps. Trees, bushes, exposed roots, cliffs, banks and mossy logs are favoured nesting spots. Riparian woodlands are preferred stopover sites during migration. Nests are concealed from view at the base of uprooted trees, among mosses, or under logs and in cavities along the stream bank (COSEWIC 2006).	Moderate	Large swamps and forested ravines within the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable nesting habitat.	May - Sep
Northern bobwhite	<i>Colinus virginianus</i>	END	END	END	S1	In Ontario, northern bobwhite breeds in early successional habitats. This species requires a combination of three habitat types: woody cover, cropland and grassland. Croplands provide foraging habitat, grassland and fields are used for nesting, and dense brush provides both winter forage and year round cover. These birds nest on the ground in a shallow depression lined with grasses and other dead vegetation (Brennan et al. 2014).	Low	Although there are areas of grassland, cropland, and woodland that could potentially provide suitable habitat for this species, there are no recent records in the vicinity of the study area (eBird 2019).	n/a
Peregrine falcon (anatum / tundrius subspecies)	<i>Falco peregrinus anatum/tundrius</i>	SC	SC	NAR	S3B	In Ontario, peregrine falcon breeds in areas containing suitable nesting locations and sufficient prey resources. Such habitat includes both natural locations containing cliff faces (heights of 50 - 200 m preferred) and also anthropogenic landscapes including urban centres containing tall buildings, open pit mines and quarries, and road cuts. Peregrine falcons nest on cliff ledges and crevices and building ledges. Nests consist of a simple scrape in the substrate (COSEWIC 2007).	Moderate	Cliff faces, such as the escarpment along the Niagara River, and tall buildings within the study area may provide suitable nesting habitat. There does not appear to be any suitable cliffs or tall buildings on or around the Sites of Interest.	May - Sep
Prothonotary warbler	<i>Protonotaria citrea</i>	END	END	END	S1B	In Ontario, prothonotary warbler breeds in mature and semi-mature, deciduous swamp forest with a closed canopy, and large expanses of relatively deep, open standing water. Swamps are typically dominated by silver maple, black ash, yellow birch, and black gum. These birds nest in tree cavities, favouring small, shallow holes often situated at low heights in dead or dying trees. Nests are typically situated over standing or slow-moving water. Artificial nest boxes are also readily accepted. This species is area sensitive and is seldom found in forests less than 100 ha in size (COSEWIC 2007).	Low	Although there are deciduous swamps in the study area that could potentially provide habitat for this species, there are no recent records in the vicinity of the study area (eBird 2019).	n/a
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	SC	THR	END	S4B	In Ontario, red-headed woodpecker breeds in open, deciduous woodlands or woodland edges and are often found in parks, cemeteries, golf courses, orchards and savannahs (Woodliffe 2007). They may also breed in forest clearings or open agricultural areas provided that large trees are available for nesting. They prefer forests with little or no understory vegetation. They are often associated with beech or oak forests, beaver ponds and swamp forests where snags are numerous. Nests are excavated in the trunks of large dead trees (Smith et al. 2000).	Moderate	Forests and treed urban and rural areas within the study area and on the Sites of Interest (i.e., 1, 3, 5, 7-11) may provide suitable nesting habitat for this species.	May - Sep

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Wood thrush	<i>Hylocichla mustelina</i>	SC	THR	THR	S4B	In Ontario, wood thrush breeds in moist, deciduous hardwood or mixed stands that are often previously disturbed, with a dense deciduous undergrowth and with tall trees for singing perches. This species selects nesting sites with the following characteristics: lower elevations with trees less than 16 m in height, a closed canopy cover (>70%), a high variety of deciduous tree species, moderate subcanopy and shrub density, shade, fairly open forest floor, moist soil, and decaying leaf litter (COSEWIC 2012).	Moderate	Large forest blocks within the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable nesting habitat for this species. In addition, there are multiple occurrence records within the study area (eBird 2019).	May - Sep
Yellow-breasted chat	<i>Icteria virens virens</i>	END	END	END	S2B	In Ontario, yellow-breasted chat breeds in early successional, shrub-thicket habitats including woodland edges, regenerating old fields, railway and hydro right-of-ways, young coniferous reforestations, and wet thickets bordering wetlands. Tangles of grape (<i>Vitis</i> spp.) and raspberry (<i>Rubus</i> spp.) vines are features of most breeding sites. There is some evidence that the yellow-breasted chat is an area sensitive species. Nests are located in dense shrubbery near to the ground (COSEWIC 2011).	Low	Although shrub thicket habitats in the study area may provide suitable nesting habitat, there are no recent occurrence records in the vicinity of the study area (eBird 2019).	n/a
American eel	<i>Anguilla rostrata</i>	END	—	THR	S1?	In Ontario, American eel is native to the Lake Ontario, St. Lawrence River and Ottawa River watersheds. Their current distribution includes lakes Huron, Erie, and Superior and their tributaries. The Ottawa River population is considered extirpated. The preferred habitat of the American eel is cool water of lakes and streams with muddy or silty substrates in water temperatures between 16 and 19°C. The American eel is a catadromous fish that lives in fresh water until sexual maturity then migrates to the Sargasso Sea to spawn (Burridge et al. 2010; Eakins 2016).	Moderate	Niagara River at the east edge of the study area may provide suitable habitat for this species. Watercourses connected to the Niagara River, including the Welland River (adjacent to several Sites of Interest), may also provide suitable habitat.	May - Sep
Grass pickerel	<i>Esox americanus ssp. vermiculatus</i>	SC	SC	SC	S3	In Ontario, grass pickerel is found in Lake Huron, Lake St. Clair, Lake Erie, Niagara River, Lake Ontario and St. Lawrence River and their tributaries, and an isolated population occurs in the Severn River system. This fish species is found in warm, slow moving streams and shallow bays of lakes. It prefers clear to tea-coloured water and dense aquatic vegetation. The grass pickerel typically occurs over mud substrates, but has also been found over rock and gravel. Spawning occurs in vegetated areas of streams and lakes (COSEWIC 2005).	Moderate	Niagara River and its tributaries within the study area, may provide suitable habitat for this species. DFO SAR mapping shows habitat, or potential habitat, within the Niagara River and its tributaries within the study area.	May - Sep
Lake chubsucker	<i>Erimyzon sucetta</i>	THR	END	END	S2	In Ontario, lake chubsucker, a small species of freshwater sucker, occurs in Lake Erie, Lake Huron, Lake St. Clair, the Niagara and their tributaries. They prefer clear, slow-moving to still waters with dense vegetation over substrates of gravel, clay, sand and silt mixed with organic debris. These habitats are often found in backwaters, bayous, drainage ditches, floodplain lakes, marshes, oxbows, sloughs and wetlands. This is a warm-water fish species. Spawning sites in the Great Lakes includes shallow waters of bays, the lower reaches of tributaries, ponds and marshes (MNR 2012).	Moderate	Niagara River and its tributaries within the study area may provide suitable habitat for this species. DFO SAR mapping shows habitat, or potential habitat, within various tributaries within the study area.	May - Sep

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Lake sturgeon - Great Lakes / Upper St. Lawrence population	<i>Acipenser fulvescens</i>	END	—	THR	S2	In Ontario, lake sturgeon, a large prehistoric freshwater fish, is found in all the Great Lakes and in all drainages of the Great Lakes and of Hudson Bay. This species typically inhabits highly productive shoal areas of large lakes and rivers. They are bottom dwellers, and prefer depths between 5-10 m and mud or gravel substrates. Small sturgeons are often found on gravelly shoals near the mouths of rivers. They spawn in depths of 0.5 to 4.5 m in areas of swift water or rapids. Where suitable spawning rivers are not available, such as in the lower Great Lakes, they are known to spawn in wave action over rocky ledges or around rocky islands (Golder 2011).	Moderate	Niagara River at the east edge of the study area may provide suitable habitat for this species. There is a recent NHIC occurrence record (2011) within 1 km of the study area.	May - Sep
Eastern small-footed myotis	<i>Myotis leibii</i>	END	—	—	S2S3	This species is not known to roost within trees, but there is very little known about its roosting habits. The species generally roosts on the ground under rocks, in rock crevices, talus slopes and rock piles. It occasionally inhabits buildings. Areas near the entrances of caves or abandoned mines may be used for hibernaculum, where the conditions are drafty with low humidity, and may be subfreezing (Humphrey 2017).	Moderate	Rocks, rock crevices, talus slopes, and rock piles in the study area and on the Sites of Interest (i.e., 3, 5-11) may provide suitable roosting habitat for this species. In addition, due to the presence of the escarpment in the study area, there is potential for in cave hibernacula in the study area.	May - Sep
Gray fox	<i>Urocyon cinereoargenteus</i>	THR	THR	THR	S1	While the Ontario range of this species extends across much of southern and southeastern Ontario, the only known population in the province is on Pelee Island, with very rare sightings elsewhere in the province at points close to the border with the United States. This species inhabits deciduous forests and marshes, and will den in a variety of features including rock outcroppings, hollow trees, burrows or brush piles, usually where dense brush provides cover and in close proximity to water. This species is considered a habitat generalist (COSEWIC 2015).	Low	The only known population in the province is on Pelee Island.	n/a
Little brown myotis	<i>Myotis lucifugus</i>	END	END	END	S4	In Ontario, this species' range is extensive and covers much of the province. It will roost in both natural and man-made structures. Roosting colonies require a number of large dead trees, in specific stages of decay and that project above the canopy in relatively open areas. May form nursery colonies in the attics of buildings within 1 km of water. Caves or abandoned mines may be used as hibernacula, but high humidity and stable above freezing temperatures are required (Environment Canada 2015).	Moderate	Large blocks of forest in the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable roosting habitat. In addition, due to the presence of the escarpment in the study area, there is potential for in cave hibernacula in the study area.	May - Sep
Northern myotis	<i>Myotis septentrionalis</i>	END	END	END	S3	In Ontario, this species' range is extensive and covers much of the province. It will usually roost in hollows, crevices, and under loose bark of mature trees. Roosts may be established in the main trunk or a large branch of either living or dead trees. Caves or abandoned mines may be used as hibernacula, but high humidity and stable above freezing temperatures are required (Environment Canada 2015).	Moderate	Large blocks of forest in the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable roosting habitat. In addition, due to the presence of the escarpment in the study area, there is potential for in cave hibernacula in the study area.	May - Sep
Tri-colored bat	<i>Perimyotis subflavus</i>	END	END	END	S3?	In Ontario, tri-colored bat may roost in foliage, in clumps of old leaves, hanging moss or squirrel nests. They are occasionally found in buildings although there are no records of this in Canada. They typically feed over aquatic areas with an affinity to large-bodied water and will likely roost in close proximity to these. Hibernation sites are found deep within caves or mines in areas of relatively warm temperatures. These bats have strong roost fidelity to their winter hibernation sites and may choose the exact same spot in a cave or mine from year to year (Environment Canada 2015).	Moderate	Large blocks of forest in the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable roosting habitat. In addition, due to the presence of the escarpment in the study area, there is potential for in cave hibernacula in the study area.	May - Sep

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Woodland vole	<i>Microtus pinetorum</i>	SC	SC	SC	S3?	In Ontario, woodland vole is associated with mature deciduous forests with soft, often sandy soils and a deep litter and humic layer, suitable for burrowing. Common associates include oaks, hickory, black walnut, American beech and tulip tree. This species is often found at woodland edges near roads, railway tracks and field edges. Woodland vole is restricted to the Carolinian forest zone (COSEWIC 2010).	Moderate	Deciduous forests in the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable habitat for this species.	May - Sep
Eastern pondmussel	<i>Ligumia nasuta</i>	SC	SC	END	S1	In Ontario, the preferred habitat of eastern pondmussel is sheltered areas of lakes or slow streams in substrates of fine sand and mud at depths of 0.3 to 4.5 m (COSEWIC 2017). Two currently known populations: one in the delta area of Lake St. Clair and the second in Lyn Creek, a small tributary of the upper St. Lawrence River.	Low	This species is no longer known to exist in the vicinity of the study area (COSEWIC 2017).	n/a
Fawnsfoot	<i>Truncilla donaciformis</i>	END	END	END	S2	In Ontario, fawnsfoot only occurs in the Great Lakes drainage. Fawnsfoot inhabits medium and large rivers with moderate to slow-flowing water. It is usually found in shallow waters (1-5 m deep) with gravel, sand or muddy bottoms (COSEWIC 2008).	Low	This species is no longer known to exist in the vicinity of the study area (COSEWIC 2008).	n/a
Kidneyshell	<i>Ptychobranthus fasciolaris</i>	END	END	END	S1	The kidneyshell is most often found in small to medium-sized rivers and streams, where it prefers shallow areas with clear, swift-flowing water and substrates of firmly packed coarse gravel and sand. It is rarely found in either large rivers or headwater creeks, but has been found on gravel shoals in Lake Erie and Lake St. Clair. It is often found near beds of water willow, an aquatic plant. It is usually found deeply buried in the substrate (Morris 2010).	Moderate	DFO SAR mapping shows habitat, or potential habitat, within various tributaries within the study area.	May - Sep
Mapleleaf	<i>Quadrula quadrula</i>	SC	SC	SC	S2	In Ontario, the mapleleaf is usually found in medium to large rivers with slow to moderate currents and firmly packed substrate of sand, coarse gravel or clay/mud. It may also occur in shallow lakes, big river embayments and deep river impoundments (COSEWIC 2016).	Low	This species is no longer known to exist in the vicinity of the study area (COSEWIC 2016).	n/a
Round hickorynut	<i>Obovaria subrotunda</i>	END	END	END	S1	In Ontario, round hickorynut is found in medium to large-sized rivers and shallow lake delta regions of Lakes Erie and St. Clair. Preferred habitat is generally described as freshwater with steady, moderate flows and sand or gravel bottoms, at depths of up to 2 m. In Lake St. Clair, it currently occupies shallow (<1 m), near-shore areas with firm, sandy substrates (Morris 2010).	Moderate	DFO SAR mapping shows habitat, or potential habitat, within various tributaries within the study area.	May - Sep
Round pigtoe	<i>Pleurobema sintoxia</i>	END	END	END	S1	In Ontario, round pigtoe is found in medium to large rivers, and occasionally in lakes. In smaller rivers, this species is often found in areas of moderate flow below riffles, and buried in substrates of gravel, cobble and boulder. In larger rivers, it is found in mud, sand and gravel at varying depths. It also occurs on sand and gravel bars (Morris and Burrige 2010).	Low	Although DFO SAR mapping shows habitat, or potential habitat, within the Niagara River and its tributaries within the study area, this species is no longer known to exist in the vicinity of the study area (Morris and Burrige 2010).	n/a
Spoon-leaved moss	<i>Bryoandersonia illecebra</i>	END	END	END	S2	While historic Ontario locations for spoon-leaved moss have included cedar swamps, deciduous forests, pine plantations, and areas of hawthorn and juniper scrub, extant Canadian colonies are confined to soil that is in or near flat, low-lying, seasonally wet areas. Although it can grow on rocks or tree bases, all known colonies of spoon-leaved moss in southern Ontario have been on soil (COSEWIC 2017). This species is restricted to a few sites in Elgin, Essex and Welland counties, as well as the Niagara Region.	Moderate	Low-lying forests in the study area and on the Sites of Interest (i.e., 3, 6, 7, 9, 10) may provide suitable habitat for this species.	May - Sep

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Blanding's turtle - Great Lakes / St. Lawrence population	<i>Emydoidea blandingii</i>	THR	THR	END	S3	In Ontario, Blanding's turtle will use a range of aquatic habitats, but favor those with shallow, standing or slow-moving water, rich nutrient levels, organic substrates and abundant aquatic vegetation. They will use rivers, but prefer slow-moving currents and are likely only transients in this type of habitat. This species is known to travel great distances over land in the spring in order to reach nesting sites, which can include dry conifer or mixed forests, partially vegetated fields, and roadsides. Suitable nesting substrates include organic soils, sands, gravel and cobble. They hibernate underwater and infrequently under debris close to water bodies (COSEWIC 2016).	Moderate	Large wetlands in the study area and on the Sites of Interest (i.e., 3) may provide suitable habitat for this species.	May - Sep
Eastern hog-nosed snake	<i>Heterodon platirhinos</i>	THR	THR	THR	S3	Eastern hog-nosed snake can be classified as a habitat generalist as it uses a variety of habitats across its range. In Ontario, this snake typically uses habitat with open vegetation cover, including open woodlands, wetlands, fields, forest edges, beaches and dunes, and disturbed sites, most often near water. In the Georgian Bay area, disturbed fields, rock barrens and forests appear to be preferred habitats. This species relies on sandy well drained soils. Hibernation occurs in sandy soils below the frost line. This species has been observed excavating hibernation sites in mixed intolerant upland forests. Nesting and oviposition has been noted in upland sandy areas and rock outcrops under large flat rocks. The majority of their diet is comprised of American toad and Fowler's toad (Kraus 2011).	Moderate	Wetlands, forests, and fields in the study area and on the Sites of Interest (i.e., 3, 7, 9, 10) may provide suitable habitat for this species.	May - Sep
Eastern ribbonsnake - Great Lakes population	<i>Thamnophis sauritus</i>	SC	SC	SC	S4	In Ontario, eastern ribbonsnake is semi-aquatic, and is rarely found far from shallow ponds, marshes, bogs, streams or swamps bordered by dense vegetation. They prefer sunny locations and bask in low shrub branches. Hibernation occurs in mammal burrows, rock fissures or even ant mounds (COSEWIC 2012).	Moderate	Wetlands and ponds in the study area and on the Sites of Interest (i.e., 3) may provide suitable habitat for this species.	May - Sep
Five-lined skink - Carolinian population	<i>Plestiodon fasciatus</i>	END	END	END	S2	In southwestern Ontario, five-lined skink is associated with dune habitat, open woods or savannah with ample debris for cover. This species also requires abundant basking habitat in the form of stumps, logs, rocky outcrops and brush/wood piles. Nesting takes place under rocks or logs. Hibernation takes place under tree trunks or rocks below the frost line (Seburn 2010).	Moderate	Open woodlands in the study area may provide suitable habitat for this species. There does not appear to be any suitable open woodland or savannah habitat on the Sites of Interest.	May - Sep
Milksnake	<i>Lampropeltis triangulum</i>	NAR	SC	SC	S4	In Ontario, milksnake uses a wide range of habitats including prairies, pastures, hayfields, wetlands and various forest types, and is well-known in rural areas where it frequents older buildings. Proximity to water and cover enhances habitat suitability. Hibernation takes place in mammal burrows, hollow logs, gravel or soil banks, and old foundations (COSEWIC 2014).	Moderate	Fields, wetlands, and forests in rural portions of the study area and on the Sites of Interest (i.e., 3, 5-11) may provide suitable habitat for this species.	May - Sep
Northern map turtle	<i>Graptemys geographica</i>	SC	SC	SC	S3	In Ontario, the northern map turtle prefers large waterbodies with slow-moving currents, soft substrates, and abundant aquatic vegetation. Ideal stretches of shoreline contain suitable basking sites, such as rocks and logs. Along Lakes Erie and Ontario, this species occurs in marsh habitat and undeveloped shorelines. It is also found in small to large rivers with slow to moderate flow. Hibernation takes place in soft substrates under deep water (COSEWIC 2012).	Moderate	Large wetlands and rivers in the study area and on the Sites of Interest (i.e., 3, 7-11) may provide suitable habitat for this species.	May - Sep

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Snapping turtle	<i>Chelydra serpentina</i>	SC	SC	SC	S3	In Ontario, snapping turtle uses a wide range of waterbodies, but shows preference for areas with shallow, slow-moving water, soft substrates and dense aquatic vegetation. Hibernation takes place in soft substrates under water. Nesting sites consist of sand or gravel banks along waterways or roadways (COSEWIC 2008).	Moderate	Wetlands and ponds, as well as large rivers, in the study area and on the Sites of Interest (i.e., 3, 7-11) may provide suitable habitat for this species.	May - Sep
Stinkpot or Eastern musk turtle	<i>Sternotherus odoratus</i>	SC	THR	SC	S3	In Ontario, eastern musk turtle is very rarely out of water and prefers permanent bodies of water that are shallow and clear, with little or no current and soft substrates with abundant organic materials. Abundant floating and submerged vegetation is preferred. Hibernation occurs in soft substrates under water. Eggs are sometimes laid on open ground, or in shallow nests in decaying vegetation, shallow gravel or rock crevices (COSEWIC 2012).	Moderate	Large wetlands in the study area and on the Sites of Interest (i.e., 3) may provide suitable habitat for this species.	May - Sep
American chestnut	<i>Castanea dentata</i>	END	END	END	S1S2	In Ontario, American chestnut occurs in mixed or deciduous forests in the Carolinian zone (Farrar 1995). It is often found in communities with dense canopy cover and often associated with oak and maple. This tree grows primarily on acidic, sand or gravel soils (Boland et al. 2012).	Moderate	Forests in the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable habitat for this species.	May - Sep
American columbo	<i>Frasera caroliniensis</i>	END	END	END	S2	In Ontario, American columbo is most commonly associated with open deciduous forested slopes, but it can also be found in thickets, swamps and clearings. It is often associated with oak, hickory and sassafras trees. American columbo grows on a wide variety of soils, particularly dry mesic to mesic clay and clay loam soils (Environment Canada 2016).	Moderate	Forests, thickets, swamps, and clearings in the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable habitat for this species.	May - Sep
American ginseng	<i>Panax quinquefolius</i>	END	END	END	S2	In Ontario, American ginseng is found in moist, undisturbed and relatively mature deciduous woods often dominated by sugar maple. It is commonly found on well-drained, south-facing slopes. American ginseng grows under closed canopies in well-drained soils of glacial origin that have a neutral pH (ECCC 2018).	Moderate	Large blocks of forest in the study area and on the Sites of Interest (i.e., 5-7, 9-11) may provide suitable habitat for this species.	May - Sep
American hart's-tongue fern	<i>Asplenium scolopendrium</i>	SC	SC	SC	S3	In Ontario, hart's-tongue fern grows on thin calcareous soils on or near dolomitic limestone of the Niagara Escarpment, and occasionally on open talus/scree slopes. Most populations are found on steep, moderately moist slopes that face north to northeast and are under a hardwood canopy cover (Environment Canada 2013).	Moderate	Deciduous forests in the study area and on the Sites of Interest (i.e., 1, 5-11) may provide suitable habitat for this species.	May - Sep
American water-willow	<i>Justicia americana</i>	THR	THR	THR	S2	In Ontario, the aquatic plant American water-willow grows on muddy banks of lakes, rivers and streams, and sometimes in associated wetlands (MNFI 2007). American water-willow prefers shallow, calcareous waters of 15-20 cm in depth over gravel and organics, but can tolerate fluctuations (CDPNQ 2008).	Moderate	Stream and river banks and wetlands in the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable habitat for this species. There is a recent NHIC occurrence record (2010) within 1 km of the study area.	May - Sep
Bird's-foot violet	<i>Viola pedata</i>	END	END	END	S1	In Ontario, bird's-foot violet is typically found in open black oak savannahs and fields in dry to moist, sandy, acidic soils. Bird's-foot violet is at the northernmost edge of its range in Ontario (Environment Canada 2016). It is known at only five sites in southern Ontario.	Low	This species is no longer known to exist in the vicinity of the study area (Bickerton 2013).	n/a

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Broad beech fern	<i>Phegopteris hexagonoptera</i>	SC	—	SC	S3	In Ontario, broad beech fern inhabits rich, undisturbed mature deciduous forest dominated by beech and maple. It typically grows in moist to wet, sandy soils of lower valley slopes and occasionally swamps (van Overbeeke et al. 2013).	Moderate	Large blocks of forest and swamps in the study area and on the Sites of Interest (i.e., 5-7, 9-11) may provide suitable habitat for this species.	May - Sep
Butternut	<i>Juglans cinerea</i>	END	END	END	S2?	In Ontario, butternut is found along stream banks, on wooded valley slopes, and in deciduous and mixed forests. It is commonly associated with beech, maple, oak and hickory (Voss and Reznicek 2012). Butternut prefers moist, fertile, well-drained soils, but can also be found in rocky limestone soils. This species is shade intolerant (Farrar 1995).	Moderate	Treed areas in the study area and on the Sites of Interest (i.e., 1, 5-11) may provide suitable habitat for this species. There are recent NHIC occurrence records (2008) within 1 km of the study area.	May - Sep
Cherry birch	<i>Betula lenta</i>	END	END	END	S1	In Ontario, cherry birch typically occupies upland deciduous forests that occur on north and west facing slopes. This species is associated with sugar maple, eastern hemlock and red oak. Cherry birch grows in moist, well-drained loam soils, but may also be found in rocky shallow soils (COSEWIC 2006).	Moderate	Upland deciduous forests in the study area and on the Sites of Interest (i.e., 1, 5-11) may provide suitable habitat for this species.	May - Sep
Common hoptree	<i>Ptelea trifoliata</i>	SC	SC	SC	S3	In Ontario, common hoptree grows in open woodlands, thickets, dry prairies and along dry, and rocky shorelines. It typically occurs in sunny areas with dry sandy or rocky soils (Farrar 1995).	Moderate	Open woodlands, thickets, and shorelines in the study area and on the Sites of Interest (i.e., 1, 5-11) may provide suitable habitat for this species. There are NHIC occurrence records (1989) within 1 km of the study area.	May - Sep
Cucumber tree	<i>Magnolia acuminata</i>	END	END	END	S2	In Ontario, cucumber tree grows in deciduous woodlands in association with species such as black cherry, red maple, beech and white ash. It prefers moist to wet sites, with slightly acidic, sandy loam soils (Waldron 2003). It occurs only in the Niagara Region and Norfolk County.	Moderate	Deciduous forests in the study area and on the Sites of Interest (i.e., 1, 5-11) may provide suitable habitat for this species.	May - Sep
Deerberry	<i>Vaccinium stamineum</i>	THR	THR	THR	S1	In Ontario, deerberry inhabits open deciduous woodlands, especially oak, as well as rock barrens on both steep slopes and flat ground. It is currently found only in the Niagara Region and St. Lawrence Thousand Islands area. Deerberry grows in dry, acidic, sandy soils (NDRT 2010).	Moderate	Deciduous forests and rock barrens in the study area and on the Sites of Interest (i.e., 1, 5-11) may provide suitable habitat for this species. There are recent NHIC occurrence records (2015) within 1 km of the study area.	May - Sep
Drooping trillium	<i>Trillium flexipes</i>	END	END	END	S1	In Ontario, drooping trillium grows in the understory of mature deciduous hardwood forests, especially those with periodic spring flooding. It is associated with watercourses, usually on better drained microsites on floodplain terraces or on adjacent slopes with sandy loam soils (COSEWIC 2009). It is currently only known from two sites in southwestern Ontario, along the Sydenham and Thames Rivers.	Low	This species is no longer known to exist in the vicinity of the study area (Jalava and Ambrose 2012).	n/a
Eastern flowering dogwood	<i>Cornus florida</i>	END	END	END	S2?	In Ontario, eastern flowering dogwood grows in the understory of dry to rich deciduous forests, especially on hillsides and riverbanks. It prefers sandy acidic soils but occasionally is found in loams, clays and organic soils (Waldron 2003). This species is restricted to the Carolinian zone of southern Ontario.	Moderate	Deciduous forests in the study area and on the Sites of Interest (i.e., 1, 5-11) may provide suitable habitat for this species. There are NHIC occurrence records (2011) within 1 km of the study area.	May - Sep

Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Potential to Occur in the Study Area (Desktop)	Rationale for Potential to Occur in the Study Area (Desktop)	Survey Window
Four-leaved milkweed	<i>Asclepias quadrifolia</i>	END	—	END	S1	In Ontario, four-leaved milkweed occurs in dry upland woods, often on shallow or rocky soils over limestone or occasionally sandstone bedrock on or near steep slopes. It is often found in bur oak - shagbark hickory woodlands on shallow soil over limestone (Poisson et al. 2011). Four-leaved milkweed is only currently known to occur in Prince Edward County, but was historically recorded in Lennox and Addington County, as well as in the Niagara River gorge.	Low	This species is no longer known to exist in the vicinity of the study area (Poisson et al. 2011).	n/a
Goldenseal	<i>Hydrastis canadensis</i>	THR	THR	THR	S2	In Ontario, goldenseal occurs in damp mature deciduous forests usually under a semi-open or closed canopy and in moist microhabitats near vernal pools, along forested streams, and floodplain forests. It is associated with red oak, sugar maple, hawthorns, shagbark hickory, ironwood, and basswood and can tolerate disturbances (e.g. fallen trees, paths, or woodland edges) (Jolly 2016).	Low	This species is no longer known to exist in the vicinity of the study area (Jolly 2016).	n/a
Green dragon	<i>Arisaema dracontium</i>	SC	—	SC	S3	In Ontario, green dragon occurs in somewhat-wet to wet deciduous forests along streams. In particular, it grows in maple forest and forest dominated by red ash and white elm trees. Green dragon is restricted to shaded or partially shaded seasonally inundated floodplains (Donley et al. 2013). It is primarily restricted to southwestern Ontario.	Moderate	Deciduous forests along streams in the study area and on the Sites of Interest (i.e., 1, 3, 5, 7, 9, 10) may provide suitable habitat for this species.	May - Sep
Pink milkwort	<i>Polygala incarnata</i>	END	END	END	S1	In Ontario, pink milkwort grows in moist, to dry, sandy, undisturbed prairie habitats, often in association with little bluestem (<i>Schizachyrium scoparium</i>) (COSEWIC 2009). There is one extant population at Ojibway Prairie Nature Reserve and three extant populations at Walpole Island First Nation.	Low	This species is no longer known to exist in the vicinity of the study area (COSEWIC 2009).	n/a
Red mulberry	<i>Morus rubra</i>	END	END	END	S2	In Ontario, red mulberry occurs in moist forested habitats including floodplains, bottomlands, the slopes and ravines along the southern portion of the Niagara escarpment and in swales on some western Lake Erie sand spits. This species is moderately shade tolerant, but grows best in forest openings (Parks Canada Agency 2011). This species is restricted to the Carolinian zone of southwestern Ontario.	Moderate	Forested valleys and floodplains in the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide habitat for this species. There is a recent NHIC occurrence record (2006) within 1 km of the study area.	May - Sep
Round-leaved greenbrier - Great Lakes Plains population	<i>Smilax rotundifolia</i>	THR	THR	THR	S2	In Ontario, suitable habitat for round-leaved greenbrier is best captured using the OMNRF (2014) wooded area boundary (ECCC 2017). It grows in open, moist to wet, woodlands, often on sandy soils. Some types of activities that open the canopy may benefit this species but activities must not open the canopy to the extent that soil moisture is altered (ECCC 2017).	Moderate	Large blocks of forests in the study area and on the Sites of Interest (i.e., 5, 8, 11) may provide suitable habitat for this species. There are recent NHIC occurrence records (2012) within 1 km of the study area.	May - Sep
Shumard oak	<i>Quercus shumardii</i>	SC	—	SC	S3	In Ontario, shumard oak occurs in mature deciduous woods on clay soil, silty loam and in swampy areas. This species is usually well spaced and never occurs in pure stands (Donley et al. 2013). It typically grows in southwestern Ontario.	Moderate	Deciduous forests and swamps in the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable habitat for this species.	May - Sep
Spotted wintergreen	<i>Chimaphila maculata</i>	THR	END	END	S2	In Ontario, spotted wintergreen occurs in sandy, well-drained soils associated with dry to fresh oak-pine or oak dominated woodlands. It requires partial shade and limited competition from other groundcover species. It is restricted to southern Ontario, and the only currently known populations are from Norfolk County and Niagara Region (Environment Canada 2015).	Moderate	Large blocks of forests in the study area and on the Sites of Interest (i.e., 5, 8, 11) may provide suitable habitat for this species.	May - Sep

Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Potential to Occur in the Study Area (Desktop)	Rationale for Potential to Occur in the Study Area (Desktop)	Survey Window
Swamp rose mallow	<i>Hibiscus moscheutos</i>	SC	SC	SC	S3	In Ontario, swamp rose mallow is restricted to shoreline marshes associated with lakes Erie, Ontario, and St. Clair. It is most commonly found in deep-water cattail marshes and meadow marshes, but is also found in dyked wetlands, open wet woods, thickets, spoil banks, and drainage ditches where it grows on organic or clay soils. Periodic water level fluctuations are necessary to sustain swamp rose mallow (Environment Canada 2013).	Moderate	Marshes in the study area and on the Sites of Interest (i.e., 3, 10) may provide suitable nesting habitat. There is a recent NHIC occurrence record (2004) within 1 km of the study area.	May - Sep
Virginia mallow	<i>Sida hermaphrodita</i>	END	END	END	S1	In Ontario, Virginia mallow occurs in loose, sandy or rocky soils of riversides and floodplains, as well as disturbed areas along roadsides and railroad banks. There are two extant populations in Haldimand County within Taquanyah Conservation Area, and within a licensed quarry and along a gas pipeline corridor in Niagara Region (Bickerton 2011).	Moderate	Disturbed right-of-ways in the study area may provide suitable habitat for this species.	May - Sep
White wood aster	<i>Eurybia divaricata</i>	THR	THR	THR	S2S3	In Ontario, white wood aster grows in open, dry to moist, deciduous woodlands with well-drained soils. It seems to grow along trails in forests dominated by sugar maple and American beech, with associates such as red, white, and black oak, shagbark hickory, and basswood (COSEWIC 2002).	Moderate	Deciduous forests in the study area and on the Sites of Interest (i.e., 1, 3, 5-11) may provide suitable habitat for this species.	May - Sep

¹ *Endangered Species Act (ESA)*, 2007 (O.Reg 242/08 last amended 27 March 2018 as O.Reg 219/18). Species at Risk in Ontario List, 2007 (O.Reg 230/08 last amended 1 Aug 2018 as O. Reg 404/18, s. 1.); Schedule 1 (Extirpated - EXP), Schedule 2 (Endangered - END), Schedule 3 (Threatened - THR), Schedule 4 (Special Concern - SC)

² *Species at Risk Act (SARA)*, 2002. Schedule 1 (Last amended 25 January 2020); Part 1 (Extirpated), Part 2 (Endangered), Part 3 (Threatened), Part 4 (Special Concern)

³ Committee on the Status of Endangered Wildlife in Canada (COSEWIC) <http://www.cosewic.gc.ca/>

⁴ Provincial Ranks (SRANK) are Rarity Ranks assigned to a species or ecological communities, by the Natural Heritage Information Centre (NHIC). These ranks are not legal designations. SRANKS are evaluated by NHIC on a continual basis and updated lists produced annually. SX (Presumed Extirpated), SH (Possibly Extirpated - Historical), S1 (Critically Imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNA (Not Applicable), S#S# (Range Rank), S? (Not ranked yet), SAB (Breeding Accident), SAN (Non-breeding Accident), SX (Apparently Extirpated). Last assessed November 2017.

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APPENDIX B

**Natural Environment Constraints for
Sites of Interest**

Table B1: Natural Environment Constraints by Site

Site Number	Major Environmental Constraints ^{1,2}	Development Considerations	Potential for Development
1	<ul style="list-style-type: none"> Thompsons Creek – NPCA hazard lands/regulated area Wooded area on southern border, including significant woodland 	<ul style="list-style-type: none"> Setbacks from watercourse, wooded area 	<ul style="list-style-type: none"> Possible negotiation for removal of wooded areas High potential for development outside setbacks
2	<ul style="list-style-type: none"> Adjacent to Grassy Brook – NPCA hazard land/regulated area Small sliver of Upper Grassie Brook Wetland Complex PSW at southern border, adjacent to Grassy Brook 	<ul style="list-style-type: none"> Setbacks from PSW, watercourse 	<ul style="list-style-type: none"> High potential for development outside setbacks
3	<ul style="list-style-type: none"> Adjacent to Welland River - NPCA hazard lands/regulated area Deer wintering area (SWH) Majority of site in Welland River East Wetland Complex PSW Wooded area, including significant woodland 	<ul style="list-style-type: none"> Setbacks from PSW, watercourse, wooded area 	<ul style="list-style-type: none"> Would require negotiation to remove wooded area, deer wintering area Low potential for development
4	<ul style="list-style-type: none"> Adjacent to Hydro Canal – NPCA hazard land/regulated area 	<ul style="list-style-type: none"> Setbacks from watercourse 	<ul style="list-style-type: none"> High potential for development outside setbacks
5	<ul style="list-style-type: none"> Wooded areas along eastern border, including significant woodland Watercourse in northern portion of site 	<ul style="list-style-type: none"> Setbacks from watercourse, wooded area 	<ul style="list-style-type: none"> High potential for development outside setbacks
6	<ul style="list-style-type: none"> Entire site is deer wintering area (SWH) Entire site is wooded area, including significant woodland Niagara Falls Slough Forest Wetland Complex PSW in northeast corner 	<ul style="list-style-type: none"> Setback from PSW 	<ul style="list-style-type: none"> Would require negotiation to remove wooded area, deer wintering area Low potential for development
7	<ul style="list-style-type: none"> Welland River East Wetland Complex PSW along south of site Niagara Falls Slough Forest Wetland Complex PSW in northeast corner Eastern portion of site is deer wintering area (SWH) Some wooded areas 	<ul style="list-style-type: none"> Setbacks from PSW, wooded areas 	<ul style="list-style-type: none"> Possible negotiation for removal of deer wintering area, wooded areas Low - moderate potential for development in southwest corner
8	<ul style="list-style-type: none"> Minimal environmental constraints Adjacent to Welland River - NPCA hazard land/regulated area Welland River East Wetland Complex PSW along northern border of site and in northwest corner Wooded area in northern portion of site, including significant woodland 	<ul style="list-style-type: none"> Setback from PSW, watercourse and wooded area 	<ul style="list-style-type: none"> High potential for development outside setbacks
9	<ul style="list-style-type: none"> Niagara Falls Slough Forest Wetland Complex PSW in northern and southwestern portion of site Adjacent to Welland River - NPCA hazard land/regulated area Majority of site is wooded, including significant woodland Northern portion of site is deer wintering area (SWH) 	<ul style="list-style-type: none"> Setback from PSW, watercourse 	<ul style="list-style-type: none"> Would require negotiation to remove wooded area, deer wintering area Moderate potential for development in two south-central parcels
10	<ul style="list-style-type: none"> Majority of site in deer wintering area (SWH) Majority of site in Lyons Creek Wetland Complex PSW Adjacent to Welland River - NPCA hazard land/regulated area Other watercourses/tributaries - NPCA hazard land/regulated area Majority of site is wooded, including significant woodland 	<ul style="list-style-type: none"> Setback from PSW, watercourses, and wooded area 	<ul style="list-style-type: none"> Would require negotiation to remove wooded area, deer wintering area Moderate potential for development in the southern portion of the site

Notes:

¹ Acronyms: NPCA = Niagara Peninsula Conservation Authority

PSW = Provincially Significant Wetland

SWH = Significant Wildlife Habitat

² General consideration for all sites:

- Conservation authority permits will be required for development in all regulated areas associated with watercourses and wetlands.
- All sites will need to consider the *Endangered Species Act* (ESA).
- The potential for development assumes that no watercourses will be removed. If required, permits/authorization may be required from Fisheries and Oceans Canada (DFO) and the Conservation Authority.

V3.1.2

REGIONAL MUNICIPALITY OF NIAGARA
SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS

Natural Environment

Natural Environment Assessment Report



REPORT

South Niagara Falls Wastewater Treatment Plant Environmental Assessment

Natural Environment Report

Submitted to:

GM BluePlan Engineering Ltd.

Submitted by:

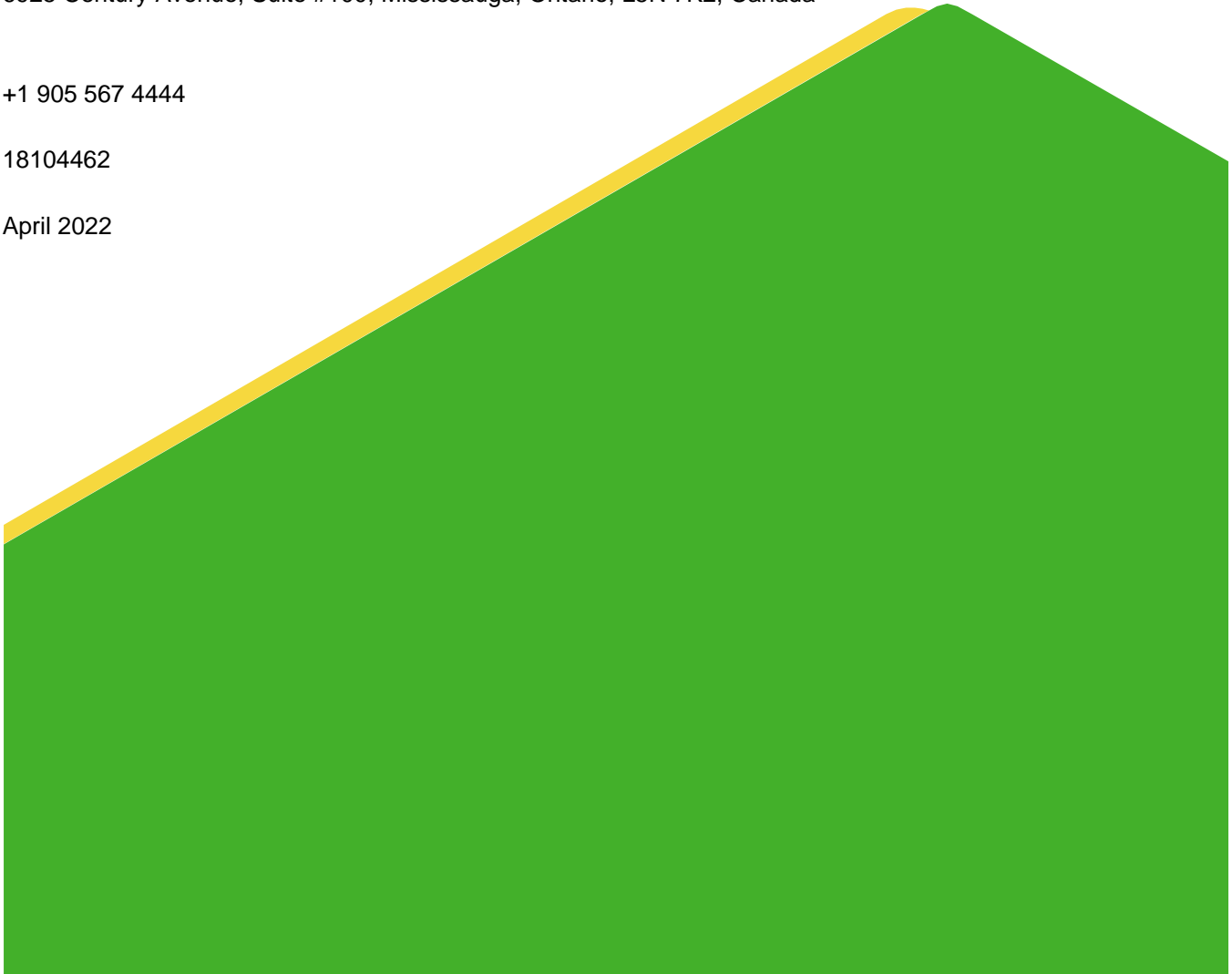
Golder Associates Ltd.

6925 Century Avenue, Suite #100, Mississauga, Ontario, L5N 7K2, Canada

+1 905 567 4444

18104462

April 2022



Distribution List

1 PDF - GM BluePlan Engineering Ltd.

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Acronyms/Abbreviations

Acronym	Definition
ANSI	Significant areas of natural and scientific interest
BCI	Bat Conservation International
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
CUM	Cultural Meadow
CUT	Cultural Thicket
DFO	Fisheries and Oceans Canada
ECCC	Environment and Climate Change Canada
ELC	Ecological Land Classification
ESA	Endangered Species Act
ESR	Environmental Study Report
FOD	Deciduous Forest
GMBP	GM BluePlan Engineering Ltd.
GHD	General Habitat Description
Golder	Golder Associates Ltd.
HADD	Harmful alteration, disruption, or destruction
HAY	Agricultural Field
LIO	Land Information Ontario
MAM2-6	Broad-leaved Sedge Mineral Meadow March
MAS	Shallow Marsh
MBCA	Migratory Bird Convention Act
MECP	Ministry for the Environment, Conservation and Parks
MMAH	Ministry of Municipal Affairs and Housing
MNDMNRF	Ministry of Northern Development, Mines, Natural Resources and Forestry
MSPU	Master Servicing Plan Update
NHIC	Natural Heritage Information Centre
NHRM	Natural Heritage Reference Manual
NPCA	Niagara Peninsula Conservation Authority
OBBA	Ontario Breeding Bird Atlas
OP	Official Plan
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetlands
RES	Residential
SAR	Species at risk
SARA	Species at Risk Act

Acronym	Definition
SARO	Species at Risk in Ontario
SOCC	species of conservation concern
South Niagara Falls Wastewater Solutions Project	The Project
SWD	Deciduous Swamp
SWH	Significant wildlife habitat
SWHMIST	Significant Wildlife Habitat Mitigation Support Tool
SWHTG	Significant Wildlife Habitat Technical Guide
The Region	Regional Municipality of Niagara
WWTP	Wastewater Treatment Plant
VPZ	Vegetation Protection Zone

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APPENDICES

APPENDIX A

Plant List

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SAR Screening

APPENDIX C

Wildlife List

1.0 INTRODUCTION

Golder Associates Ltd. (Golder), a member of WSP, has been retained by GM BluePlan Engineering Ltd. (GMBP) on behalf of the Regional Municipality of Niagara (the Region) to conduct natural environment studies as part of the South Niagara Falls Wastewater Solutions Project (the Project). The environmental studies conducted by Golder will support GMBP's Environmental Study Report (ESR), which is being developed in accordance with the requirements for a Schedule "C" Project as outlined in the Municipal Water & Wastewater projects in the Municipal Engineers Association document for Municipal Class Environmental Assessment, October 2000, as amended in 2007, 2011, and 2015 (MEA Class EA document).

The Region's 2041 Growth Plan identified significant growth in residents and employment within the Municipality by 2041. In 2017, Niagara Region updated their Water & Wastewater Master Servicing Plan Update (MSPU), which evaluated the ability of existing and planned water and wastewater infrastructure to service the Region's existing users, service anticipated growth, and to evaluate and develop recommended strategies efficiently and effectively. The MSP selected a new Wastewater Treatment Plant (WWTP) within South Niagara Falls as the preferred South Niagara Falls servicing strategy to service the anticipated growth for Niagara Region. The Project will include construction of a new WWTP, an outfall structure to the Welland River, and supporting sewer connection pipes with associated shaft locations to the new WWTP site.

The purpose of this report is to characterize natural environment existing conditions where the Project is proposed, assess potential environmental impacts of the Project on environmental features and functions, and recommend appropriate next steps and/or mitigation measures to avoid or minimize impacts, where possible.

1.1 Site and Study Area Description

For the purposes of this assessment, there are three key components (Figure 1):

- The land parcel on which the WWTP and outfall structure are located (the WWTP Site; Figure 2);
- The Montrose trunk sewer pipe alignment and shaft locations (the Montrose alignment Site; Figure 3); and,
- The Thorold South sewer alignments and new Black Horse Sewer Pumping Station (SPS) (the Thorold South alignment Site; Figure 4).

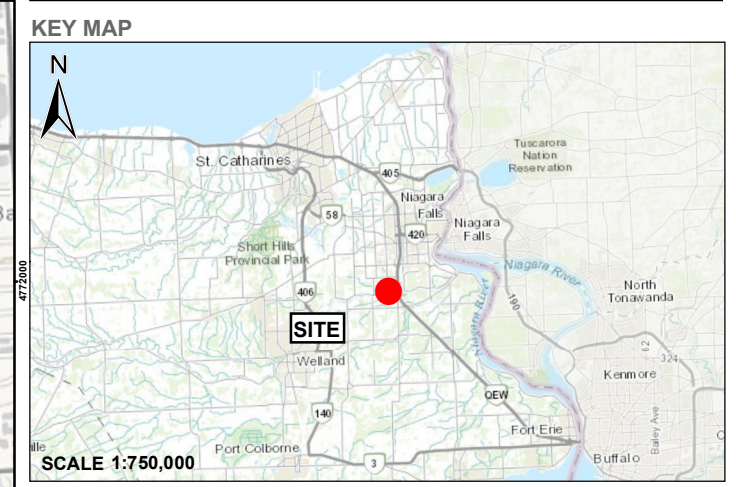
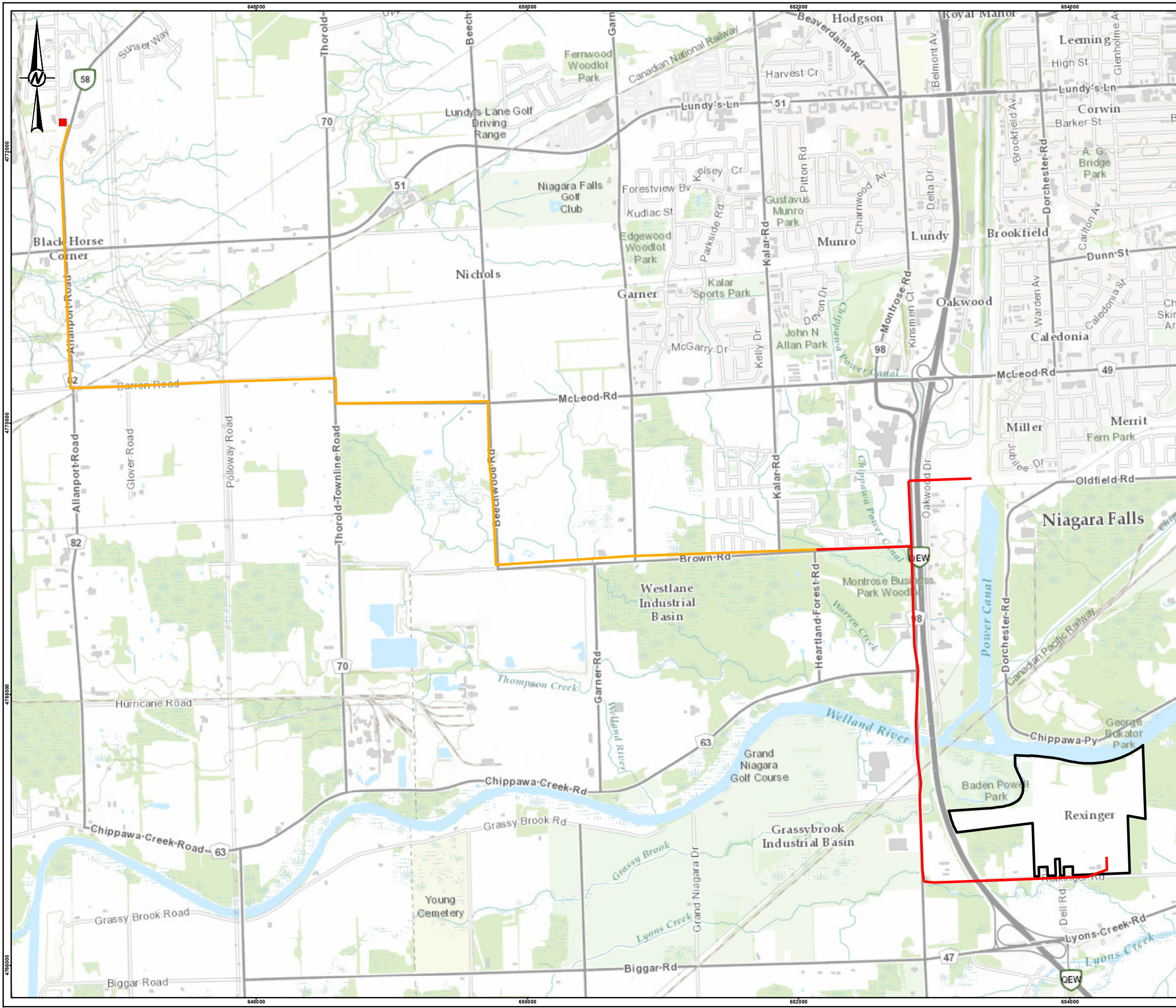
The Study Areas are defined as the Sites plus adjacent lands outward to 120 m.

The WWTP Site located at 6811 Reixinger Road (Figure 2) is bounded to the south by Reixinger Road; to the north by the Welland River; to the west by the Welland River East Wetland Complex, Montrose Road, and residential property; and to the east by the Lyon's Creek Wetland Complex and residential property. The southeast portion of the Site is a residential farmland area with a house and agricultural buildings (barn, etc.) bordering Reixinger Road. The west portion of the Site is characterized by a large open area that borders Montrose Road and the Welland River East Wetland Complex. The north portion of the Site is a mix of open lands, meadow, and forest. The WWTP Site is approximately 75 ha (109 acres) in size.

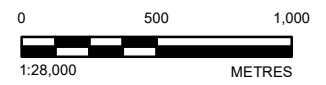
The Montrose alignment Site (Figure 3) includes a total of nine shaft locations and approximately 5.6 km of proposed trunk sewer pipeline. The Montrose alignment extends from Montrose Shaft 1 located off Oakwood Drive approximately 6 km south along Montrose Road to enter the WWTP Site on the north side of Reixinger Road. It is anticipated that the Montrose alignment will be located within the existing road right-of-way. Montrose Shaft 1 will be located within OPG/Hydro One lands. Montrose Shafts 2, 3, 4 and Shaft Brown-01 will be located

within the existing road right-of-way. Montrose Shaft 5 will be located within City-owned lands. Montrose Shaft 6 will be located within the proposed Montrose Road upgraded right-of-way. Shaft Rexinger-02 will be located within the WWTP Site. Surface disturbance associated with construction of the trunk sewer pipe alignment is expected to be limited to the proposed footprint of the shaft locations, as the trunk sewer pipe will be installed underground via the shafts. The trunk sewer pipe will also be tunneled beneath existing watercourses within the Montrose alignment Study Area. The proposed footprint of the shaft locations range in size from 0.09 ha to 0.16 ha.

The Thorold South alignment Site (Figure 4) includes a new sewer pipe connecting the new Black Horse SPS to the Montrose pipe alignment at Shaft Brown-01. The proposed Black Horse SPS is located southwest of Allanburg Rd and Highway 58. It is anticipated that the Thorold South alignment will be located within the existing road right-of-way.



- LEGEND**
- Black Horse SPS
 - Montrose Trunk Sewer
 - Thorold South Alignment
 - Wastewater Treatment Plant Site Boundary



NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE.

