



**LAKESHORE TRANSPORTATION STUDIES -
LAKESHORE BUS RAPID TRANSIT (BRT) STUDY
NATURAL ENVIRONMENT ASSESSMENT
MISSISSAUGA, ONTARIO**

Prepared for:
HDR CORPORATION

Prepared by:
MATRIX SOLUTIONS INC.

Version 3.0
June 2023
Mississauga, Ontario

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VERSION CONTROL

Version	Date	Issue Type	Filename	Description
V0.1	15-Nov-2021	Draft	33023-512 Lakeshore BRT Study NEA R 2021-11-15 draft V0.1.docx	Issued to client for review
V0.2	17-Feb-2022	Draft revised	33023-512 Lakeshore BRT Study NEA R 2022-02-17 draft V0.2.docx	Revisions issued to client for review
V1.0	30-Aug-2022	Final	33023-512 Lakeshore BRT Study NEA R 2022-08-30 final V1.0.docx	Issued to client
V2.0	28-Apr-2023	Final revised 1	33023-512 Lakeshore BRT Study NEA R 2023-04-28 final V2.0.docx	Revisions made; reissued to client
V3.0	06-June-2023	Final revised 2	33023-512 Lakeshore BRT Study NEA R 2023-06-06 final V3.0.docx	Revisions made; reissued to client

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1 INTRODUCTION

HDR Corporation and the City of Mississauga (the City) retained Matrix Solutions Inc. to complete a natural environment assessment (NEA) as part of the Lakeshore Transportation Studies. The studies include three infrastructure projects in the Lakeview, Port Credit, and Clarkson communities that build from the 2019 Lakeshore Connecting Communities Transportation Master Plan. These studies include the Lakeshore Bus Rapid Transit (BRT) Study, Lakeshore Complete Street Study, and the New Credit River Active Transportation (AT) Bridge Study.

As part of the Lakeshore Transportation Studies, the HDR is developing the preliminary design and completing the Transit Project Assessment Process (TPAP) for the Lakeshore BRT project. A TPAP is an expedited environmental assessment process in which the environmental effects of the project are analyzed. The Lakeshore BRT is planned to extend for 2 km along Lakeshore Road from the Etobicoke Creek to East Avenue.

This NEA report will focus on the natural heritage features and functions associated within the Lakeshore BRT study area, with the remaining two studies to be discussed in separate reports.

The NEA report will characterize the existing conditions through a background review and site investigation results, evaluate the significant heritage features and functions, determine what potential impacts the proposed design may have on significant features or functions, and recommend measures to avoid or mitigate the potential impacts.

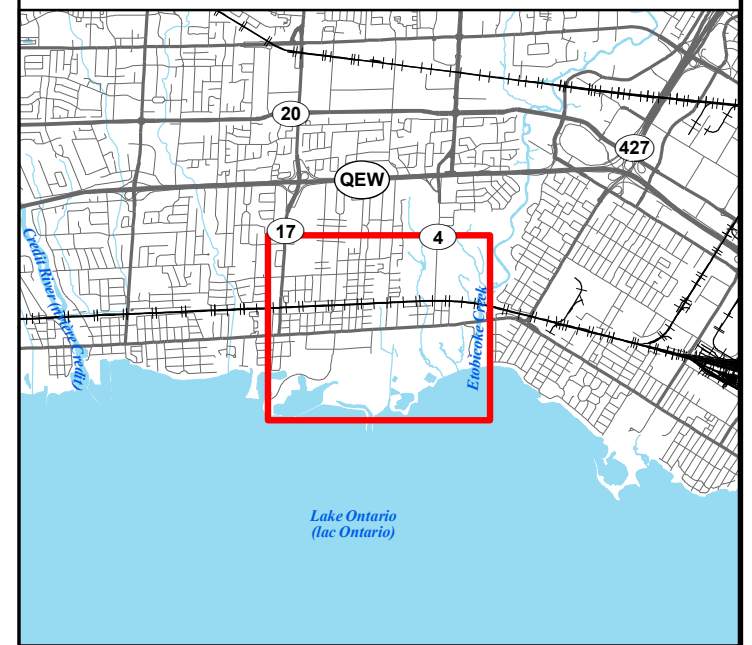
1.1 Study Area

The Lakeshore BRT study area includes the Lakeshore Road corridor extending east to west from Etobicoke Creek to East Avenue. It is anticipated that construction will be completed within the municipally-owned right-of-way (RoW); however, to account of impacts to adjacent features and potential construction just outside the RoW the NEA study area includes all areas within 50 m of the RoW. The eastern portion, including Etobicoke Creek, is regulated by Toronto and Region Conservation Authority (TRCA) and the remaining portion is regulated by Credit Valley Conservation (CVC). Due to the length of proposed work, the study area transects three subwatersheds, including Etobicoke Creek, Applewood Creek, and Serson Creek. The majority of the study area is commercial and residential land use, with a mixture of park/open space and watercourse valleylands.

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- Study Area
- Watercourse
- Railway
- Highway
- Road



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1:10,000 metres

0 100 200

NAD 1983 UTM Zone 17N



HDR Corporation
Lakeshore Bus Rapid Transit

Study Area

Date: November 2021 Project: 33023 Submitter: K. Reis Reviewer: R. Leppington

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2 REGULATORY FRAMEWORK

Review of the regulatory framework provides guidance on the protection of natural heritage features and evaluation of significance. Natural heritage features identified within the study area were evaluated against the federal, provincial, and municipal planning policies applicable to the study area (Table 1).

TABLE 1 Applicable Federal, Provincial, and Municipal Policies

Acts and Regulations	Summary of Contents	Project Implication
Federal Acts and Regulations		
<i>Migratory Birds Convention Act (MBCA)</i>	The Ontario Ministry of the Environment, Conservation and Parks (MECP) administers the MBCA through the Migratory Birds Regulations and Migratory Birds Sanctuary Regulations. Ensures the conservation of migratory bird populations by regulating potentially harmful human activities.	Any tree removals would need to be completed outside of the breeding bird season (April 1 to August 30) to avoid disturbing active nests of migratory birds protected under the MBCA.
<i>Species at Risk Act (SARA)</i>	Intended to help prevent the decline in wildlife populations due to human activity. Species classified as extirpated, endangered, and threatened in Schedule 1 of the SARA are protected under the provisions of the SARA. This includes protection to the species and their critical habitat.	While SARA applies to species on federal land, such as Canadian oceans and waterways; national parks; national wildlife areas; some migratory bird sanctuaries; and First Nations reserve lands, it also applies to species at risk (SAR) migratory birds protected under the MBCA and fish, anywhere they occur. Therefore, SARA only applies to SAR migratory birds, fish, and mussels for this project. Any impacts to these species protected under SARA would require a permit.
<i>Fisheries Act</i>	The <i>Fisheries Act</i> sets out provisions to protect fish and fish habitat, including prohibiting the death of fish and the harmful alteration, disruption, or destruction (HADD) of fish habitat as well as the deposition of deleterious substances into watercourses.	The <i>Fisheries Act</i> requires that projects avoid causing death of fish or a HADD of fish habitat unless authorized by the Minister of Fisheries and Oceans Canada (DFO) or a designated representative. The determination of risk for death of fish or HADD to fish habitat is typically done through a self-assessment process. The self assessment lists a number of criteria which identify whether or not the project may result in death of fish or HADD of fish habitat (DFO 2021). If the self assessment indicates that the project cannot avoid death of fish or HADD of fish habitat, then a formal request for review must be submitted to DFO. The request for review must include all finalized construction drawings including grading plan, erosion and sediment controls, construction details, dewatering plans, and replanting plans (DFO 2021).

Acts and Regulations	Summary of Contents	Project Implication
Provincial Acts and Regulations		
<i>Endangered Species Act (ESA)</i>	Provides for the conservation and protection of species in Ontario classified as SAR under the ESA. General habitat protection applies to all endangered and threatened species. Species-specific habitat protection is also given to those species with regulated habitat, as identified in Ontario Regulation 242/08. Species designated as special concern are not given species or habitat protection under the ESA.	The ESA applies to all SAR species within provincial lands protected under the ESA. Any impacts to these species or habitats protected under the ESA would require a permit.
Provincial Policy Statement (PPS; MMAH 2020)	<p>Provides policy direction from the provincial government relating to land use planning. The PPS addresses the need to protect natural heritage features to ensure Ontario's long-term prosperity, environmental health, and social well being.</p> <p>The following guidelines assist with the implementation of the PPS:</p> <ul style="list-style-type: none"> • <i>Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005</i> (MNR 2010) • <i>Significant Wildlife Habitat Technical Guide</i> (MNR 2000) • <i>Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E</i> (MNRF 2015) 	<p>This is a guiding document for municipalities and indicates where site development shall not be permitted, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, such as:</p> <ul style="list-style-type: none"> • significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E, and 7E • significant woodlands in Ecoregion 6E and 7E • significant valleylands in Ecoregion 6E and 7E • Significant Wildlife Habitat • significant areas of natural and scientific interest • coastal wetlands in Ecoregions 5E, 6E, and 7E that are not subject to Policy 2.1.4 (b)
<i>Conservation Authorities Act</i>	Empowers conservation authorities to regulate activities that may have an impact on watercourses within their watershed jurisdiction.	A portion of the study area is located within the TRCA watershed and is regulated under Ontario Regulation 166/06 <i>Regulation of Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses</i> . The remaining portion of the study area is located within the CVC watershed and is regulated under Ontario Regulation 160/06 <i>Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses</i> . Any works within either regulatory limit will require a permit.

Acts and Regulations	Summary of Contents	Project Implication
Municipal Acts and Regulations		
<i>Mississauga Official Plan</i> (City of Mississauga 2021)	A long-range community planning document used to guide development in Mississauga, Ontario.	A review of the official plan and natural heritage mapping was completed to incorporate Mississauga’s natural heritage features and functions within the natural environment assessment report. The study area is mapped as a Significant Natural Area and Natural Green Space. The study area also contains a Special Management Area.

3 STUDY APPROACH AND METHODOLOGY

Information pertaining to natural heritage resources within or adjacent to the study area was obtained through a review of background studies, databases, and field investigations.

3.1 Background Review

The following information sources were reviewed for records related to natural heritage features that have the potential or are known to occur within the study area.

Initial background requests regarding species at risk (SAR) were submitted to the Ontario Ministry of the Environment, Conservation and Parks (MECP). In addition to information provided by these regulatory agencies, other publicly available data sources were reviewed to determine potential species of conservation concern (scc) and SAR whose occurrence ranges overlap with the study area. Lastly, the Golder (2016) natural environment constraints assessment was reviewed to ensure inclusion of any conclusions and constraints. Background review material for the study area has also been obtained from available secondary source reports.

TABLE 2 Background Data Sources Reviewed

Name	Type	Description
Ministry of Environment, Conservation and Parks (MECP)	Data Request	A project screening request was sent to MECP on May 27, 2021, for information related to natural heritage features and species at risk (SAR) potential within the study area. The MECP responded on June 3, 2021 (Snell 2021, Pers. Comm.), indicating there were multiple additional species that have potential to be within the study area (see results in Appendix A).
Credit Valley Conservation (CVC)	Data Request	A background request for natural heritage information was submitted to the CVC via HDR. This information was received on August 24, 2021, and was incorporated into this report.
Toronto and Region Conservation Authority (TRCA)	Data Request	A background request for natural heritage information was collected from TRCAs open data portal. This information was incorporated into the report (TRCA 2021a).
TRCA	Report	Etobicoke Creek Watershed Characterization Report was reviewed and incorporated into this report (TRCA 2021a).

Name	Type	Description
Peel Region/CVC/TRCA (Peel Region 2011)	Report/Online Database	Credit River Watershed and Region of Peel Natural Areas Inventory. Specifically for site summary: Marie Curtis Park & Area (Natural Area Inventory (NAI) Area #3524,3526,4177).
Golder Associated Ltd. (2016)	Previous Natural Environment Report	A desktop level review of the natural environment within the study area. Report provides potential constraints to support the Lakeshore Road Transportation Master Plan (Appendix A).
Aquatic SAR Distribution of Fish Species at Risk Maps (DFO 2019)	Online Database	Aquatic SAR mapping is made available online by Fisheries and Oceans Canada for species listed as endangered, threatened, or special concern under the <i>Species at Risk Act</i> (Appendix A).
Natural Heritage Information Centre (NHIC) Natural Heritage Areas Make a Map (NHA MaM) (MNR 2021a)	Online Database	A web application that provides information on provincial parks, conservation reserves, and natural heritage features (i.e., Areas of Natural and Scientific Interest (ANSI), wetlands, woodlands, and natural heritage systems related to provincial policy plan areas, such as the Niagara Escarpment, Oak Ridges Moraine, and Greenbelt Plans.) The NHA MaM also provides NHIC data, which is organized into 1-km ² map squares and includes information on SCC and SAR records (Appendix A).
Lands Information Ontario (LIO) Geospatial Data (MNR 2021b)	Online Database	LIO data is maintained by the Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNR) and provides key provincial geospatial data for Ontario. Shapefiles obtained from the LIO open datasets were used to show the natural features within the study area. Key datasets that were reviewed for the study area include policy plan areas, municipal land use designations, ANSI, provincial parks and conservation areas, wetlands, woodlands, and watercourses.
<i>Ontario Reptile and Amphibian Atlas</i> (ORAA; Ontario Nature 2015)	Online Atlas	The ORAA provides known ranges of reptiles and amphibian species in Ontario based on historic and current species occurrences (Appendix A).
<i>Ontario Breeding Bird Atlas</i> (OBBA; OBBA 2001)	Online Atlas	The OBBA provides a list of bird species that have been observed during surveys completed between 1981 and 1985 and 2001 and 2005. Species that were documented between 2001 and 2005 were considered as part of this study (Appendix A).
<i>Ontario Butterfly Atlas</i> (OBA; TEA 2019)	Online Atlas	The OBA collects observations of butterflies within Ontario. Sightings were reviewed from 2016 onward (Appendix A).
<i>Atlas of the Mammals of Ontario</i> (Dobbyn 1994)	Book	The <i>Atlas of Mammals of Ontario</i> shows the geographic distribution of mammals for three time periods: pre-1900, 1900 to 1969, and 1970 to 1993. A review of the 1970 to 1993 period was completed. Results are included in Appendix A.

3.2 Field Survey Methodology

Matrix staff completed field inventories within the study area during the summer of 2021. The names and field inventories completed by each staff member is provided in Table 3.

TABLE 3 Summary of Field Surveys

Field Inventory	Date	Matrix Staff
Vegetation (Ecological Land Classification, Botanical Inventory, Invasive Species)	June 3, 2021 June 14, 2021	Peter De Carvalho
Fish and Fish Habitat	June 3, 2021	Robyn Leppington
Breeding Bird Survey	June 1, 2021 June 22, 2021	Matt Isles
Incidental Observations	All Dates	Peter De Carvalho Robyn Leppington

3.2.1 Ecological Land Classification

Vegetation community delineation was completed within the study area using aerial photography and refined through investigations in the field. The standard Ecological Land Classification (ELC) system for southern Ontario (Lee et al. 1998) was applied. Details of the vegetation communities were recorded including species composition and dominance, community structure, uncommon species or features, and evidence of anthropogenic disturbance. Vegetation community status rarity was assessed through Natural Heritage Information Centre (NHIC) vegetation community rankings (MNRF 2021a) and the local rarity rankings in the *Annual Local Occurrence Score and Local Rank Update* (TRCA 2017).

3.2.2 Botanical Inventories

A botanical inventory was completed during the field inventories for each of the vegetation communities. The field investigations were completed during the summer of 2021. A list of species was compiled to determine the presence of SCC, SAR, and invasive species. Habitats of SCC, SAR, and invasive species identified during the field inventories were mapped for the ELC community in which they encompassed.

Plants were identified to family, genus, species, subspecies, and hybrid level according to the Newmaster (1998) *Ontario Plant List* and cross-referenced with the *Database of Vascular Plants of Canada* (VASCAN; Brouillet et al. 2020) for scientifically accepted nomenclature.

3.2.3 Breeding Bird Survey

Breeding bird surveys were conducted following the protocol outlined in the Ontario Breeding Bird Atlas Guide for Participants (OBBA 2001). The protocol states that two rounds of surveys should be completed between May 24 and July 10, between 05:00 and 10:00, and under reasonable weather conditions. Surveys are not to be completed if there is heavy rain, heavy fog, or if winds are greater than 3 on the Beaufort scale (i.e., >19 km/hour).

A total of nine stations were surveyed to reflect the different habitats within the study areas. These stations were spaced approximately 300 m apart to reduce any overlap in observations between stations. Observations were made using direct (visual observation) and indirect (songs and alarm call) methods to identify the level of breeding evidence. Observations of breeding evidence for each species

were recorded based on the definitions provided by the *Ontario Breeding Bird Atlas Guide of Participants* (OBBA 2001). Dates of the field inventories are provided in Table 3.

3.2.4 Significant Wildlife Habitat and Species at Risk Assessment

An assessment of potential significant wildlife habitat (SWH) and potential SAR habitat within the study area was conducted during the field surveys. The study area was assessed for habitat identified within the criteria outlined in the *Significant Wildlife Habitat Technical Guide* (SWHTG; MNR 2000) and the *Significant Wildlife Habitat Criterion Schedules for Ecoregion 7E* (Ecoregion 7E Schedules; MNRF 2015). Natural areas were also assessed for their potential to provide habitat for those SAR and SCC identified during background review or observed during field investigations.

3.2.5 Fish Habitat Assessment

A qualitative assessment of the habitat potential based on a modified *Ontario Stream Assessment Protocol* (OSAP; Stanfield 2017) was conducted in all watercourse crossings within the study area. The objective of this assessment was to characterize the local aquatic habitat and assign a qualitative habitat potential ranking. Characteristics of high-quality aquatic habitat include natural sinuosity with a well-defined riffle/pool sequence, variability in water depth and bed substrate, naturally occurring woody debris, undercut banks, and natural riparian vegetation overhanging the banks that provides food for various aquatic organisms. The greater the quantity of preferred habitat features present, the higher potential aquatic habitat ranking. The creek was inventoried throughout the reach for a variety of geomorphic features (i.e., riffles, pools, and runs). The modified qualitative OSAP approach included documentation and assessment of the following watercourse conditions:

- general watercourse characteristics (i.e., stream pattern, general gradient, and flow)
- channel characteristics (i.e., wetted width and depth, bankfull width and depth, and depth of riffles/pools/run)
- substrate and bank materials
- other pertinent habitat features (i.e., spawning, nursery, and refuge areas, barriers to fish movement, and macrophyte growth)
- disturbances and evidence of past habitat alterations (i.e., channelization, channel hardening or straightening)

After the completion of the aquatic habitat assessment, field data were summarized to determine the overall habitat potential.

3.3 Analysis of Significance and Sensitivity

The ecological features identified within the study area are evaluated to determine the significance of each feature. Significance is based on regional, provincial, and federal designations, which are described in the following subsections.

3.3.1 Natural Area Designations

Natural area designations are those that are recognized as significant on official plans or in other policy planning documents. This includes Areas of Natural or Significant Interest (ANSIs; provincially, regionally, or other), significant wetlands (provincially, regionally, or locally), significant woodlands, and Environmentally Significant Areas. ANSIs and Environmentally Significant Areas are evaluated by the province or municipality, while of these designations, only wetlands and woodlands can be assessed for significance by non-government organizations.