REFERENCE(S)
BASE DATA - MNR LIO, OBTAINED 2020
PRODUCED BY GOLDR ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2020
BASE IMAGERY SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
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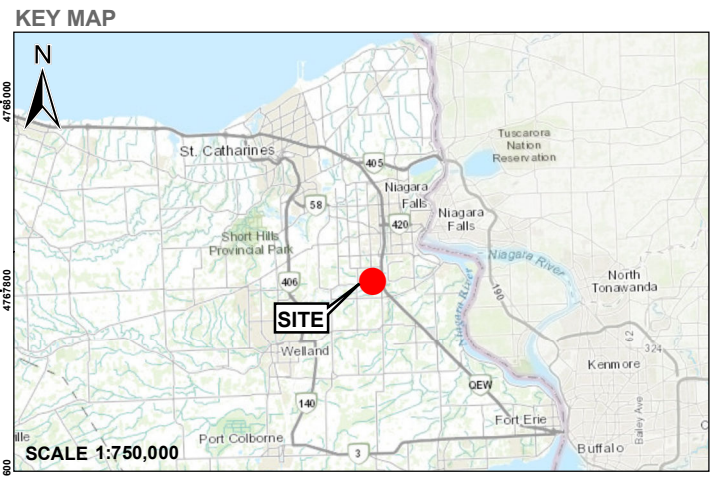
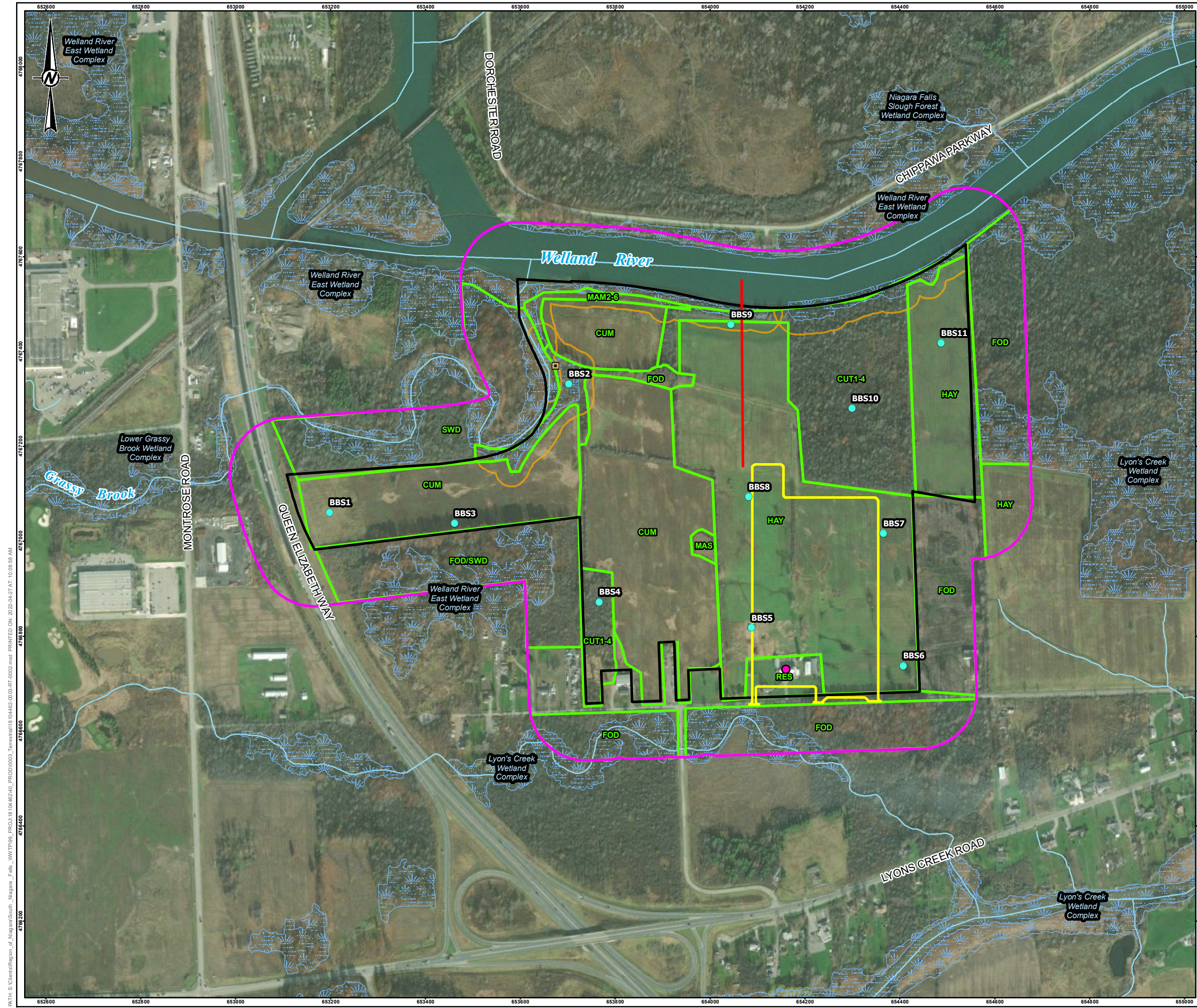
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SOUTH NIAGARA FALLS WASTEWATER TREATMENT PLANT

TITLE
SITE LOCATION MAP

CONSULTANT	YYYY-MM-DD	2022-04-27
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	PREPARED	JR/AM
	REVIEWED	AS
	APPROVED	HM

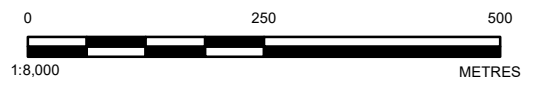
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- LEGEND**
- Agricultural Drain
 - Breeding Bird Survey
 - Feature 1
 - WWTP Footprint
 - Outfall Pipe
 - Study Area
 - ELC Community
 - Provincially Significant Wetland
 - Provincially Significant Wetland Setback (30m)
 - Site Boundary

ELC Code	ELC Community
CUT1-4	Grey Dogwood Cultural Thicket
CUM	Cultural Meadow
FOD	Deciduous Forest
HAY	Agricultural Field
MAM2-6	Broad-Leaved Sedge Mineral Meadow Marsh
MAS	Shallow Marsh
RES	Residential
SWD	Deciduous Swamp



NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE.

REFERENCE(S)
BASE DATA - MNR LIO, OBTAINED 2020
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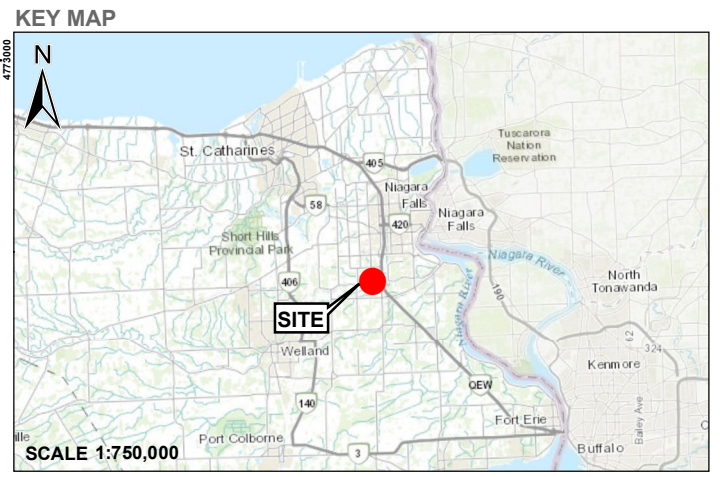
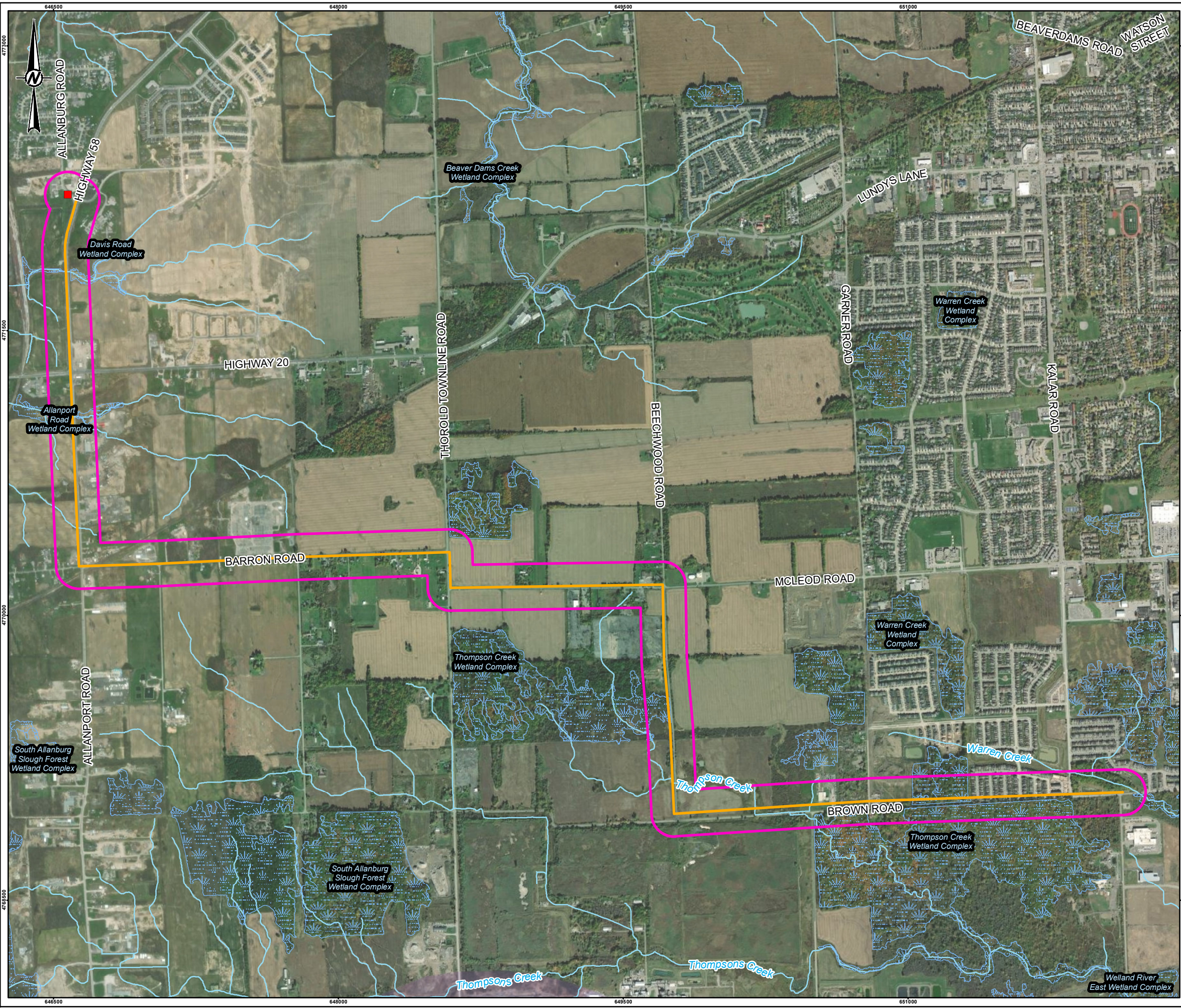
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SOUTH NIAGARA FALLS WASTEWATER TREATMENT PLANT

TITLE
WASTEWATER TREATMENT PLANT SITE
ECOLOGICAL LAND CLASSIFICATION AND SURVEY STATIONS

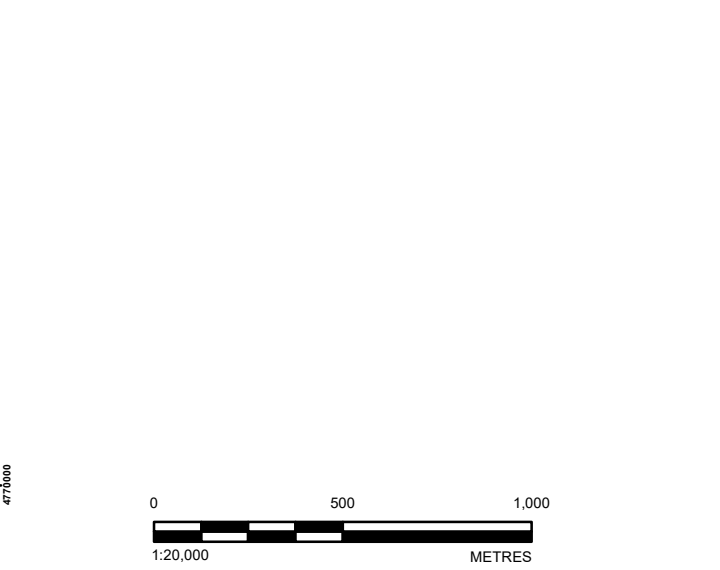
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GOLDER MEMBER OF WSP	DESIGNED	JR
	PREPARED	JR
	REVIEWED	AS
	APPROVED	HM

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- LEGEND**
- Black Horse SPS Site
 - Thorold South Alignment
 - Watercourse
 - Study Area
 - Provincially Significant Wetland



NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE.

REFERENCE(S)
BASE DATA - MNR LIO, OBTAINED 2020
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BASE IMAGERY SOURCE: ESRI, MAXAR, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRIID, IGN, AND THE GIS USER COMMUNITY
SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
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PROJECT
SOUTH NIAGARA FALLS WASTEWATER TREATMENT PLANT

TITLE
THOROLD SOUTH ALIGNMENT / BLACK HORSE SPS SITE

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GOLDER MEMBER OF WSP	DESIGNED	JR
	PREPARED	JR/AM
	REVIEWED	AS
	APPROVED	HM

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2.0 POLICY CONTEXT

Potential significant natural features considered for this assessment include designated features (e.g., Provincially Significant Wetlands), species at risk (SAR), Niagara Peninsula Conservation Authority (NPCA) regulated areas, fish habitat, and significant wildlife habitat (SWH) as identified in the following Acts and policy documents:

- Provincial Policy Statement (PPS; MMAH 2020a);
- *Fisheries Act* (Canada 1985);
- *Migratory Birds Convention Act* (Canada 1994);
- Species at Risk Act (SARA) (Canada 2002);
- *Endangered Species Act* (ESA) (Ontario 2007);
- Growth Plan for the Greater Golden Horseshoe (MMAH 2020b);
- Official Plan for the City of Niagara Falls (Niagara Falls 2019);
- Region of Niagara Official Plan (Region of Niagara 2015); and,
- O. Reg. 155/06 Niagara Peninsula Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario 2006).

2.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) was issued under Section 3 of the *Planning Act* (MMAH 2020a). The natural heritage policies of the PPS are intended to protect natural features and their ecological functions for the long term, and restoring or improving linkages between these natural features, surface water features and ground water features.

Development and Site alteration are prohibited within significant wetlands and significant coastal wetlands. Development and Site alteration is not permitted in fish habitat or habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.

Development may be permitted within or adjacent to several other types of natural features where it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, including: significant wetlands (north of Ecoregions 5E, 6E, and 7E), significant woodlands, significant valleylands, significant wildlife habitat, significant areas of natural and scientific interest (ANSI), and other coastal wetlands.

2.2 Fisheries Act

The purpose of the *Fisheries Act* (Canada 1985) is to maintain healthy, sustainable and productive Canadian fisheries through the prevention of pollution and the protection of fish and their habitat. All projects undertaking in-water or near-water work must comply with the provisions of the *Fisheries Act*.

All projects where work is being proposed that cannot avoid impacts to fish or fish habitat require a Fisheries and Oceans Canada (DFO) Project review (DFO 2013). If it is determined through the DFO review process that the Project will result in death of fish or harmful alteration, disruption, or destruction (HADD) of fish habitat, an authorization is required under the *Fisheries Act*. This includes projects that have the potential to obstruct fish passage or affect flows.

Proponents of projects requiring a *Fisheries Act* Authorization are required to also submit a Habitat Offsetting Plan, which provides details of how the death of fish and/or HADD of fish habitat will be offset, and outlines associated costs and monitoring commitments. Proponents also have a duty to notify DFO of any unforeseen activities during the Project that cause harm to fish or fish habitat, and outline the steps taken to address them.

2.3 Migratory Birds Convention Act

The *Migratory Birds Convention Act* (MBCA) (Canada 1994) prohibits the killing or capturing of migratory birds, as well as any damage, destruction, removal, or disturbance of active nests. It also allows the Canadian government to pass and enforce regulations to protect various species of migratory birds, as well as their habitats.

While Environment and Climate Change Canada (ECCC) can issue permits allowing the destruction of nests for scientific or agricultural purposes, or to prevent damage being caused by birds, it does not typically allow for permits in the case of industrial or construction activities.

2.4 Species at Risk

2.4.1 Species at Risk Act

At a federal level, SAR designations for species occurring in Canada are initially determined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). If approved by the federal Minister of the Environment and Climate Change, species are added to the federal List of Wildlife Species at Risk (Canada 2002). Species that are included on Schedule 1 of the *Species at Risk Act* (SARA) as endangered or threatened are afforded protection of critical habitat on federal lands under the Act. On private or provincially-owned lands, only migratory birds and aquatic species listed as endangered, threatened, or extirpated are protected under SARA, and critical habitat protection on non-federal lands is afforded only to aquatic species, unless ordered by the Governor in Council.

2.4.2 Endangered Species Act

Species at risk designations for species in Ontario are initially determined by the Committee on the Status of Species at Risk in Ontario (COSSARO), and if approved by the provincial Minister of Environment, Conservation and Parks, species are added to the provincial *Endangered Species Act* (ESA) (Ontario 2007). The legislation prohibits the killing or harming of species identified as endangered or threatened in the various schedules to the Act. The ESA also provides habitat protection to all species listed as threatened or endangered. As of June 30, 2008, the Species at Risk in Ontario (SARO) List is contained in Ontario Regulation (O. Reg.) 230/08.

Subsection 9(1) of the ESA prohibits the killing, harming, or harassing of species identified as 'endangered' or 'threatened' in the various schedules to the Act. Subsection 10(1) (a) of the ESA states that "*No person shall damage or destroy the habitat of a species that is listed on the SARO list as an endangered or threatened species*".

General habitat protection is provided, by the ESA, to all threatened and endangered species. Species-specific habitat protection is only afforded to those species for which a habitat regulation has been prepared and passed into law as a regulation of the ESA. The ESA has a permitting and registration process where alterations to the habitat of protected species may be considered.

2.5 Growth Plan for the Greater Golden Horseshoe

The Growth Plan for the Greater Golden Horseshoe was issued under the Places to Grow Act (MMAH 2020b). The Growth Plan is intended, in coordination with other provincial plans, to establish a unique land use planning framework for the Greater Golden Horseshoe that supports the achievement of complete communities, a thriving economy, clean and healthy environment and social equity. A natural heritage system for the Greater Golden Horseshoe has been mapped under the Growth Plan to support planning for the protection of the region's natural heritage and biodiversity. However, the provincial mapping does not apply until it has been implemented in the applicable municipal official plan(s). The Study Areas are not located within the Growth Plan natural heritage system.

2.6 Niagara Region Official Plan

The Sites and Study Areas are within the municipal jurisdiction of the Niagara Region and therefore subject to the policies of the official plan (OP) developed by Niagara Region. Schedule C of the Region's OP identifies lands within and adjacent to both the Montrose alignment and WWTP Sites and within the Study Areas, as designated Environmental Protection Areas, Environmental Conservation Areas, potential natural heritage corridors, and fish habitat. All of these features are considered part of the Region's core natural heritage system (Region of Niagara 2015).

Environmental Protection Areas include Provincially Significant Wetlands (PSW), provincially significant Life Science ANSIs, and significant habitat of endangered and threatened species. Environmental Conservation Areas include significant woodlands, SWH, significant habitat for species of concern, regionally significant Life Science ANSIs, other evaluated wetlands, significant valleylands, rare vegetation communities (i.e., savannahs, tallgrass prairies and alvars) and publicly owned conservation lands.

Development is generally not permitted within these areas, with some exceptions for passive recreational or conservation projects. Development proposed within or adjacent to an Environmental Protection Area, Environmental Conservation Area, fish habitat or potential natural heritage corridors requires completion of an impact assessment.

2.7 City of Niagara Official Plan

Both Sites and their Study Areas are also within the municipal jurisdiction of the City of Niagara Falls and therefore subject to the policies of the City's OP. According to OP mapping (Niagara Falls 2019), there are Environmental Protection Areas and Environmental Conservation Areas (Schedule A1), significant woodlands and fish habitat (Appendix III-C), and Potential Natural Heritage Corridors (Appendix III-E) mapped on both the Montrose alignment and WWTP Sites and within the Study Areas. All of these features are considered part of the City's natural heritage system.

Environmental Protection Areas include PSWs, NPCA regulated wetlands greater than 2 ha in size, provincially significant Life Science ANSIs, significant habitat of endangered and threatened species, and environmentally sensitive areas. Environmental Conservation Areas include significant woodlands, significant valleylands, SWH, fish habitat, significant Life and Earth Science ANSIs, and locally significant wetlands or NPCA wetlands less than 2 ha in size.

Development is generally not permitted within these areas, with some exceptions for passive recreational or conservation projects. Development proposed within or adjacent to an Environmental Protection Area, Environmental Conservation Area, fish habitat, significant woodlands or potential natural heritage corridors requires completion of an impact assessment.

2.8 Niagara Peninsula Conservation Authority

According to available mapping (NPCA 2021), both Sites and Study Areas are located within the NPCA regulated limits as defined under O. Reg. 155/06: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario 2006). Therefore, a permit from the NPCA may be required for development within the regulated limits.

3.0 METHODS

3.1 Existing Conditions

The investigation of existing conditions for the WWTP and Montrose alignment Study Areas included a background review, SAR screening, and field investigations to ground-truth the findings of the background review and SAR screening.

A high-level desktop assessment of existing conditions for the proposed Black Horse SPS was also conducted. Field surveys will be conducted to ground-truth existing conditions during the detailed design stage.

3.1.1 Background Review

The investigation of existing conditions in the Study Areas included a background information search and literature review to gather data about the local area and provide context for the evaluation of the natural features. The following resources were used:

- Natural Heritage Information Centre (NHIC) database, maintained by the Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF) (NHIC 2021);
- Land Information Ontario (LIO) geospatial data (MNDMNRF 2021a);
- Species at Risk Public Registry (ECCC 2021);
- Species at Risk in Ontario (SARO) List (MNDMNRF 2021b);
- Breeding Bird Atlas of Ontario (OBBA) (Cadman et al. 2007);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2020);
- Bat Conservation International (BCI) range maps (BCI 2020);
- Ontario Butterfly Atlas (Jones et al. 2020);
- eBird species maps (eBird 2020);
- Vascular Plants Atlas (Leslie 2018);
- iNaturalist species occurrence database (iNaturalist 2020);

- MNDMNRF LIO Aquatic Resources Area Layer (MNDMNRF 2021c);
- Fish ON-Line (MNDMNRF 2021d);
- Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Maps (DFO 2021);
- City of Niagara Official Plan (Niagara Falls 2019);
- Regional Official Plan (Niagara 2015); and,
- Aerial imagery.

To develop an understanding of the drainage patterns, ecological communities and potential natural heritage features that may be affected by the proposed Project, MNRF LIO data were used to create base layer mapping for the Study Areas. A geographic query of the NHIC database was conducted to identify element occurrences of any natural heritage features, including wetlands, Areas of Natural and Scientific Interest (ANSI), life science sites, rare vegetation communities, rare species (i.e., species ranked S1-S3 by NHIC), species designated under the ESA or SARA, and other natural heritage features within the Study Areas.

3.1.2 Species at Risk Screening

SAR considered for this report include those species listed in the ESA and SARA. An assessment was conducted to determine which SAR had potential habitat in the Study Areas. A screening of all SAR which have the potential to be found in the vicinity of the Study Areas was conducted as a desktop exercise using the sources listed in Section 3.1. Species with ranges overlapping the Study Areas, or recent occurrence records in the vicinity, were screened by comparing their habitat requirements to habitat conditions in the Study Areas.

The potential for the species to occur was determined through a probability of occurrence. A ranking of low indicates no suitable habitat availability for that species in the Study Areas and no specimens identified. Moderate probability indicates more potential for the species to occur, as suitable habitat appeared to be present in the Study Areas, but no occurrence of the species has been recorded. Alternatively, a moderate probability could indicate an observation of a species, but there is no suitable habitat in the Study Areas. High potential indicates a known species record in the Study Areas (based on the background data review or field surveys) and good quality habitat is present.

3.1.3 Field Surveys

3.1.3.1 Ecological Land Classification and Botanical Inventory

Plant communities on the Sites and in the Study Areas were first delineated at a desktop level using high-resolution aerial imagery, then ground-truthed in the field (where access was possible) on August 20, 2020 (WWTP Site) and July 28, 2021 (Montrose alignment Site) using the Ecological Land Classification (ELC) System for southern Ontario (Lee et al. 1998). These inventories were carried out by systematically traversing accessible portions of the Sites and Study Areas to ensure a thorough survey of species and communities. During the field surveys, information on plant community structure and composition was recorded to better define and refine the plant community polygons.

The botanical inventory included an area search in all naturally-occurring habitats. The search was conducted by systematically walking through all habitats in a meandering fashion, generally paralleling the principal (long) axis of a natural area, where feasible, and ensuring that the full width of the area was examined. A list of all plant species identified during the survey was compiled.

Because surface disturbance within the Montrose alignment Site will be limited to the shaft locations, ELC and botanical inventories on the Montrose alignment Site were only completed for the shaft locations and the area within 120 m of the shaft locations.

3.1.3.2 Fish Habitat

Sufficient background information was available to describe the fish community in surface water features in the Study Areas, and therefore no detailed fisheries inventory was warranted.

A qualitative fish habitat survey of the two surface water features in the WWTP Study Area (i.e., Welland River and Grassy Brook) was completed on August 20, 2020 to document the presence of fish and to assess the quality of fish habitat. The survey was completed by walking along each surface water feature and collecting measurements of the wetted and bankfull width, bank height and water depth. Other habitat parameters, such as substrate type, cover features, instream and riparian vegetation were also recorded.

Qualitative fish habitat surveys were not completed on watercourses located within the Montrose alignment Study Area as no impacts to these watercourses are anticipated as the Montrose alignment will be tunneled underneath these features.

3.1.3.3 Breeding Bird Survey

Breeding bird point count surveys were conducted at 11 stations on the WWTP Site on May 29, 2020 and June 25, 2020 (Figure 1). Surveys followed protocols from the Canadian Breeding Bird Survey (Downes and Collins 2003) and the OBBA (Cadman et al. 2007). Point count stations were established in representative habitats on the WWTP Site and were spaced at minimum 250 m apart. Surveys were conducted between 30 minutes before sunrise and 10:00 am to encompass the period of maximum bird song.

Each station consisted of a circle with a 100 m radius from the centre point (where the observer stands), and each point count was 10 minutes in duration, and was separated into survey windows of 0-3, 3-5, and 5-10 minutes. All birds seen or heard were noted on pre-printed datasheets and observations were made regarding sex, age, and notable behaviour, when possible. Birds heard or seen outside of the 100 m radius were also noted using methods from the OBBA, including estimated distance (where possible).

Breeding bird point count surveys were not completed on the Montrose alignment Site.

3.2 Assessment of Significant Natural Features and Impact Assessment

An assessment was conducted to determine if any significant natural heritage features or SAR exist, or have moderate or high potential to exist, in the WWTP or Montrose alignment Study Areas and assess whether the proposed Project has potential to negatively impact significant natural heritage features or SAR on the Sites or in the Study Areas. Mitigative measures were also considered in assessing the net effects of the proposed Project on the surrounding ecosystem. Any significant natural heritage features or SAR that were anticipated to be impacted by the proposed Project were carried forward to the impact assessment.

No impact assessment was conducted for the Thorold South alignment Site or Study Area.

4.0 EXISTING CONDITIONS

4.1 Ecosystem Setting and Regional Context

The Project is located in Ecoregion 7E (Lake Erie-Lake Ontario), which covers approximately 2% of southern Ontario. Ecoregion 7E, also known as the Carolinian Forest zone, is underlain by limestone bedrock and is generally flat. Most substrates are calcareous mineral materials dominated by Gray Brown Luvisols and Gleysols. Approximately 78% of the ecoregion is used for cropland or pasture, and another 7% is developed. Deciduous and mixed forest covers just over 12% of the ecoregion (Crins et al. 2009).

4.2 Surface Water Features

There are two watercourses within the WWTP Study Area: Welland River and Grassy Brook (Figure 1).

There are four watercourses within the Montrose alignment Study Area: Welland River, Grassy Brook, Lyon's Creek, and Warren Creek. The Montrose alignment crosses Welland River between Montrose Shaft 4 and 5, and crosses Grassy Brook between Montrose Shaft 5 and 6. Brown Shaft 1 is located approximately 30 m west of Warren Creek, that also crosses the Montrose alignment between Montrose Shaft 3 and 4. Montrose-Shaft-06 is adjacent to Lyon's Creek, which appears to cross beneath Rexinger Road adjacent to the shaft via a culvert (Figure 2).

There are six watercourses within the Thorold South alignment Study Area: four unnamed tributaries of the Welland Canal, Thompson Creek and Warren Creek. The four unnamed tributaries cross the alignment between Allanburg Road and Barron Road. Thompson Creek crosses the alignment on Beechwood Road approximately 205 m north of Brown Road, as well as on Brown Road approximately 405 m east of Beechwood Road. Warren Creek crosses Brown Road approximately 85 m east of the end of the alignment. There are no watercourses within Blackhorse SPS.

All of the watercourses are located within the Lower Welland River and South Niagara Falls watershed (NPCA 2012).