3.3.2 Significant Wildlife Habitat Screening

The Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNR) provides specific guidance on identifying and assessing wildlife habitat in the SWHTG (MNR 2000), the Ecoregion 7E Schedules (MNR 2015), and the *Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005* (NHRM; MNR 2010). The MNDMNR recognizes five main categories of wildlife habitat, each with several wildlife habitat types, each with criteria to evaluate significance. A description of each of the wildlife habitat categories is provided further in this section.

- Seasonal concentration areas of animals: defined as “areas where animals occur in relatively high densities for the species at specific periods in their life cycles and/or in particular seasons” and areas that are “localized and relatively small in relation to the area of habitat used at other times of the year” (MNR 2010).
- Rare vegetation communities: defined as “areas that contain a provincially rare vegetation community and areas that contain a vegetation community that is rare within the planning area” (MNR 2010).
- Specialized habitat for wildlife: defined as “areas that support wildlife species that have highly specific habitat requirements, areas with high species and community diversity, and areas that provide habitat that greatly enhances species' survival” (MNR 2010).
- Habitat for SCC: defined as “habitats of species that are designated at the national level as Endangered or Threatened by COSEWIC [the Committee on the Status of Endangered Wildlife in Canada], which are not protected in regulation under Ontario's ESA [the *Endangered Species Act*]; habitats of species listed as special concern under the ESA on the SARO [Species at Risk in Ontario] List (formerly referred to as "Vulnerable" in the SWHTG); and habitats of species that are assigned a

provincial (i.e., sub-national) conservation status rank of S1, S2 or S3 and are not on the SARO List” (MNR 2010).

- **Animal Movement Corridors:** defined as “elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another” (MNR 2000).

To determine if confirmed or candidate SWH is present within the study area, field investigations and background review data was evaluated using the criteria from the SWH Ecoregion 7E Scheduled (MNRF 2015). The results of the SWH habitat screening are provided in Section 4.3.4.

3.3.3 Species at Risk Screening

The background review identified potential SAR that could occur within the study area. All SAR identified were screened to determine the likelihood of occurrence and whether suitable habitat is present.

SAR are defined in this report to include the following provincial and federal designations:

- **ESA (provincial):** all provincially designated species that are listed as extirpated, endangered, or threatened on the SARO List and protected under the ESA; species listed as special concern are considered a SCC, as they are not protected under the ESA.
- **SARA (federal):** only applies to fish and migratory birds protected under the *Migratory Birds Convention Act* (MBCA), anywhere they occur (e.g., includes non-federal land), that are designated as extirpated, endangered, and/or threatened under the SARA. All other species are only protected if special provisions or executive orders are made.

A list of SAR with potential to occur within or adjacent to the study area was compiled from background review and agency consultation (Table 4). To determine if suitable habitat for SAR is available within the study area, the preferred habitat requirements for reported SAR were compared to vegetation communities, aquatic habitats, and niche habitats identified during field inventories and the background review. The results of the SAR habitat screening are provided in Section 5.7.

TABLE 4 Potential Species at Risk and Species of Conservation Concern

Species Common Name	Species Scientific Name	Source	SARA Status	ESA Status
Herptofauna (6)				
Blanding’s Turtle	<i>Emydoidea blandingii</i>	MNRF 2021a/Golder 2016	THR	THR
Eastern Musk Turtle	<i>Sternotherus odoratus</i>	Golder 2016	SC	SC
Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	Golder 2016	THR	SC
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	Ontario Nature 2015	END	END
Northern Map Turtle	<i>Graptemys geographica</i>	Golder 2016/ Ontario Nature 2015	SC	SC
Snapping Turtle	<i>Chelydra serpentina</i>	MNRF 2021a/Ontario Nature 2015/Golder 2016	SC	SC
Birds (17)				
Bank Swallow	<i>Riparia</i>	MNRF 2021a/ OBBA 2001/Golder 2016	THR	THR
Barn Swallow	<i>Hirundo rustica</i>	MNRF 2021a/ OBBA 2001/Golder 2016	THR	THR
Bobolink	<i>Dolichonyx oryzivorus</i>	MNRF 2021a/ OBBA 2001/Golder 2016	THR	THR
Cerulean Warbler	<i>Setophaga cerulea</i>	Golder 2016	END	THR
Chimney Swift	<i>Chaetura pelagica</i>	MNRF 2021a/OBBA 2001	THR	THR
Common Nighthawk	<i>Chordeiles minor</i>	OBBA 2001	THR	SC
Eastern Meadowlark	<i>Sturnella magna</i>	MNRF 2021a/ OBBA 2001/Golder 2016	THR	THR
Eastern Wood-pewee	<i>Contopus virens</i>	OBBA 2001	SC	SC
Henslow’s Sparrow	<i>Ammodramus henslowii</i>	Golder 2016	END	END
Least Bittern	<i>Ixobrychus exilis</i>	Golder 2016	THR	THR
Louisiana Waterthrush	<i>Parkesia motacilla</i>	Golder 2016/Snell 2021, Pers. Comm.	THR	THR
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Golder 2016	-	END
Northern Bobwhite	<i>Colinus virginianus</i>	Golder 2016	END	END
Peregrine Falcon	<i>Falco peregrinus</i>	MNRF 2021a/OBBA 2001/ Golder 2016	SC	SC
Red-necked Grebe	<i>Podiceps grisegena</i>	OBBA 2001	-	-
Short-eared Owl	<i>Asio flammeus</i>	Snell 2021, Pers. Comm.	SC	SC
Wood Thrush	<i>Hylocichla musteline</i>	MNRF 2021a/OBBA 2001	THR	SC
Mammals (5)				
American Badger	<i>Taxidea taxus jacksoni</i>	Dobbyn 1994	END	END
Eastern Small-footed Myotis	<i>Myotis leibii</i>	Dobbyn 1994/Snell 2021, Pers. Comm.	END	END
Little Brown Myotis	<i>Myotis lucifugus</i>	Dobbyn 1994/Golder 2016/Snell 2021, Pers. Comm.	END	END
Northern Myotis	<i>Myotis septentrionalis</i>	Dobbyn 1994/Golder 2016/Snell 2021, Pers. Comm.	END	END
Tricoloured Bat	<i>Perimyotis subflavus</i>	Dobbyn 1994	END	END
Insects (3)				
Monarch	<i>Danus plexipus</i>	TEA 2019	SC	SC

Species Common Name	Species Scientific Name	Source	SARA Status	ESA Status
Mottled Duskywing	<i>Erynnis martialis</i>	TEA 2019/Golder 2016	-	END
Unicorn Clubtail	<i>Arigomphus villosipes</i>	MNRF 2021a	END	END
Fish (4)				
American Eel	<i>Anguilla rostrata</i>	MNRF 2021a/Golder 2016	-	END
Lake Sturgeon (Great Lakes population)	<i>Acipenser fulvescens</i>	Golder 2016	-	END
Redside Dace	<i>Clinostomus elongatus</i>	MNRF 2021a/Golder 2016	END	END
Shortnose Cisco	<i>Coregonus reighardi</i>	Golder 2016	END	END
Vegetation (3)				
American Chestnut	<i>Castanea dentata</i>	Snell 2021, Pers. Comm.		
Butternut	<i>Juglans cinerea</i>	MNRF 2021a/Golder 2016	END	END
White Wood Aster	<i>Eurybia divaricata</i>	Golder 2016	THR	THR

ESA - Endangered Species Act
SARA - Species at Risk Act
END - endangered
THR - threatened
SC - special concern

As noted previously, SAR species that are designated as special concern listing in Table 4 above, do not receive habitat protection under the ESA and are therefore considered SCC. Species with no ESA or SARA status in Table 4 are species that are ranked S1 to S3 which are also considered SCC. SCC species are discussed further in Section 4.3.4 when discussing SWH.

4 EXISTING NATURAL ENVIRONMENT

Characterization of the natural environment is provided in the following subsections. A complete list of species identified during the background review, is located in Appendix A. The results of the field programs are described in the following subsections, with site photographs presented in Appendix B.

4.1 Topography

The major physiographic regions within the Lakeshore BRT study area are the Iroquois Sand Plain with a South Slope inclusion at the eastern end near Etobicoke Creek (TRCA 2010). The South Slope is characterized by a smooth, faintly drumlinized, clay till plain and a deeply incised stream valley (TRCA 2010). The Lake Iroquois Sand Plain comprises sand, silt, and clay deposits, with the finer materials being closer to the current Lake Ontario shoreline (TRCA 2010).

4.2 Identified Natural Heritage Features

There are no ANSIs, Environmentally Significant Areas, Provincially Significant Wetlands (PSWs), locally significant wetlands, or Special Management Areas present within the study area.

The City’s Official Plan (City of Mississauga 2021) Schedule 3 identifies Etobicoke Creek and Applewood Creek and their associated valleylands are a part of the City’s “Significant Natural Area.” The NHIC database indicated the presence of unevaluated wetlands upstream and downstream Lakeshore Road within Etobicoke Creek.

4.3 Terrestrial Resources

4.3.1 Vegetation Communities

Vegetation communities within the study area are mapped on Figure 2 and described in further detail in Table 5. In total, eight ELC communities and three aquatic communities were documented based on field assessments conducted by Matrix in 2021. Of the native vegetation communities found within the study area none are considered to be rare and all are ranked as either S4 or S5.

TABLE 5 Ecological Land Classification Communities

Ecological Land Classification Community Type	Location	Community Description
CUW1: Mineral Cultural Woodland	Park east of Etobicoke Creek (South of Lakeshore Road)	A park east of the Etobicoke Creek consisted mostly of manicured lawn. However, several remnant pockets of woody vegetation were present. These pockets were dominated by Manitoba Maple (<i>Acer negundo</i>), which varies in height from 1-10+ m. Various other mature trees were noted as present within these pockets as well, including Black Walnut (<i>Juglans nigra</i>), Bur Oak (<i>Quercus macrocarpa</i>), Norway Spruce (<i>Picea abies</i>), and Red Maple (<i>Acer rubrum</i>). These pockets exhibit pronounced edge effect and were dominated in the outer margin by younger Manitoba Maple or shrubs (European Buckthorn [<i>Rhamnus cathartica</i>]; Climbing Nightshade [<i>Solanum dulcamara</i>]; River Grape [<i>Vitis riparia</i>]; Virginia Creeper [<i>Parthenocissus quinquefolia</i>], and noxious or invasive weedy species [Garlic Mustard [<i>Alliaria petiolate</i>]; Stinging Nettle [<i>Urtica dioica</i>]]).
	Along both sides of Etobicoke Creek (80 m downstream of Lakeshore Road)	The riparian corridor adjacent to Lakeshore Road East generally met the characteristics of moist lowland deciduous forest, with some areas dominated by Willow (FOD7-3) and Black Walnut (FOD7-4). On the whole, canopy composition was found to be variable, with other species including Manitoba Maple, Silver Maple (<i>Acer saccharinum</i>), Eastern Cottonwood (<i>Populus deltoides</i>), Siberian Elm (<i>Ulmus pumila</i>), and Sugar Maple (<i>Acer saccharum</i>) also occurring with regular frequency in the ecosite. The FOD7-type ecosite is associated with more open canopies (<60%), but the linear nature of this system and the presence of pedestrian trails adjacent (and through) the treed corridor lends more to the definition of CUW1 in areas. A fragmented supercanopy of very large (>100 diameter at breast height [DBH]) Crack Willow (<i>Salix fragilis</i>) is a consistent feature of this ecosite. The understory was typically dominated by

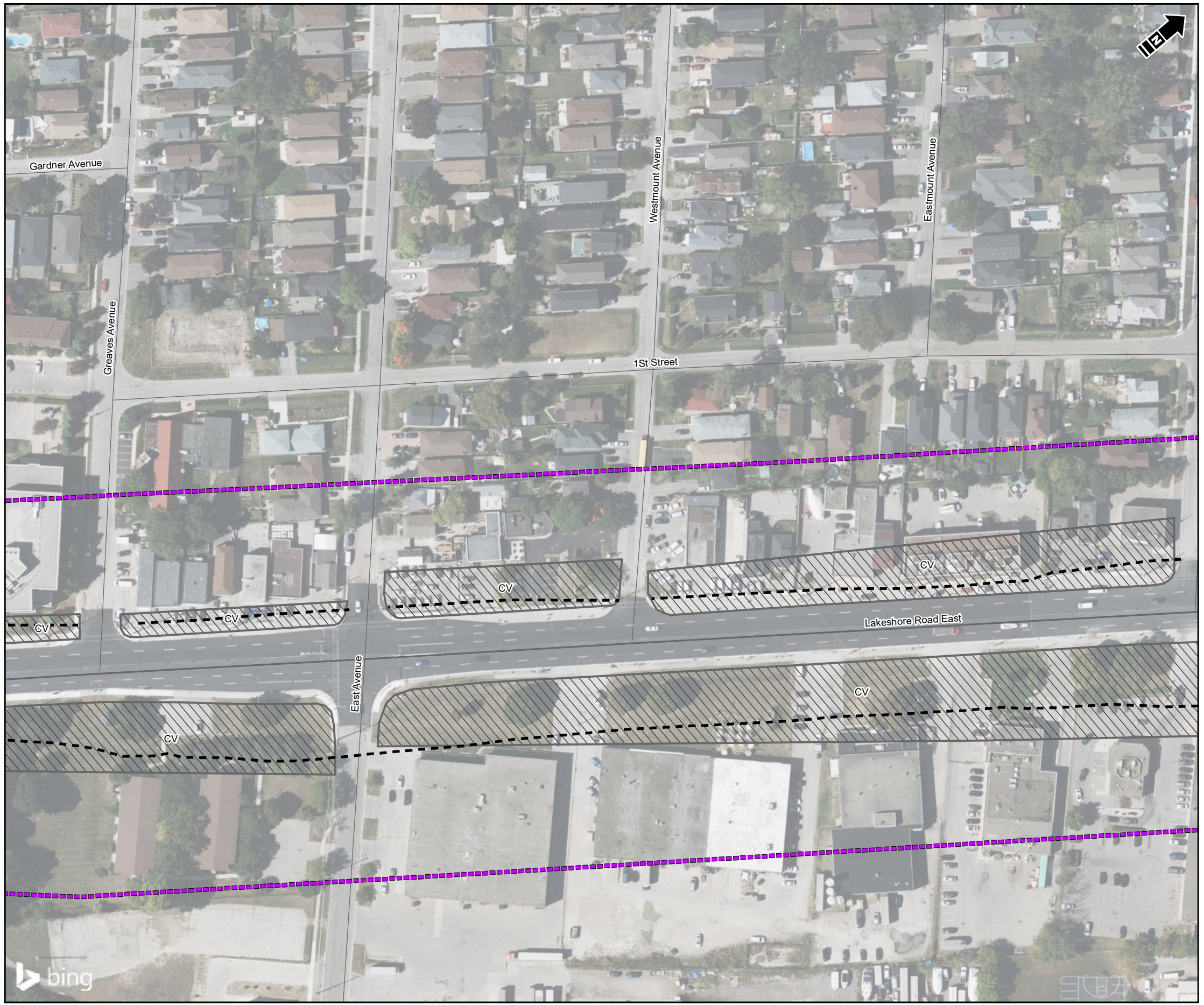
Ecological Land Classification Community Type	Location	Community Description
		Manitoba Maple, with other common associates including European Buckthorn, Tatarian Honeysuckle, Gray Dogwood (<i>Cornus racemosa</i>), Green Ash regeneration (<i>Fraxinus pennsylvanica</i>), River Grape, and Virginia Creeper. Disturbance was evident in these areas and included the presence of litter and off-trail footpaths. As well, dense areas of both Garlic Mustard and Japanese Knotweed (<i>Reynoutria japonica</i>) were noted in this ecosite.
	Within Marie Curtis Park (south of Lakeshore Road)	Several sections of open woodlot were noted at Marie Curtis park. These areas were variable in composition. These ecosites were characterized by fewer mature trees (Honey Locust [<i>Gleditsia triacanthos</i>]; Black Walnut, Manitoba Maple, Silver Maple) with a very open/broken canopy (approximately 40% to 50%). These areas were not noted to have a robust shrub layer and were generally graminoid- and forb-dominated in the understory, potentially alluding to semi-regular maintenance/mowing in these areas. Dense areas of Garlic Mustard and <i>Phragmites australis</i> were noted in sections.
	West of thicket adjacent to Etobicoke Creek (north of Lakeshore Road)	This vegetation community replicates the species found in the CUW1 vegetation community within Marie Curtis Park on the south side of Lakeshore Road.
	East of 1352 Lakeshore Rd. E. (south of Lakeshore Rd. E.)	Small sections of open woodlot were observed bordering CUM1-H. This woodland was dominated by Manitoba Maple, but also featured one or several individuals of Basswood (<i>Tilia americana</i>), Black Walnut, Eastern Cottonwood, Norway Maple, Scotch Pine (<i>Pinus sylvestris</i>) and other tree species. These areas featured a robust shrub layer, especially on the outer margins due to the fragmented nature of these ecosites. Common shrubs included Gray Dogwood, European Buckthorn, Tatarian Honeysuckle, River Grape, and Virginia Creeper. The understory of interior habitat was dominated by dense Garlic Mustard.
	Area adjacent to Serson Creek (both north and south of Lakeshore Road)	Serson Creek is bordered on either side by a narrow dense woodland. The ecosite both north and south of Lakeshore Road East is dominated by Manitoba Maple, though the canopy receives contribution from numerous species including Norway Maple, Norway Spruce, Siberian Elm, Ornamental Pear (<i>Pyrus calleryana</i>), and Eastern Red Cedar (<i>Juniperus virginiana</i>). As with all narrow woodland ecosites, edge effect significantly impacts the botanical integrity here. In some areas the CUW is no more than a single tree thick, and the outer margin is often overgrown with shrubby Manitoba Maple, Gray Dogwood, Red-Osier Dogwood, Virginia Creeper, and River Grape. What interior habitat is present was found to be often choked with downed woody debris and rampant growth of invasive species such as Garlic Mustard.