4.3 Vegetation

4.3.1 Regional Setting

The Project is located in the Deciduous Forest Region and the Niagara subregion. The Deciduous Forest region is characterized by deciduous species, as well as Carolinian-specific species, such as black cherry (*Prunus serotina*), tulip-tree (*Liriodendron tulipifera*), black oak (*Quercus velutina*), cucumber tree (*Magnolia acuminata*), pin oak (*Quercus ellipsoidalis*), and pignut hickory (*Carya glabra*). Other common deciduous species include sugar maple and beech (*Fagus sylvatica*) in combination with basswood (*Tilia americana*), red maple (*Acer rubrum*), red oak (*Quercus rubra*), white oak, and bur oak (*Quercus macrocarpa*). Bitternut hickory (*Carya cordiformis*), butternut (*Juglans cinerea*), rock elm (*Ulmus thomasi*), blue-beech (*Carpinus caroliniana*), and silver maple (*Acer saccharinum*) also occur. Coniferous species are less common and scattered through the region (Rowe 1972).

4.3.2 Plant Communities

The plant communities within the WWTP Study Area are shown on Figure 1 and are briefly described in Table 1. The plant communities on and adjacent to the shaft locations within the Montrose alignment Study Area are shown on Figure 2 and briefly described in Table 2.

The Black Horse SPS location is characterized by open cultural meadow or manicured lawn. The location is bordered on the south and east by a deciduous hedgerow.

Table 1: Plant Communities in the WWTP Study Area

ELC Community	Field Description	SRANK ^a
CUT1-4 Grey Dogwood Cultural Thicket	A cultural thicket in the northeast portion of the Site. Dominated by grey dogwood (<i>Cornus racemose</i>), common buckthorn (<i>Rhamnus cathartica</i>), white ash (<i>Fraxinus americana</i>) and green ash (<i>Fraxinus pennsylvanica</i>). Occasional American elm (<i>Ulmus americana</i>), apple (<i>Malus sp.</i>), Shumard oak (<i>Quercus shumardii</i>), pin oak (<i>Quercus palustris</i>), swamp white oak (<i>Quercus bicolor</i>), and black walnut (<i>Juglans nigra</i>) were present. Ground cover consisted of green ash, white ash, goldenrod and Virginia creeper. Occasional snags from ash trees (<i>Fraxinus sp.</i>) were observed.	n/a
CUM Cultural Meadow	A large cultural meadow throughout the western portion of the Site.	n/a
FOD Deciduous Forest	A small deciduous forest on the western edge of the Site. Dominated by green ash, with white ash, white oak (<i>Quercus alba</i>), common buckthorn, red raspberry (<i>Rubus idaeus</i>), staghorn sumac (<i>Rhus typhina</i>), and jack-in-the-pulpit (<i>Arisaema triphyllum</i>). There are also deciduous forest communities off-Site, in the east and south portions of the Study Area.	n/a
HAY Agricultural Field	Large agricultural fields throughout the eastern portion of the Site. Fields were dominated by grasses and forbs, including vetch (<i>Vicia spp.</i>), knapweed (<i>Centaurea spp.</i>), clover (<i>Trifolium spp.</i>), and alfalfa (<i>Medicago spp.</i>).	n/a
MAM2-6 Broad-leaved Sedge Mineral Meadow Marsh	A broad-leaved sedge mineral meadow marsh on the north edge of the Site, bordering Welland River, and designated as part of the Welland River East provincially significant wetland (PSW). Areas of submerged aquatic plants were observed within the river at the shoreline, dominated by pondweed and water-milfoil species. Swamp rose mallow (<i>Hibiscus moscheutos</i>) was also identified in the marsh. MAM2-6 is within the floodplain of Welland River; however most areas do not contain standing water. This ecosite would be influenced by changing seasonal water levels.	S5
MAS Shallow Marsh	A small cattail marsh in the center of the Site. Dominated by extremely dense narrowleaf cattail (<i>Typha angustifolia</i>), with pinkweed (<i>Persicaria pensylvanica</i>), swamp smartweed (<i>Persicaria hydropiperoides</i>), purple loosestrife (<i>Lythrum salicaria</i>), and goldenrod present. No standing water was observed throughout the marsh. This wetland is unlikely to be complexed with the Welland River East Wetland Complex PSW due to its small size and lack of hydrological connection to the PSW.	n/a
RES Residential	Residential area in the south portion of the Site.	n/a
SWD Deciduous Swamp	Deciduous swamp associated with the Welland River East PSW off-Site, in the northwest corner of the study area.	n/a
FOD / SWD Deciduous Forest / Deciduous Swamp	A deciduous forest and swamp mosaic associated with the Welland River East PSW off-Site, in the west portion of the study area.	n/a

Notes: ^a An SRank is a provincial level rank indicating the conservation status of a species or plant community and is assigned by the NHIC in Ontario (NHIC 2015). SRanks are not legal designations but are used to prioritize protection efforts in the Province. SRanks for plant communities in Ontario are defined in the Significant Wildlife Habitat Technical Guide (MNR 2000). Ranks 1-3 are considered extremely rare to uncommon in Ontario; Ranks 4 and 5 are considered to be common and widespread. n/a indicates a community that has not been ranked, which often applies to anthropogenic, culturally-influenced or high-level ELC communities (i.e., FOD).

Table 2: Plant Communities at Shaft Locations on the Montrose Alignment Site

Shaft Location	ELC Community	Description	SRANK ^a
Montrose Shaft 1	CUM Cultural Meadow	A cultural meadow with goldenrod (<i>Solidago spp.</i>), phragmites (<i>Phragmites spp.</i>), white sweet-clover (<i>Melilotus alba</i>), red clover (<i>Trifolium pratense</i>), tufted vetch (<i>Vicia cracca</i>), birdsfoot trefoil (<i>Lotus corniculatus</i>), and teasel (<i>Dipsacus spp.</i>). Shaft was adjacent to residential property and a cultural thicket consisting of eastern cottonwood (<i>Populus deltoides</i>), willow (<i>Salix spp.</i>), Manitoba maple (<i>Acer negundo</i>), staghorn sumac (<i>Rhus typhina</i>).	n/a
Montrose Shaft 2	CUM Cultural Meadow	A cultural meadow directly adjacent to Montrose Road. Goldenrod was abundant throughout cultural meadow, with white sweet-clover, birdsfoot trefoil, teasel, yellow sweet-clover (<i>Melilotus officinalis</i>), wild carrot (<i>Daucus Carota</i>), and <i>Sonchus spp.</i> Manitoba maple, eastern cottonwood, and black locust (<i>Robinia pseudoacacia</i>) were present within meadow, but rare.	n/a
Montrose Shaft 3	SWD Deciduous Swamp	The majority of the shaft footprint is located on the road (Brown Road) right-of-way, however a small portion of the shaft footprint's south edge overlaps a deciduous swamp. The swamp was dominated by white ash, with basswood (<i>Tilia americana</i>), pin oak, American elm, hickory (<i>Carya spp.</i>), swamp white oak, and common buckthorn. A cultural meadow was directly adjacent to the north.	n/a
Montrose Shaft 4	CUM Cultural Meadow	A cultural meadow directly adjacent to the intersection of Montrose Road and Chippewa Creek Road. Surrounded by agricultural fields to the northwest, an industrial area to the west, and a deciduous forest to the south.	n/a
Montrose Shaft 5	IND Industrial	The shaft was directly adjacent to a deciduous forest (entrance to Baden Powell Park) and borders Montrose Road, with a cultural meadow on the east side of the road.	n/a
Montrose Shaft 6	SWD Deciduous Swamp	The majority of the shaft footprint is on the road (Reixinger Road) right-of-way, however a small portion of the north and south edges of the shaft overlaps a deciduous swamp dominated by green ash. American elm, basswood, spotted Joe Pye weed (<i>Eutrochium maculatum</i>), swamp milkweed (<i>Asclepias incarnata</i>), spotted jewelweed (<i>Impatiens capensis</i>), hedge parsley (<i>Torilis arvensis</i>), and grass species were also present.	n/a
Brown Shaft 1	CUM Cultural Meadow	The majority of the shaft footprint is on the road (Brown Road) right-of-way however a small portion on the north and south edges of the Site include roadside ditch and a cultural meadow.	n/a
Reixinger Shaft 2	HAY Agricultural Field	The shaft was located within a large agricultural field. Fields were dominated by grasses and forbs, including vetch, knapweed, clover, and alfalfa.	n/a

Notes: ^a An SRank is a provincial level rank indicating the conservation status of a species or plant community and is assigned by the NHIC in Ontario (NHIC 2015). SRanks are not legal designations but are used to prioritize protection efforts in the Province. SRanks for plant communities in Ontario are defined in the Significant Wildlife Habitat Technical Guide (MNR 2000). Ranks 1-3 are considered extremely rare to uncommon in Ontario; Ranks 4 and 5 are considered to be common and widespread. n/a indicates a community that has not been ranked, which often applies to anthropogenic, culturally-influenced or high-level ELC communities (i.e., FOD).

4.3.3 Vascular Plants

A total of 88 plant species were identified during the botanical, or other, surveys completed in the WWTP and Montrose alignment Study Areas (Appendix A). Of those, 56 are native species, and 26 are non-native species. The remaining six species were unable to be identified to the species level due to plant condition or seasonal timing (e.g., was not flowering).

Significant and Sensitive Species

The majority of plant species observed in the WWTP and Montrose alignment Study Areas are secure and common, widespread and abundant in Ontario and globally (S5; G5).

Two species designated special concern under the ESA were observed on the WWTP Site during field surveys: Shumard oak (*Quercus shumardii*) and swamp rose-mallow (*Hibiscus moscheutos*). Both of these species are also ranked S3 (vulnerable) and are considered uncommon in the province.

No other plant species identified in the desktop SAR screening as having ranges which overlap the WWTP or Montrose alignment Study Areas were found during the field surveys (Appendix B).

4.4 Wildlife

4.4.1 Birds

A total of 58 bird species were observed during breeding bird, or other, surveys in the WWTP and Montrose alignment Study Areas (Appendix C).

4.4.1.1 Significant and Sensitive Species

The majority of bird species observed in the WWTP and Montrose alignment Study Areas are secure and common, widespread and abundant in Ontario and globally (S5; G5).

WWTP Site

Five bird species designated under the ESA were observed within the WWTP Study Area: bald eagle (*Haliaeetus leucocephalus*), barn swallow (*Hirundo rustica*), bobolink (*Dolichonyx oryzivorus*), eastern meadowlark (*Sturnella magna*), and eastern wood-pewee (*Contopus virens*). Additionally, common nighthawk (*Chordeiles minor*) was assessed to have moderate potential to occur on the WWTP Site and/or within the Study Area based on availability of potential suitable habitat.

Barn swallow, designated threatened under the ESA, was observed nesting in the barn (Feature 1 on Figure 1) on the WWTP Site. The wetlands (MAM2-6, MAS), cultural meadow (CUM), agricultural fields (HAY) and shoreline of Welland River on the WWTP Site may provide suitable foraging habitat for this species (Figure 1). Lyon's Creek PSW and the agricultural fields to the east of the WWTP Site, within the Study Area, may also provide suitable foraging habitat for this species.

Bobolink and eastern meadowlark, designated threatened under the ESA, were confirmed to be breeding in the agricultural fields (HAY) on the WWTP Site (Figure 1). Off-Site, the agricultural fields in the eastern portion of the WWTP Study Area may also provide suitable habitat for this species.

Common nighthawk, designated special concern under the ESA may nest in the cultural meadows (CUM) and agricultural fields (HAY) on the Site and within the Study Area.

Eastern wood-pewee, designated special concern under the ESA, was observed off-Site, within the WWTP Study Area during field surveys. The deciduous forest/deciduous swamp (FOD/SWD) in the southeast portion of the Study Area and deciduous forest (FOD) in the east and south portions of the Study Area may provide suitable habitat for this species (Figure 1).

Bald eagle, designated special concern under the ESA, was observed flying over the WWTP Site and Study Area. However, the WWTP Site lacked super-canopy trees for nesting and no evidence of previous nesting activity (i.e., nests) were observed. Super-canopy trees, suitable nesting habitat for bald eagle, may be present along Welland River, off-Site, within the Study Area.

Montrose Alignment Site

One bird species designated under the ESA was observed within the Montrose alignment Study Area: barn swallow. Eleven additional bird species designated under the ESA were assessed to have moderate potential to occur on the Montrose alignment Site and/or within the Study Area based on availability of potential suitable habitat: bald eagle, bobolink, Canada warbler (*Cardellina canadensis*), Cerulean warbler (*Setophaga cerulea*), chimney swift (*Chaetura pelagica*), common nighthawk, eastern meadowlark, eastern wood-pewee, red-headed woodpecker (*Melanerpes erythrocephalus*), wood thrush (*Hylocichla mustelina*), and yellow-breasted chat (*Icteria virens virens*).

Barn swallow was observed at Montrose Shafts 1 and Reixinger Shaft 2, and along the Montrose alignment during field surveys. The residential and commercial buildings, barns, sheds, bridges, and culverts on the Site and within the Study Area may provide suitable nesting habitat for this species.

Bobolink and eastern meadowlark were confirmed to be breeding in the agricultural fields (HAY) on Site at Reixinger Shaft 2, which is also located within the WWTP Site.

Although not observed, super-canopy trees along the Welland River at the eastern edge of the Study Area may provide suitable nesting habitat for bald eagle.

Although not observed, deciduous swamp (SWD) on the Site in the vicinity of Montrose Shaft 3 and 6, and within the Study Area, in the vicinity of Brown Shaft 1 and Montrose Shaft 5 may provide suitable habitat for Canada warbler, designated special concern under the ESA (Figure 2).

Anthropogenic nesting sites (i.e., chimneys) for chimney swift, designated threatened under the ESA, may be present off-Site within the Montrose alignment Study Area. No potential nesting sites were observed on the Site.

Although not observed, the cultural meadows (CUM) and agricultural hay field (HAY) on the shaft Sites (Montrose Shaft 1 and 2), along the Montrose alignment and within the Study Area may provide suitable nesting and foraging habitat for common nighthawk (Figure 2).

Although individuals were not observed, deciduous forests and swamps (FOD, SWD) on the Site, in the vicinity of Montrose Shaft 3 and 6 Site, and within the Study Area in the vicinity of Brown Shaft 1 and Montrose Shaft 5, and the mature forest south of Reixinger Road may provide suitable nesting habitat for cerulean warbler (threatened under the ESA), eastern wood-pewee, and wood thrush (special concern under the ESA) (Figure 2).

Although individuals were not observed, thickets (CUT), woodlands and forest edges (FOD, SWD) on the Site, in the vicinity of Brown Shaft 1, Montrose Shafts 1, 2, 3, 4, 5, 6 and the Montrose alignment may provide suitable nesting and foraging habitat for red-headed woodpecker, designated special concern under the ESA.

Although not observed, cultural thickets (CUT) within the Study Area, specifically in the vicinity of Montrose Shaft 1, may provide suitable nesting habitat for yellow-breasted chat, designated endangered under the ESA.

Barn swallow, bobolink, Cerulean warbler, chimney swift, eastern meadowlark, and yellow-breasted chat are discussed further in Section 5.5. Bald eagle, Canada warbler, common nighthawk, eastern wood-pewee, red-headed woodpecker, and wood thrush are discussed further in Section 5.6.

4.4.2 Other Wildlife and Wildlife Habitat

A total of five arthropod species, four mammal species, one amphibian species, and one reptile species were observed in the in the WWTP and Montrose alignment Study Areas during field surveys (Appendix C).

Welland River and Grassy Brook on the WWTP Site (Figure 1) may provide suitable aquatic habitat for turtles. Specifically, the broad-leaved sedge mineral meadow marsh (MAM2-6) within the Welland River East PSW in the northwest corner of the Site may provide suitable aquatic habitat. Multiple logs were observed in these areas during field surveys that may provide basking habitat. The small shallow cattail marsh (MAS) in the center of the WWTP Site (Figure 1) was assessed to not provide suitable turtle habitat.

No suitable large cavity trees for tree roosting bats were observed in the deciduous forest (FOD) on the WWTP Site during field surveys. Off-Site, forest in the eastern portion of the WWTP Study Area may have suitable large cavity trees for roosting. In addition, the barn on the WWTP Site was assessed to have potential to support roosting for bat species that use anthropogenic structures. Several forested areas (i.e., FOD, SWD) on the Montrose alignment Site and in the Study Area were characterized as mature communities with candidate snag trees and that may provide maternity roost habitat for tree-roosting bats.

No amphibian breeding habitat was identified on the WWTP Site. Off-Site, Welland River East and Lyon's Creek PSW within the WWTP Study Area may provide suitable wetland amphibian breeding habitat. The portion of Welland River East PSW along the northern edge of the WWTP Site is unlikely to provide suitable amphibian habitat due to the presence of fish in Welland River. No amphibian breeding habitat was identified on the Montrose alignment Site. Areas throughout Warren Creek Wetland located southeast of Brown Shaft 1 and southwest of Montrose Shaft 3, within the Montrose alignment Study Area, may provide suitable amphibian breeding habitat.

There is limited wildlife habitat at the Black Horse SPS on the Thorold South Site. Birds may forage over the meadow/lawn. The deciduous hedgerow may contain cavity or snag trees to support maternity roost habitat for bats.

4.4.2.1 Significant and Sensitive Species

The majority of other wildlife species observed in the WWTP and Montrose alignment Study Areas during field surveys are secure and common in Ontario and globally (S5; G5) (Appendix C).

One species designated under the ESA was observed at both the WWTP and Montrose alignment Sites: monarch (*Danaus plexippus*). Eleven additional species designated under the ESA were assessed to have moderate potential to occur on the Sites and/or within the Study Areas based on availability of potential suitable habitat: yellow-banded bumblebee (*Bombus terricola*), little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), tri-coloured bat (*Perimyotis subflavus*), woodland vole (*Microtus pinetorum*), Blanding's turtle (*Emydoidea blandingii*), eastern ribbonsnake (*Thamnophis sauritus*), milksnake (*Lampropeltis triangulum*), northern map turtle (*Graptemys geographica*), snapping turtle (*Chelydra serpentina*), and eastern musk turtle (*Sternotherus odoratus*).

WWTP Site

Monarch and milkweed, their host plant, were observed on the Site during the field surveys. Yellow-banded bumble bee (designated special concern under the ESA) has similar habitat needs as monarch. Farmland (HAY), meadows (CUM), open wetlands (Welland River East and Lyon's Creek Wetland Complex), and roadsides on the Site and within the Study Area provide suitable breeding and foraging habitat for these species.

The barn on the Site (Feature 1 on Figure 1) may provide suitable anthropogenic roosting habitat for little brown myotis (endangered under the ESA). Forests off-Site, in the eastern portion of the Study Area may have suitable large cavity trees for roosting for little brown myotis, northern myotis, and tri-coloured bat (endangered under the ESA).

Forested areas (FOD, CUT) on the Site and off-Site, within the Study Area (forested areas east, south and west of the Site) may provide suitable habitat for woodland vole (Figure 1), designated special concern under the ESA.

Welland River and Grassy Brook may provide suitable aquatic habitat for Blanding's turtle (threatened under the ESA), northern map turtle, snapping turtle, and eastern musk turtle (all special concern under the ESA).

Welland River East PSW and Lyon's Creek PSW may provide suitable habitat for eastern ribbonsnake, designated special concern under the ESA.

Montrose Alignment Site

Monarch and milkweed, their host plant, were observed on the Site during the field surveys. The cultural meadows (CUM) and roadsides throughout the Site and Study Area, cultural thicket (CUT) within Montrose Shaft 1 Study Area, and fields (HAY) within the Study Area may provide suitable breeding and foraging habitat for monarch and yellow-banded bumble bee (Figure 2).

Forested areas (FOD, SWD) on the Site, in the vicinity of Montrose Shaft 3 and 6, and within the Study Area, in the vicinity of Brown Shaft 1 and Montrose Shaft 5, and the mature forest south of Reixinger Road (Figure 2) may have suitable maternity roost habitat for little brown myotis, northern myotis, and tri-coloured bat. These forested areas may also provide suitable habitat for woodland vole.

Riparian areas on the Site between Brown Shaft 1 to Montrose Shaft 3 and Montrose Shaft 4 to 6, and the forested areas (FOD, SWD) at Montrose Shaft 3 and 6, within the Study Area, in the vicinity of Brown Shaft 1 and Montrose Shaft 5, and the mature forest south of Reixinger Road may provide suitable habitat for eastern ribbonsnake.

Monarch, yellow-banded bumblebee, woodland vole, eastern ribbonsnake, milksnake, northern map turtle, snapping turtle, and eastern musk turtle are discussed further in Section 5.6. Little brown myotis, northern myotis, tri-coloured bat, and Blanding's turtle are discussed further in Section 5.4.

4.5 Fish and Fish Habitat

4.5.1 Fish Habitat

4.5.1.1 Welland River

Habitat along the entire reach of the Welland River within the WWTP Study Area had very consistent habitat characterized by a slow-flowing run. Welland River was approximately 130 – 135 m wide, and depth was recorded as greater than 1.5 m. Substrates along the southern bank were firm, and consisted of clay and silt, with trace amounts of sand. The wadeable portion along the southern bank had submergent vegetation providing cover for fish. Fish (shiner species) were observed amongst the vegetation during the field survey. The water depth increased to greater than 1.5 m approximately 20 m from the bank, and cover/substrate could not be assessed past this point. The water was turbid. Bank height at the east end of the WWTP Study Area was 1.8 m, and decreased towards the west, eventually becoming even with the water level around the mid point of the WWTP Study Area. The banks were comprised of fines and were moderately stable. Erosion along the toe of the bank was observed for the length of the reach assessed. The reach was assessed to have potential to provide overwintering and rearing habitat for small-bodied fish, suckers, and predatory fish. The reach may also be used as a migratory route for fish traveling upstream around Niagara Falls. Submergent vegetation along the edges may provide spawning habitat potential for northern pike and other vegetation-spawners.

4.5.1.2 Grassy Brook

Habitat along the entire reach of Grassy Brook within the WWTP Study Area was very consistent. The watercourse was characterized by a slow-flowing flat (i.e., homogenous stretch with no breaking water such as ripples or rapids). Wetted width averaged 23 m near the mouth and narrowed to 13 m at the upstream extent of the WWTP Study Area. Substrates throughout the reach were fines, ranging from organics to silt and clay. Dense cover for fish was provided throughout the reach by aquatic vegetation. Vegetation was primarily submergent (tapegrass), with 10-20% floating (white pondlily) and 5% emergent (cattails, arrowhead). The reach was assessed to provide excellent rearing habitat for small-bodied fish, suckers, and warmwater species. The reach was also assessed as having good spawning habitat potential for northern pike (*Esox lucius*) and other vegetation-spawners. The bank vegetation was wetland in the downstream portions, and throughout the reach on the western bank. Bank heights increased on the eastern bank further upstream (i.e., away from the Welland River) as the riparian community changed to deciduous forest on the east side. Bank composition was fines, ranging from organics to sand, and stability was moderate. Pumpkinseed (*Lepomis gibbosus*) and cyprinid species were observed within the watercourse during the field survey. One agricultural drain was identified entering Grassy Brook on the eastern bank (Figure 1), which was not flowing at the time of the survey.

No field surveys were completed at Lyon's Creek or Warren Creek in the Montrose alignment Study Area as neither watercourse is anticipated to be impacted by the proposed Project.

4.5.2 Fish

Welland River and Grassy Brook are known to support a wide variety of fish species, including: lake sturgeon (*Acipenser fulvescens*), bowfin (*Amia calva*), northern brook lamprey (*Ichthyomyzon fossor*), grass pickerel (*Esox americanus vermiculatus*), central mudminnow (*Umbra limi*), white sucker (*Catostomus commersoni*), lake chubsucker (*Erimydon sucetta*), shorthead redhorse (*Moxostoma macrolepidotum*), greater redhorse (*Moxostoma valenciennesi*), redhorse sp (*Moxostoma sp.*), trout-perch (*Percopsis omiscomaycus*), rainbow darter (*Etheostoma caeruleum*), johnny darter (*Etheostoma nigrum*), logperch (*Percina caprodes*), freshwater drum (*Aplodinotus grunniens*), brook silverside (*Labidesthes sicculus*), brook stickleback (*Culaea inconstans*), mottled

sculpin (*Cottus bairdi*), golden shiner (*Notemigonus crysoleucas*), emerald shiner (*Notropis atherinoides*), common shiner (*Luxilus cornutus*), spottail shiner (*Notropis hudsonius*), bluntnose minnow (*Pimephales notatus*), fathead minnow (*Pimephales promelas*), creek chub (*Semotilus atromaculatus*), minnow sp (*Cyprinidae*), rock bass (*Ambloplites rupestris*), green sunfish (*Lepomis cyanellus*), pumpkinseed, bluegill (*Lepomis macrochirus*), northern pike, muskellunge (*Esox masquinongy*), smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), white crappie (*Pomoxis annularis*), black crappie (*Pomoxis nigromaculatus*), yellow perch (*Perca flavescens*), rainbow trout (*Oncorhynchus mykiss*), gizzard shad (*Dorosoma cepedianum*), round goby (*Neogobius melanostomus*), banded killifish (*Fundulus diaphanus*), rainbow smelt (*Osmerus mordax*), white perch (*Morone americana*), goldfish (*Carassius auratus*), common carp (*Cyprinus carpio*), and rudd (*Scardinius erythrophthalmus*) (Yagi and Blott 2021).

Lyon's Creek is known to support a wide variety of fish species including: black crappie, bluegill, bluntnose minnow, bowfin, brown bullhead, central mudminnow, channel catfish (*Ictalurus punctatus*), common carp, common shiner, emerald shiner, freshwater drum, golden shiner, goldfish, grass pickerel, green sunfish, johnny darter, largemouth bass, logperch, northern pike, pumpkinseed, rock bass, round goby, shorthead redhorse, spotted sucker, smallmouth bass, tadpole madtom (*Noturus gyrinus*), white crappie, white sucker, yellow bullhead, and yellow perch.

Warren Creek in the Montrose alignment Study Area, east of Brown Shaft 1 has no fish records, however, this watercourse is mapped by the DFO as potential grass pickerel habitat (DFO 2021).

4.5.2.1 Significant and Sensitive Species

No aquatic SAR species were observed in the Welland River or Grassy Brook during the field surveys, and no unique or important habitat was observed along the surveyed reaches.

Five fish species designated under the ESA or SARA were assessed to have moderate potential to occur within Welland River and Grassy Brook in the WWTP Study Area based on availability of potential suitable habitat: grass pickerel (special concern under the ESA and SARA), lake chubsucker (threatened under the ESA and endangered under SARA), lake sturgeon (endangered under the ESA and not designated under SARA), northern brook lamprey (special concern under the ESA and SARA), and spotted sucker (*Minytrema melanops*) (special concern under the ESA and SARA). Grass pickerel and spotted sucker also have potential to occur in Lyon's Creek (DFO 2021).

Four mollusc species designated under the ESA or SARA were assessed to have moderate potential to occur within Welland River and Grassy Brook in the WWTP Study Area based on availability of potential suitable habitat: eastern pondmussel (*Ligumia nasuta*) (special concern under the ESA and SARA), fawnsfoot (*Truncilla donaciformis*) (endangered under the ESA and SARA), kidneyshell (*Ptychobranthus fasciolaris*) (endangered under the ESA and SARA), and mapleleaf (*Quadrula quadrula*) (special concern under the ESA and SARA).

Grass pickerel, northern brook lamprey, spotted sucker, eastern pondmussel, and mapleleaf are discussed further in Section 5.6. Lake chubsucker, lake sturgeon, fawnsfoot, kidneyshell, and round hickorynut are discussed further in Section 5.4.

5.0 ASSESSMENT OF SIGNIFICANT NATURAL HERITAGE FEATURES

This section assesses the natural heritage features and functions relevant to the policies and legislation outlined in Section 2.0 located within the Study Areas.

5.1 Fish Habitat

Welland River (WWTP Site), Grassy Brook (WWTP Site), Lyon's Creek (near Montrose-Shaft-06), and Warren Creek y (near Brown-Shaft-01) are fish habitat. Unnamed tributaries of Welland Canal, Thompson Creek and Warren Creek within the Thorold South alignment Study Area are fish habitat.