Ecological Land Classification Community Type	Location	Community Description
	Areas west and east of hydro laneway (north of Lakeshore Road)	These narrow, treed sections were both dominated by Manitoba Maple, though Black Walnut and Norway Maple were common in the canopy. Edge effect was prominent, resulting in a dense, shrubby perimeter of Manitoba Maple, Gray Dogwood, Tatarian Honeysuckle, European Buckthorn, River Grape, and Virginia Creeper. Understory was dominated by Garlic Mustard, though vegetation assemblage was heavily influenced by the adjacent cultural meadow as well.
CUT1-1: Sumac Mineral Cultural Thicket	Several sections within proximity to the Marie Curtis Park complex	Several sections within proximity to the Marie Curtis park complex were identified as thick stands of Staghorn Sumac (<i>Rhus typhina</i>). What little understory existed here was similar in characteristic to adjacent Cultural Meadow ecosites, though other shrubs were occasionally also noted at the margins of these areas (Tatarian Honeysuckle [<i>Lonicera tatarica</i>]; European Buckthorn).
CUT1: Mineral Cultural Thicket	Etobicoke Creek riparian corridor (south of Lakeshore Road)	Where mature trees were not the dominant vegetation along the Etobicoke Creek riparian corridor, a dense and variable shrub thicket was present. The thicket areas were similar in composition to edge areas of FOD7/CUW1-B, and generally dominated by Manitoba Maple. Common associates include Staghorn Sumac, Gray Dogwood, Tatarian Honeysuckle, young Green Ash, European Buckthorn, River Grape, and Virginia Creeper.
	Etobicoke Creek riparian corridor (north of Lakeshore Road)	The thicket areas were similar in composition to edge areas of FOD7/CUW1-B, and generally dominated by Manitoba Maple. Common associates include Staghorn Sumac, Gray Dogwood, Tatarian Honeysuckle, young Green Ash, European Buckthorn, River Grape, and Virginia Creeper.
	Within Marie Curtis Park (south of Lakeshore Rd. E.)	This relatively open thicket had a variable composition, though was dominated in areas by Gray Dogwood, Staghorn Sumac, and Tatarian Honeysuckle, with dense patches of Mugwort (<i>Artemisia vulgaris</i>), Stinging Nettle, and Plumeless Thistle (<i>Carduus acanthoides</i>).
FOD4: Dry- Fresh Deciduous Forest	Within Marie Curtis Park (south of Lakeshore Road)	A higher proportion of mesic species (Red Oak [<i>Quercus rubra</i>]; Little-leaf Linden [<i>Tilia cordata</i>]; Sugar Maple, Staghorn Sumac) within this ecosite indicated a transition to drier moisture regime heading west from Etobicoke Creek. Once again Manitoba Maple was the dominant species in this area. The FOD4 ecosite is generally considered to occur as a result of disturbance or management. This does appear to be a remnant woodlot that has been left to secede. A mature supercanopy of Red Oak, Silver Maple, Sugar Maple, Norway Maple (<i>Acer platanoides</i>), and Black Walnut is surrounded by relatively young Trembling Aspen (<i>Populus tremuloides</i>) and dense shrubby Manitoba Maple.
FOD9-2: Fresh-Moist Oak-Maple Deciduous Forest	Adjacent to Applewood Creek (south of Lakeshore Road)	The woodland on either side of Applewood Creek south of Lakeshore Road has a higher moisture regime, allowing it to support a canopy dominated by Silver Maple. Other tree species include Honey Locust, Manitoba Maple, Sugar Maple, and Red

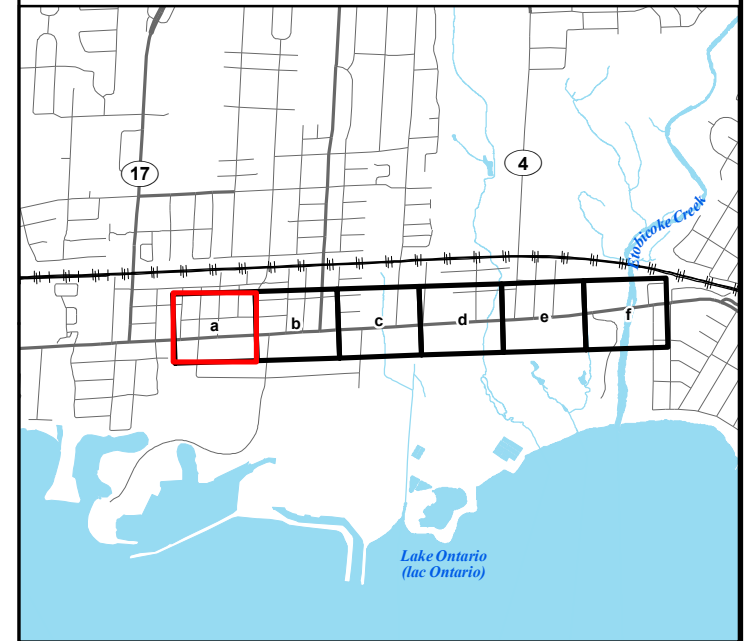
Ecological Land Classification Community Type	Location	Community Description
		Oak. Multiple dead standing snags (White Ash) were noted as present here. Manitoba Maple contributed a thick shrub-layer at the margins of these woodlots, along with Virginia Creeper and River Grape. The undergrowth was generally dominated by Garlic Mustard, especially in the eastern woodlot. Other common species included Poison Ivy (<i>Toxicodendron radicans</i>), Enchanter's Nightshade (<i>Circaea lutetiana</i>), and Yellow Avens (<i>Geum alleppicum</i>). Spotted Jewelweed (<i>Impatiens capensis</i>) and Wild Mint were noted closer to the creek. The riparian woodland is bisected by a pedestrian trail and an open meadow which may be infrequently mowed.
	East of pathway along Applewood Creek (south of Lakeshore Road)	This vegetation community replicates the species found in the FOD9-2 community along Applewood Creek riparian corridor.
CUM1/ CUM1-1: Mineral Cultural Meadow	West side of Etobicoke Creek (south of Lakeshore Road)	Inclusion within the MAM2 vegetation community. Colonized by facultative hydrophilic species (Stinging Nettle, Willow sp., Wild Mint - <i>Mentha arvensis</i>), and others still are colonized by more upland species (Canada Goldenrod - <i>Solidago canadensis</i> ; Dame's Rocket - <i>Hesperis matronalis</i> ; White Sweetclover - <i>Melilotus albus</i>).
	Between 1352 Lakeshore Rd. E. and Marie Curtis Park (south of Lakeshore Road)	A large vacant field was assessed from the RoW through a chain-link fence. The ecosite was a graminoid-dominated meadow, with a number of common grass species noted as (Reed-canary Grass; Timothy - <i>Phleum pratense</i> ; Orchard Grass - <i>Dactylis glomerata</i> ; Quackgrass - <i>Elymus repens</i> ; Creeping Red Fescue - <i>Festuca rubra</i> ; <i>Poa</i> sp.). Other species frequently observed include Wild Carrot (<i>Daucos carota</i>), Bird's-foot Trefoil (<i>Lotus corniculatus</i>), Perforated St. John's Wort (<i>Hypericum perforatum</i>), Red and White Clover (<i>Trifolium pratense</i> , <i>Trifolium repens</i>), and Oxeye Daisy (<i>Leucanthemum vulgare</i>). The cultural meadow was bordered by chain-link fencing which was overgrown in places by small trees (Manitoba Maple, Siberian Elm) and shrubs (Tatarian Honeysuckle, European Buckthorn, Virginia Creeper, River Grape). On satellite imagery it appears that this ecosite may transition to cultural thicket to the south, but this has not been verified.
	East of Applewood Creek along pathway (south of Lakeshore Road)	The cultural meadow east of Applewood Creek featured meadow species common of open areas along the corridor. Common grasses included Orchard grass, Quackgrass, Timothy, <i>Poa</i> sp., and Reed-canary Grass, while other common species included Red and White Clover, Wild Carrot, Bird's-foot Trefoil, Tufted Vetch (<i>Vicia cracca</i>), and Philadelphia Fleabane (<i>Erigeron philadelphicus</i>). A number of planted Ohio Buckeye (<i>Aesculus glabra</i>) were also noted.
	East of Applewood Creek (north of Lakeshore Rd. E.)	The cultural meadow east of Applewood Creek featured meadow species common of open areas along the corridor. Common grasses included Orchard grass, Quackgrass, Timothy, <i>Poa</i> sp.,

Ecological Land Classification Community Type	Location	Community Description
		and Reed-canary Grass, while other common species included Red and White Clover, Wild Carrot, Bird’s-foot Trefoil, Tufted Vetch (<i>Vicia cracca</i>), and Philadelphia Fleabane (<i>Erigeron philadelphicus</i>). A number of planted Ohio Buckeye (<i>Aesculus glabra</i>) were also noted.
	Hydro corridor west of Serson Creek (north of Lakeshore Road)	The meadow within the hydro-corridor generally comprised the same species that characterized the previous cultural meadow and waste areas along the RoW. This was a graminoid-dominated community, with Creeping Red Fescue, Timothy, Reed-canary Grass, Quackgrass, Smooth Brome, (<i>Bromus inermis</i>), Green Foxtail (<i>Setaria viridis</i>) and <i>Poa</i> sp. Other common species included Canada/Tall Goldenrod, Philadelphia Fleabane, Annual Fleabane (<i>Erigeron annuus</i>), Perforated St. John’s Wort, Red and White Clover, Bird’s-foot Trefoil, and Black Medick (<i>Medicago lupulina</i>).
MAM2: Mineral Meadow Marsh	Portion of Serson Creek (north and south of Lakeshore Road)	Similar to the other creeks in this corridor, Serson Creek featured largely unvegetated mineral banks. Where riparian vegetation was present, it predominantly consisted of Gray Dogwood, Red-osier Dogwood, and Reed-canary Grass. Within the channel was a mix of Common Cattail, Narrowleaf Cattail, Reed-canary Grass, and Water Smartweed, though most vegetated sections of the channel were found to be dominated by Wild Mint. This community is a result of low water conditions within the creek.
MAM2-10: Forb Mineral Meadow Marsh	Portion of Applewood Creek (south of Lakeshore Road)	The channel of Applewood Creek south of Lakeshore Road East was relatively unvegetated. The bank on either side was found to be sparsely vegetated with Spotted Jewelweed, Goldenrod species, Gray Dogwood, and Reed-canary Grass. Where vegetation within the channel was present, it was a mix of Common Cattail, Water Smartweed (<i>Persicaria amphibia</i>) and Wild Mint. This community is a result of low water conditions within the creek
OA: Open Aquatic	Etobicoke Creek, Applewood Creek, and Serson Creek	This community consists of the open aquatic systems.

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- TRCA Regulated Area (2021)
- Credit Valley Conservation Regulation Limit
- Conservation Authority Administrative Area
- Plan Prop Boundary Construction Limits
- Highway
- Road
- Ecological Land Classification**
- CV: Constructed



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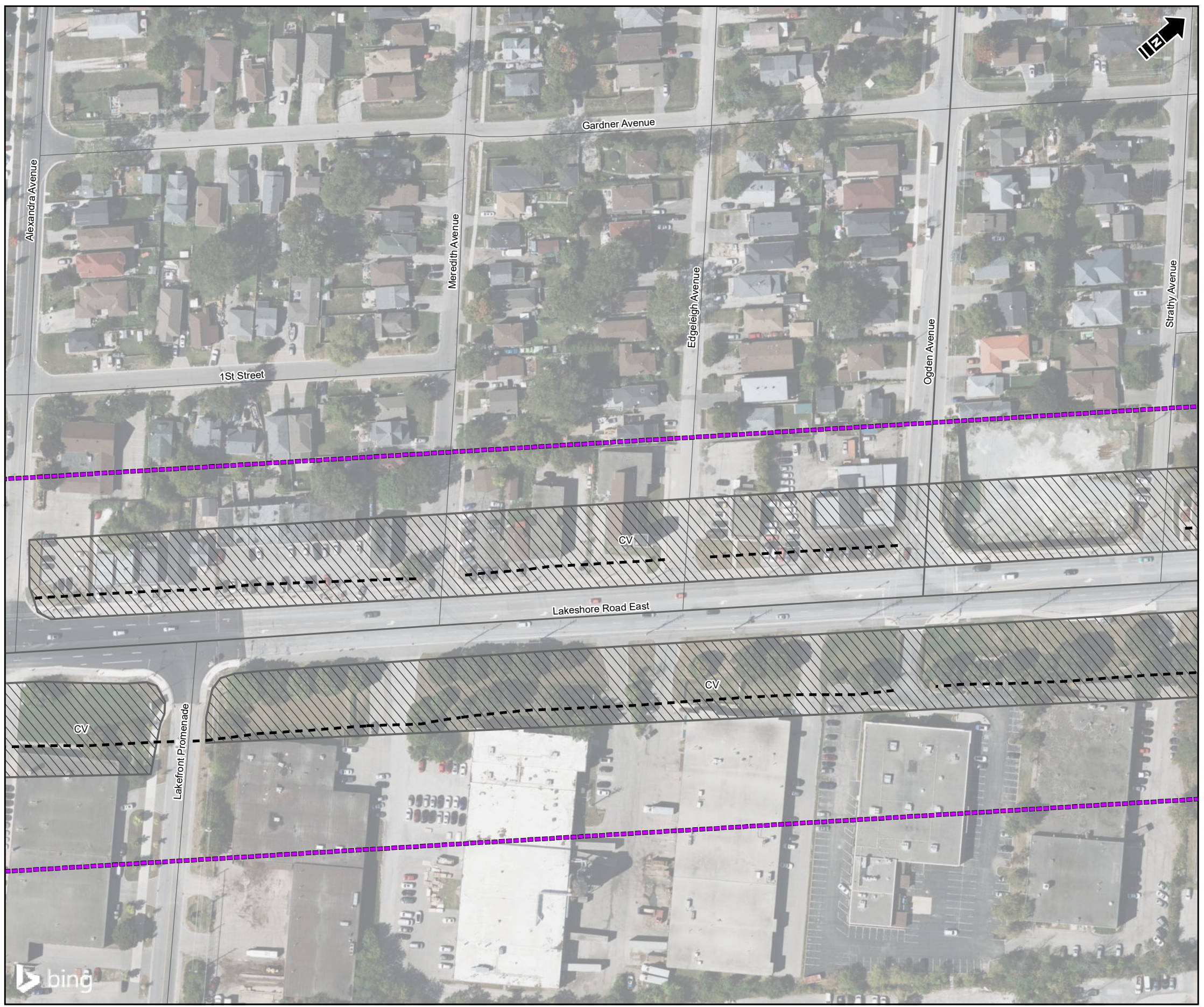
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Ecological Land Classification

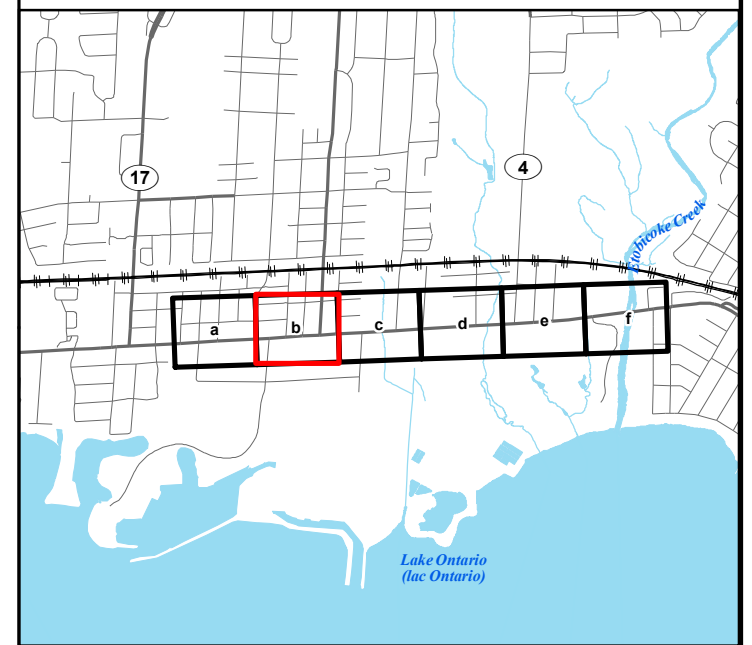
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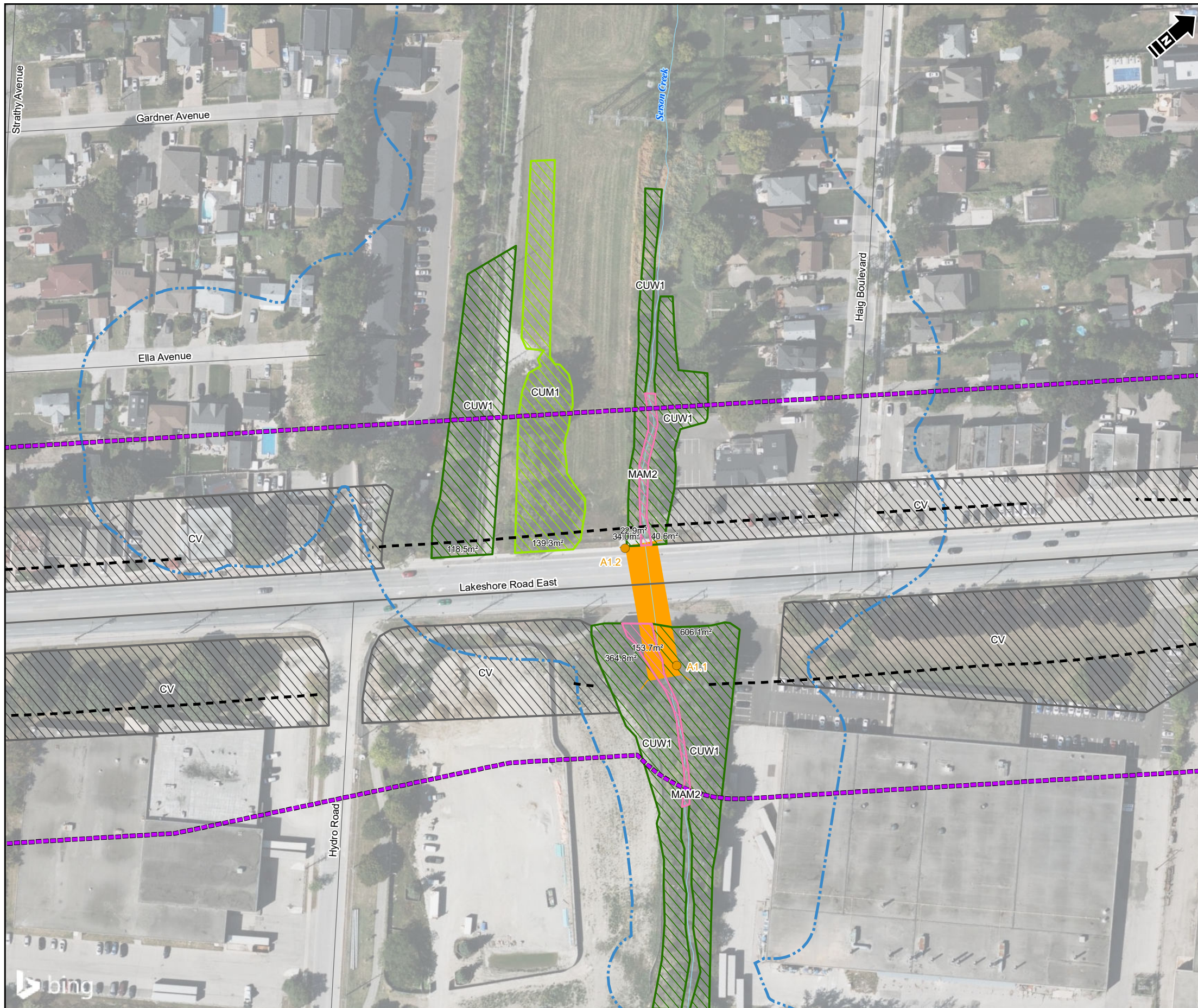
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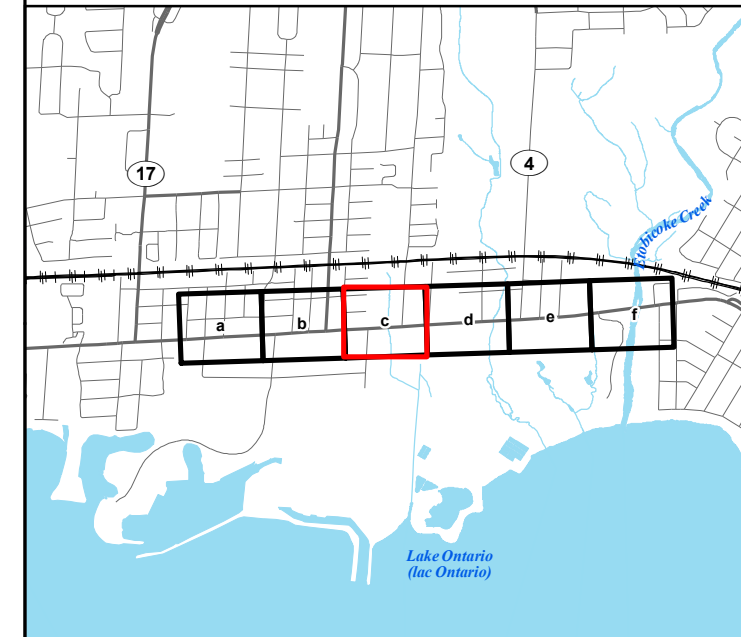
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- Study Area
- TRCA Regulated Area (2021)
- Credit Valley Conservation Regulation Limit
- New Culvert
- Conservation Authority Administrative Area
- Plan Prop Boundary Construction Limits
- Watercourse
- Highway
- Road
- Breeding Bird Station
- Ecological Land Classification**
- CUM1-1: Mineral Cultural Meadow
- CUW1: Mineral Cultural Woodland
- MAM2: Mineral Meadow Marsh
- CV: Constructed