The Montrose alignment will be tunneled beneath Lyon's Creek and Warren Creek. No adverse impacts to either watercourse are anticipated.

The WWTP outfall pipe will be constructed in the Welland River, and additional field surveys will be required during the detailed design to assess the impacts of the construction on fish and fish habitat, as well as fish and mussel SAR.

Where development is proposed within or adjacent (i.e., within 30 m) to fish habitat, an assessment must be completed to demonstrate that development will not adversely affect the feature or its ecological function. Development and site alteration within or adjacent to fish habitat may be permitted in accordance with provincial and federal requirements. As work is being completed within a fish bearing watercourse (i.e., Welland River) a DFO Request for Review will be required for the Project. Dependant upon the type of work being undertaken, residual effects of the project that may result in the harmful alternation, disruption or destruction to fish habitats and/or as a result of the DFO review process, a DFO *Fisheries Act* Authorization for the project may be required.

5.2 Significant Wetlands

Significant wetlands are areas identified as provincially significant by the MNRF using evaluation procedures established by the Province, as amended from time to time. Wetlands are assessed based on a range of criteria, including biology, hydrology, societal value and special features.

Development is not permitted within a PSW according to provincial policies (MMAH 2020a). Development may be permitted adjacent (i.e., within 120 m) to a significant wetland where an assessment demonstrates that development will not adversely affect the feature or its ecological function.

On the WWTP Site, there is one PSW, the Welland River East Wetland Complex, in the north portion of the Site. Off-Site, another section of the Welland River East Wetland Complex PSW also overlaps the west portion of the Study Area and the Lyon's Creek PSW overlaps the south portion of the Study Area (Figure 1).

On the Montrose alignment Site, the Welland River East PSW crosses the Montrose alignment between Montrose Shaft 4 and 5, and Lower Grassy Brook PSW crosses the Montrose alignment between Montrose Shaft 5 and 6. Off-Site, Warren Creek PSW is located in the north portion of the Study Area, and Lyon's Creek PSW is located in the south portion of the Study Area. There are no PSWs within the shaft footprints for the Montrose alignment Site.

However, several of the shaft locations are located adjacent to PSWs (Figure 2):

- Warren Creek PSW is located approximately 35 m west of Montrose-Shaft-03.
- Welland River East PSW is located approximately 110 m west of Montrose-Shaft-04.
- Lower Grassy Brook PSW is located approximately 85 m southeast of Montrose-Shaft-05.
- Lyon's Creek PSW is located approximately 110 m south of Reixinger-Shaft-02.

In the Thorold South alignment Study Area there are two PSWs (Figure 4):

- Thompson Creek PSW west of Beechwood Road and south of Brown Road.
- Warren Creek PSW north of Brown Road.

The Project includes the construction of an outfall pipe, which will involve development within the Welland River East PSW on the north edge of the WWTP Site. Although development within a PSW is generally not permitted, construction of essential infrastructure (as is the case for the proposed Project) may be permitted on a case-by-case basis in consultation with appropriate agencies. Based on consultation with the MNDMNR and NPCA, including a site visit with the NPCA on November 12, 2020 to confirm PSW boundaries, the anticipated location of the outfall pipe was agreed upon as being acceptable for development, despite the pipeline from the WWTP to the outfall being located within the PSW. Potential impacts to the Welland River East PSW are discussed in Section 6.1.

In addition, the outfall pipe and pipeline on the WWTP Site, and Montrose Shafts 3 and 6 on the Montrose alignment Site are within NPCA regulated limits and may require a permit for development. Work within the right-of-way for the Thorold South alignment adjacent to the two PSWs identified above may also require a permit from NPCA.

5.3 Significant Woodlands

Woodlands can vary in their level of significance at the local, regional and provincial levels. Significant woodlands are an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history (MMAH 2020a). Where local municipalities have not defined or mapped significant woodlands, these features are to be identified using criteria established by the NDMNR as included in the Natural Heritage Reference Manual (NHRM) for Policy 2.3 of the PPS (MNR 2010).

Development may be permitted within or adjacent (i.e., within 120 m) to a significant woodland, where an assessment demonstrates that development will not adversely affect the feature or its ecological function (e.g., ability to provide wildlife habitat, structural stability on slopes, etc.). Where development is proposed within a significant woodland, efforts should be made to modify the design plan to minimize encroachment to the extent possible. If development does require tree removal, compensation planting to offset or replace lost habitat may be required. A Tree Savings Plan may also be required as a condition of development approval (Niagara Falls 2019).

The City has mapped significant woodlands on Appendix III-C of the OP (Niagara Falls 2019). Based on this mapping, there are significant woodlands throughout the WWTP, Montrose alignment, and Thorold South alignment Sites and Study Areas.

On the WWTP Site, the deciduous forest (FOD) bordering Grassy Brook in the western portion of the Site, and the cultural thicket (CUT) on the northeastern portion of the Site (Figure 1) are mapped as significant woodlands. OP mapping is often completed at a desktop level and may be refined based on ground-truthing. Based on the field surveys, the northeast corner was classified as a cultural thicket (CUT) and does not meet the definition of a woodland as outlined in the City's OP or NHRM, and is therefore not a significant woodland. Off-Site, within the WWTP Study Area, forest within the Welland River East PSW to the west of the WWTP Site; forest within and surrounding the Lyon's Creek PSW east of the WWTP Site; and forest south of Reixinger Road are mapped as significant woodland.

On the Montrose alignment Site, the forested area north of Brown Shaft 1 and the forested area west of Montrose Shaft 5 (Figure 3) are mapped as significant woodlands.

In the Thorold South alignment Study Area, the woodlands north and south of Brown Road and the woodland west of Beechwood Road (Figure 4) are mapped as significant woodlands.

The City of Thorold maps significant woodlands as part of the Environmental Protection Two land use area on Schedule A (Thorold 2016). There are no significant woodlands mapped in the Thorold South alignment Site or Study Area.

All significant woodlands mapped within the WWTP Montrose alignment Sites and Study Areas are located outside of the proposed construction footprint and significant woodlands are not anticipated to be impacted by the proposed development. Further analysis is not warranted.

5.4 Significant Valleylands

Significant valleylands should be defined and designated by the planning authority. General guidelines for determining significance of these features are presented in the NHRM for Policy 2.3 of the PPS (MNR 2010). Recommended criteria for designating significant valleylands under the PPS include prominence as a distinctive landform, degree of naturalness, importance of its ecological functions, restoration potential, and historical and cultural values.

Significant valleylands are not specifically mapped by the City or Region, but are included as part of the City and Region's Environmental Conservation Area designation. Both the City and Region defer to the definition of significant valleylands as provided in the NHRM. No significant valleylands were identified within the WWTP, Montrose alignment or Thorold South alignment Study Areas.

The City of Thorold maps significant valleylands as part of the Environmental Protection Two land use area on Schedule A (Thorold 2016). There are no significant valleylands mapped in the Thorold South alignment Site or Study Area.

Further analysis is not warranted.

5.5 Habitat of Endangered or Threatened Species

General habitat protection is provided by the ESA to all threatened and endangered species. General habitat is defined as the area on which a species depends directly or indirectly to carry out life processes, including reproduction, rearing, hibernation, migration, or feeding. Species-specific habitat protection is only afforded to those species for which a habitat regulation has been prepared and passed into law as a regulation of the ESA. A habitat regulation outlines specific habitat features and associated buffers that are protected, and also specifies

the geographic area(s) of the Province where the habitat regulation applies. In some cases, a General Habitat Description (GHD) may also be prepared to help define and refine the area of protected habitat in advance of a habitat regulation.

Development is not permitted within significant habitat of threatened or endangered species except in accordance with the ESA. Developments must always be in compliance with the ESA, even after the site plans have been approved by the City.

Three species designated threatened or endangered under the ESA were observed during field surveys: barn swallow, bobolink, and eastern meadowlark. Based on the SAR screening, 10 additional species were assessed to have moderate potential to occur within the WWTP and/or Montrose alignment Study Areas based on availability of potential suitable habitat: cerulean warbler, yellow-breasted chat, lake chubsucker, lake sturgeon, fawnsfoot, kidneyshell, little brown myotis, northern myotis, tri-coloured bat, and Blanding's turtle.

The Black Horse SPS on the Thorold South Site has limited potential to support habitat for SAR. Based on a desktop assessment, the deciduous hedgerow may provide suitable maternity roost habitat for little brown myotis, northern myotis, or tri-coloured bat. Butternut may also grow in the deciduous hedgerow.

Barn Swallow

The barn swallow GHD (MNR 2013b) defines habitat by three categories:

- Category 1 - nest
- Category 2 - the area within 5 m of the nest (representing area by the male)
- Category 3 - the area between 5 m and 200 m of the nest (i.e., foraging habitat)

Barn swallow was confirmed to be nesting in the barn on the WWTP Site, and the open habitat (CUM, HAY) within 200 m of the barn is considered foraging habitat. The barn and foraging habitat on the WWTP Site are expected to be removed as part of the proposed Project. Barn swallow is carried forward to the impact assessment (Section 6.0).

Bobolink

The bobolink GHD (MNRF 2018a) defines habitat by three categories:

- Category 1 - nest and the area within 10 m of the nest
- Category 2 - the area between 10 m and 60 m of the nest or centre of approximated defended territory
- Category 3 - the area of continuous suitable habitat between 60 m and 300 m of the nest

The cultural meadow (CUM) and agricultural fields (HAY) on the WWTP Site were confirmed to provide suitable nesting habitat for bobolink (Figure 1). This habitat also overlaps Reixinger Shaft 2 of the Montrose alignment Site. The agricultural fields east of the WWTP Site, within the Study Area, may also provide suitable habitat for this species. The agricultural fields (HAY) on the WWTP Site and Reixinger Shaft 2 are anticipated to be removed as part of the proposed Project. Bobolink is carried forward to the impact assessment (Section 6.0).

Cerulean Warbler

There is no GHD for cerulean warbler, therefore the habitat is defined as the specific features that support critical life processes for this species (i.e., nesting and foraging). The deciduous forests and swamps (FOD, SWD) on the Montrose alignment Site, in the vicinity of Montrose Shaft 3 and 6 Site, and within the Study Area, in the vicinity of Brown Shaft 1 and Montrose Shaft 5, and the mature forest south of Reixinger Road may provide suitable habitat for this species (Figure 2). It is anticipated that the footprint of the shafts will be limited to the road right-of-way and will not require removal of trees from adjacent potential habitat. If removal of trees is anticipated on the Montrose alignment Site, two breeding bird surveys should be completed to confirm if the habitat is being used by cerulean warbler. If habitat is being used, permitting under the ESA may be required to remove habitat.

Chimney Swift

The GHD (MNR 2013c) for chimney swift defines habitat by one category:

- Category 1 – human-made nest/roost, or a natural nest/roost cavity and the area within 90 m of the natural cavity

No potential nesting habitat was identified on the Montrose alignment Site or WWTP Site. However, anthropogenic nesting habitat (i.e., chimneys) may be present off-Site within both Study Areas. Potential suitable nesting habitat for chimney swift is located off-Site and is not expected to be adversely impacted by the proposed Project. Further analysis is not warranted.

Eastern Meadowlark

The eastern meadowlark GHD (MNR 2018b) defines habitat by three categories:

- Category 1 - nest and the area within 10 m of the nest
- Category 2 - the area between 10 m and 100 m of the nest or centre of approximated defended territory
- Category 3 - the area of continuous suitable habitat between 60 m and 300 m of the nest

The cultural meadow (CUM) and agricultural fields (HAY) on the WWTP Site were confirmed to provide suitable nesting habitat for eastern meadowlark (Figure 1). This habitat also overlaps Reixinger Shaft 2 of the Montrose alignment Site. The agricultural fields east of the WWTP Site, within the Study Area, may also provide suitable habitat for this species. The agricultural fields (HAY) on the WWTP Site and on the Montrose alignment Site at Reixinger Shaft 2 are anticipated to be removed as part of the proposed Project. Eastern meadowlark is carried forward to the impact assessment (Section 6.0).

Yellow-breasted Chat

There is no GHD for yellow-breasted chat, therefore the habitat is defined as the specific features that support critical life processes for this species (i.e., nesting and foraging). Cultural thickets (CUT) off-Site, adjacent to Montrose Shaft 1 within the Montrose alignment Study Area may provide suitable nesting habitat. All potential habitat is located off-Site and outside of the proposed footprint, and no adverse impacts are anticipated. Further analysis is not warranted.

Lake Chubsucker, Lake Sturgeon, Fawnsfoot, Kidneyshell

There is no GHD for lake chubsucker, lake sturgeon, fawnsfoot, or kidneyshell, and therefore the habitat is defined as the specific features that support critical life processes for these species. Based on the SAR screening (Appendix B) and field surveys, Grassy Brook, Welland River, Lyon's Creek, and Warren Creek on the WWTP Site and within the Montrose alignment Study Area may provide suitable habitat for these aquatic species. As discussed in Section 5.1, the WWTP outfall will be constructed in the Welland River, and additional field surveys will be required during the detailed design to assess the impacts of the construction on these fish and mussel SAR.

Little Brown Myotis, Northern Myotis, Tri-coloured Bat

There is no GHD for little brown myotis, northern myotis, or tri-coloured bat, and therefore the habitat is defined by the ELC feature (plant community) or anthropogenic structure that supports critical life processes for this bat species (i.e., maternity roosting or hibernacula). The barn (Feature 1 on Figure 1) on the WWTP Site may provide suitable anthropogenic roosting habitat for little brown myotis.

The deciduous swamp (SWD) on the Montrose alignment Site at Montrose Shaft 3 and 6 Site, and within Brown Shaft 1 and Montrose Shaft 5 Study Area, and the mature forest south of Reixinger Road may provide suitable roosting habitat for little brown myotis, northern myotis, and tri-coloured bat. It is anticipated that the footprint of the shafts will be limited to the road right-of-way and will not require removal of trees from adjacent potential habitat. If removal of any snag or cavity trees greater than 10 cm diameter at breast height (DBH) are to be removed, exit surveys should be conducted to confirm if the tree is being used as a roost a minimum of 24 h prior to removal. If habitat is confirmed to be in use, permitting under the ESA may be required to remove habitat.

The barn on the WWTP Site is anticipated to be removed, and therefore, little brown myotis carried forward to the impact assessment (Section 6.0).

Blanding's Turtle

The Blanding's turtle GHD (MNR 2013e) defines habitat by three categories:

- Category 1 - nest and the area within 30 m or overwintering sites and the area within 30 m
- Category 2 - the wetland complex (i.e., all suitable wetlands or waterbodies within 500 m of each other) that extends up to 2 km from an occurrence, and the area within 30 m around those suitable wetlands or waterbodies
- Category 3 - area between 30 m and 250 m around suitable wetlands/waterbodies identified in Category 2, within 2 km of an occurrence

Welland River and Grassy Brook, particularly the broad-leaved sedge mineral meadow marsh (MAM2-6) on the north edge of the WWTP Site, may provide suitable aquatic and hibernation habitat for Blanding's turtle (Figure 1). The meadow marsh on the north edge of the WWTP Site is expected to be impacted during outfall construction, therefore Blanding's turtle is carried forward to the impact assessment (Section 6.0).

5.6 Significant Wildlife Habitat

SWH is one of the more complicated natural heritage features to identify and evaluate. The NHRM (MNR 2010) includes criteria and guidelines for designating SWH. There are two other documents, the Significant Wildlife Habitat Technical Guide (SWHTG) and the Significant Wildlife Habitat Mitigation Support Tool (SWHMiST) (MNR 2000 and MNR 2014), that can be used to help decide what areas and features should be considered SWH. These documents were used as reference material for this study.

There are five general types of SWH: seasonal concentration areas, migration corridors, rare vegetation communities, specialized habitats, and habitat for species of conservation concern (SOCC). The specific habitats considered in this report are evaluated based on the criteria outlined in the Ecoregion 7E Criterion Schedule (MNR 2015).

Based on the desktop review and field surveys, there is potential for four types of SWH on the Site and within the Study Area: seasonal concentration areas, specialized wildlife habitat, habitat for species of conservation concern (SOCC), and animal movement corridors. Table 3 outlines potential SWH within each Site and Study Area. These SWH habitats are discussed in more detail in the following sections.

Table 3: Potential Significant Wildlife Habitat

SWH Type	Habitat	Location			
		WWTP		Montrose Alignment Site	
		Site	Study Area	Site	Study Area
Seasonal Concentration Areas	Raptor Wintering Area	X	X		
	Bat Maternity Colonies	X	X	X	X
	Turtle Wintering Areas	X	X		
	Deer Congregation Areas		X		X
Specialized Wildlife Habitat	Bald Eagle and Osprey Nesting, Foraging and Perching Habitat		X		X
	Woodland Raptor Nesting Habitat		X		X
	Amphibian Breeding Habitat (Wetlands)	X	X		X
	Woodland Area – Sensitive Bird Breeding Habitat	X	X	X	X
Habitat for Species of Conservation Concern	Terrestrial Crayfish	X	X		
	Habitat of Special Concern and Rare Wildlife Species	X	X		X
Animal Movement Corridors	Amphibian Movement Corridor	X	X		

5.6.1 Seasonal Concentration Areas of Animals

Seasonal concentration areas of animals are considered to be areas where large numbers of a species gather together at one time of the year, or where several species congregate on an annual basis.

Candidate SWH for four seasonal concentration areas of animals were identified within the Study Areas: raptor wintering area, bat maternity colonies, turtle wintering areas, and deer congregation areas.

Raptor Wintering Area

The deciduous forest (FOD), cultural meadow (CUM) and cultural thicket (CUT) within the WWTP Site and Study Area may provide raptor wintering area. Together, these habitats (> 20 ha in size) provide a combination of fields and woodlands that are suitable for roosting, foraging, and resting habitats for wintering raptors. However, this candidate SWH is outside of the Project footprint and is not anticipated to be impacted by the proposed development. Further analysis is not warranted.

Bat Maternity Colonies

Forested areas (i.e., FOD, SWD) throughout the WWTP and Montrose alignment Study Areas may provide habitat for bat maternity colonies.

The deciduous swamp (SWD) off-Site to the west of the WWTP Site in Baden Powell Park, and the deciduous forest (FOD) off-Site surrounding and within Lyon's Creek Wetland Complex east of the WWTP Site may provide habitat for bat maternity colonies. All suitable habitat within the WWTP Study Area is located off-Site and outside of the Project footprint and is not anticipated to be impacted by development.

The deciduous swamp (SWD) within the Montrose alignment Site at Montrose Shaft 3 and 6, and within the Study Area, in the vicinity of Brown Shaft 1 and Montrose Shaft 5, and the deciduous swamp (SWD) south of Reixinger Road may also provide habitat for bat maternity colonies. It is anticipated that the footprint of the shafts will be limited to the road right-of-way and will not require removal of trees from adjacent potential habitat. However, if tree removal is required, it would be limited to a few trees along the edge of the deciduous swamp. Removal of a small number of trees is not expected to impact the overall ability of the forest to support bat maternity colonies. With implementation of mitigation measures (Section 7.7), no adverse impacts to this candidate SWH are anticipated. Further analysis is not warranted.

Turtle Wintering Areas

Welland River and Grassy Brook within the WWTP Study Area provide suitable wintering areas for turtle species. Outfall construction may impact this habitat, particularly Welland River. However, the section of suitable habitat to be removed is a thin strip of vegetation between the bank of Welland River and the agricultural field (HAY). The overall impacts are likely to be minor due to the small area of vegetation to be removed, and once construction is complete the vegetation will regenerate, restoring continuity of the wetland. Additionally, there is abundant suitable habitat throughout the Study Area and local landscape that will not be impacted by the Project. Further analysis is not warranted.

Deer Congregation Areas

There are no deer congregation areas on the WWTP Site or Montrose alignment Site. Lyon's Creek PSW east of the WWTP Site and Welland River East PSW west of the WWTP Site, as well as the deciduous swamp (SWD) south of Brown Shaft 1 in the Montrose alignment Study Area are designated deer wintering areas. However, these areas are off-Site and outside of the Project footprint and not anticipated to be impacted by the Project. Further analysis is not warranted.

5.6.2 Specialized Habitat for Wildlife

Specialized habitats for wildlife are large areas of suitable habitat that contribute to a species long-term survival. Some species require large areas of unfragmented, suitable habitat for successful breeding, and populations can decline if these habitats reduce in size. Specialized habitat for wildlife is community- and diversity-based, therefore, the more wildlife species a habitat contains, the more significant the habitat becomes.

Candidate SWH for four specialized habitats for wildlife were identified within the Study Areas: bald eagle and osprey nesting, foraging and perching, woodland raptor nesting habitat, amphibian breeding habitat (wetlands), woodland area sensitive bird breeding habitat.

Bald Eagle and Osprey Nesting, Foraging and Perching Habitat

There are no bald eagle and osprey habitat on the WWTP Site or Montrose alignment Site. Forested areas along Welland River within the WWTP and Montrose alignment Study Areas may provide suitable habitat for bald eagle and osprey nesting, foraging and perching. However, these areas are off-Site and outside of the Project footprint and are not anticipated to be impacted by the Project. Further analysis is not warranted.

Woodland Raptor Nesting Habitat

There are no woodland raptor nesting habitats on the WWTP Site or Montrose alignment Site. Lyon's Creek PSW east of the WWTP Site in the WWTP Study Area, and , the deciduous swamp (SWD) to the south of Brown Shaft 1 in the Montrose alignment Study Area may provide suitable woodland raptor nesting habitat. However, these areas are off-Site and outside of the Project footprint and are not anticipated to be impacted by the Project. Further analysis is not warranted.

Amphibian Breeding Habitat

There are no amphibian breeding habitats on the WWTP Site or Montrose alignment Site. Welland River East and Lyon's Creek PSW within the WWTP Study Area may provide suitable wetland amphibian breeding habitat. Areas throughout Warren Creek Wetland, southeast of Brown Shaft 1 and southwest of Montrose Shaft 3, within the Montrose alignment Study Area may also provide suitable habitat. However, these areas are off-Site and outside of the Project footprint and are not anticipated to be impacted by the Project. Further analysis is not warranted.

Woodland Area – Sensitive Bird Breeding Habitat

There is no woodland area – sensitive bird breeding habitat on the WWTP Site or Montrose alignment Site. The deciduous forest (FOD) surrounding and within Lyon's Creek PSW east of the WWTP Site in the WWTP Study Area and the deciduous swamp (SWD) south of Brown Shaft 1 and west of Montrose Shaft 3 in the Montrose alignment Study Area may provide woodland habitat for sensitive breeding birds. Potential habitat in the WWTP Study Area and adjacent to Brown Shaft 1 is off-Site and not anticipated to be impacted by the Project. Although potential habitat was identified immediately adjacent to Montrose Shaft 3, it is anticipated that the footprint of the shaft will be limited to the road right-of-way and will not require removal of trees from adjacent potential habitat. However, if tree removal is required, it would be limited to a few trees along the edge of the deciduous swamp. It is unlikely that the removal of this habitat will affect the woodland's ability to provide suitable habitat for area sensitive breeding birds. With implementation of best management practices (Section 7.1), no adverse impacts to individuals are expected. Further analysis is not warranted.

5.6.3 Habitat for Species of Conservation Concern

Special concern and rare wildlife species include species listed as special concern under the ESA; species identified as endangered or threatened by COSEWIC; species that are rare, whose populations are significantly declining, or have a high percentage of their global population in Ontario (i.e., ranked S1-S3 by NHIC); and species designated as rare by municipalities. This category excludes species listed as endangered or threatened under the ESA (Section 5.1).

Candidate or confirmed SWH for two habitats of SOCC were identified within the Study Areas: terrestrial crayfish and habitat of special concern and rare wildlife species.

Terrestrial Crayfish

Marsh habitat (MAM2-6) on the WWTP Site may provide habitat for crayfish burrows. Outfall construction will impact the marsh (MAM2-6). However, construction disturbance will be temporary and localized to a small portion of the marsh on the WWTP Site (Figure 1). No cumulative, long term impacts to terrestrial crayfish habitat from the outfall construction are anticipated. Additionally, terrestrial crayfish or their chimneys were not observed. Further analysis is not warranted.

Habitat of special concern and rare wildlife species

The following 20 SOCC were identified as having suitable habitat within the WWTP Study Area and/or Montrose alignment Study Area: monarch, yellow-banded bumblebee, bald eagle, Canada warbler, common nighthawk, eastern wood-pewee, red-headed woodpecker, wood thrush, grass pickerel, northern brook lamprey, spotted sucker, woodland vole, eastern pondmussel, mapleleaf, eastern ribbonsnake, northern map turtle, snapping turtle, eastern musk turtle, Shumard oak, and swamp rose mallow (Appendix A).

Monarch

Both monarch and milkweed were observed at both the WWTP and Montrose alignment Sites during the field surveys. Farmland (HAY), meadows (CUM), open wetlands (Welland River East PSW and Lyon's Creek PSW), and roadsides on both Sites and in both Study Areas may provide suitable breeding and foraging habitat for this species. Impacts to the agricultural fields (HAY) on the WWTP site and meadows (CUM) throughout several of the shaft locations of the Montrose alignment Site are anticipated. However, there is similar suitable habitat throughout the Study Areas and local landscape. Additionally, the meadows throughout the shaft locations are small and isolated and unlikely to support a large concentration of individuals. Further analysis is not warranted.

Yellow-banded bumblebee

Woodlands and thickets (FOD, CUT), farmland (HAY) and meadows (CUM) throughout both the WWTP and Montrose alignment Sites and Study Areas may provide overwintering and nesting habitat for yellow-banded bumble bee. Impacts to the agricultural fields (HAY) on the WWTP site and meadows (CUM) throughout several of the shaft locations of the Montrose alignment Site are anticipated. However, there is similar suitable habitat throughout the Study Areas and local landscape. Additionally, the meadows throughout the shaft locations are small and isolated and unlikely to support a large concentration of individuals. Further analysis is not warranted.

Bald eagle

Bald eagle was observed flying over the WWTP Site during field surveys. However, the WWTP Site lacked super-canopy trees for nesting and no evidence of previous nesting activity were observed on Site. Super-canopy trees may be present along Welland River within the WWTP Study Area. However, this potential habitat is off-Site and outside of the Project footprint and is not anticipated to be impacted by the Project. Further analysis is not warranted.

Canada warbler

The deciduous swamp (SWD) at Montrose Shaft 3 and 6 Site, within Brown Shaft 1 and Montrose Shaft 5, and the mature forest south of Reixinger Road in the Montrose alignment Study Area may provide suitable habitat for Canada warbler. Potential habitat at Montrose Shaft 3 and 6 is anticipated to be impacted by the Project. However, the areas impacted by the Project are anticipated to be small, edge habitat along roads. It is unlikely that the removal of this habitat will affect the forest's ability to provide suitable habitat for this species. Additionally, there is abundant forest throughout the Montrose alignment Study Area and local landscape that would provide suitable habitat. With implementation of best management practices (Section 7.1), no adverse impacts to individuals are expected. Further analysis is not warranted.

Common nighthawk

On the WWTP Site and within the WWTP Study Area, open areas including farmland (HAY), meadow (CUM) and Welland River East PSW and Lyon's Creek PSW may provide suitable habitat for this species. The cultural meadows (CUM) along the Montrose alignment Site and within the Study Area may also provide suitable nesting and foraging habitat for common nighthawk. Impacts to the farmland (HAY) on the WWTP Site and meadows (CUM) throughout the shaft locations of the Montrose alignment Site are anticipated. However, there is abundant similar suitable habitat within the WWTP and Montrose alignment Study Areas and local landscape that will provide alternative habitat. With implementation of best management practices (Section 7.1), no adverse impacts to individuals are expected. Further analysis is not warranted.

Eastern wood-pewee

Eastern wood-pewee was observed off-Site, in the WWTP Study Area during field surveys. The deciduous forest/deciduous swamp (FOD/SWD) in the southeast portion of the WWTP Study Area and deciduous forest (FOD) in the east and south portions of the WWTP Study Area may provide suitable habitat for this species. Additionally, deciduous forests and swamps (FOD, SWD) at Montrose Shaft 3 and 6, , in the vicinity of Brown Shaft 1 and Montrose Shaft 5, and the mature forest south of Reixinger Road in the Montrose alignment Study Area may provide suitable habitat.