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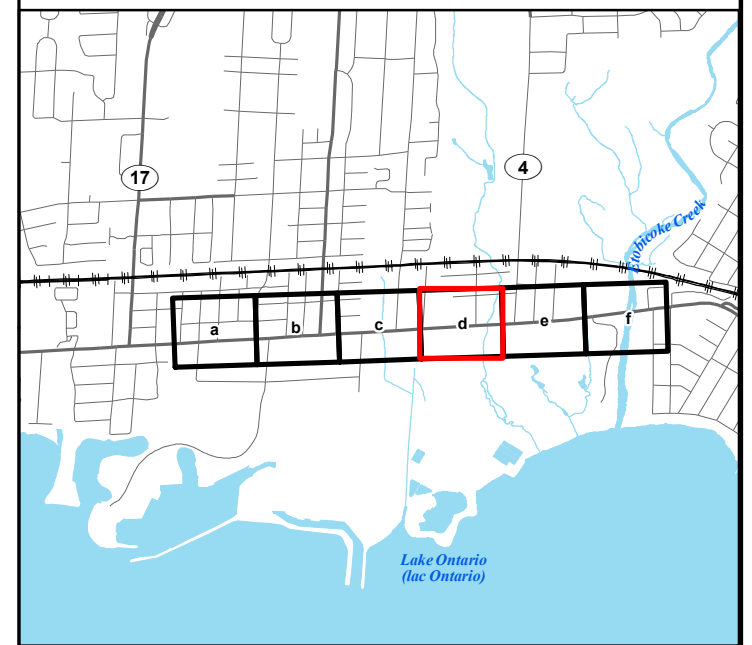
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- Study Area
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- Credit Valley Conservation Regulation Limit
- Culvert Extension
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- Highway
- Road
- Breeding Bird Station
- Ecological Land Classification**
- CUM1-1: Mineral Cultural Meadow
- CUT1: Mineral Cultural Thicket
- FOD9-2: Fresh-Moist Oak-Maple Deciduous Forest
- MAM2-10: Forb Mineral Meadow Marsh
- OA: Open Aquatic
- CV: Constructed



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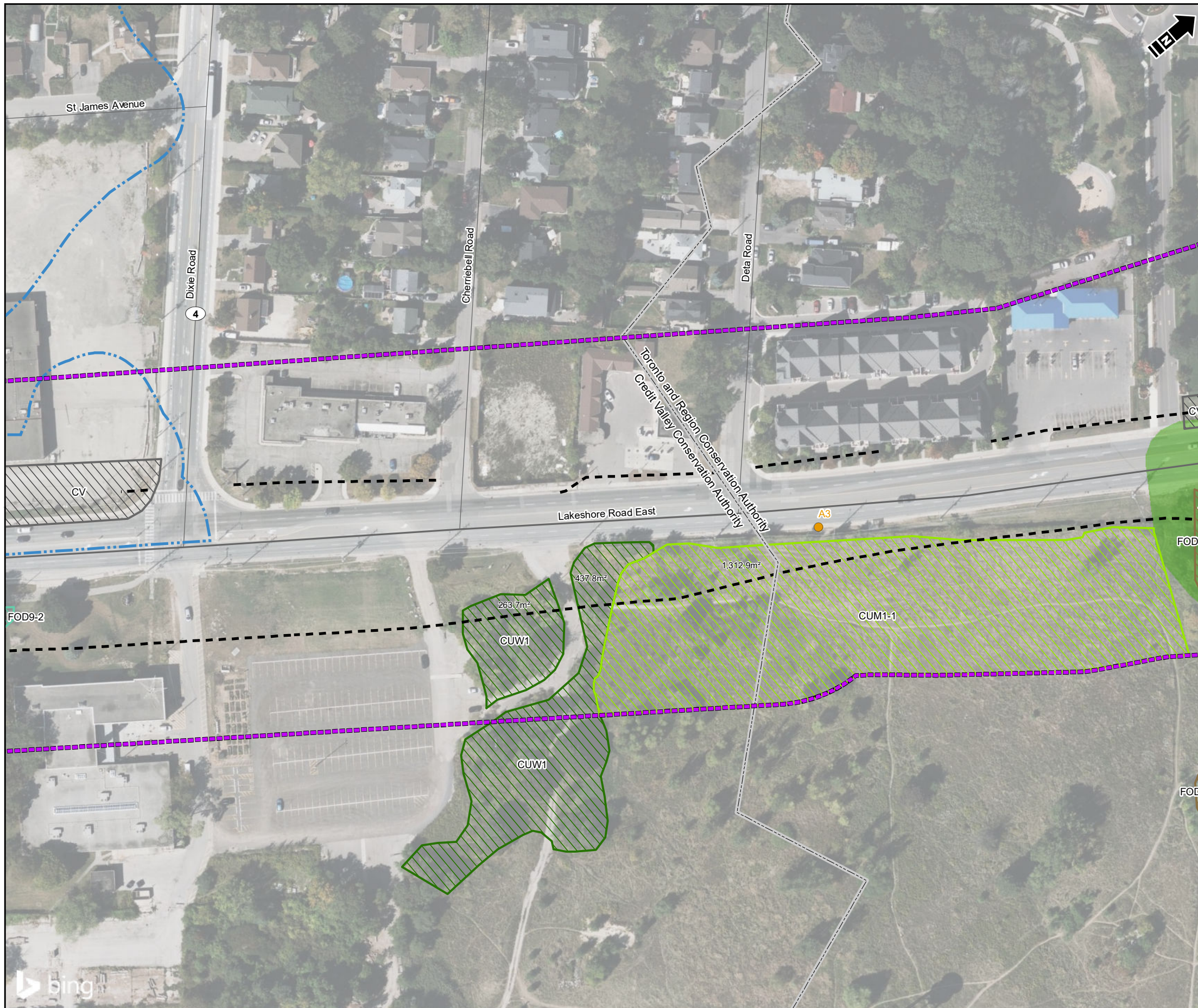


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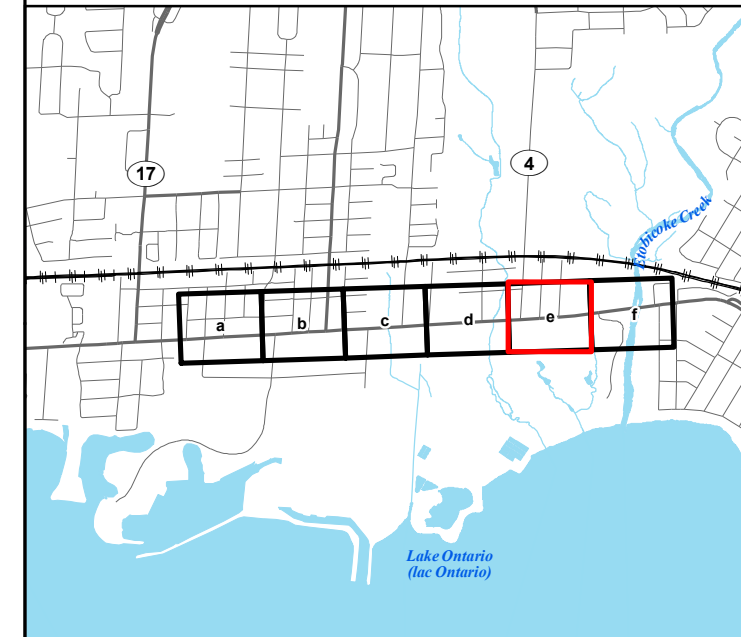
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- Road
- Breeding Bird Station
- Ecological Land Classification**
- CUM1-1: Mineral Cultural Meadow
- CUW1: Mineral Cultural Woodland
- FOD4: Dry- Fresh Deciduous Forest
- FOD9-2: Fresh-Moist Oak-Maple Deciduous Forest
- CV: Constructed



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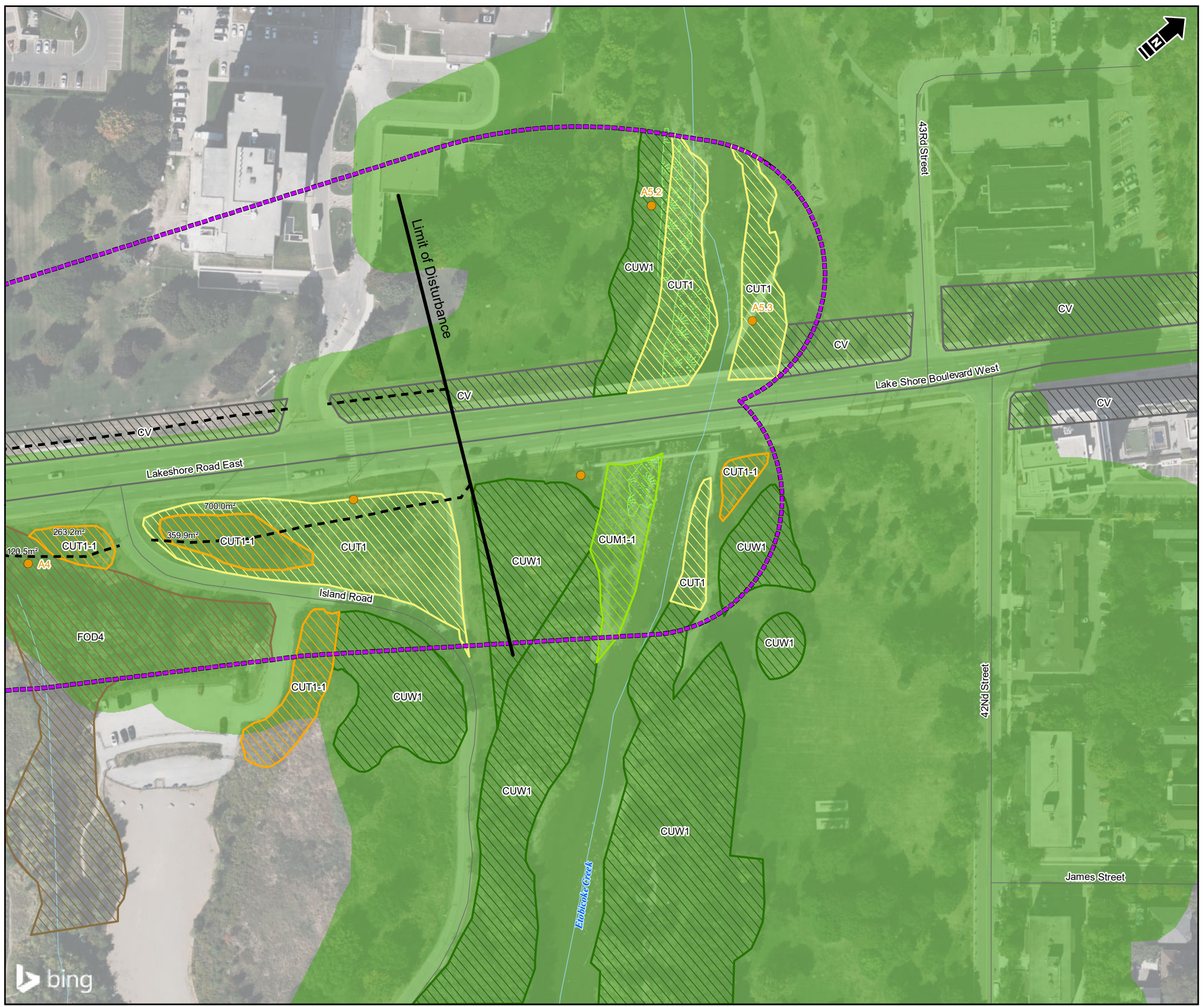
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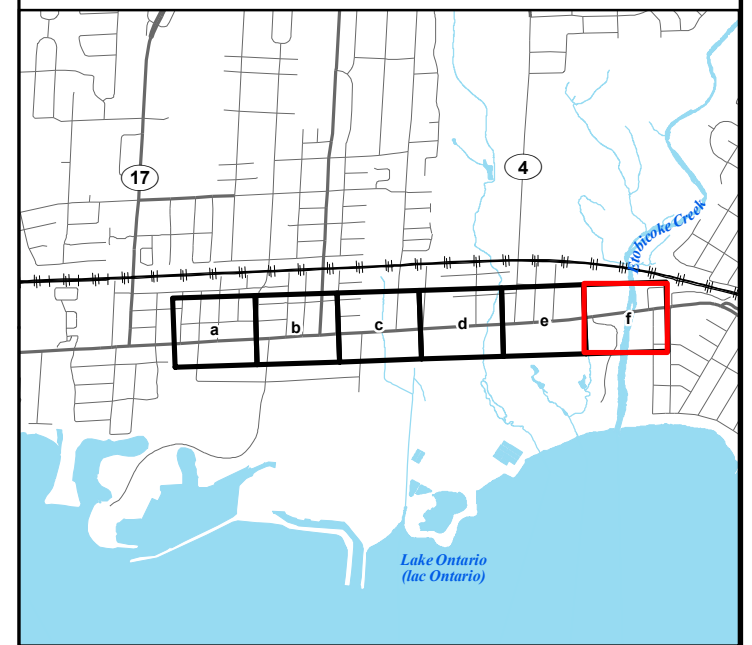
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- CUT1-1: Sumac Mineral Cultural Thicket
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Ecological Land Classification

Date: April 2023 | Project: 33023 | Submitter: K. Reis | Reviewer: R. Leppington

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4.3.2 Flora

A total of 168 vascular plant species were identified within the study area through the botanical inventory (Appendix C). Of the 168 species identified, 44% of species are considered native or naturalized within the province; 46% are considered non-native, introduced, or a cultivar and 10% were unclassified.

One tree, an Ohio Buckeye, was found in a CUM1 vegetation community to the east of Applewood Creek and south of Lakeshore Road that is provincially rare as it has an S1 rank. Since this species was planted within the area (i.e., a cultivar), it is not considered an SCC and its habitat (CUM1) is not considered to be SWH (see Section 4.3.4 and Section 5.3). No SAR were identified during the botanical inventory (Appendix C). SAR and SCC identified within the background review were assessed to identify potential habitat within the study area (Appendix D)

4.3.3 Avian Species

Based on the database inquiries, there were a total of 112 avian species within the study area which had the potential to occur. Of the 112 species identified within the background review, 13 SAR, and 4 SCC were noted to potentially occur within the study area. The SAR and SCC species were assessed to identify the habitat potential within the study areas and the results of the SAR assessment are detailed within Section 5.7 and the SCC are discussed in relation to SWH in Section 4.3.4.

Breeding bird surveys were conducted on June 1 and June 22, 2021, and were completed within nine areas (Figure 2). The breeding bird survey confirmed the presence of 37 species, which included confirmed breeding of seven species, and probable breeding of an additional five species (Appendix D). Two SAR (Barn Swallow [*Hirundo rustica*]) and (Chimney Swift [*Chaetura pelagica*]) were identified within the study area foraging or flying over the study area with no breeding evidence (Appendix D). The confirmed SAR are discussed further in Section 5.6. No SCC were observed within the study area.

4.3.4 Significant Wildlife Habitat

The wildlife habitat assessment was based on vegetation communities and incidental wildlife observations documented during the site investigations, as well as data collected from the background review.

The assessment of SWH follows the guidelines in the NHRM (MNR 2010) and the criteria from the Ecoregion 7E Schedules (MNRF 2015), with support from the SWHTG (MNR 2000) as appropriate. There are four categories of SWH which include the following:

- seasonal concentration areas of animals
- rare vegetation communities or specialized habitat for wildlife
- habitat for SCC
- animal movement corridors

Each of these categories includes various SWH types and with criteria to evaluate significance. These four categories were assessed based on aerial photography, background review, and field investigations performed by Matrix. A full SWH evaluation is provided in Appendix E with a summary of the confirmed or candidate SWH is provided in Table 6. To support the evaluation of SCC habitat in Appendix E, a specific evaluation with regards to SCC and their potential to occur within the study area is provided in Appendix F. As noted previously, the Ohio Buckeye that was found is not considered an SCC as the species found to be a cultivar and its habitat is not considered SWH.

TABLE 6 Significant Wildlife Habitat Assessment Summary

Category	Wildlife Habitat Feature	Confirmed/Candidate
Seasonal Concentration Areas of Animals	Bat Maternity Colonies	Candidate - FOD communities are present adjacent to Etobicoke Creek and Applewood Creek.
	Migratory Butterfly Stopover Area	Candidate - A cultural meadow is located between the forested riparian area surrounding Etobicoke Creek and Applewood Creek. This area is located within 1 km of Lake Ontario.
	Landbird Migratory Stopover Area	Candidate - There are forested areas surrounding both Etobicoke Creek and Applewood Creek that are contiguous with forested areas outside of the study area make them greater than 5 ha in size. Both of these areas are within 5 km of Lake Ontario.
Rare Vegetation Communities and Specialized Habitat for Wildlife	Bald Eagle and Osprey Nesting/Foraging/Perching	Candidate - Woodland communities are directly adjacent to river riparian areas.
Habitat for Species of Conservation Concern	Special Concern and Rare Plant and Wildlife Species	Candidate - Monarch, Eastern Wood-pewee, Eastern Ribbonsnake, Northern Map Turtle, and Snapping Turtle.
Animal Movement Corridors	Amphibian Movement Corridor	Candidate - Ecosites associated with water (i.e., SWD, MAM, etc.) are present but significant breeding habitat is unconfirmed at this time.