Potential suitable habitat within the WWTP Study Area is located off-Site and impacts are not anticipated. Forested areas at Montrose Shaft 3 and 6 may be impacted during construction. However, the area impacted by the Project is anticipated to be small, edge habitat along roads. It is unlikely that the removal of this habitat will affect the forest's ability to provide suitable habitat for this species. Additionally, there is abundant forest throughout the Montrose alignment Study Area and local landscape that would provide suitable habitat. With implementation of best management practices (Section 7.1), no adverse impacts to individuals are expected. Further analysis is not warranted.

Red-headed woodpecker

Thickets (CUT), woodlands and forest edges (FOD, SWD) at Montrose Shaft 3 and 6, in the vicinity of Brown Shaft 1 and Montrose Shaft 5, and the mature forest south of Reixinger Road in the Montrose alignment Study Area may provide suitable nesting and foraging habitat for red-headed woodpecker. Forested areas (FOD, SWD) at Montrose Shaft 3 and 6 may be impacted during construction. However, the forested area impacted by the Project is anticipated to be small, edge habitat along roads. It is unlikely that the removal of this habitat will affect the forest's ability to provide suitable habitat for this species. Additionally, there is abundant suitable habitat throughout the Montrose alignment Study Area and local landscape that would provide alternative habitat. With implementation of best management practices (Section 7.1), no adverse impacts to individuals are expected. Further analysis is not warranted.

Wood thrush

The deciduous forest (FOD) on the WWTP Site and forested areas in the east, south and west portions of the WWTP Study Area may provide suitable habitat for this species. Additionally, deciduous forests and swamps (FOD, SWD) at Montrose Shaft 3 and 6, in the vicinity of Brown Shaft 1 and Montrose Shaft 5, and the mature forest south of Reixinger Road in the Montrose alignment Study Area may provide suitable habitat.

Potential habitat in the WWTP Study Area are off-Site and no impacts are anticipated. Forested areas at Montrose Shaft 3 and 6 may be impacted during construction. However, the area impacted by the Project is anticipated to be small, edge habitat along roads. It is unlikely that the removal of this habitat will affect the forest's ability to provide suitable habitat for these species. Additionally, there is abundant forest throughout the Montrose alignment Study Area and local landscape that would provide suitable habitat. With implementation of best management practices (Section 7.1), no adverse impacts to individuals are expected. Further analysis is not warranted.

Grass pickerel, spotted sucker

The Welland River and Grassy Brook within the WWTP Study Area may provide suitable habitat for this species. As discussed in Section 5.1, additional field investigations will be required during detailed design to confirm impacts to fish and fish habitat.

Woodland vole

Deciduous forest (FOD) and cultural thicket (CUT) on the WWTP Site and forested areas in the east, south and west portions of the WWTP Study Area may provide suitable habitat for this species. Additionally, the forested area west of Montrose Shaft 3 and south of Montrose Shaft 6 and the mature forest south of Reixinger Road in the Montrose alignment Study Area may also provide suitable habitat. Potential suitable habitat on the WWTP Site and within the WWTP Study Area are outside of the Project footprint and are not anticipated to be impacted. Forested areas at Montrose Shaft 3 and Montrose Shaft 6 may be impacted during shaft construction. However, the area impacted by the Project is anticipated to be small, edge habitat along roads. It is unlikely that the removal of this habitat will affect the forest's ability to provide suitable habitat for these species. Additionally, there is abundant forest throughout the Montrose alignment Study Area and local landscape that would provide suitable habitat. Further analysis is not warranted.

Eastern ribbonsnake

Welland River East PSW and Lyon's Creek PSW within the WWTP Study Area may provide suitable habitat for this species. Additionally, riparian areas between Brown Shaft 1 to Montrose Shaft 3 and Montrose Shaft 4 to 6 of the Montrose alignment Study Area may provide suitable habitat for eastern ribbonsnake. The deciduous swamp (SWD) within Montrose Shaft 3 and 6 may be impacted during shaft construction. However, the area impacted by the Project is anticipated to be small, edge habitat along roads. It is unlikely that the removal of this habitat will affect the forest's ability to provide suitable habitat for this species. Further analysis is not warranted.

Northern map turtle, snapping turtle, eastern musk turtle

The Welland River and Grassy Brook within the WWTP Study Area may provide suitable aquatic habitat for these turtle species. Welland River is anticipated to be impacted during outfall construction. However, construction disturbance will be temporary and localized to a small portion of the marsh (MAM2-6) on the WWTP Site, which will be restored following construction (Figure 1). In addition, mitigation measures that will be required to prevent adverse impacts to fish are expected to also prevent adverse impacts to turtle individuals. Additionally, there is abundant suitable habitat throughout the WWTP Study Area and local landscape that will not be impacted by the Project. No further analysis is warranted.

Shumard oak

Shumard oak is present on the WWTP Site in two locations within the deciduous forest (FOD) (Figure 1). The deciduous forest is outside of the Project footprint and no impacts to individuals or habitat on the WWTP site are anticipated. No further analysis is warranted.

Swamp rose mallow

Swamp rose mallow is present on the WWTP Site on the north edge of the marsh (MAM2-6) adjacent to Welland River. Additionally, shoreline marshes off-Site throughout the WWTP Study Area, particularly surrounding Grassy Brook and Welland River, may provide suitable habitat for this species. Outfall construction will impact the marsh (MAM2-6) along the north edge of the WWTP Site, therefore, consideration of habitat for this species as potential SWH is carried forward to the impact assessment (Section 6.0).

5.6.4 Animal Movement Corridors

Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another. This is generally in response to different seasonal habitat requirements. Examples include trails used by deer to move to wintering areas or areas used by amphibians between breeding and summer or overwintering habitat. To qualify as significant wildlife habitat, these corridors should be a critical link between habitats that are regularly used by wildlife.

The Region has mapped potential natural heritage corridors, which connect core natural areas as part of their core natural heritage system. Based on this mapping, there are potential corridors within both the WWTP and Montrose alignment Sites and Study Area (Region of Niagara 2015).

The north edge of the WWTP Site and Study Area, including the Welland River East PSW, has been mapped as a potential natural heritage corridor. Additionally, the area around both the Welland River and Warren Creek Wetland Complex (between Brown Shaft 1 and Montrose Shaft 3) on the Montrose alignment Site and Study Area are mapped as potential natural heritage corridors.

Additionally, candidate SWH for amphibian movement corridor has been identified within the WWTP Study Area. Welland River East PSW within the WWTP Site and Study Area, and Lyon's Creek PSW off-Site, within the WWTP Study Area, may provide suitable amphibian movement corridor habitat.

All mapped natural heritage corridors and potential amphibian movement corridor SWH are located off-Site and outside of the Project footprint, and no impacts are anticipated. Further analysis is not warranted.

6.0 IMPACT ASSESSMENT

6.1 Significant Wetlands

The outfall construction includes a pipe that will be constructed through the Welland River East PSW on the north edge of the WWTP Site, along the bank of Welland River, specifically the cultural thicket (CUT) and mineral meadow marsh (MAM2-6) (Figure 1). Impacts will vary depending on the construction method used. The overall impacts are likely to be minor due to the localized and small area of vegetation to be removed. Once construction is complete the vegetation is expected to regenerate, restoring continuity of the wetland. It is anticipated that the development will not affect the overall integrity of the PSW. Mitigation measures to minimize impacts to the feature will be determined in consultation with NPCA. If these mitigation measures as well as best management practices described in Section 7.0 are implemented, disturbance to the wetland is unlikely to have a significant negative impact on the plant and wildlife communities in the local area or on the overall form and function of the wetland.

6.2 Habitat of Endangered or Threatened Species

Barn Swallow

Barn swallow was observed nesting in the barn (Feature 1 on Figure 1) on the WWTP Site. The barn on the WWTP Site is anticipated to be removed, therefore permitting under the ESA will be required to remove barn swallow habitat. This activity (i.e., removal of the barn structure) is subject to O. Reg. 830/21 Part III (barn swallow) under the ESA. This regulation allows removal or alteration of a structure that is nesting habitat for barn swallow with a number of conditions, including registering the activity with the MECP. Mitigation measures to address barn swallow nesting on the WWTP Site are discussed further in Section 7.5.

Bobolink and Eastern Meadowlark

The cultural meadow (CUM) and agricultural fields (HAY) on the WWTP Site (which also overlaps Reixinger Shaft 2 of the Montrose alignment Site) were confirmed to provide breeding habitat for bobolink and eastern meadowlark. A portion of the agricultural fields (HAY) on the WWTP Site and Montrose alignment Site (Reixinger Shaft 2) (approximately 10 ha) will be permanently removed to construct the WWTP footprint.

Permitting under the ESA will be required to remove habitat for bobolink and eastern meadowlark. Because the amount of habitat to be removed is less than 30 ha, the activity is subject to O. Reg. 830/21 Part IV (bobolink, eastern meadowlark) under the ESA. This regulation allows removal of less than 30 ha of habitat for bobolink or eastern meadowlark with a number of conditions, including registering the activity with the MECP. Mitigation measures to address bobolink and eastern meadowlark nesting on the WWTP and Montrose alignment Site are discussed further in Section 7.6.

Lake Chubsucker, Lake Sturgeon, Fawnsfoot, Kidneyshell

Additional field surveys will be required during detailed design to assess the impacts of the construction on these aquatic species.

Little Brown Myotis

The barn (Feature 1 on Figure 1) on the WWTP Site may provide suitable roosting habitat for little brown myotis. As the barn on the WWTP Site is anticipated to be removed, bat acoustic and exit surveys are required to confirm habitat use by little brown myotis prior to barn removal. If habitat is confirmed to be in use, permitting under the ESA may be required to remove habitat.

6.3 Significant Wildlife Habitat

6.3.1 Habitat for Species of Conservation Concern – Swamp rose mallow

Swamp rose mallow is present in the marsh (MAM2-6) adjacent to Welland River at the north end of the WWTP Site. Outfall construction will impact the marsh (MAM2-6). A protection barrier will be installed around the individuals to protect the core population on the WWTP Site.

7.0 MITIGATION MEASURES

Mitigation measures to minimize or avoid impacts to natural features are detailed in the following sections and summarized in Table 4.

Table 4: Required Mitigation Measures for the Project

Natural Feature	Responsible Agency	Location	Mitigation
General	N/A	WWTP Site Montrose alignment Site (all Shaft locations)	<ul style="list-style-type: none"> ■ Clearly demarcate and maintain the development boundaries shown on the site plan. ■ Implement sediment and erosion controls adjacent to natural features during site preparation. ■ Ensure all equipment is cleaned prior to transportation and use to avoid the spread or introduction of invasive species
Migratory Birds	ECCC	WWTP Site Montrose alignment Site (all Shaft locations)	<ul style="list-style-type: none"> ■ Avoid removal of vegetation during the active season for breeding birds (April 10 – August 31). ■ If vegetation clearing cannot be avoided during the active season, construction disturbance will be preceded by a nesting survey conducted by a qualified biologist
Fish Habitat	DFO	WWTP Site – outfall location	<ul style="list-style-type: none"> ■ Conduct field surveys as part of detailed design to evaluate impacts to fish and fish habitat. ■ Complete a DFO Request for Review to determine if a DFO Fisheries Act Authorization is required.
Welland River	NPCA	WWTP Site – outfall location	<ul style="list-style-type: none"> ■ Obtain NPCA permit for the alteration of the watercourse.
Provincially Significant Wetland	NDMNR and NPCA	WWTP Site – outfall location	<ul style="list-style-type: none"> ■ Obtain NPCA permit for the alteration of the wetland ■ Implement mitigation measures as advised by NPCA ■ Avoid the storage of construction materials or fill adjacent to the PSW

Natural Feature	Responsible Agency	Location	Mitigation
Species at Risk – Barn Swallow	MECP	WWTP Site - barn	<ul style="list-style-type: none"> ■ Register the Project with the MECP through the online Notice of Activity (NOA) process. ■ Comply with all conditions of the registration ■ Remove the barn outside of the barn swallow active season (May 1 – August 31). ■ If the barn must be removed during the active season barn, implement measures to exclude barn swallow from the structure prior to May 1 (e.g., install a tarp or netting).
Species at Risk – Bobolink / Eastern Meadowlark	MECP	WWTP Site - meadow and hay fields	<ul style="list-style-type: none"> ■ Register the Project with the MECP through the online Notice of Activity (NOA) process. ■ Comply with all conditions of the registration ■ Remove habitat outside of the active season (April 1 – August 15).
Species at Risk – Bats	MECP	WWTP Site - barn	<ul style="list-style-type: none"> ■ Confirm use of the barn by little brown myotis through acoustic surveys prior to removal. ■ Deploy stationary acoustic detectors at the barn for a minimum of 10 nights in June (the maternity roosting period for bats). ■ Conduct two exit surveys at the barn in June, one at the time of acoustic detector deployment, and one at the time of acoustic detector collection. ■ If the barn is confirmed to be in use, contact MECP to confirm permitting requirements ■ Remove barn outside of the bat maternity roosting period (April 1 – September 30).
		Montrose alignment Site – Montrose Shaft 3 and 6	<ul style="list-style-type: none"> ■ If removal of snag or cavity trees greater than 10 cm in diameter is required within the deciduous swamp (SWD) adjacent the shafts, conduct exit surveys a minimum of 24 h prior to removal. ■ If trees are in use by SAR bats, contact MECP to confirm permitting requirements. ■ Remove trees outside of the bat maternity roosting period (April 1 – September 30).

Notes:

NPCA = Niagara Peninsula Conservation Authority
 NDMNRF = Ministry of Northern Development, Mines, Natural Resources and Forestry
 DFO = Fisheries and Oceans Canada
 ECCC = Environment and Climate Change Canada

7.1 General Best Management Practices

Standard Best Management Practices that will be implemented during construction of all components to mitigate damage to the adjacent natural features include the following:

- Clearly demarcate and maintain the development boundaries shown on the site plan.
- Implement sediment and erosion controls adjacent to natural features during site preparation.
- To be in compliance with the MBCA and minimize adverse impacts to special concern and rare bird species avoid removal of vegetation during the active season for breeding birds (April 10 – August 31; ECCC 2020). If vegetation clearing cannot be avoided during the active season, construction disturbance will be preceded by a nesting survey conducted by a qualified biologist. If any active nests are found during the nesting survey, a buffer will be installed around the nest to protect against disturbance. Vegetation within the protection buffer cannot be removed until the young have fledged the nest, to be confirmed by a qualified biologist.
- Restore disturbed areas to existing conditions, where possible.
- Avoid the storage of construction materials or fill adjacent to the significant woodland and PSW to minimize disturbance to these features and resident wildlife.
- Ensure all equipment is cleaned prior to transportation and use on the Site to avoid the spread or introduction of invasive species on the Site.

7.2 Lighting

Mitigation measures to consider implementing on site to reduce potential sensory disturbance from lighting to wildlife residing in the adjacent natural features from lighting include the following:

- Avoid direct glare into adjacent natural features by installing low intensity and downward pointing lights.
- Turn off outdoor lighting when not in use, except where used for security and safety.
- Consider the use of motion sensors on all safety and security lighting.

7.3 Fish Habitat

The following operational constraints, mitigation measures, and protection recommendations will be implemented during Project activities to protect fish and fish habitat:

- Additional field surveys will be completed during detailed design to evaluate potential impacts to fish and fish habitat. As work is being completed within a fish bearing watercourse a DFO Request for Review will be required for the Project. Dependant upon the type of work being undertaken, residual effects of the project that may result in the harmful alternation, disruption or destruction to fish habitats and/or as a result of the DFO review process, a DFO *Fisheries Act* Authorization for the project may be required. Mitigation measures identified therein are expected to be adhered to.
- As work is taking place within NPCA jurisdiction, a NPCA permit application for the alteration of the watercourse may be required for the Project. Mitigation measures identified therein are expected to be adhered to.

7.4 Wetlands

Mitigation measures to minimize impacts to the Welland River East PSW on the WWTP Site will be determined in consultation with NPCA as part of the permitting process.

7.5 Barn Swallow

Mitigation measures that will be implemented for barn swallow include the following:

- Register the Project with the MECP through the online Notice of Activity (NOA) process. As part of the registration, all the requirements outlined in O. Reg. 830/21 Part III, must be met. As of April 29, 2022 proponents also have the option to pay into the SAR Conservation Fund in order to satisfy some of the requirements under O. Reg. 830/21 Part III.
- Once MECP has provided approval, remove the barn outside of the barn swallow active season (May 1 – August 31). If the barn must be removed during the active season, steps must be taken to prevent barn swallow from entering the structure and building nests (e.g., install a tarp or netting) prior to the start of that active season (i.e., before May 1).

7.6 Bobolink and eastern meadowlark

Mitigation measures that will be implemented for bobolink and eastern meadowlark include the following:

- Register the Project with the MECP through the online Notice of Activity (NOA) process. As part of the registration, all the requirements outlined in O. Reg. 830/21 Part IV, must be met. As of April 29, 2022 proponents also have the option to pay into the SAR Conservation Fund in order to satisfy some of the requirements under O. Reg. 830/21 Part IV.
- Once MECP has provided approval, remove habitat outside of the active season (April 1 – August 15).

7.7 Little brown myotis, northern myotis, tri-coloured bat

Use of potential habitat in the barn on the WWTP Site by little brown myotis will be confirmed through acoustic surveys prior to removal. It is recommended that both bat acoustic surveys and exit surveys are conducted:

- Deploy stationary acoustic detectors at the barn on Site for a minimum of 10 nights in June (the maternity roosting period for bats).
- Conduct two exit surveys in June, one at the time of acoustic detector deployment, and one at the time of acoustic detector collection.

If the barn is confirmed to be in use by little brown myotis, consultation with the MECP will be required to confirm permitting requirements. The barn would also need to be removed outside of the bat maternity roosting period (April 1 – September 30) to avoid adverse impacts to little brown myotis.

If tree removal of any snag or cavity trees greater than 10 cm DBH is required within the deciduous swamp (SWD) adjacent to Montrose Shaft 3 and 6 on the Montrose alignment Site, exit surveys must be conducted to confirm if the tree is being used as a roost a minimum of 24 h prior to removal. If habitat is confirmed to be in use, permitting under the ESA may be required to remove habitat. Trees must also be removed outside of the bat maternity roosting period (April 1 – September 30) to avoid adverse impacts to little brown myotis, northern myotis or tri-colored bat individuals.

8.0 SUMMARY AND RECOMMENDATIONS

The Project has been assessed for potential ecological impacts under the Provincial Policy Statement and the policies of the City of Niagara Official Plan and the Region of Niagara Official Plan, as well as other relevant legislation, including the Growth Plan for the Greater Golden Horseshoe and the ESA.

Based on these analyses of the proposed development and the implementation of appropriate mitigation measures, it is expected that there will be no residual negative impacts to the significant natural features and functions in the study area. These conclusions are based on the following recommendations and assumptions:

- Conduct species-specific surveys to confirm the use of potential habitat on the WWTP Site for little brown myotis. If habitat use is confirmed, authorization under the *Endangered Species Act* may be required and consultation with the MECP is recommended.
- Conduct field surveys during detailed design of the outfall pipe to evaluate impacts to fish and fish habitat, and confirm if a DFO Request for Review and Project Authorization are required under the *Fisheries Act*, or if any permitting for fish and mussel SAR are required under the *Endangered Species Act* or *Species at Risk Act*.
- Notice of Activity registrations for barn swallow, eastern meadowlark and bobolink on the WWTP Site are completed under the *Endangered Species Act* and associated conditions complied with.
- Best management practices (Section 7.1-7.2) and mitigation measures (Sections 7.3-7.7) will be implemented.
- Both Sites are within the Regulation Limit of the NPCA, protected under Ontario Regulation 42/06 (Development, Interference with Wetland and Alteration to Shorelines and Watercourses Regulations), and a permit from the NPCA may be required for any development to proceed.

9.0 LIMITATIONS

The results of this report are based on information available to Golder at the time of the review, and the status of species listed in the noted Acts and Regulations effective as of the date of this report. Limited field investigations by a qualified biologist have been conducted to verify the presence of significant features or habitat, and the review may be subject to limitations associated with base mapping and other publicly available information used. Additional surveys may be required to confirm habitat use and/or delineate feature boundaries for setback / VPZ measurements.

10.0 CLOSURE

We trust this report meets your current needs. If you have any further questions regarding this report, please contact the undersigned.

Signature Page

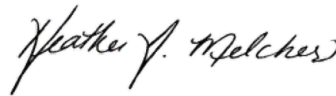
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APPENDIX A

Plant List

Vascular plants on and around the proposed Site, based on field work in 2020 and 2021					
Scientific Name ^a	Common Name ^b	Origin ^b	Status ^b	G Rank ^c	S Rank ^c
<i>Acer negundo</i>	Manitoba maple	(N)		G5	S5
<i>Acer rubrum</i>	Red maple	N		G5	S5
<i>Carya sp.</i>	Hickory sp.	N		G5	-
<i>Carya cordiformis</i>	Bitternut hickory	N		G5	S5
<i>Carya ovata</i>	Shagbark hickory	N		G5	S5
<i>Fraxinus sp.</i>	Ash sp.	-		-	-
<i>Fraxinus americana</i>	White ash	N		G5	S5
<i>Fraxinus excelsior</i>	European ash	I		GNR	SNA
<i>Fraxinus pennsylvanica</i>	Green ash	N		G5	S5
<i>Juglans nigra</i>	Black walnut	(N)		G5	S4
<i>Malus pumila</i>	Apple	I		G5	SNA
<i>Populus deltoides</i>	Eastern cottonwood	N		G5T5	S5
<i>Quercus alba</i>	White oak	N		G5	S5
<i>Quercus bicolor</i>	Swamp white oak	N		G5	S4
<i>Quercus macrocarpa</i>	Bur oak	N		G5	S5
<i>Quercus palustris</i>	Pin oak	N		G5	S4
<i>Quercus rubra</i>	Red oak	N		G5	S5
<i>Quercus shumardii</i>	Shumard oak	N	SC	G5	S3
<i>Quercus velutina</i>	Black oak	N		G5	S4
<i>Robinia pseudoacacia</i>	Black locust	I		G5	SNA
<i>Tilia americana</i>	Basswood	N		G5	S5
<i>Ulmus americana</i>	White elm	N		G5?	S5
<i>Alnus incana</i>	Speckled alder	N		G5	S5
<i>Cornus sp.</i>	Dogwood sp.	N		G5	-
<i>Cornus amomum</i>	Silky dogwood	N		G5	S5
<i>Cornus foemina</i>	Gray dogwood	N		G5	S5
<i>Crataegus crus-galli</i>	Cockspur hawthorn	N		G5	S5
<i>Lonicera tatarica</i>	Tartarian honeysuckle	I		GNR	SNA
<i>Parthenocissus inserta</i>	Virginia creeper	N		G5	S5
<i>Parthenocissus quinquefolia</i>	Virginia creeper	N		G5	S4?
<i>Rhamnus cathartica</i>	Common buckthorn	I		GNR	SNA
<i>Rhamnus frangula</i>	Glossy buckthorn	I		GNR	SNA
<i>Rhus radicans</i>	Poison-ivy	N		G5T5	S5
<i>Rhus typhina</i>	Staghorn sumac	N		G5	S5
<i>Rosa sp.</i>	Rose Sp.	-		-	-
<i>Rubus idaeus</i>	Red raspberry	N		G5T5	S5
<i>Salix calcicola</i>	Willow	N		G4	S4
<i>Spiraea alba</i>	Meadowsweet	N		G5	S5
<i>Ulmus pumila</i>	Siberian elm	I		GNR	SNA
<i>Viburnum recognitum</i>	Southern arrowwood	N		G4G5	S4
<i>Vitis riparia</i>	Riverbank grape	N		G5	S5
<i>Onoclea sensibilis</i>	Sensitive fern	N		G5	S5
<i>Carex sp.</i>	Sedge sp.	-		-	-
<i>Cyperus erythrorhizos</i>	Umbrella-sedge	N		G5	S4
<i>Juncus sp.</i>	Rush sp.	N		-	-
<i>Phalaris arundinacea</i>	Reed canary grass	N		G5	S5
<i>Phleum pratense</i>	Timothy	I		GNR	SNA
<i>Phragmites australis</i>	Common reed	N		G5	S5
<i>Scirpus atrovirens</i>	Black bulrush	N		G5?	S5
<i>Setaria viridis</i>	Green foxtail	I		GNR	SNA

Vascular plants on and around the proposed Site, based on field work in 2020 and 2021					
Scientific Name ^a	Common Name ^b	Origin ^b	Status ^b	G Rank ^c	S Rank ^c
<i>Typha angustifolia</i>	Narrow-leaved cattail	N		G5	SNA
<i>Typha latifolia</i>	Common cattail	N		G5	S5
<i>Achillea millefolium</i>	Common yarrow	I		G5T5?	SNA
<i>Apocynum cannabinum</i>	Indian hemp	N		GNR	S5
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	N		G5	S5
<i>Asclepias syriaca</i>	Common milkweed	N		G5	S5
<i>Centaurea stoebe</i>	Spotted knapweed	I		GNR	SNA
<i>Cichorium intybus</i>	Chicory	I		GNR	SNA
<i>Daucus carota</i>	Wild carrot	I		GNR	SNA
<i>Dianthus armeria</i>	Deptford pink	I		GNR	SNA
<i>Dipsacus fullonum</i>	Fuller's teasel	I		GNR	SNA
<i>Eupatorium perfoliatum</i>	Boneset	N		G5	S5
<i>Euthamia graminifolia</i>	Grass-leaved goldenrod	N		G5	S5
<i>Eutrochium maculatum</i>	Joe-pye weed	N		G5TNR	S5
<i>Geranium robertianum</i>	Herb-robert	I		G5	SNA
<i>Geum canadense</i>	White avens	N		G5	S5
<i>Hibiscus moscheutos</i>	Swamp rose-mallow	N	SC	G5	S3
<i>Hypericum perforatum</i>	Common St. John's-wort	I		GNR	SNA
<i>Impatiens sp.</i>	Jewelweed sp.	-		-	-
<i>Lotus corniculatus</i>	Bird's-foot trefoil	I		GNR	SNA
<i>Lythrum salicaria</i>	Purple loosestrife	I		G5	SNA
<i>Mellilotus alba</i>	White sweet clover	I		G5	SNA
<i>Mellilotus officinalis</i>	Yellow sweet-clover	I		GNR	SNA
<i>Nymphaea leibergii</i>	Dwarf white water-lily	N		G5	S4?
<i>Persicaria amphibium</i>	Water smartweed	N		G5	S5
<i>Persicaria pensylvanica</i>	Pink smartweed	N		G5	S5
<i>Pontederia cordata</i>	Pickerelweed	N		G5	S5
<i>Potentilla palustris</i>	Marsh cinquefoil	N		G5	S5
<i>Sagittaria latifolia</i>	Broadleaf Arrowhead	N		G5	S5
<i>Solidago Sp.</i>	Goldenrod Sp.	-		-	-
<i>Solidago canadensis</i>	Canada goldenrod	N		G5T5	S5
<i>Sonchus sp.</i>	Sow-thistle	I		GNR	SNA
<i>Symphyotrichum sp.</i>	Aster sp.	-		-	-
<i>Taraxacum officinale</i>	Common dandelion	I		G5	SNA
<i>Torilis japonica</i>	Hedge-parsley	I		GNR	SNA
<i>Trifolium pratense</i>	Red clover	I		GNR	SNA
<i>Vallisneria americana</i>	Tape-grass	N		G5	S5
<i>Vicia cracca</i>	Cow-vetch	I		GNR	SNA

Notes:

^a Scientific names follow Morton & Venn (1990) and published volumes of the Flora of North America (1993-2010).

^b Common names and origin based upon Varga *et al.* (2000) and NHIC (2012).

Origin: N = Native; (N) = Native but not in study area region; I = Introduced.

Status: P = Provincial; R = Regional (OMNR Central Region); L = Local (County or R.M.).

END= Endangered; SC = Special Concern; THR = Threatened.

^c Ranks based upon determinations made by the Natural Heritage Information Centre (2012).

G = Global; S = Provincial; Ranks 1-3 are considered imperiled or rare; Ranks 4 and 5 are considered secure.

NA = Not applicable [used mainly for abundance of non-natives; NR = Not ranked [used mainly for non-natives];

Q = Taxonomic questions not fully resolved; T = sub-specific taxon (taxa) present in the province; U = Uncertain.

APPENDIX B

SAR Screening

Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Rationale for Potential to Occur on Site or in the Study Area (Desktop)	
							WWTP	Pipe Alignment / Shafts
Monarch	<i>Danaus plexippus</i>	SC	SC	END	S2N, S4B	In Ontario, monarch is found throughout the northern and southern regions of the province. This butterfly is found wherever there are milkweed (<i>Asclepias</i> spp.) plants for its caterpillars and wildflowers that supply a nectar source for adults. It is often found on abandoned farmland, meadows, open wetlands, prairies and roadsides, but also in city gardens and parks. Important staging areas during migration occur along the north shores of the Great Lakes (COSEWIC 2010).	High Monarch and milkweed were observed on the Site during the field surveys. Farmland, meadows, open wetlands, and roadsides, on the Site and within the Study Area may provide suitable breeding and foraging habitat for this species.	High Monarch and milkweed were observed on Site at Montrose Shaft 3 and 4, Reixinger Shaft 2, and along the pipeline alignment during the field survey. The cultural meadow, roadsides, deciduous shrub thicket, and fields on the Shaft Sites, along the pipeline alignment and within the Study Area may provide suitable breeding and foraging habitat.
Yellow-banded bumble bee	<i>Bombus terricola</i>	SC	SC	SC	S2	This species is a forage and habitat generalist. Mixed woodlands are commonly used for nesting and overwintering, but it also occupies various open habitats including native grasslands, farmlands and urban areas. It is an early emerging species, making it likely an important pollinator of early blooming wild flowering plants (e.g. wild blueberry) and agricultural crops (e.g., apple). Nest Sites are mostly abandoned rodent burrows (COSEWIC 2015).	Moderate Farmland, meadows, open wetlands, and roadsides, on the Site and within the Study Area may provide suitable nesting and overwintering habitat for this species.	Moderate The cultural meadows and thickets, roadsides, and farmland on Site along the pipeline alignment and within the Study Area may provide suitable nesting and overwintering habitat.
Acadian flycatcher	<i>Empidonax virescens</i>	END	END	END	S2S3B	In Ontario, Acadian flycatcher breeds in the understory of large, mature, closed-canopy forests, swamps and forested ravines. This bird prefers forests greater than 40 ha in size, and exhibits edge sensitivity preferring the deep interior of the forest. Its nest is loosely woven and placed near the tip of branch in a small tree or shrub often, but not always, near water (Whitehead and Taylor 2002).	Low There is no suitable habitat on Site or within the Study Area. In addition, no individuals were observed during field surveys.	Low The woodlands, forests, and swamps on Site and within the Study Area are not large enough to provide suitable habitat.
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC	—	NAR	S2N,S4B	In Ontario, bald eagle nests are typically found near the shorelines of lakes or large rivers, often on forested islands. The large, conspicuous nests are typically found in large super-canopy trees along water bodies (Buehler 2000).	Moderate There is no suitable habitat on Site or within the Study Area. However, individuals were observed during field surveys.	Moderate Super-canopy trees along the Welland River at the eastern edge of the Study Area may provide suitable nesting habitat for this species.
Bank swallow	<i>Riparia riparia</i>	THR	THR	THR	S4B	In Ontario, bank swallow breeds in a variety of natural and anthropogenic habitats, including lake bluffs, stream and river banks, sand and gravel pits, and roadcuts. Nests are generally built in a vertical or near-vertical bank. Breeding Sites are typically located near open foraging Sites such as rivers, lakes, grasslands, agricultural fields, wetlands and riparian woods. Forested areas are generally avoided (Garrison 1999).	Low No suitable nesting habitat was identified on the Site or within the Study Area. In addition, no individuals were observed during field surveys.	Low The cultural meadows, thickets, swamps, and woodlands on Site and within the Study Area may provide suitable foraging habitat. However, no suitable nesting habitat was observed on Site or within the Study Area.

Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Rationale for Potential to Occur on Site or in the Study Area (Desktop)	
							WWTP	Pipe Alignment / Shafts
Barn swallow	<i>Hirundo rustica</i>	THR	THR	SC	S4B	In Ontario, barn swallow breeds in areas that contain a suitable nesting structure, open areas for foraging, and a body of water. This species nests in human made structures including barns, buildings, sheds, bridges, and culverts. Preferred foraging habitat includes grassy fields, pastures, agricultural cropland, lake and river shorelines, cleared right-of-ways, and wetlands (COSEWIC 2011). Mud nests are fastened to vertical walls or built on a ledge underneath an overhang. Suitable nests from previous years are reused (Brown and Brown 1999).	High Barn swallows were confirmed to be nesting in the barn on Site. The wetland, Welland River, and agricultural fields on the Site and in the Study Area provide foraging habitat.	High Barn swallows were observed at Montrose Shaft 1 and Reixinger Shaft 2, and along the Montrose 3-4 pipe alignment during the field survey. The cultural meadows and thickets, the marsh, residential and commercial buildings, barns, sheds, bridges, and culverts on Site and within the Study Area may provide suitable nesting habitat for this species.
Bobolink	<i>Dolichonyx oryzivorus</i>	THR	THR	THR	S4B	In Ontario, bobolink breeds in grasslands or graminoid dominated hayfields with tall vegetation (Gabhauer 2007). Bobolink prefers grassland habitat with a forb component and a moderate litter layer. They have low tolerance for presence of woody vegetation and are sensitive to frequent mowing within the breeding season. They are most abundant in established, but regularly maintained, hayfields, but also breed in lightly grazed pastures, old or fallow fields, cultural meadows and newly planted hayfields. Their nest is woven from grasses and forbs. It is built on the ground, in dense vegetation, usually under the cover of one or more forbs (Renfrew et al. 2015).	High Bobolinks were confirmed to be breeding in the agricultural fields on the Site during field surveys.	Moderate The agricultural fields on Site at Reixinger Shaft 2 and within the Study Area has suitable grass and forb components that may provide nesting habitat. Reixinger Shaft 2 is also located within the WWTP Site.
Canada warbler	<i>Cardellina canadensis</i>	SC	THR	THR	S4B	In Ontario, breeding habitat for Canada warbler consists of moist mixed forests with a well-developed shrubby understory. This includes low-lying areas such as cedar and alder swamps, and riparian thickets (McLaren 2007). It is also found in densely vegetated regenerating forest openings. Suitable habitat often contains a developed moss layer and an uneven forest floor. Nests are well concealed on or near the ground in dense shrub or fern cover, often in stumps, fallen logs, overhanging stream banks or mossy hummocks (Reitsma et al. 2010).	Low Although there is potentially suitable habitat on Site and within the Study Area, no individuals were observed during field surveys.	Moderate The forest north and south of Brown Road (identified as wet and potentially a swamp), the forest along the Welland River, and the ash woodland swamp along Montrose Road on the Shaft Sites, along the pipeline alignment and within the Study Area may provide suitable nesting and foraging habitat.
Cerulean warbler	<i>Setophaga cerulea</i>	THR	END	END	S3B	In Ontario, breeding habitat of cerulean warbler consists of second-growth or mature deciduous forest with a tall canopy of uneven vertical structure and a sparse understory. This habitat occurs in both wet bottomland forests and upland areas, and often contains large hickory and oak trees. This species may be attracted to gaps or openings in the upper canopy. The cerulean warbler is associated with large forest tracks, but may occur in woodlots as small as 10 ha (COSEWIC 2010). Nests are usually built on a horizontal limb in the mid-story or canopy of a large deciduous tree (Buehler et al. 2013).	Low Although there is potentially suitable habitat on Site and within the Study Area, no individuals were observed during field surveys.	Moderate The forest south of Brown Road, and the mature forest south of Reixinger Street on the Shaft Sites, along the pipeline alignment and with the Study Area may provide suitable nesting habitat.

Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Rationale for Potential to Occur on Site or in the Study Area (Desktop)	
							WWTP	Pipe Alignment / Shafts
Chimney swift	<i>Chaetura pelagica</i>	THR	THR	THR	S3B	In Ontario, chimney swift breeding habitat is varied and includes urban, suburban, rural and wooded Sites. They are most commonly associated with towns and cities with large concentrations of chimneys. Preferred nesting Sites are dark, sheltered spots with a vertical surface to which the bird can grip. Unused chimneys are the primary nesting and roosting structure, but other anthropogenic structures and large diameter cavity trees are also used (COSEWIC 2007).	Low No suitable nesting habitat was identified on the Site or within the Study Area. In addition, no individuals were observed during field surveys.	Moderate There are numerous buildings within the Study Area that may have potential chimneys that may provide suitable nesting habitat.
Common nighthawk	<i>Chordeiles minor</i>	SC	THR	SC	S4B	In Ontario, these aerial foragers require areas with large open habitat. This includes farmland, open woodlands, clearcuts, burns, rock outcrops, alvars, bogs, fens, prairies, gravel pits and gravel rooftops in cities (Sandilands 2007)	Moderate The cultural meadows and agricultural fields on the Site may provide suitable nesting habitat for common nighthawk.	Moderate The cultural meadows, farmlands, swamps, and the Welland River on the Shaft Sites, along the pipeline alignment and within the Study Area may provide suitable nesting and foraging habitat.
Eastern meadowlark	<i>Sturnella magna</i>	THR	THR	THR	S4B	In Ontario, eastern meadowlark breeds in pastures, hayfields, meadows and old fields. Eastern meadowlark prefers moderately tall grasslands with abundant litter cover, high grass proportion, and a forb component (Hull 2003). They prefer well drained Sites or slopes, and Sites with different cover layers (Roseberry and Klimstra 1970)	High Eastern meadowlark were confirmed to be breeding in the agricultural fields on the Site during field surveys.	Moderate The agricultural fields on Site at Reixinger Shaft 2 and within the Study Area has suitable grass and forb components that may provide nesting habitat. Reixinger Shaft 2 is also located within the WWTP Site.
Eastern whip-poor-will	<i>Antrostomus vociferus</i>	THR	THR	THR	S4B	In Ontario, whip-poor-will breeds in semi-open forests with little ground cover. Breeding habitat is dependent on forest structure rather than species composition, and is found on rock and sand barrens, open conifer plantations and post-disturbance regenerating forest. Territory size ranges from 3 to 11 ha (COSEWIC 2009). No nest is constructed and eggs are laid directly on the leaf litter (Mills 2007).	Low No suitable nesting habitat was identified on the Site or within the Study Area. In addition, no individuals were observed during field surveys.	Low No suitable nesting habitat was identified on the Site or within the Study Area. In addition, no individuals were observed during field surveys.
Eastern wood-pewee	<i>Contopus virens</i>	SC	SC	SC	S4B	In Ontario, eastern wood-pewee inhabits a wide variety of wooded upland and lowland habitats, including deciduous, coniferous, or mixed forests. It occurs most frequently in forests with some degree of openness. Intermediate-aged forests with a relatively sparse midstory are preferred. In younger forests with a relatively dense midstory, it tends to inhabit the edges. Also occurs in anthropogenic habitats providing an open forested aspect such as parks and suburban neighborhoods. Nest is constructed atop a horizontal branch, 1-2 m above the ground, in a wide variety of deciduous and coniferous trees (COSEWIC 2012).	High Eastern wood-pewee was observed Site within the Study Area, southwest of the Site, during field surveys. Forest blocks and treed urban and rural areas on Site and within the Study Area may provide suitable nesting habitat for this species.	Moderate The forest on the south side of Brown Road, the deciduous woodland on the east side of Montrose Road, the mature forest south of Reixinger Road on the shaft Sites, along the pipeline alignment and within the Study may provide suitable nesting and foraging habitat.

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Grasshopper sparrow <i>pratensis</i> subspecies	<i>Ammodramus savannarum</i> (<i>pratensis</i> subspecies)	SC	SC	SC	S4B	In Ontario, grasshopper sparrow is found in medium to large grasslands with low herbaceous cover and few shrubs. It also uses a wide variety of agricultural fields, including cereal crops and pastures. Close-grazed pastures and limestone plains (e.g. Carden and Napanee Plains) support highest density of this bird in the province (COSEWIC 2013).	Low Although there is potentially suitable habitat on Site and within the Study Area, no individuals were observed during field surveys.	Low The cultural meadows and agricultural fields on Site and with the Study Area are too small to provide suitable nesting habitat. In addition, no individuals were observed during the field survey.
Henslow's sparrow	<i>Ammodramus henslowii</i>	END	END	END	SHB	In Ontario, Henslow's sparrow breeds in large grasslands with low disturbance, such as lightly grazed and ungrazed pastures, fallow hayfields, grassy swales in open farmland, and wet meadows. Preferred habitat contains tall, dense grass cover, typically over 30 cm high, with a high percentage of ground cover, and a thick mat of dead plant material. Henslow's sparrow generally avoids areas with emergent woody shrubs or trees, and fence lines. Areas of standing water or ephemerally wet patches appear to be important. This species breeds more frequently in patches of habitat greater than 30 ha and preferably greater than 100 ha (COSEWIC 2011).	Low Although there is potentially suitable habitat on Site and within the Study Area, no individuals were observed during field surveys.	Low The cultural meadows and agricultural fields on Site and with the Study Area are too small to provide suitable nesting habitat. In addition, no individuals were observed during the field survey.
Least bittern	<i>Ixobrychus exilis</i>	THR	THR	THR	S4B	In Ontario, least bittern breeds in marshes, usually greater than 5 ha, with emergent vegetation, relatively stable water levels and areas of open water. Preferred habitat has water less than 1 m deep (usually 10 – 50 cm). Nests are built in tall stands of dense emergent or woody vegetation (Woodliffe 2007). Clarity of water is important as siltation, turbidity, or excessive eutrophication hinders foraging efficiency (COSEWIC 2009).	Low Marshes on Site and within the Study Area are too small to provide suitable nesting habitat. In addition, no individuals were observed during field surveys.	Low The swamps and marshes on Site and with the Study Area are too small to provide suitable nesting habitat. In addition, no individuals were observed during the field survey.
Northern bobwhite	<i>Colinus virginianus</i>	END	END	END	S1	In Ontario, northern bobwhite breeds in early successional habitats. This species requires a combination of three habitat types: woody cover, cropland and grassland. Croplands provide foraging habitat, grassland and fields are used for nesting, and dense brush provides both winter forage and year round cover. These birds nest on the ground in a shallow depression lined with grasses and other dead vegetation (Brennan et al. 2014).	Low Although there are areas of grassland, cropland, and woodland that could potentially provide suitable habitat for this species, there are no recent records in the vicinity of the Study Area (eBird 2019).	Moderate The cultural meadows, farmland and pastures, and the mature forest on Site between Montrose Shaft 6 to Reixinger Shaft 2 may provide suitable nesting and foraging habitat.
Peregrine falcon (<i>anatum/tundrius</i> subspecies)	<i>Falco peregrinus anatum/tundrius</i>	SC	SC	Not at Risk	S3B	In Ontario, peregrine falcon breeds in areas containing suitable nesting locations and sufficient prey resources. Such habitat includes both natural locations containing cliff faces (heights of 50 - 200 m preferred) and also anthropogenic landscapes including urban centres containing tall buildings, open pit mines and quarries, and road cuts. Peregrine falcons nest on cliff ledges and crevices and building ledges. Nests consist of a simple scrape in the substrate (COSEWIC 2007).	Low There are no suitable nesting locations on Site or within the Study Area. In addition, no individuals were observed during field surveys.	Low There are no suitable cliff faces or anthropogenic structures on Site or within the Study Area to provide suitable habitat. In addition, no individuals were observed during the field survey.

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Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	END	THR	END	S4B	In Ontario, red-headed woodpecker breeds in open, deciduous woodlands or woodland edges and are often found in parks, cemeteries, golf courses, orchards and savannahs (Woodliffe 2007). They may also breed in forest clearings or open agricultural areas provided that large trees are available for nesting. They prefer forests with little or no understory vegetation. They are often associated with beech or oak forests, beaver ponds and swamp forests where snags are numerous. Nests are excavated in the trunks of large dead trees (Smith et al. 2000).	Low The marshes, deciduous forest on and along Welland River on Site, and the forest along the south portion of the Study Area may provide suitable nesting and foraging habitat. However, this species was not observed during breeding bird surveys.	Moderate The cultural meadows, thickets, woodlands and forest edges throughout the shaft Sites, along the pipeline alignment and within the Study Area may provide suitable nesting and foraging habitat.
Wood thrush	<i>Hylocichla mustelina</i>	SC	THR	THR	S4B	In Ontario, wood thrush breeds in moist, deciduous hardwood or mixed stands that are often previously disturbed, with a dense deciduous undergrowth and with tall trees for singing perches. This species selects nesting Sites with the following characteristics: lower elevations with trees less than 16 m in height, a closed canopy cover (>70 %), a high variety of deciduous tree species, moderate subcanopy and shrub density, shade, fairly open forest floor, moist soil, and decaying leaf litter (COSEWIC 2012).	Low Large forest blocks within the Study Area may provide suitable nesting habitat for this species. In addition, there are multiple recent occurrence records within The Study Area, however this species was not observed during breeding bird surveys. (eBird 2021).	Moderate The forest on the south side of Brown Road, the deciduous woodland on the east side of Montrose Road, the mature forest south of Reixinger Road on the Shaft Sites, along the pipeline alignment and within the Study may provide suitable nesting and foraging habitat.
Yellow-breasted chat	<i>Icteria virens virens</i>	END	END	END	S1B	In Ontario, yellow-breasted chat breeds in early successional, shrub-thicket habitats including woodland edges, regenerating old fields, railway and hydro right-of-ways, young coniferous reforestations, and wet thickets bordering wetlands. Tangles of grape (<i>Vitis</i> spp.) and raspberry (<i>Rubus</i> spp.) vines are features of most breeding Sites. There is some evidence that the yellow-breasted chat is an area sensitive species. Nests are located in dense shrubbery near to the ground (COSEWIC 2011).	Low Although there is potentially suitable habitat on Site and within the Study Area, no individuals were observed during field surveys.	Moderate Cultural thickets within Montrose Shaft 1 Study Area may provide suitable nesting habitat.
Grass pickerel	<i>Esox americanus ssp. vermiculatus</i>	SC	SC	SC	S3	In Ontario, grass pickerel is found in Lake Huron, Lake St. Clair, Lake Erie, Niagara River, Lake Ontario and St. Lawrence River and their tributaries, and an isolated population occurs in the Severn River system. This fish species is found in warm, slow moving streams and shallow bays of lakes. It prefers clear to tea-coloured water and dense aquatic vegetation. The grass pickerel typically occurs over mud substrates, but has also been found over rock and gravel. Spawning occurs in vegetated areas of streams and lakes (COSEWIC 2005).	Moderate Welland River and Grassy Brook on the north and west edges of the Site and within the Study Area may provide suitable habitat for this species. DFO SAR mapping shows habitat, or potential habitat, within the Welland River and its tributaries within the Study Area.	Moderate Welland River on the east and west side of the Site along the pipeline alignment and within the Study Area may provide suitable habitat for this species.

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Lake chubsucker	<i>Erimyzon sucetta</i>	THR	END	END	S2	In Ontario, lake chubsucker, a small species of freshwater sucker, occurs in Lake Erie, Lake Huron, Lake St. Clair, the Niagara and their tributaries. They prefer clear, slow-moving to still waters with dense vegetation over substrates of gravel, clay, sand and silt mixed with organic debris. These habitats are often found in backwaters, bayous, drainage ditches, floodplain lakes, marshes, oxbows, sloughs and wetlands. This is a warm-water fish species. Spawning Sites in the Great Lakes includes shallow waters of bays, the lower reaches of tributaries, ponds and marshes (MNR 2012).	Moderate Welland River and Grassy Brook on the north and west edges of the Site and within the Study Area may provide suitable habitat for this species.	Moderate Welland River on the east and west side of the Site along the pipeline alignment and within the Study Area may provide suitable habitat for this species.
Lake sturgeon - Great Lakes / Upper St. Lawrence population	<i>Acipenser fulvescens</i>	END	—	THR	S2	In Ontario, lake sturgeon, a large prehistoric freshwater fish, is found in all the Great Lakes and in all drainages of the Great Lakes and of Hudson Bay. This species typically inhabits highly productive shoal areas of large lakes and rivers. They are bottom dwellers, and prefer depths between 5-10 m and mud or gravel substrates. Small sturgeons are often found on gravelly shoals near the mouths of rivers. They spawn in depths of 0.5 to 4.5 m in areas of swift water or rapids. Where suitable spawning rivers are not available, such as in the lower Great Lakes, they are known to spawn in wave action over rocky ledges or around rocky islands (Golder 2011).	Moderate Welland River on the north west edges of the Site and within the Study Area may provide suitable habitat for this species.	Moderate Welland River on the east and west side of the Site along the pipeline alignment and within the Study Area may provide suitable habitat for this species.
Northern brook lamprey - Great Lakes / Upper St. Lawrence population	<i>Ichthyomyzon fossor</i>	SC	SC	SC	S3	In Ontario, northern brook lamprey occurs in rivers draining into Lakes Superior, Huron and Erie, as well as in the Ottawa and St. Lawrence Rivers. It is found in clear streams of varying sizes. Adults prefer riffle and run areas of coldwater streams and rivers with gravel and sand substrates. Spawning habitat usually includes a swift current and coarse gravel or rocky substrate, with which males construct inconspicuous nests (COSEWIC 2007).	Moderate Welland River on the north west edges of the Site and within the Study Area may provide suitable habitat for this species.	Moderate Welland River on the east and west side of the Site along the pipeline alignment and within the Study Area may provide suitable habitat for this species.
Spotted Sucker	<i>Minytrema melanops</i>	SC	SC	SC	S2	In Ontario, spotted sucker is known to occur in western Lake Erie, Lake St. Clair and tributaries, the Detroit River, St. Clair River, Sydenham River, and Thames River. The spotted sucker is a freshwater fish found in slow-moving streams and nearshore areas of lakes. It prefers warm, clear water, although in Ontario it has frequently been found in muddy, turbid waters. This species prefers hard substrates, such as clays, sand, gravel and rubble. It has also been found in larger rivers, oxbows and backwater areas, and small turbid creeks. Spawning occurs in shallow riffle areas of streams and rivers (COSEWIC 2005).	Moderate The Welland River and Grassy Brook on the north and west edges of the Site and within the Study Area may provide suitable habitat for this species. DFO SAR mapping shows habitat, or potential habitat, within the Welland River and its tributaries within the Study Area.	Moderate The Welland River on the east and west side of the Site along the pipeline alignment and within the Study Area may provide suitable habitat for this species.

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Eastern small-footed myotis	<i>Myotis leibii</i>	END	—	—	S2S3	This species is not known to roost within trees, but there is very little known about its roosting habits. The species generally roosts on the ground under rocks, in rock crevices, talus slopes and rock piles. It occasionally inhabits buildings. Areas near the entrances of caves or abandoned mines may be used for hibernaculum, where the conditions are drafty with low humidity, and may be subfreezing (Humphrey 2017)	Low No suitable roosting habitat was observed on Site or within the Study Area.	Low No rock crevices, talus slopes, or rock piles were observed on Site or within the Study Area.
Gray fox	<i>Urocyon cinereoargenteus</i>	THR	THR	THR	S1	While the Ontario range of this species extends across much of southern and southeastern Ontario, the only known population in the province is on Pelee Island, with very rare sightings elsewhere in the province at points close to the border with the United States. This species inhabits deciduous forests and marshes, and will den in a variety of features including rock outcroppings, hollow trees, burrows or brush piles, usually where dense brush provides cover and in close proximity to water. This species is considered a habitat generalist (COSEWIC 2015).	Low The only known population in the province is on Pelee Island, which is outside of the Study Area.	Low The only known population in the province is on Pelee Island, which is outside of the Study Area.
Little brown myotis	<i>Myotis lucifugus</i>	END	END	END	S3	In Ontario, this specie's range is extensive and covers much of the province. It will roost in both natural and man-made structures. Roosting colonies require a number of large dead trees, in specific stages of decay and that project above the canopy in relatively open areas. May form nursery colonies in the attics of buildings within 1 km of water. Caves or abandoned mines may be used as hibernacula, but high humidity and stable above freezing temperatures are required (Environment Canada 2015).	Moderate Large blocks of forest on Site and within the Study Area may provide suitable maternity roosting habitat	Moderate The forest along the south and east side of Brown and Montrose Road, the forest along the north side of Welland River, the ash swamp east of Montrose Road, and the mature forest south of Reixinger Road may have suitable nesting and maternity roosting habitat.
Northern myotis	<i>Myotis septentrionalis</i>	END	END	END	S3	In Ontario, this species' range is extensive and covers much of the province. It will usually roost in hollows, crevices, and under loose bark of mature trees. Roosts may be established in the main trunk or a large branch of either living or dead trees. Caves or abandoned mines may be used as hibernacula, but high humidity and stable above freezing temperatures are required (Environment Canada 2015).	Moderate Large blocks of forest on Site and within the Study Area may provide suitable maternity roosting habitat	Moderate The forest along the south and east side of Brown and Montrose Road, the forest along the north side of Welland River, the ash swamp east of Montrose Road, and the mature forest south of Reixinger Road may have suitable nesting and maternity roosting habitat.

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Tri-colored bat	<i>Perimyotis subflavus</i>	END	END	END	S3?	In Ontario, tri-colored bat may roost in foliage, in clumps of old leaves, hanging moss or squirrel nests. They are occasionally found in buildings although there are no records of this in Canada. They typically feed over aquatic areas with an affinity to large-bodied water and will likely roost in close proximity to these. Hibernation Sites are found deep within caves or mines in areas of relatively warm temperatures. These bats have strong roost fidelity to their winter hibernation Sites and may choose the exact same spot in a cave or mine from year to year (Environment Canada 2015).	Moderate Large blocks of forest on Site and within the Study Area may provide suitable maternity roosting habitat	Moderate The forest along the south and east side of Brown and Montrose Road, the forest along the north side of Welland River, the ash swamp east of Montrose Road, and the mature forest south of Reixinger Road on Site and within the Study Area may have suitable nesting and maternity roosting habitat.
Woodland vole	<i>Microtus pinetorum</i>	SC	SC	SC	S3?	In Ontario, woodland vole is associated with mature deciduous forests with soft, often sandy soils and a deep litter and humic layer, suitable for burrowing. Common associates include oaks, hickory, black walnut, American beech and tulip tree. This species is often found at woodland edges near roads, railway tracks and field edges. Woodland vole is restricted to the Carolinian forest zone (COSEWIC 2010).	Moderate Deciduous forests on Site and within the Study Area may provide suitable habitat for this species.	Moderate The forest along the south and east side of Brown and Montrose Road, the forest along the north side of Welland River, and the mature forest south of Reixinger Road may have suitable habitat.
Eastern pondmussel	<i>Ligumia nasuta</i>	SC	SC	END	S1	In Ontario, the preferred habitat of eastern pondmussel is sheltered areas of lakes or slow streams in substrates of fine sand and mud at depths of 0.3 to 4.5 m (COSEWIC 2017). Two currently known populations: one in the delta area of Lake St. Clair and the second in Lyn Creek, a small tributary of the upper St. Lawrence River.	Moderate Eastern pondmussel are known to occur within the Welland River (COSEWIC 2017).	Moderate Eastern pondmussel are known to occur within the Welland River, which is along the east and west side of the Site pipeline alignment and Study Area (COSEWIC 2017).
Fawnsfoot	<i>Truncilla donaciformis</i>	END	END	END	S2	In Ontario, fawnsfoot only occurs in the Great Lakes drainage. Fawnsfoot inhabits medium and large rivers with moderate to slow-flowing water. It is usually found in shallow waters (1-5 m deep) with gravel, sand or muddy bottoms (COSEWIC 2008).	Moderate Welland River, off site, within the Study Area may have suitable substrates that provide habitat.	Moderate Welland River, along the east and western side of the Site pipeline alignment and Study Area, may have suitable substrates that provide habitat.
Kidneyshell	<i>Ptychobranthus fasciolaris</i>	END	END	END	S1	The kidneyshell is most often found in small to medium-sized rivers and streams, where it prefers shallow areas with clear, swift-flowing water and substrates of firmly packed coarse gravel and sand. It is rarely found in either large rivers or headwater creeks, but has been found on gravel shoals in Lake Erie and Lake St. Clair. It is often found near beds of water willow, an aquatic plant. It is usually found deeply buried in the substrate (Morris 2010).	Moderate Welland River, off site, within the Study Area may have suitable substrate, water clarity and flow to provide habitat.	Moderate Welland River, along the east and western side of the Site pipeline alignment and Study Area, may have suitable substrate, water clarity and flow to provide habitat.
Mapleleaf	<i>Quadrula quadrula</i>	SC	SC	SC	S2	In Ontario, the mapleleaf is usually found in medium to large rivers with slow to moderate currents and firmly packed substrate of sand, coarse gravel or clay/mud. It may also occur in shallow lakes, big river embayments and deep river impoundments (COSEWIC 2016).	Moderate Welland River, off site, within the Study Area may have suitable flow and substrate that would provide habitat for mapleleaf.	Moderate Welland River, along the east and western side of the Site pipeline alignment and Study Area, may have suitable flow and substrate that would provide habitat for mapleleaf.