4.4 Aquatic Resources

4.4.1 Aquatic Habitat

4.4.1.1 Etobicoke Creek

The section of Etobicoke Creek that crosses Lakeshore Road flows as a defined watercourse within a narrow natural corridor through a highly urbanized environment. Both banks contain a narrow band of cultural woodland and thicket. Within the study area, the channel is considered an open aquatic habitat with some areas of meadow marsh/thicket inclusions along the periphery. At the bridge both banks are lined with concrete, with a pedestrian underpass on the east side. The pedestrian path located on the east

bank is paved and continues along the bank until the river mouth reaches Lake Ontario. The channel is sparsely shaded by overhead deciduous trees and overhanging shrubs in the understory along the banks. Channel morphology within the study area of Etobicoke Creek consisted of a combination of pools and riffles which are narrower under the Lakeshore Road bridge. On average the watercourse is 24 m wide. Riffles had a mean depth of 0.18 m with an average wetted width of 17 m. Pools had a mean depth of 1 m with an average wetted width of 30 m. The substrates consisted of 80% cobble and shale, and 20% sand and gravel for both the riffles and pools. A shale channel bar that is under the west section of the bridge, vegetated with trees and long grasses, shows evidence of water flow during high flow seasons. Riparian vegetation within the study area consisted primarily of deciduous trees and shrubs within the cultural thicket and woodland along both banks. The ground cover consists of grasses and herbaceous plants for ground cover. No emergent instream vegetation was observed within the channel, however there were areas of filamentous algae on the substrate. Habitat within the study area was limited and included cover provided by large cobbles and shale. Overhanging trees and shrubs provide minimal shade offering additional habitat.

4.4.1.2 *Applewood Creek*

The section of Applewood Creek that crosses Lakeshore Road East flows as a defined watercourse within a very narrow natural corridor through a highly urbanized environment. The Lakeview Golf Course surrounds the creek upstream of the study site. Both banks contain a very narrow band of vegetation consisting of forest, thicket, and meadow communities. Within the study area, the channel is considered an open aquatic habitat with the areas closest to the culvert acting as a meadow marsh. At the culvert there is a flood control culvert along with channel hardening using large armour stones on both sides of Lakeshore Road East. The channel is partly shaded by overhead deciduous trees and overhanging shrubs in the understory along the banks. Channel morphology within the study area of Applewood Creek consisted of a combination of pools and riffles along with a drop off point and cascade 50 m upstream of Lakeshore Road. On average the watercourse is 4 m wide. Riffles had a mean depth of 0.15 m with an average wetted width of 1.5 m. Pools had a mean depth of 0.43 m with an average wetted width of 4.5 m. The substrates consisted of 90% cobble and 10% gravel for both the riffles and pools. Downstream of Lakeshore Road East there is a large pool with a mud bottom measuring an average of 1.0 m in depth which becomes steep vegetated banks a few meters downstream from the road. Upstream has boulders lining the channel. Riparian vegetation within the study area consisted primarily of deciduous trees and shrubs (Oak and Maple dominant). The banks consisted of trees on the west bank while the east bank was mostly forbs and grasses. No instream vegetation was observed within the channel; however, filamentous algae was present. Habitat within the study area was limited and included cover provided by large cobbles. Overhanging trees and shrubs provide shade offering additional habitat.

4.4.1.3 *Serson Creek*

The section of Serson Creek that crosses Lakeshore Road East flows as a defined watercourse within a highly urbanized environment with a hydro corridor on the west bank consisting primarily of a grassy lawn

(CUM1) and a very narrow strip of vegetation on the east bank. Both banks contain a narrow band of vegetation consisting of trees and shrubs with forbes and grasses as an understory. Within the study area, the channel is considered an open aquatic habitat with meadow marsh qualities both upstream and downstream of Lakeshore Road. Near the culvert, on both sides of Lakeshore Road, the banks are steep and covered in vegetation. The channel is partly shaded by overhead deciduous trees and overhanging shrubs along the banks.

Channel morphology within the study area of Serson Creek consisted of a combination of pools and riffles. On average the watercourse is 2.5 m wide and 0.24 m deep upstream and 0.5 m deep downstream. Riffles had a mean depth of 0.18 m with an average wetted width of 2 m. Pools had a mean depth of 1.0 m with an average wetted width of 2.5 m. Upstream of Lakeshore Road the substrates consisted of muck and has very little visual flow. Downstream of Lakeshore Road the substrate consisted of cobbles where the visible flow increases to a trickle.

Riparian vegetation within the study area consisted of deciduous trees and shrubs along both banks with grasses and herbaceous plants for ground cover. Instream vegetation consisting of cattails was observed within the channel as well as on the banks.

Habitat within the study area was limited and included cover provided by large cobbles and cattails. Overhanging trees and shrubs provide some shade offering additional habitat further upstream and downstream of the Lakeshore Road.

4.4.2 Fish Community

4.4.2.1 Etobicoke Creek

The Etobicoke Creek is a warm water system with an average health rating of fair for fish and poor for benthic communities (TRCA 2021b). Fisheries data from TRCA includes all fish species captured between 1989 and 2019 (Table 7). The fisheries data contained 43 species which included one SAR and no SCC. Except for the one SAR species, the fish species within Etobicoke Creek are common and secure in Ontario (i.e., S5 and S4 ranked species).

TABLE 7 TRCA Fisheries Data for Etobicoke Creek

Common Name	Scientific Name	ESA Status	SARA Status	Most Recent Observation
Alewife	<i>Alosa pseudoharengus</i>	-	-	July 24, 2017
American Eel	<i>Anguilla rostrata</i>	END	-	July 23, 2015
Blacknose Dace	<i>Rhinichthys atratulus</i>	-	-	September 18, 2019
Blacknose Shiner	<i>Notropis heterolepis</i>	-	-	August 6, 2013
Bluntnose Minnow	<i>Pimephales notatus</i>	-	-	September 18, 2019
Brook Stickleback	<i>Culaea inconstans</i>	-	-	September 18, 2019
Brown Bullhead	<i>Ameiurus nebulosus</i>	-	-	September 15, 2016
Brown Trout	<i>Salmo trutta</i>	-	-	October 2, 2012

Common Name	Scientific Name	ESA Status	SARA Status	Most Recent Observation
Central Mudminnow	<i>Umbra limi</i>	-	-	July 27, 2016
Central Stoneroller	<i>Campostoma anomalum</i>	-	-	July 11, 2018
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	-	-	October 20, 2015
Coho Salmon	<i>Oncorhynchus kisutch</i>	-	-	October 16, 1990
Common Carp	<i>Cyprinus carpio</i>	-	-	August 18, 2015
Common Shiner	<i>Luxilus cornutus</i>	-	-	September 18, 2019
Creek Chub	<i>Semotilus atromaculatus</i>	-	-	September 18, 2019
Emerald Shiner	<i>Notropis atherinoides</i>	-	-	August 10, 2016
Fantail Darter	<i>Etheostoma flabellare</i>	-	-	June 14, 2016
Fathead Minnow	<i>Pimephales promelas</i>	-	-	July 11, 2018
Freshwater Drum	<i>Aplodinotus grunniens</i>	-	-	July 14, 2014
Golden Shiner	<i>Notemigonus crysoleucas</i>	-	-	June 17, 2013
Goldfish	<i>Carassius auratus</i>	-	-	July 16, 2015
Green Sunfish	<i>Lepomis cyanellus</i>	-	-	September 18, 2019
Johnny Darter	<i>Etheostoma nigrum</i>	-	-	August 8, 2019
Largemouth Bass	<i>Micropterus salmoides</i>	-	-	September 9, 2018
Longnose Dace	<i>Rhinichthys cataractae</i>	-	-	August 26, 2019
Logperch	<i>Percina caprodes</i>	-	-	August 20, 2019
Mimic Shiner	<i>Notropis volucellus</i>	-	-	August 14, 2007
Mottled Sculpin	<i>Cottus bairdii</i>	-	-	August 18, 2008
Northern Pearl Dace	<i>Margariscus margarita</i>	-	-	August 14, 2007
Northern Redbelly Dace	<i>Chrosomus eos</i>	-	-	September 4, 2008
Pumpkinseed	<i>Lepomis gibbosus</i>	-	-	September 18, 2019
Rainbow Darter	<i>Etheostoma caeruleum</i>	-	-	August 20, 2019
Rainbow Smelt	<i>Osmerus mordax</i>	-	-	September 26, 1989
Rainbow Trout	<i>Oncorhynchus mykiss</i>	-	-	November 1, 2007
Rock Bass	<i>Ambloplites rupestris</i>	-	-	August 9, 2019
Rosyface Shiner	<i>Notropis rubellus</i>	-	-	August 26, 2019
Round Goby	<i>Neogobius melanostomus</i>	-	-	September 18, 2019
Smallmouth Bass	<i>Micropterus dolomieu</i>	-	-	July 24, 2017
Spottail Shiner	<i>Notropis hudsonius</i>	-	-	October 8, 2013
Trout-perch	<i>Percopsis omiscomaycus</i>	-	-	July 25, 2007
White Bass	<i>Morone chrysops</i>	-	-	October 13, 2016
White Perch	<i>Morone americana</i>	-	-	July 20, 1992
White Sucker	<i>Catostomus commersonii</i>	-	-	August 26, 2019
Yellow Perch	<i>Perca flavescens</i>	-	-	August 9, 2019

ESA - Endangered Species Act

SARA - Species at Risk Act

END- endangered

4.4.2.2 Applewood Creek

Applewood Creek is a warm water system which contains a pollution tolerant mix of cyprinid species. Fisheries data collected by the CVC between 2001 and 2018 indicated the presence of five species within

Applewood Creek (Table 8). No SAR or SCC were identified. The fish species within Applewood Creek are common and secure in Ontario (i.e., S5 and S4 ranked species).

TABLE 8 Credit Valley Conservation Fisheries Data for Applewood Creek

Common Name	Scientific Name	ESA Status	SARA Status	Most Recent Observation
Creek Chub	<i>Semotilus atromaculatus</i>	-	-	June 7, 2011
Lake Chub	<i>Couesius plumbeus</i>	-	-	June 7, 2011
Longnose Dace	<i>Rhinichthys cataractae</i>	-	-	June 7, 2011
Western Blacknose Dace	<i>Rhinichthys obtusus</i>	-	-	June 7, 2011
White Sucker	<i>Catostomus commersonii</i>	-	-	May 2, 2018

ESA - *Endangered Species Act*

SARA - *Species at Risk Act*

4.4.2.3 Serson Creek

Serson Creek is a warmwater system. Fish surveys completed by CVC in 2011 and 2021 did not yield any fish species. It is anticipated that recent restoration works downstream have improved the connection and enhanced fish passage between Serson Creek and Lake Ontario. As such, it is assumed that fish are present within Serson Creek.

5 SIGNIFICANT NATURAL HERITAGE FEATURES AND FUNCTIONS

Significant natural heritage features and functions include those listed in the Provincial Policy Statement (MMAH 2020), the NHRM (MNR 2010), the SWHTG (MNR 2000) and the Ecoregion 7E Schedules (MNR 2015). Reference was also obtained from the natural heritage system from the City’s Official Plan (City of Mississauga 2021). The findings of the site investigations were cross-referenced with the criteria provided in these documents in order to identify the presence of or potential presence of significant natural heritage features.

The following significant features were not present within the study area:

- ANSIs
- Environmentally Significant Areas
- PSWs
- Special Management Areas

Significant features that are present within the study area are discussed further in Sections 5.1 to 5.6.

5.1 Significant Valleylands and Corridors

Valleylands are linear natural areas that occur in a valley or other landform depressions that have water flowing through or standing for some period of the year (MNR 2010). These areas are important corridors

which provide unique features and functions to an area as well as linkages between terrestrial and aquatic habitats.

The following watercourses and associated valleylands are a part of the City's "Significant Natural Areas" (City of Mississauga 2021):

- Etobicoke Creek (north of Lakeshore Road)
- Applewood Creek (south of Lakeshore Road)

Following the guidance and definition of significant valleylands from MNR (2010), Serson Creek is also considered a significant valleyland. As a result, the valleylands associated with Etobicoke, Applewood, and Serson Creeks would be considered significant.

5.2 Unevaluated Wetlands

The NHIC database has identified unevaluated wetlands directly upstream and downstream of Etobicoke Creek. However, during field investigations for the study area, these wetlands were not observed. Currently no works are anticipated within Etobicoke Creek and therefore this feature will not be discussed further.

5.3 Significant Woodlands

Section 6.3.12 of the City's Official Plan (City of Mississauga 2021) states the criteria needed to meet the significant woodlands designation within the City of Mississauga. It includes:

- *woodlands, excluding cultural savannahs, greater than or equal to four hectares*
- *woodlands, excluding cultural woodlands and cultural savannahs, greater than or equal to two hectares and less than four hectares*
- *any woodland greater than 0.5 hectares that supports old growth trees, supports a significant linkage function, is located within 100 m of another Significant Natural Area, is located within 30 m of a watercourse or significant wetland, or supports significant species or communities.*

Based on this definition there are two significant woodlands within the study area. The forested area surrounding both Etobicoke Creek and Applewood Creek are greater than 0.5 ha and are within 30 m of a watercourse.

5.4 Significant Wildlife Habitat

The MNDMNR's guidance on identifying and assessing wildlife habitat recognizes five main categories of wildlife habitat, each with several wildlife habitat types, each with criteria to evaluate significance. SWH was evaluated in Section 4.3.4 based on field observations and background data.

The results of the assessment indicated the potential for candidate SWH and included the following:

- **Bat Maternity Colonies:** there are FOD communities within the study area that are located adjacent to water that allow for areas of feeding. In addition, both Oak (*Quercus*) and Maple (*Acer*) species were recorded in these areas which are preferred by SAR bats.
- **Migratory Butterfly Stopover Area:** a cultural meadow is located between the forested riparian area surrounding Etobicoke Creek and Applewood Creek. This area is located within 1 km of Lake Ontario.
- **Landbird Migratory Stopover Area:** there are forested areas surrounding both Etobicoke Creek and Applewood Creek that are contiguous with areas outside of the study area making them greater than 5 ha in size. Both of these areas are within 5 km of Lake Ontario.
- **Bald Eagle and Osprey Nesting/Foraging/Perching:** there is forested area surrounding all watercourses within the study area.
- **Rare Wildlife Species:** candidate habitat for the following SCC species within the study area: Monarch, Eastern Wood-pewee, Eastern Ribbonsnake, Northern Map Turtle, and Snapping Turtle.
- **Amphibian Movement Corridors:** Etobicoke Creek and Applewood Creek corridors act as north-south linkages associated with water and may act as movement corridors for amphibian species.

5.5 Fish and Fish Habitat

As presented in Section 4.4, the study area does contain fish as well as permanent fish habitat within Etobicoke Creek, Applewood Creek, and Serson Creek.

Fish and fish habitat are regulated by Fisheries and Oceans Canada (DFO) under the *Fisheries Act*. The *Fisheries Act* requires that projects avoid causing the death of a fish or a harmful alteration, disruption or destruction (HADD) of fish habitat unless authorized by the Minister or a designated representative (Government of Canada 2019). The determination of death of fish or HADD is typically done through a self-assessment process.

5.6 Linkages and Corridors

Linkages and corridors are important features within a natural system. These features are continuous, often linear bands of vegetation in the landscape which provide opportunities to connect natural areas and provide cover for wildlife movement and dispersal of otherwise isolated populations.

As per the City's Official Plan (City of Mississauga 2021), Etobicoke Creek and Applewood Creek are considered linkages under their "Significant Natural Area" designation. These linkages represent a

significant linkage for both terrestrial and aquatic organisms. The wooded riparian area along the edge of the creeks provides a linkage to other natural areas within the system.

5.7 Species at Risk

A total of 28 SAR was identified as potentially occurring within the study area based on background review and site investigations. To identify the likelihood of species occurrences within the study area, each species was assessed based on the habitat criteria of that species and the availability of habitat (Appendix F). The results of the assessment indicated that 20 species were unlikely to inhabit the area based on the lack of appropriate habitat. Six species were identified as potentially occurring within the study area, which include three SAR bat species: Bobolink, Eastern Meadowlark and American Eel. Two species were confirmed during surveys within the study area (Barn Swallow and Chimney Swift).

Barn Swallow (Threatened) - Confirmed

Barn Swallows were observed foraging and flying overhead within the study area. The ESA general habitat protection identifies three categories of protection which ranges from the lowest tolerance to alteration (Category 1) to the highest tolerance to alteration (Category 3). Category 1 includes the nest, Category 2 is the area within 5 m of the nest, and Category 3 is the area between 5 to 20 m of the nest. No nests were observed during the 2021 field study; therefore, this species will not be discussed further. General protections for migratory bird species are discussed in Section 7.

Chimney Swift (Threatened) - Confirmed

Chimney Swifts were observed foraging and flying overhead within the study area. The ESA general habitat protection identifies this species habitat as, human-made nesting/roosting feature, or a natural nesting/roosting tree cavity and the area within 90 m of the tree. Regular building use and building improvements that do not impair the function of the habitat are considered acceptable. The study area did not include any candidate nesting trees or chimneys; therefore, this species will not be discussed further. General protections for migratory bird species are discussed in Section 7.

Little Brown Myotis (Endangered) - Potential

Little Brown Myotis was once one of the most common bats in Ontario before White Nose Syndrome (WNS; Frick et al. 2015) and used a wide variety of places to roost. This species most frequently uses buildings for maternity roosting, but it will often use the cavities of large trees (Lacki et al. 2007). It is often found feeding over wetlands and edge habitat (Nelson and Gillam 2017) and is well accustomed to human development. During the winter, it hibernates in underground features such as caves, mines, or tunnels where the temperature and humidity are stable. The forested communities adjacent to Applewood Creek and Etobicoke Creek may provide suitable habitat, though any suitable snag trees may provide habitat for this species. Prior to construction, additional surveys should be conducted within all treed habitats and suitable lone trees where impacts are anticipated to determine if this species is utilizing potential habitat within the study area.

Northern Myotis (Endangered) - Potential

Northern Myotis was also very common before WNS, but it is more closely associated with large trees in intact forests (Broders et al. 2006). It will most often have maternity roosts in tree cavities or exfoliating bark, and very rarely in buildings. It often stays within the forest to feed, using open corridors and streams. During the winter, it hibernates in the same types of underground features as does the Little Brown Myotis. The forested communities adjacent to Applewood Creek and Etobicoke Creek may provide suitable habitat, though any suitable snag trees may provide habitat for this species. Prior to construction, additional surveys should be conducted within all treed habitats and suitable lone trees where impacts are anticipated to determine if this species is utilizing potential habitat within the study area.

Tricoloured Bat (Endangered) - Potential

Tricoloured Bat biology is very poorly understood in Ontario. From studies in other regions, it typically roosts within leaf clumps, squirrel nests or hanging moss in the foliage of trees especially near water (Poissant et al. 2015). There are also anecdotal records of it using buildings as roosts. The forested communities adjacent to Applewood and Etobicoke creeks may provide suitable habitat, though any suitable snag trees may provide habitat for this species. Prior to construction, additional surveys should be conducted within all treed habitats and suitable lone trees where impacts are anticipated to determine if this species is utilizing potential habitat within the study area.

Bobolink (Threatened)- Potential

Bobolink historically lived in North American tallgrass prairie and other open meadows. Since the clearing of native prairies in Ontario, Bobolinks have started residing in hayfields. They live in large, open expansive grasslands with dense ground cover, hayfields, meadows, or fallow fields or marshes and often build their nests on the ground in dense grasses (MECP 2021). This species was not heard or observed during the breeding bird survey in 2021; however, there is potential habitat for this species within the large CUM1 habitat between Applewood Creek and Etobicoke Creek. Species-specific surveys will be required to determine presence/absence of this species prior to anticipated direct impacts to suitable open-area habitats.

Eastern Meadowlark (Threatened) - Potential

This species nests in similar habitats to that of the Bobolink. These habitats include open, grassy meadows, farmland, pastures, hayfield, or grasslands with elevated singing perches. They are also found on cultivated land, in weedy areas, or in old orchards with nearby open grassy areas greater than 10 ha in size (MECP 2021). This species was not heard or observed during the breeding bird survey in 2021; however, there is potential habitat for this species within the large CUM1 habitat between Applewood Creek and Etobicoke Creek. Species-specific surveys will be required to determine presence/absence of this species prior to anticipated direct impacts to suitable open-area habitats.

American Eel (Endangered) - Potential

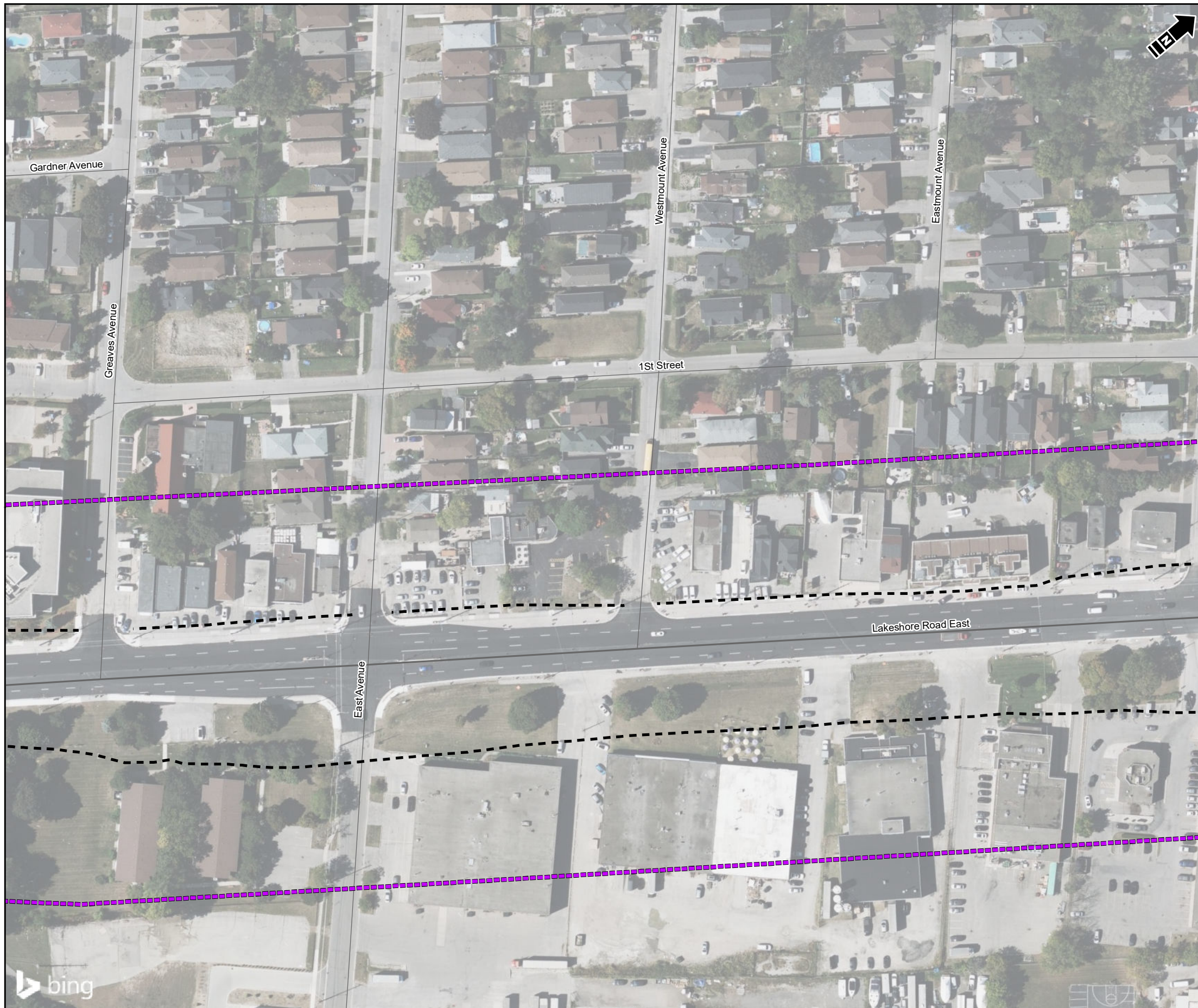
This species can be found in fresh water and saltwater areas that are accessible from the Atlantic Ocean. In Ontario, American Eels can be found as far inland as Algonquin Park before returning to the Sargasso Sea to spawn (MECP 2021). This species was captured within Etobicoke Creek in 2015, and therefore this creek system is considered potential habitat for this species.





5.8 Significant Features and Functions Summary

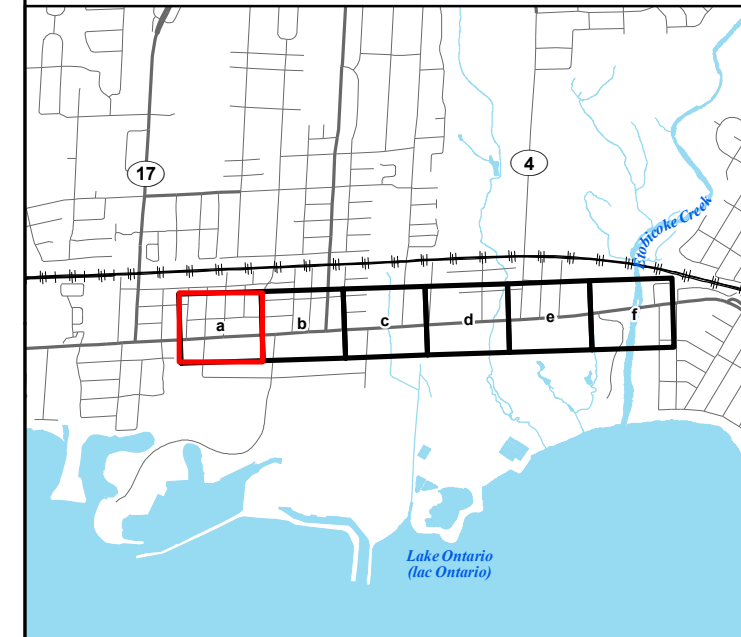
Based on the background review and site investigations to date, the potential and confirmed significant features and functions that are present within the study area are summarized below and depicted in Figure 3:

- significant woodland (confirmed) - only for forested area surrounding Etobicoke Creek and Applewood Creek
- significant valleyland (confirmed)
- fish and fish habitat (confirmed)
- candidate SWH, specifically for:
 - ✦ Bat Maternity Colonies
 - ✦ Migratory Butterfly Stopover Area
 - ✦ Landbird Migratory Stopover Area
 - ✦ Bald Eagle and Osprey Nesting/Foraging/Perching
 - ✦ Rare Wildlife Species (SCC)
 - Potential: Monarch, Eastern Wood-Pewee, Eastern Ribbon snake, Northern Map Turtle, and Snapping Turtle
 - ✦ Amphibian Movement Corridors
- SAR, specifically for:
 - ✦ potential SAR bats
 - ✦ potential Bobolink
 - ✦ potential Eastern Meadowlark
 - ✦ potential American Eel

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-  Study Area
-  Plan Prop Boundary Construction Limits
-  Highway
-  Road



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NAD 1983 UTM Zone 17N



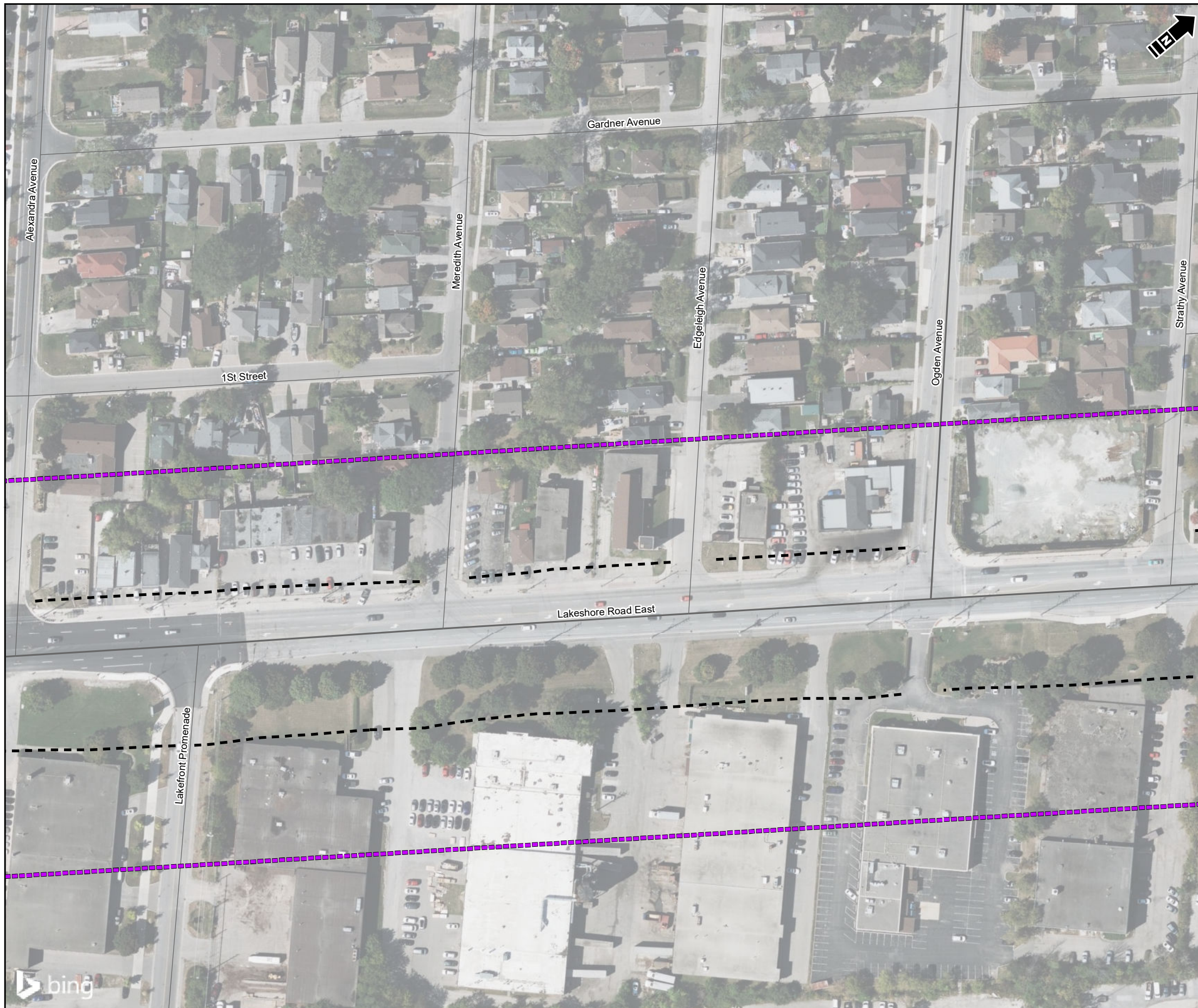
HDR Corporation
Lakeshore Bus Rapid Transit





Significant Features and Functions

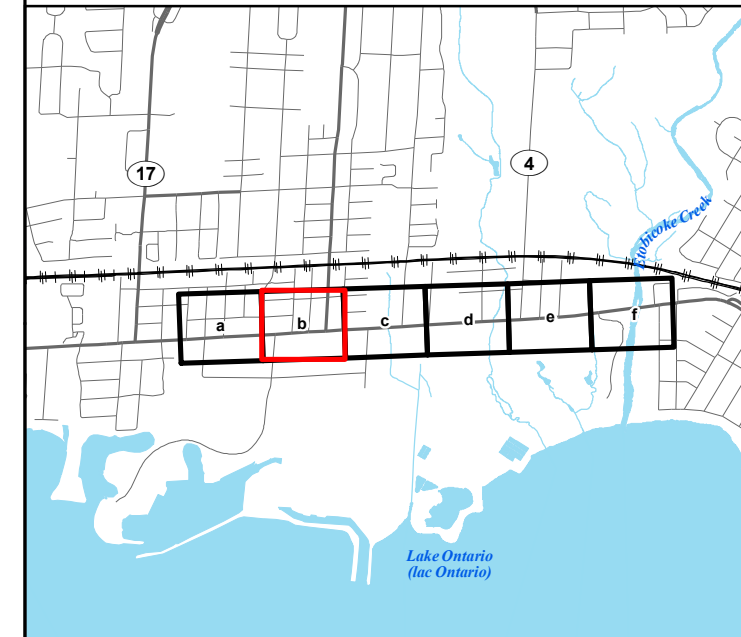
Date: April 2023 Project: 33023 Submitter: K. Reis Reviewer: R. Leppington

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-  Study Area
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-  Highway
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1:1,500 metres
15 0 15 30
NAD 1983 UTM Zone 17N



HDR Corporation
Lakeshore Bus Rapid Transit

Significant Features and Functions

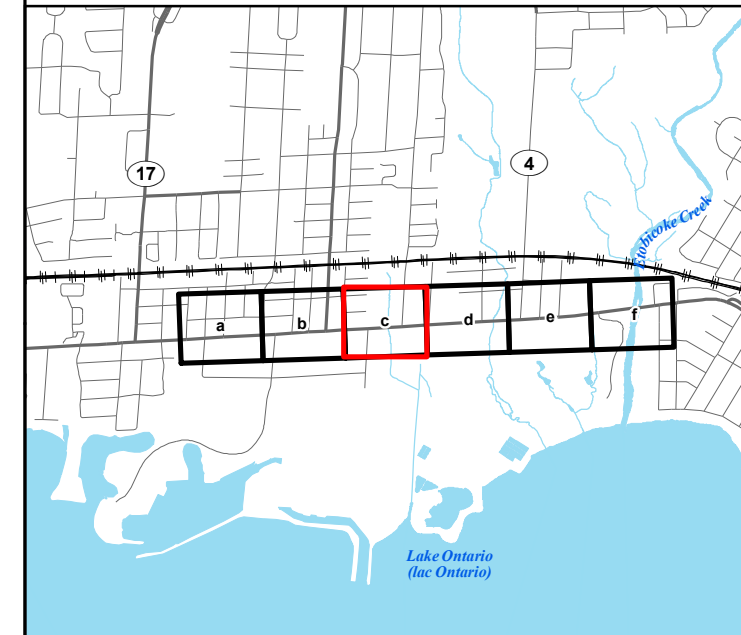
Date: April 2023 Project: 33023 Submitter: K. Reis Reviewer: R. Leppington

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- Study Area
- Credit Valley Conservation Regulation Limit
- New Culvert
- Plan Prop Boundary Construction Limits
- Watercourse
- Highway
- Road



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1:1,500 metres
15 0 15 30
NAD 1983 UTM Zone 17N



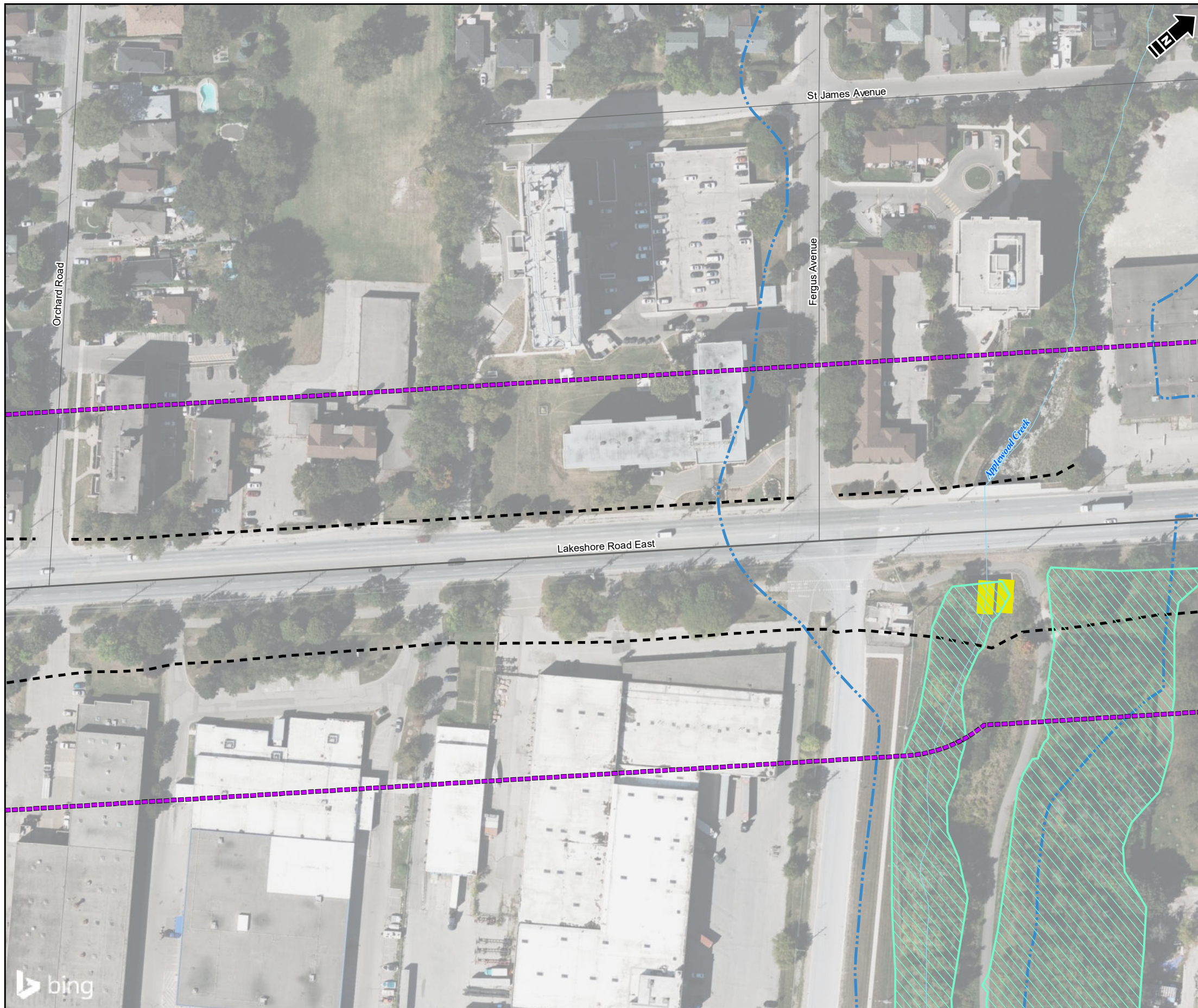
HDR Corporation
Lakeshore Bus Rapid Transit