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Round hickorynut	<i>Obovaria subrotunda</i>	END	END	END	S1	In Ontario, round hickorynut is found in medium to large-sized rivers and shallow lake delta regions of Lakes Erie and St. Clair. Preferred habitat is generally described as freshwater with steady, moderate flows and sand or gravel bottoms, at depths of up to 2 m. In Lake St. Clair, it currently occupies shallow (<1 m), near-shore areas with firm, sandy substrates (Morris 2010).	Low Welland River on Site and within the Study Area may provide suitable habitat, however this species is only known to occur Lake St. Clair.	Low Welland River on Site and within the Study Area may provide suitable habitat, however this species is only known to occur Lake St. Clair.
Spoon-leaved moss	<i>Bryoandersonia illecebra</i>	END	THR	END	S2	While historic Ontario locations for spoon-leaved moss have included cedar swamps, deciduous forests, pine plantations, and areas of hawthorn and juniper scrub, extant Canadian colonies are confined to soil that is in or near flat, low-lying, seasonally wet areas. Although it can grow on rocks or tree bases, all known colonies of spoon-leaved moss in southern Ontario have been on soil (COSEWIC 2017). This species is restricted to a few Sites in Elgin, Essex and Welland counties, as well as the Niagara Region.	Low Although suitable habitat exists on Site and within the Study Area, this species was not observed during field surveys.	Low Spoon-leaved moss is only found within a few Sites in Elgin, Essex and Welland counties, as well as the Niagara Region. This species was not observed during the field survey.
Blanding's turtle - Great Lakes / St. Lawrence population	<i>Emydoidea blandingii</i>	THR	END	END	S3	In Ontario, Blanding's turtle will use a range of aquatic habitats, but favor those with shallow, standing or slow-moving water, rich nutrient levels, organic substrates and abundant aquatic vegetation. They will use rivers, but prefer slow-moving currents and are likely only transients in this type of habitat. This species is known to travel great distances over land in the spring in order to reach nesting Sites, which can include dry conifer or mixed forests, partially vegetated fields, and roadsides. Suitable nesting substrates include organic soils, sands, gravel and cobble. They hibernate underwater and infrequently under debris close to water bodies (COSEWIC 2016).	Moderate Welland River and Grassy Brook on the north and west edges of the Site and within the Study Area provide suitable nesting and hibernation habitat.	Moderate Welland River and Grassy Brooks on Site along the pipeline alignment and within the Study Area may provide suitable nesting and hibernation habitat.
Eastern ribbonsnake - Great Lakes population	<i>Thamnophis sauritius</i>	SC	SC	SC	S4	In Ontario, eastern ribbonsnake is semi-aquatic, and is rarely found far from shallow ponds, marshes, bogs, streams or swamps bordered by dense vegetation. They prefer sunny locations and bask in low shrub branches. Hibernation occurs in mammal burrows, rock fissures or even ant mounds (COSEWIC 2012).	Moderate The forests, wetlands and riparian areas on Site and within the Study Area may provide suitable habitat for this species.	Moderate The forests, ash swamps, marshes, and riparian areas on Site along the pipeline alignment and within the Study Area may provide suitable nesting and hibernation habitat.
Milksnake	<i>Lampropeltis triangulum</i>	NAR	SC	SC	S4	In Ontario, milksnake uses a wide range of habitats including prairies, pastures, hayfields, wetlands and various forest types, and is well-known in rural areas where it frequents older buildings. Proximity to water and cover enhances habitat suitability. Hibernation takes place in mammal burrows, hollow logs, gravel or soil banks, and old foundations (COSEWIC 2014).	Moderate Fields, wetlands, roadways, edge of railway tracks, banks along Grassy Brook, and forests on Site and within the Study Area may provide suitable habitat for this species.	Moderate The cultural meadows, farmland, forests, roadways, edge of railway tracks, and riparian areas (between Brown Shaft 1 to Montrose Shaft 3 and Montrose Shaft 4 to 6) within the Site and Study Area may provide suitable habitat.

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Northern map turtle	<i>Graptemys geographica</i>	SC	SC	SC	S3	In Ontario, the northern map turtle prefers large waterbodies with slow-moving currents, soft substrates, and abundant aquatic vegetation. Ideal stretches of shoreline contain suitable basking Sites, such as rocks and logs. Along Lakes Erie and Ontario, this species occurs in marsh habitat and undeveloped shorelines. It is also found in small to large rivers with slow to moderate flow. Hibernation takes place in soft substrates under deep water (COSEWIC 2012).	Moderate Welland River within the Study Area may provide suitable nesting and hibernation habitat for this species.	Moderate Welland River on Site along the pipeline alignment and within the Study Area may provide suitable nesting and hibernation habitat.
Snapping turtle	<i>Chelydra serpentina</i>	SC	SC	SC	S4	In Ontario, snapping turtle uses a wide range of waterbodies, but shows preference for areas with shallow, slow-moving water, soft substrates and dense aquatic vegetation. Hibernation takes place in soft substrates under water. Nesting Sites consist of sand or gravel banks along waterways or roadways (COSEWIC 2008).	Moderate Wetlands, ash swamp, the Welland River and Grassy Brook within the Study Area may provide suitable nesting and hibernation habitat for this species.	Moderate The roadsides, the ash swamps, Welland River and Grassy Brooks on Site along the pipeline alignment and within the Study Area may provide suitable nesting, foraging, and hibernation habitat.
Stinkpot or Eastern musk turtle	<i>Sternotherus odoratus</i>	SC	THR	SC	S3	In Ontario, eastern musk turtle is very rarely out of water and prefers permanent bodies of water that are shallow and clear, with little or no current and soft substrates with abundant organic materials. Abundant floating and submerged vegetation is preferred. Hibernation occurs in soft substrates under water. Eggs are sometimes laid on open ground, or in shallow nests in decaying vegetation, shallow gravel or rock crevices (COSEWIC 2012).	Moderate The Welland River and Grassy Brook within the Study Area may provide suitable nesting and hibernation habitat for this species	Moderate The Welland River and Grassy Brooks on Site along the pipeline alignment and within the Study Area may provide suitable nesting and hibernation habitat.
American columbo	<i>Frasera caroliniensis</i>	END	END	END	S2	In Ontario, American columbo is most commonly associated with open deciduous forested slopes, but it can also be found in thickets, swamps and clearings. It is often associated with oak, hickory and sassafras trees. American columbo grows on a wide variety of soils, particularly dry mesic to mesic clay and clay loam soils (Environment Canada 2016).	Low Although potentially suitable habitat exists on Site, this species was not observed during field surveys.	Low Although potentially suitable habitat exists on Site, this species was not observed during field surveys.
American ginseng	<i>Panax quinquefolius</i>	END	END	END	S2	In Ontario, American ginseng is found in moist, undisturbed and relatively mature deciduous woods often dominated by sugar maple. It is commonly found on well-drained, south-facing slopes. American ginseng grows under closed canopies in well-drained soils of glacial origin that have a neutral pH (ECCC 2018).	Low The Site and Study Area are likely too disturbed to provide suitable habitat. In addition, this species was not observed during field surveys.	Low Although potentially suitable habitat exists on Site, this species was not observed during field surveys.
American hart's-tongue fern	<i>Asplenium scolopendrium</i>	SC	SC	SC	S3	In Ontario, hart's-tongue fern grows on thin calcareous soils on or near dolomitic limestone of the Niagara Escarpment, and occasionally on open talus/scree slopes. Most populations are found on steep, moderately moist slopes that face north to northeast and are under a hardwood canopy cover (Environment Canada 2013).	Low The Site and Study Area lack slopes to provide preferred habitat. In addition, this species was not observed during field surveys.	Low The Site and Study Area lack slopes to provide preferred habitat. In addition, this species was not observed during field surveys.

Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Rationale for Potential to Occur on Site or in the Study Area (Desktop)	
							WWTP	Pipe Alignment / Shafts
American water-willow	<i>Justicia americana</i>	THR	THR	THR	S2	In Ontario, the aquatic plant American water-willow grows on muddy banks of lakes, rivers and streams, and sometimes in associated wetlands (MNFI 2007). American water-willow prefers shallow, calcareous waters of 15-20 cm in depth over gravel and organics, but can tolerate fluctuations (CDPNQ 2008).	Low The banks of Grassy Brook and Welland River, and Welland River East Wetland Complex (PSW) on Site and within the Study Area may provide suitable habitat for this species. However, this species was not observed during field surveys.	Low The banks of Welland River and Grassy Brook on Site along the pipeline alignment and within the Study Area may provide suitable growing habitat. However, this species was not observed during field surveys.
Broad beech fern	<i>Phegopteris hexagonoptera</i>	SC	—	SC	S3	In Ontario, broad beech fern inhabits rich, undisturbed mature deciduous forest dominated by beech and maple. It typically grows in moist to wet, sandy soils of lower valley slopes and occasionally swamps (van Overbeeke et al. 2013).	Low Forested areas on Site are disturbed and not mature, and are not beech-maple dominated. In addition, this species was not observed during field surveys.	Low The mature deciduous forest south of Montrose Shaft 6 to Reixinger Shaft 2 may provide suitable growing habitat. However, this species was not observed during field surveys.
Butternut	<i>Juglans cinerea</i>	END	END	END	S2?	In Ontario, butternut is found along stream banks, on wooded valley slopes, and in deciduous and mixed forests. It is commonly associated with beech, maple, oak and hickory (Voss and Reznicek 2012). Butternut prefers moist, fertile, well-drained soils, but can also be found in rocky limestone soils. This species is shade intolerant (Farrar 1995).	Low Although there is potentially suitable habitat for this species on the Site, this species was not observed during field surveys.	Low The banks of Welland River and Grassy Brook on Site along the pipeline alignment and within the Study Area may provide suitable growing habitat. However, this species was not observed during field surveys.
Cherry birch	<i>Betula lenta</i>	END	END	END	S1	In Ontario, cherry birch typically occupies upland deciduous forests that occur on north and west facing slopes. This species is associated with sugar maple, eastern hemlock and red oak. Cherry birch grows in moist, well-drained loam soils, but may also be found in rocky shallow soils (COSEWIC 2006).	Low The Site and Study Area lack slopes, and this species was not observed during field surveys.	Low The mature deciduous forest south of Montrose Shaft 6 to Reixinger Shaft 2 had lots of oak and sugar maple, which may provide suitable growing habitat. However, this species was not observed during field surveys.

Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Rationale for Potential to Occur on Site or in the Study Area (Desktop)	
							WWTP	Pipe Alignment / Shafts
Common hoptree	<i>Ptelea trifoliata</i>	SC	SC	SC	S3	In Ontario, common hoptree grows in open woodlands, thickets, dry prairies and along dry, and rocky shorelines. It typically occurs in sunny areas with dry sandy or rocky soils (Farrar 1995).	Low Although there is suitable habitat on Site and within the Study Area, this species was not observed during field surveys.	Low The forests, cultural thickets, and woodlands on Site along the pipeline alignment and within the Study Area may provide suitable growing habitat. However, this species was not observed during field surveys.
Cucumber tree	<i>Magnolia acuminata</i>	END	END	END	S2	In Ontario, cucumber tree grows in deciduous woodlands in association with species such as black cherry, red maple, beech and white ash. It prefers moist to wet Sites, with slightly acidic, sandy loam soils (Waldron 2003). It occurs only in the Niagara Region and Norfolk County.	Low Although there is suitable habitat on Site and within the Study Area, this species was not observed during field surveys.	Low The deciduous forests and woodlands on Site along the pipeline alignment and within the Study Area may provide suitable growing habitat. However, this species was not observed during field surveys.
Deerberry	<i>Vaccinium stamineum</i>	THR	THR	THR	S1	In Ontario, deerberry inhabits open deciduous woodlands, especially oak, as well as rock barrens on both steep slopes and flat ground. It is currently found only in the Niagara Region and St. Lawrence Thousand Islands area. Deerberry grows in dry, acidic, sandy soils (NDRT 2010).	Low Although there is suitable habitat on Site and within the Study Area, this species was not observed during field surveys.	Low There are no rock barrens on Site or within the Study Area that would provide growing habitat.
Eastern flowering dogwood	<i>Cornus florida</i>	END	END	END	S2?	In Ontario, eastern flowering dogwood grows in the understory of dry to rich deciduous forests, especially on hillsides and riverbanks. It prefers sandy acidic soils but occasionally is found in loams, clays and organic soils (Waldron 2003). This species is restricted to the Carolinian zone of southern Ontario.	Low Although there is suitable habitat on Site and within the Study Area, this species was not observed during field surveys.	Low The forests, woodlands, and banks of Welland River and Grassy Brook on Site along the pipeline alignment and within the Study Area may provide suitable growing habitat. However, this species was not observed during field surveys.
Goldenseal	<i>Hydrastis canadensis</i>	THR	THR	THR	S2	In Ontario, goldenseal occurs in damp mature deciduous forests usually under a semi-open or closed canopy and in moist microhabitats near vernal pools, along forested streams, and floodplain forests. It is associated with red oak, sugar maple, hawthorns, shagbark hickory, ironwood, and basswood and can tolerate disturbances (e.g. fallen trees, paths, or woodland edges) (Jolly 2016).	Low This species is no longer known to exist in the vicinity of the Study Area (Jolly 2016), and was not observed during field surveys.	Low There is no suitable habitat on Site or within the Study Area for goldenseal.
Green dragon	<i>Arisaema dracontium</i>	SC	—	SC	S3	In Ontario, green dragon occurs in somewhat-wet to wet deciduous forests along streams. In particular, it grows in maple forest and forest dominated by red ash and white elm trees. Green dragon is restricted to shaded or partially shaded seasonally inundated floodplains (Donley et al. 2013). It is primarily restricted to southwestern Ontario.	Low Although there is suitable habitat on Site and within the Study Area, this species was not observed during field surveys.	Low The forests, ash swamps, and banks of Welland River and Grassy Brook on Site along the pipeline alignment and within the Study Area may provide suitable growing habitat. However, this species was not observed during field surveys.

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							WWTP	Pipe Alignment / Shafts
Pink milkwort	<i>Polygala incarnata</i>	END	END	END	S1	In Ontario, pink milkwort grows in moist, to dry, sandy, undisturbed prairie habitats, often in association with little bluestem (<i>Schizachyrium scoparium</i>) (COSEWIC 2009). There is one extant population at Ojibway Prairie Nature Reserve and three extant populations at Walpole Island First Nation.	Low This species is no longer known to exist in the vicinity of the Study Area (COSEWIC 2009) and was not observed during field surveys.	Low This species is no longer known to exist in the vicinity of the Site and Study Area and was not observed during the field survey.
Red mulberry	<i>Morus rubra</i>	END	END	END	S2	In Ontario, red mulberry occurs in moist forested habitats including floodplains, bottomlands, the slopes and ravines along the southern portion of the Niagara escarpment and in swales on some western Lake Erie sand spits. This species is moderately shade tolerant, but grows best in forest openings (Parks Canada Agency 2011). This species is restricted to the Carolinian zone of southwestern Ontario.	Low Although there is suitable habitat on Site and within the Study Area, this species was not observed during field surveys.	Low The forests, ash swamps, and banks of Welland River and Grassy Brook on Site along the pipeline alignment and within the Study Area may provide suitable growing habitat. However, this species was not observed during field surveys.
Round-leaved greenbrier - Great Lakes Plains population	<i>Smilax rotundifolia</i>	THR	THR	THR	S2	In Ontario, suitable habitat for round-leaved greenbrier is best captured using the OMNRF (2014) wooded area boundary (ECCC 2017). It grows in open, moist to wet, woodlands, often on sandy soils. Some types of activities that open the canopy may benefit this species but activities must not open the canopy to the extent that soil moisture is altered (ECCC 2017).	Low Although there is suitable habitat on Site and within the Study Area, this species was not observed during field surveys.	Low The ash swamps and marshes, and banks of Welland River and Grassy Brook on Site along the pipeline alignment and within the Study Area may provide suitable growing habitat. However, this species was not observed during field surveys.
Shumard oak	<i>Quercus shumardii</i>	SC	—	SC	S3	In Ontario, shumard oak occurs in mature deciduous woods on clay soil, silty loam and in swampy areas. This species is usually well spaced and never occurs in pure stands (Donley et al. 2013). It typically grows in southwestern Ontario.	High This species was confirmed to be present on the WWTP/outfall Site within the deciduous forest. Deciduous forests throughout the Study Area may provide suitable habitat for this species.	Low The deciduous forests, woodlands, and banks of Welland River and Grassy Brook on Site along the pipeline alignment and within the Study Area may provide suitable growing habitat. However, this species was not observed during field surveys.
Spotted wintergreen	<i>Chimaphila maculata</i>	THR	END	END	S2	In Ontario, spotted wintergreen occurs in sandy, well-drained soils associated with dry to fresh oak-pine or oak dominated woodlands. It requires partial shade and limited competition from other groundcover species. It is restricted to southern Ontario, and the only currently known populations are from Norfolk County and Niagara Region (Environment Canada 2015).	Low Although there is suitable habitat on Site and within the Study Area, this species was not observed during field surveys.	Low The deciduous forests and woodlands on Site along the pipeline alignment and within the Study Area may have suitable growing conditions. However, this species was not observed during field surveys.

Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Rationale for Potential to Occur on Site or in the Study Area (Desktop)	
							WWTP	Pipe Alignment / Shafts
Swamp rose mallow	<i>Hibiscus moscheutos</i>	SC	SC	SC	S3	In Ontario, swamp rose mallow is restricted to shoreline marshes associated with lakes Erie, Ontario, and St. Clair. It is most commonly found in deep-water cattail marshes and meadow marshes, but is also found in dyked wetlands, open wet woods, thickets, spoil banks, and drainage ditches where it grows on organic or clay soils. Periodic water level fluctuations are necessary to sustain swamp rose mallow (Environment Canada 2013).	High This species was confirmed to be on Site during field surveys.	Low The banks of Welland River and Grassy Brook on Site along the pipeline alignment and within the Study Area may provide suitable growing habitat. However, this species was not observed during field surveys.
Virginia mallow	<i>Sida hermaphrodita</i>	END	END	END	S1	In Ontario, Virginia mallow occurs in loose, sandy or rocky soils of riversides and floodplains, as well as disturbed areas along roadsides and railroad banks. There are two extant populations in Haldimand County within Taquanyah Conservation Area, and within a licensed quarry and along a gas pipeline corridor in Niagara Region (Bickerton 2011).	Low No suitable habitat was observed on Site or within the Study Area, and this species was not observed during field surveys.	Low The Site and Study Area are outside of the species two recorded areas.
White wood aster	<i>Eurybia divaricata</i>	THR	THR	THR	S2S3	In Ontario, white wood aster grows in open, dry to moist, deciduous woodlands with well-drained soils. It seems to grow along trails in forests dominated by sugar maple and American beech, with associates such as red, white, and black oak, shagbark hickory, and basswood (COSEWIC 2002).	Low Although there is suitable habitat on Site and within the Study Area, this species was not observed during field surveys	Low The mature forest south of Montrose Shaft 6 to Reixinger Shaft 2 had lots of sugar maple, oak, and hickory, which may provide suitable growing habitat. However, this species was not observed during field surveys.

Notes:

¹ *Endangered Species Act (ESA), 2007. General (O.Reg 242/08 last amended 1 April 2021 as O. Reg 228/21). Species at Risk in Ontario List (O.Reg 230/08 last amended 26 January 2022 as O. Reg. 24/22.); Schedule 1 (Extirpated - EXP), Schedule 2 (Endangered - END), Schedule 3 (Threatened - THR), Schedule 4 (Special Concern - SC)*

² *Species at Risk Act (SARA), 2002. Schedule 1 (Last amended 01 September 2021); Part 1 (Extirpated), Part 2 (Endangered), Part 3 (Threatened), Part 4 (Special Concern)*

³ *Committee on the Status of Endangered Wildlife in Canada (COSEWIC) <http://www.cosewic.gc.ca/>*

⁴ *Provincial Ranks (SRANK) are Rarity Ranks assigned to a species or ecological communities, by the Natural Heritage Information Centre (NHIC). These ranks are not legal designations. SRANKS are evaluated by NHIC on a continual basis and updated lists produced annually. SX (Presumed Extirpated), SH (Possibly Extirpated - Historical), S1 (Critically Imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNA (Not Applicable), S#S# (Range Rank), S? (Not ranked yet), SAB (Breeding Accident), SAN (Non-breeding Accident), SX (Apparently Extirpated). Last assessed November 2019.*

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APPENDIX C

Wildlife List

Common Name	Scientific Name	SRANK ^a	GRANK ^a	ESA ^b
Amphibians				
Northern Leopard Frog	<i>Lithobates pipiens</i>	S5	G5	—
Arthropods				
Banded Hairstreak	<i>Satyrrium calanus</i>	S4	G5	—
Cabbage White	<i>Pieris rapae</i>	SNA	G5	—
Monarch	<i>Danaus plexippus</i>	S2N,S4B	G4	SC
Pearl Crescent	<i>Phyciodes tharos</i>	S4	G5	—
Question Mark	<i>Polygonia interrogationis</i>	S5	G5	—
Birds				
American Crow	<i>Corvus brachyrhynchos</i>	S5B	G5	—
American Goldfinch	<i>Carduelis tristis</i>	S5B	G5	—
American Redstart	<i>Setophaga ruticilla</i>	S5B	G5	—
American Robin	<i>Turdus migratorius</i>	S5B	G5	—
Bald Eagle	<i>Haliaeetus leucocephalus</i>	S2N,S4B	G5	SC
Baltimore Oriole	<i>Icterus galbula</i>	S4B	G5	—
Barn Swallow	<i>Hirundo rustica</i>	S4B	G5	THR
Black-capped Chickadee	<i>Poecile atricapilla</i>	S5	G5	—
Blackpoll Warbler	<i>Setophaga striata</i>	S4B	G5	—
Blue Jay	<i>Cyanocitta cristata</i>	S5	G5	—
Blue-winged Warbler	<i>Vermivora cyanoptera</i>	S4B	G5	—
Bobolink	<i>Dolichonyx oryzivorus</i>	S4B	G5	THR
Brown Thrasher	<i>Toxostoma rufum</i>	S4B	G5	—
Brown-headed Cowbird	<i>Molothrus ater</i>	S4B	G5	—
Canada Goose	<i>Branta canadensis</i>	S5	G5	—
Carolina Wren	<i>Thryothorus ludovicianus</i>	S4	G5	—
Cedar Waxwing	<i>Bombycilla cedrorum</i>	S5B	G5	—
Chesnut-sided warbler	<i>Setophaga pensylvanica</i>	S5B	G5	—
Chipping Sparrow	<i>Spizella passerina</i>	S5B	G5	—
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	S4B	G5	—
Common grackle	<i>Quiscalus quiscula</i>	S5B	G5	—
Common Tern	<i>Sterna hirundo</i>	S4B	G5	—
Common Yellowthroat	<i>Geothlypis trichas</i>	S5B	G5	—
Downy Woodpecker	<i>Picoides pubescens</i>	S5	G5	—
Eastern Kingbird	<i>Tyrannus tyrannus</i>	S4B	G5	—
Eastern Meadowlark	<i>Sturnella magna</i>	S4B	G5	THR
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	S4B	G5	—
Eastern wood-pewee	<i>Contopus virens</i>	S4B	G5	SC
European Starling	<i>Sturnus vulgaris</i>	SNA	G5	—
Field Sparrow	<i>Spizella pusilla</i>	S4B	G5	—
Gray Catbird	<i>Dumetella carolinensis</i>	S4B	G5	—
Great Blue Heron	<i>Ardea herodias</i>	S4	G5	—
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	S4B	G5	—
Great Egret	<i>Ardea alba</i>	S2B	G5	—
House Sparrow	<i>Passer domesticus</i>	SNA	G5	—

Common Name	Scientific Name	SRANK ^a	GRANK ^a	ESA ^b
House Wren	<i>Troglodytes aedon</i>	S5B	G5	—
Indigo Bunting	<i>Passerina cyanea</i>	S4B	G5	—
Killdeer	<i>Charadrius vociferus</i>	S5B, S5N	G5	—
Mourning Dove	<i>Zenaida macroura</i>	S5	G5	—
Northern Cardinal	<i>Cardinalis cardinalis</i>	S5	G5	—
Northern Mockingbird	<i>Mimus polyglottos</i>	S4	G5	—
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	S4B	G5	—
Red-eyed Vireo	<i>Vireo olivaceus</i>	S5B	G5	—
Red-tailed Hawk	<i>Buteo jamaicensis</i>	S5	G5	—
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	S4	G5	—
Ring-billed Gull	<i>Larus delawarensis</i>	S5B, S4N	G5	—
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	S4B	G5	—
Savannah Sparrow	<i>Passerculus sandwichensis</i>	S4B	G5	—
Song Sparrow	<i>Melospiza melodia</i>	S5B	G5	—
Swamp Sparrow	<i>Melospiza georgiana</i>	S5B	G5	—
Tree Swallow	<i>Tachycineta bicolor</i>	S4B	G5	—
Turkey Vulture	<i>Cathartes aura</i>	S5B	G5	—
Warbling Vireo	<i>Vireo gilvus</i>	S5B	G5	—
White-breasted Nuthatch	<i>Sitta carolinensis</i>	S5B	G5	—
Wild Turkey	<i>Meleagris gallopavo</i>	S5	G5	—
Willow Flycatcher	<i>Empidonax traillii</i>	S5B	G5	—
Wood Thrush	<i>Hylocichla mustelina</i>	S4B	G5	SC
Yellow Warbler	<i>Setophaga petechia</i>	S5B	G5	—
Mammals				
Eastern Cottontail	<i>Sylvilagus floridanus</i>	S5	G5	—
Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	S5	G5	—
Muskrat	<i>Ondatra zibethicus</i>	S5	G5	—
White-tailed Deer	<i>Odocoileus virginianus</i>	S5	G5	—
Fish				
Pumpkinseed	<i>Lepomis gibbosus</i>	S5	G5	—
Minnnow Sp.	Cyprinidae sp.	—	—	—
Reptiles				
Eastern Gartersnake	<i>Thamnophis sirtalis sirtalis</i>	S5	G5T5	—

Notes:

^a Ranks based upon determinations made by the Ontario Natural Heritage Information Centre

G = Global; S = Provincial; Ranks 1-3 are considered imperiled or rare; Ranks 4 and 5 are considered secure.

SNA = Not applicable for Ontario Ranking (e.g. Exotic species)

^b Ontario *Endangered Species Act (ESA)*, 2007 (O.Reg 242/08 last amended 29 June 2020 as O.Reg 328/20). Species at Risk in Ontario List, 2007 (O.Reg 230/08 last amended 11 Aug 2018 as O. Reg 404/18, s. 1.); Schedule 1 (Extirpated - EXP), Schedule 2 (Endangered - END), Schedule 3 (Threatened - THR), Schedule 4 (Special Concern - SC)

Bolded species are designated under the ESA



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