Significant Features and Functions

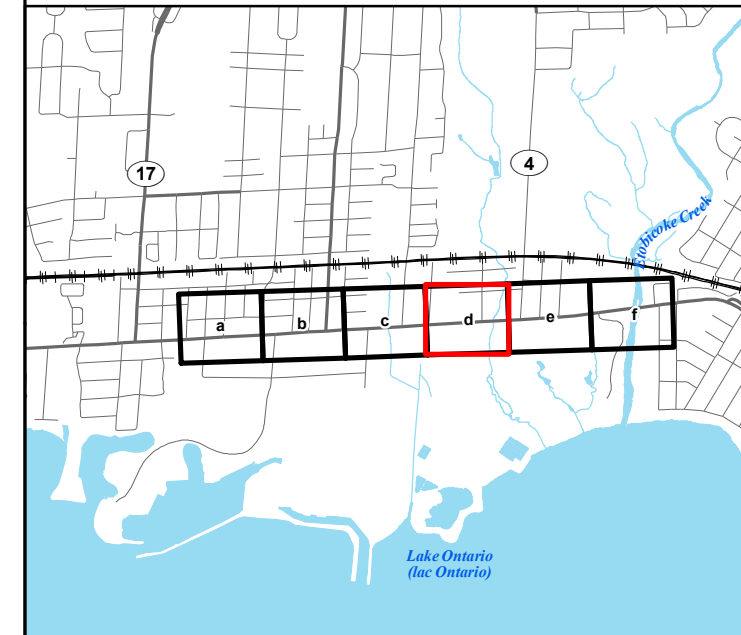
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-  Study Area
-  Significant Woodland, Potential SAR and SWH Habitat
-  Credit Valley Conservation Regulation Limit
-  Culvert Extension
-  Plan Prop Boundary Construction Limits
-  Watercourse
-  Highway
-  Road



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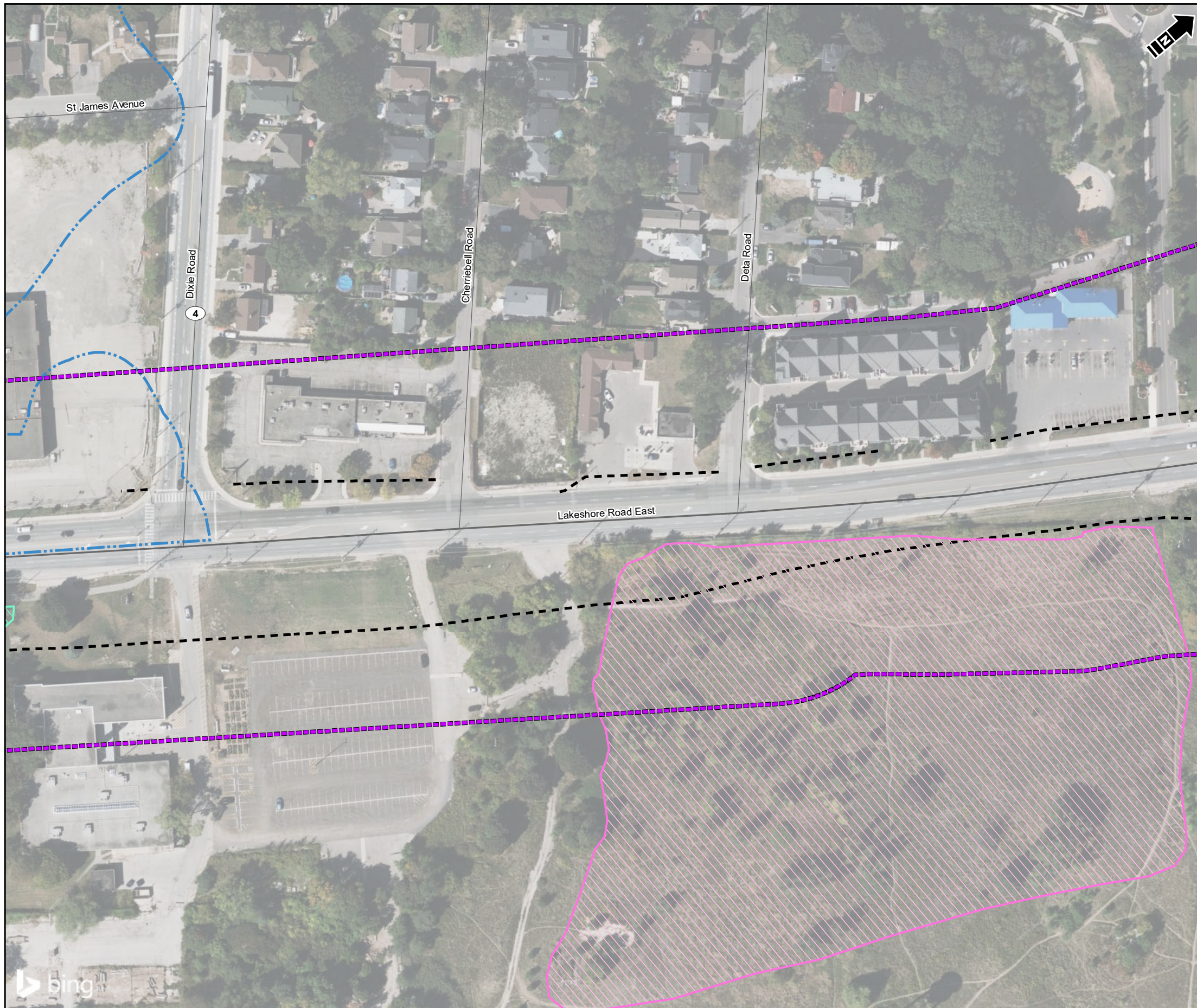
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Significant Features and Functions

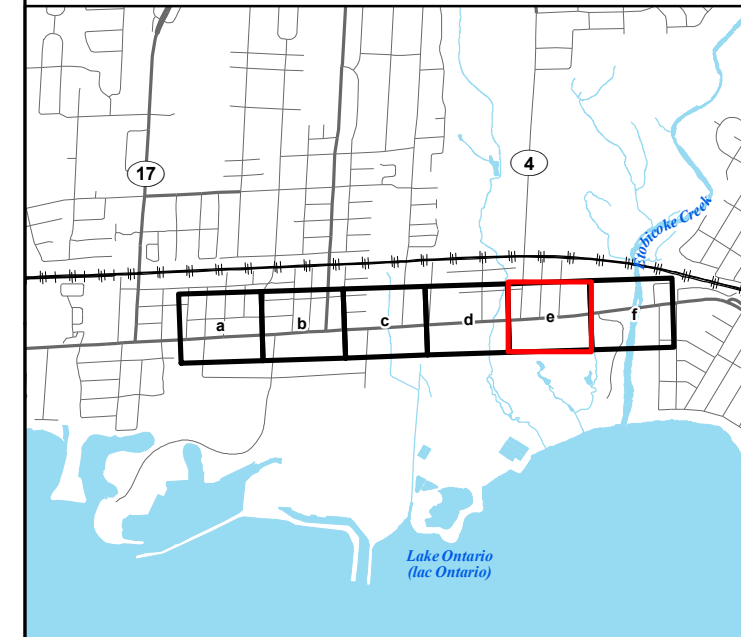
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-  Study Area
-  Potential SAR and SWH Habitat
-  Significant Woodland, Potential SAR and SWH Habitat
-  Credit Valley Conservation Regulation Limit
-  Plan Prop Boundary Construction Limits
-  Watercourse
-  Highway
-  Road



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1:1,500 metres
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NAD 1983 UTM Zone 17N



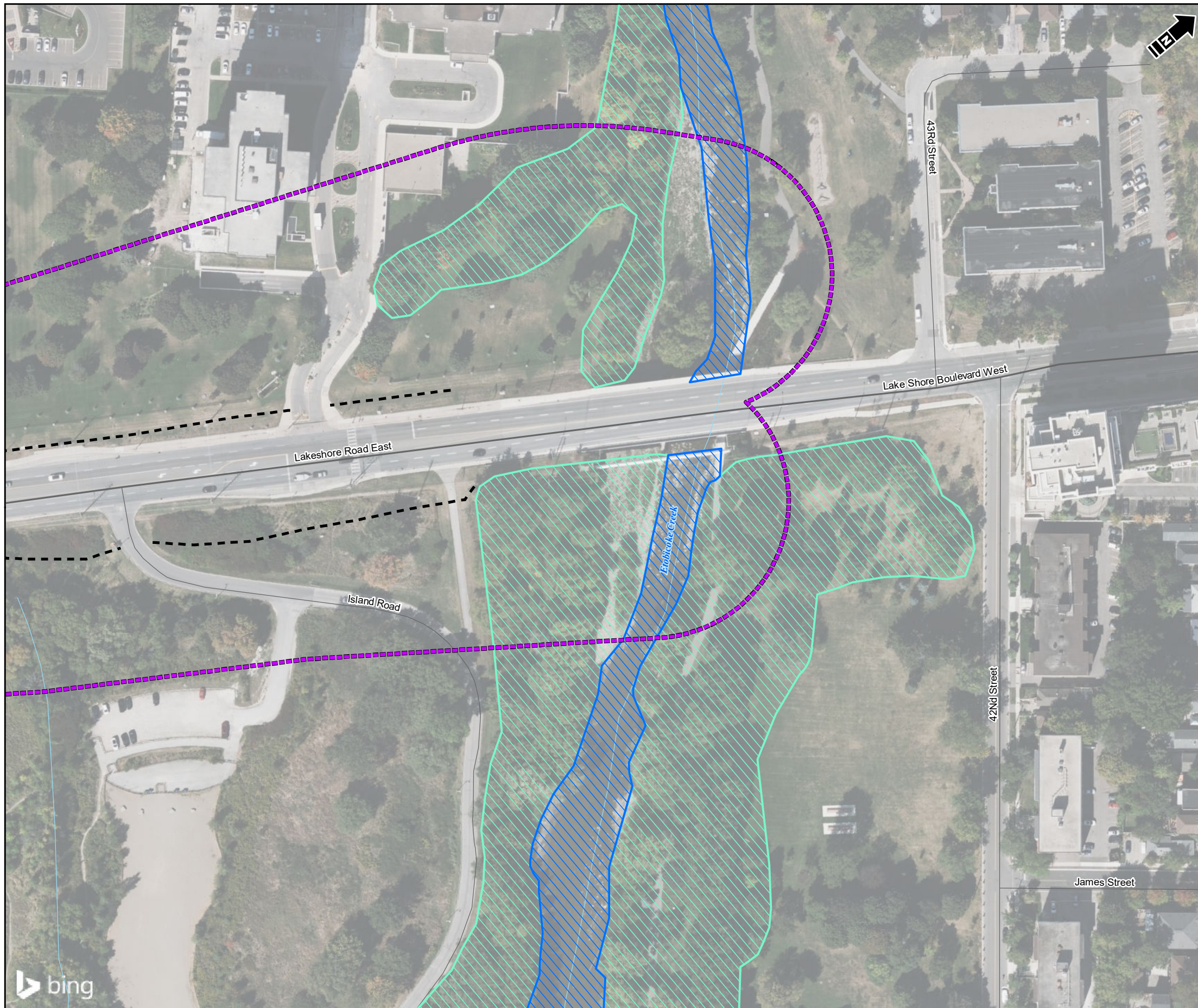
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Significant Features and Functions

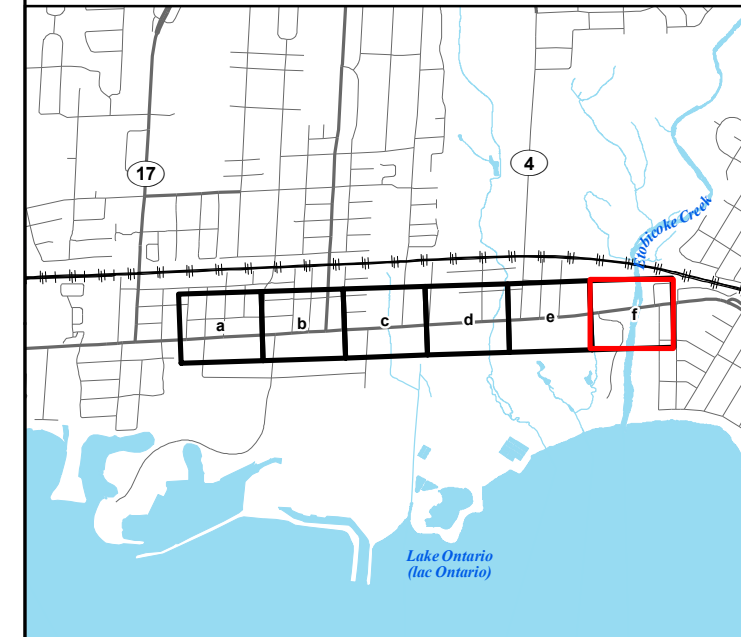
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-  Study Area
-  Potential SAR Habitat
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HDR Corporation
Lakeshore Bus Rapid Transit

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6 PROPOSED DEVELOPMENT

As part of the improvements to active transport options and connectivity, a portion of Lakeshore Road East will be widened to accommodate the Lakeshore BRT. The Lakeshore BRT is planned to extend for two kilometres along Lakeshore Road from the Etobicoke Creek to East Avenue. The design will feature:

- Separated bike lanes and generous sidewalks
- New centre-running BRT lanes
- New express bus stops in the centre of the street
- Maintain curbside local transit stops in mixed traffic
- Maintain two lanes of vehicular traffic in both directions
- Left turn lanes at signalized intersections

The City's Lakeshore Connecting Communities Master Plan Study (2019) identified a preferred conceptual design for Lakeshore Road East, including dedicated median bus lanes between East Avenue and Etobicoke Creek, the subject of this current TPAP and preliminary design study. The key components that informed the conceptual corridor design are:

- reconfiguration/reallocation of existing vehicular travel way to promote and prioritize multi-modal travel including goods movement
- provision of continuous, dedicated, and separated facilities to support pedestrians and cyclists in the form of sidewalks and one-directional cycling facilities in each boulevard
- additional amenities and facilities to support local curbside transit and express transit service
- dedicated median bus lanes and stations to support future higher order transit
- streetscaping and landscaping opportunities

The horizontal alignment for the preliminary design is generally consistent with the existing centreline of Lakeshore Road East, with the exception of a southerly alignment shift resulting in road widening from East Avenue to Deta Road, to accommodate the dedicated median bus lanes and stations while minimizing impacts to developed properties on north side of Lakeshore Road East. The horizontal alignment accommodates the required minimum roadway curvature radius of 1,700 m based on a 60 km/hour design speed. The vertical alignment is proposed to follow the existing road profile. The typical proposed cross-section for Lakeshore Road East is presented in Figure 4.

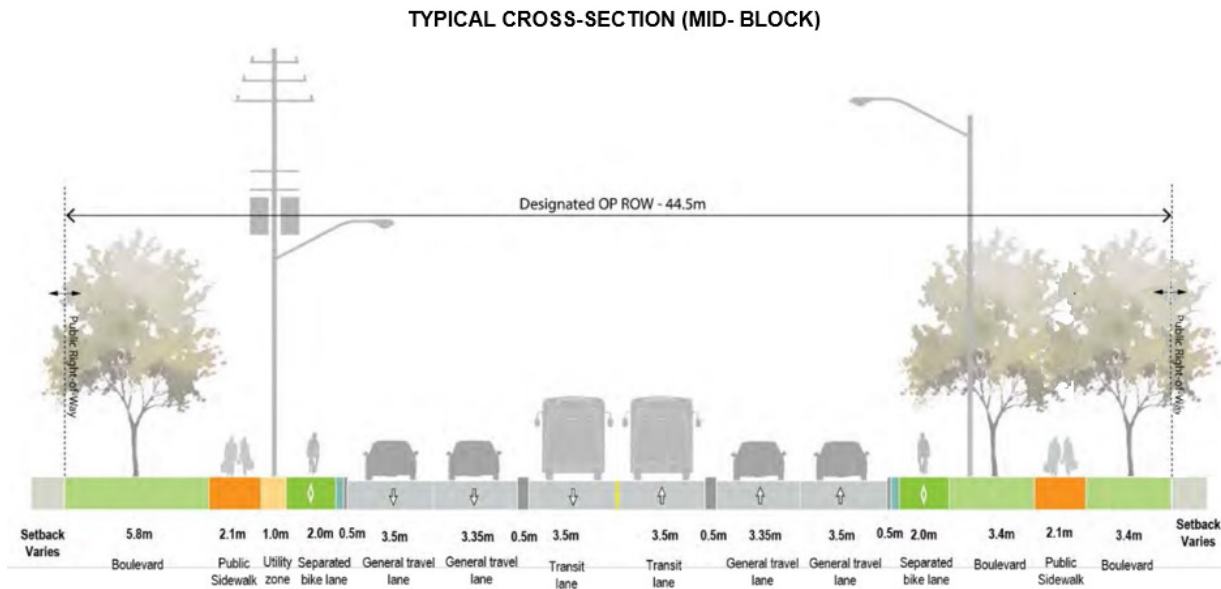


FIGURE 4 Typical Proposed Cross-section for Lakeshore Road East

The typical cross-section generally consists of the following to accommodate the median rapid way:

- four general purpose lanes, two in each direction (3.35 m inner lane width and 3.5 m outer lane width)
- two 3.5 m dedicated bus lanes, one in each direction
- 4.2 m width rapid way station platform
- 2.0 m one-directional cycling facilities, one in each direction
- 2.1 m sidewalk, one in each boulevard
- planting strips in each boulevard
- utility buffers

Roadway widening requirements at two key watercourse crossings, Serson Creek and Applewood Creek, will require alteration of the existing watercourse culverts under Lakeshore Road. The Serson Creek crossing will require a replacement of the existing culvert to prevent increases to flood hazard per discussion with the CVC. The new culvert will be a single-span open foot structure with an opening span of 11 m and a length of 47 m. The existing culvert at Applewood Creek will need to be extended an additional 12.5 m.

The corridor design incorporates sidewalks and a one-directional (westbound) off-road cycle track in the boulevard along the study corridor, from east of Dixie Road to East Avenue. On the south side, a one-way cycle track is provided from East Avenue to Hydro Road, where it transitions to a two-way cycle path to

west of Dixie Road, to provide a continuous cycling connections across the study area. The cycling facilities will be raised cycle track(s) and have a 2.0 m (one-way)/3.0 m (two-way) width along the corridor. The selection of material type and treatment for the cycling facility will be reviewed and confirmed during subsequent design stages.

The conceptual design protects for local curbside transit facilities, express bus service, and median dedicated bus lanes to support the express bus service. Local curbside transit facilities are proposed throughout the corridor from East Avenue to east of Dixie Road. Per MiWay's requirements, a 15 m clearance with concrete passenger landing pad is also incorporated in the conceptual corridor design to accommodate safe access for passengers exiting the rear doors of 40 foot and 60 foot transit vehicles. This hard surface passenger landing pad is proposed to connect to the sidewalk and no street trees and/or street furniture are permitted within the 15 m clearance.

In addition to the curbside transit stops within this segment, median transit stops are proposed as far side stops at the Lakeshore Road intersections with:

- Lakefront Promenade/Alexandra Avenue
- Haig Boulevard
- Dixie Road

Median transit stops will be accessed by passengers at signalized intersection crossings. The median transit platform design is consistent with the design proposed for the Dundas Connects Study and protects for:

- 4.2 m stop width, which accommodates a 3.2 m wide pedestrian platform with 0.5 m parapet wall/railing and 0.5 m painted buffer to adjacent traffic lane. The 4.2 m stop width will mirror the opposing left turn lane and 0.5 m buffer
- 65 m stop length, which accommodates a 5 m pedestrian ramp, 40 m stop to accommodate two articulated buses (21 m each), and 20 m mountable median for Emergency Medial Services and service vehicles.

6.1 Project Activities

The impact assessment will focus on the following activities associated with the construction to accommodate the Lakeshore BRT that will influence the natural environment:

- construction access, staging, and laydown areas
- vegetation clearing, earthworks/grubbing, and disposal
- in-water construction works (culvert replacement and /or extension, natural channel, Bedforms, bank, and bed treatments.)

The anticipated effects and mitigations of these construction works will be discussed further in Section 8.

7 EFFECTS ASSESSMENT

The results of the natural heritage assessment indicated a number of ecological features that are present within the study area:

- significant woodland (The forested area surrounding both Etobicoke Creek and Applewood Creek)
- significant valleyland (confirmed)
- fish and fish habitat (confirmed)
- candidate SWH, specifically for:
 - ✦ Bat Maternity Colonies
 - ✦ Migratory Butterfly Stopover Area
 - ✦ Landbird Migratory Stopover Area
 - ✦ Bald Eagle and Osprey Nesting/Foraging/Perching
 - ✦ Rare Wildlife Species (SCC)
 - Potential: Monarch, Eastern Wood-Pewee, Eastern Ribbon snake, Northern Map Turtle, and Snapping Turtle
 - ✦ Amphibian Movement Corridors
- SAR, specifically for:
 - ✦ potential SAR bats
 - ✦ potential Bobolink
 - ✦ potential Eastern Meadowlark
 - ✦ potential American Eel

Each of these natural features are significant, as they support flora and fauna communities, connections between aquatic and terrestrial environments and, in the case of the SAR, support species that have limited habitats elsewhere both nationally and provincially. If the preferred alternative damages or interferes with these features and their function, habitat and species loss can occur.

Both direct and indirect impacts on natural heritage features and functions can occur as a result of the preferred alternative. Impacts and residual effects on natural heritage features were assessed based on the following criteria:

- duration: long or short-term
- extent: localized or expansive
- permanent: permanent or temporary

- severity: positive or negative

Most direct impacts occur during the construction phase of a project, and contain localized, short-term, temporary, negative effects that can be reduced through avoidance and proper construction practices. After construction, there may be more long-term, indirect impacts while the site recovers, and vegetation growth takes place. Typically, after the site revegetates, there is either a neutral or positive impact due to intentional native plantings, improved sediment control, and runoff control.

Predicted potential impacts associated with the short list of alternatives are described in the sections below including recommended mitigation measures and residual impacts (after mitigation).

7.1 Potential Impacts

Construction activities associated with the Lakeshore BRT will require permanent land alternation, in-water works, and re-vegetation of the study areas.

The widening of Lakeshore Road will result in the loss of edge vegetation. The majority of vegetation lost will be street trees within commercial and residential areas with mowed grass under the trees. Within the naturalized areas, the amount of edge vegetation being removed is described in Table 9 and is based on the ELC polygons. As noted above, both Applewood and Serson Creek culverts will require an extension, this will require in-water works and will alter approximately 151 m² and 190 m² of aquatic habitat respectfully.

TABLE 9 Total Disturbance within the Natural Communities

Ecological Land Classification	Amount of Habitat Lost (m ²)	Habitat Loss (TRCA Jurisdiction)	Habitat Loss (CVC Jurisdiction)
FOD9-2	1,425	-	1425
CUM1/CUM1-1	2,052	421	1,631
CUW1	1,866	-	1,866
FOD4	121	121	-
CUT1-1	623	623	-
CUT1	700	700	-
MAM2	177	-	177

The greatest potential impacts are associated with the removal of vegetation within the significant woodlands and valleylands of Etobicoke Applewood Creek, and Serson Creek, as well as in-water works within Applewood Creek and Serson Creek. This work could include the removal of potential SAR trees or SAR bat habitat, as well as destruction to fish and fish habitat.

Table 10 illustrates the potential impacts to the natural heritage features, as well as mitigation measures which should be followed to avoid serious harm. Once the mitigation measures are implemented, the residual effects are assessed to determine their duration, extent, severity, and permanence.

TABLE 10 Impacts, Mitigations, and Net Effects of the Short List of Alternatives

Project Activity	Natural Heritage Features	Potential Impacts	Mitigation Measures	Net Effects
Construction access, staging, and laydown areas	General Wildlife and Habitat	<u>Habitat Loss and/or Alteration</u> <ul style="list-style-type: none"> soil compaction and rutting outside of construction zone damage to edge trees (i.e., outside of construction zone) fugitive dust spills (e.g., fuel) erosion and sedimentation 	Timing Windows <ul style="list-style-type: none"> 1A- 2A, 4A Best Construction Practices <ul style="list-style-type: none"> 1B-7B Prevention of Terrestrial Disturbance <ul style="list-style-type: none"> 1D-7D Erosion and Sedimentation Control <ul style="list-style-type: none"> 1F- 5F, 7F, 9F-10F 	<ul style="list-style-type: none"> It is anticipated that construction access and staging will utilize the existing paved areas to reduce impacts to the natural heritage features. Impacts associated with construction access, staging, and laydown areas are anticipated to be isolated, temporary, and will not result in long term effects.
		<u>Disturbance/Avoidance of Habitat</u> <ul style="list-style-type: none"> increase noise during construction increased human presence 	Timing Widows <ul style="list-style-type: none"> 1A- 2A, 4A Prevention of Wildlife Mortality and Disturbance <ul style="list-style-type: none"> 1C-7C 	
		<u>Injury or Incidental Take</u> (particularly during migration to and/or emergence from hibernacula, nesting sites, or during natural travel patterns to and from habitats) <ul style="list-style-type: none"> increased collision with machinery 	Timing Widows <ul style="list-style-type: none"> 1A-2A, 4A Prevention of Wildlife Mortality and Disturbance <ul style="list-style-type: none"> 1C-7C 	
Vegetation clearing, earthworks/grubbing, and disposal	Significant Woodlands Significant Valleylands Potential SWH: <ul style="list-style-type: none"> Bat Maternity Colonies Migratory Butterfly Stopover Area Potential Landbird Migratory Stopover Area Potential Bald Eagle and Osprey Nesting/Foraging/Perching Rare Wildlife Species <ul style="list-style-type: none"> Monarch Eastern Wood-Pewee Eastern Ribbonsnake Amphibian Movement Corridors Potential SAR <ul style="list-style-type: none"> SAR bats Bobolink Eastern Meadowlark 	<u>Habitat Loss and/or Alteration</u> <ul style="list-style-type: none"> permanent/temporary loss of edge habitat along the study area including potential SWH soil compaction and changes in moisture regime changes to the structure and composition of vegetation communities (e.g., introduction of invasive species) fugitive dust spills (e.g., fuel) 	Timing Windows <ul style="list-style-type: none"> 1A-2A, 4A, 5A Best Construction Practices <ul style="list-style-type: none"> 2B, 4B, 6B, 7B Prevention of Terrestrial Disturbance <ul style="list-style-type: none"> 1D-7D Erosion and Sedimentation Control <ul style="list-style-type: none"> 1F -5F, 7F, 9F-10F 	<ul style="list-style-type: none"> The vegetation clearing will result in a permanent removal of terrestrial habitats. This habitat is primarily edge habitat directly adjacent to the existing roadway. The approximate amount of vegetation being removed within the naturalized areas is included in Table 9 in Section 7. Minor encroachment into terrestrial habitats along the BRT is unlikely to have a significant impact on the quality or size of habitat for SAR species. If the prescribed mitigation measures are followed, then the compensation planting of new, native, vegetation within the area should result in no long-term impacts to the environment.
		<u>SAR</u> <ul style="list-style-type: none"> There is potential for SAR bat species within the forest stands adjacent to Etobicoke, Applewood, and Serson creeks. Vegetation and tree removal to accommodate the BRT has the potential to reduce the availability of suitable cavity trees. There is potential for Bobolink and Eastern Meadowlarks within the large CUM1 habitat between Applewood and Etobicoke creeks. Vegetation removals to accommodate the BRT has the potential to impact these species during the breeding season through avoidance of habitat or destruction of nests. 	Prevention of Terrestrial Disturbance <ul style="list-style-type: none"> 1D-4D, 6D-7D Prevention of Wildlife Mortality and Disturbance <ul style="list-style-type: none"> 5C-7C 	
		<u>Disturbance/Avoidance of Habitat</u> <ul style="list-style-type: none"> increased noise during construction increased human presence 	Timing Widows <ul style="list-style-type: none"> 1A-2A, 4A, 5A Prevention of Wildlife Mortality and Disturbance <ul style="list-style-type: none"> 1C-8C 	
		<u>Injury or Incidental Take</u> (particularly during migration to and/or emergence from hibernacula, nesting sites, or during natural travel patterns to and from habitats) <ul style="list-style-type: none"> increased collision with machinery removal of nests and eggs smothering hibernacula or nesting site 	Timing Widows <ul style="list-style-type: none"> 1A-2A, 4A, 5A Prevention of Wildlife Mortality and Disturbance <ul style="list-style-type: none"> 1C-8C 	

Project Activity	Natural Heritage Features	Potential Impacts	Mitigation Measures	Net Effects
In-water and Near- water construction works	Fish and Fish habitat Significant Valleylands Potential SWH: <ul style="list-style-type: none"> Potential Rare Wildlife Species <ul style="list-style-type: none"> Eastern Ribbon snake Northern Map Turtle Snapping Turtle Potential SAR <ul style="list-style-type: none"> American Eel 	<u>Habitat Loss and/or Alteration</u> In-water works have the potential to impact aquatic and semi-aquatic species and their habitat through the following: <ul style="list-style-type: none"> temporary and permanent loss of fish habitat which may include potential SWH fugitive dust spills (e.g., fuel) erosion and sedimentation temporary impacts to fish passage and fish habitat during construction 	Timing Windows <ul style="list-style-type: none"> 2A, 3A Best Construction Practices <ul style="list-style-type: none"> 1B-6B Prevention of Wildlife Mortality and Disturbance <ul style="list-style-type: none"> 7C Prevention of Fish Mortality and Aquatic Disturbance <ul style="list-style-type: none"> 1E-7E Erosion and Sedimentation Control <ul style="list-style-type: none"> 1F-10F 	<ul style="list-style-type: none"> In-water works are anticipated to occur within Serson and Applewood Creek for the extension of the culverts. A DFO self-assessment will be required to determine the risk for death of fish or HADD to fish habit. Where culvert extension is proposed, natural channel design principles should be employed for channel improvements to better tie-into the culvert at the upstream and downstream ends to provide added stability and enhance fish passage. Bedforms, bank, and bed treatments should be appropriately selected and designed at the detailed phase. Design should consider extending restoration beyond anticipated zone of impact to enhance channel stability or improve fish passage where appropriate. Wildlife crossing should be considered during the detailed design phase of the culvert to improve wildlife passage and linkages. If the mitigation measures are followed, there should be no long-term impacts within the aquatic system.
		<u>SAR</u> American Eel has the potential to inhibit Etobicoke Creek. Currently no in-water works are anticipated for Etobicoke Creek, and therefore this species is not anticipated to be impacted.	<ul style="list-style-type: none"> Only Applewood and Serson Creek require in-water works, and there are no SAR associated with those waterbodies. 	
		<u>Disturbance/Avoidance of Habitat</u> <ul style="list-style-type: none"> increased noise during construction increased human presence 	Timing Widows <ul style="list-style-type: none"> 2A, 3A Prevention of Fish Mortality and Aquatic Disturbance <ul style="list-style-type: none"> 1E-7E 	
		<u>Injury or Incidental Take</u> (particularly during migration to and/or emergence from hibernacula, nesting sites, or during natural travel patterns to and from habitats) <ul style="list-style-type: none"> increased collision with machinery removal of nests and eggs smothering hibernacula or nesting site incidental take of fish species while performing in water works 	Timing Widows <ul style="list-style-type: none"> 1A, 2A, 4A Prevention of Fish Mortality and Aquatic Disturbance <ul style="list-style-type: none"> 1E-7E 	

8 MITIGATION MEASURES

The following outlines mitigation recommendations for construction and operational effects to the natural heritage features within the study areas. These mitigation measures are designed to prevent or significantly reduce impacts to terrestrial habitat communities.

8.1 Timing Windows/Working in the Dry

The magnitude of effects to aquatic habitat and communities is related to the extent, timing, and duration of the project. The following mitigation measures are recommended:

- **1A:** Remove trees outside of the breeding bird window of April 10 to August 15 (Government of Canada 2021) If trees are to be removed during the breeding bird window, then an avian biologist must conduct a nesting survey before tree removals.
- **2A:** Confine the contractor to the minimum area necessary to perform the work.
- **3A:** No in-water work should occur between July 1 to March 31 to protect spawning fish.
- **4A:** Ensure candidate SAR bat snag trees are protected during construction. If snag trees can not be avoided, it is recommended that snag removal occur between October 1 and March 31, of a given year.
- **5A:** To minimize potential impacts to SAR species, any tree removal within candidate habitat areas should occur outside of the extended activity period (April 1 to September 30).

8.2 Best Construction Practices

Implementation of best construction practices during construction will reduce the potential for spills or other materials/equipment entering the water. The following measures will be employed:

- **1B:** Control all equipment maintenance and refuelling to prevent any discharge of petroleum products. Conduct vehicular maintenance and refuelling at least 30 m from the watercourse, watercourse banks, and natural heritage features.
- **2B:** Implement surface protection measures to minimize soil compaction.
- **3B:** Store construction material, excess material, construction debris, and empty containers at least 30 m from the watercourse and banks to prevent entry.
- **4B:** Enlist an environmental monitor onsite to provide advice and ensure that activities will not have any negative effects. Information for site-specific SAR should be posted in construction trailer.

- **5B:** Implement a stormwater management plan to maintain pre-construction drainage patterns and flows during all project phases.
- **6B:** Implement an emergency and response management plan to address the potential for spills.
- **7B:** Implement “Clean Equipment Protocol for Industry” (Halloran et al. 2013) to inspect and clean equipment for the purposes of invasive species prevention.

8.3 Prevention of Wildlife Mortality and Disturbance

Preventative measures during construction will reduce the potential mortality and disturbance of wildlife within the study area, and should include the following:

- **1C:** Demarcate wildlife habitat to avoid offsite disturbance and to restrict construction activities to the work areas.
- **2C:** Implement traffic limits if onsite vehicle use is required.
- **3C:** Install exclusionary fencing to prevent wildlife from entering the construction site. Exclusionary fencing should not prohibit access to nearby habitats. Where required, redirect wildlife to areas where they can avoid the potential for incidental take, and still have access to habitats. Exclusionary fencing should be monitored daily throughout construction. Exclusionary fencing is to meet or exceed guidelines as detailed by MNR (2013) in the Reptile and Amphibian Exclusion Fencing Best Practices Technical Note.
- **4C:** Inspect construction area for wildlife each morning before the commencement of construction activities. Removal of trapped wildlife should be completed by a qualified biologist.
- **5C:** Educate workers to be aware of potential wildlife occurrences and measures to take to minimized potential for injury or incidental take. Maintain a log to record and report incidents of injury and/or mortality.
- **6C:** Complete a snag survey surrounding Applewood Creek and Etobicoke Creek to identify if there are any candidate snag trees which may be utilized by bats.
- **7C:** Where culvert replacement and /or extension is recommended, potential wildlife crossing opportunities should be considered at detailed design following CVC Fish and Wildlife Crossing Guidelines (2017).
- **8C:** Ensure all prescribed survey work and subsequent permitting requirements have been met for SAR bats and area-sensitive grassland birds (Bobolink, Eastern Meadowlark) prior to any vegetation removal in natural areas.

8.4 Prevention of Terrestrial Disturbance

Preventative measures during construction will reduce the likelihood of disturbance and destruction of the terrestrial features, and should include the following:

- **1D:** Identify setbacks from natural features and trees with the installation of tree protection fencing along the disturbance limit (10 m). No construction activities are to occur outside of these fences (including overhead), nor the piling of construction materials.
- **2D:** Minimize the construction disturbance area to the extent feasible. Particular care should be taken to ensure minimal tree removal and natural habitat within significant woodland areas.
- **3D:** Retain an Arborist during detailed design to create a tree preservation plan to protect as many healthy, native trees as possible through the process.
- **4D:** Implement a dust management plan for the suppression of fugitive dust.
- **5D:** Ensure that temporarily disturbed areas are restored with native vegetation and monitored during construction and post construction based on TRCA/CVC and the cities specifications.
- **6D:** Develop a restoration plan at detailed design to prescribe when and how disturbed areas will be restored. Tree compensation ratios for restoration plans should incorporate CVC's ecological offsetting guidelines and TRCA's habitat compensation guidelines. Plantings should consist of native trees, shrubs, and seed mixes. Replace tree species at the ratios specified within the arborist report.
- **7D:** Develop an edge management plan at detailed design for the wooded terrestrial habitats which will be removed during construction.

8.5 Prevention of Fish Mortality and Aquatic Disturbance

The potential for fish mortality will be mitigated through following the DFO measures to protect fish and fish habitat (DFO 2021):

- **1E:** Preventing death of fish through the use of appropriate timing windows as indicated by mitigation measures in Section 9.1.
- **2E:** Maintain fish passage by isolating the work area.
- **3E:** Install intake screen at all pumps to prevent fish mortality.
- **4E:** Rescue any fish trapped during dewatering of the work area by a qualified biologist and release captured fish to suitable habitat within the same watercourse.

- **5E:** Limit heavy equipment (wheeled or tracked) from entering the wetted area at any time pre-, during, or post-construction.
- **6E:** Ensure proper sediment and erosion controls are in place as identified in Section 8.6.
- **7E:** Where culvert replacement and /or extension is recommended, natural channel design principles should be employed for channel improvements to better tie-into the culvert at the upstream and downstream ends to provide added stability and enhance fish passage. Consideration should be given to extending natural channel design beyond the anticipated areas of impact if it would serve to improve overall channel stability or enhance fish passage. A qualified professional in fluvial geomorphology should be consulted for design, and consultation with aquatic and terrestrial ecologists should be completed to ensure appropriate habitat improvements.

8.6 Erosion and Sediment Control

Effective erosion and sediment control (ESC) will be achieved throughout the project with careful planning and design, stringent construction supervision, monitoring of the site, and maintenance of control works throughout their operational life. ESC measures will include:

- **1F:** Develop an ESC plan to minimize the potential for erosion and construction-related sediment release into nearby natural features/water bodies and prepare ESC plan condition reports as part of the monitoring and maintenance plan.
- **2F:** Install ESC measures before ground-breaking.
- **3F:** Monitor and maintain ESC measures as per specifications.
- **4F:** Delineate storage, stockpiling, and staging areas prior to construction and inspected.
- **5F:** Install sediment control fence along the channel margins to prevent the entry of sediment into the watercourse.
- **6F:** Dewatering plans should follow the Ontario Provincial Standard Specification (OPSS 517). This will include install intake screens on all pumps during dewatering, and have discharge directed to a sediment basin, sediment bag, etc. before release to the watercourse.
- **7F:** Avoid construction during high volume rain events or significant snow melts/thaws. Construction will resume once soils have stabilized to avoid risk of erosion, soil compaction, or the potential for sediment release into nearby natural features/watercourses.
- **8F:** Direct discharge from sediment clean out to a filter bag or taken offsite for disposal.

- **9F:** Implement construction monitoring to ensure erosion and sediment measures are in place and working effectively. ESC should be checked weekly and after major rain events (>10 mm) to ensure it is installed and functioning properly. Daily monitoring will be completed by the contractor. Any deficiencies should be repaired immediately. A construction monitoring log should be maintained to ensure any deficiencies and corrective actions are documented.
- **10F:** Remove all temporary ESCs following construction once disturbed areas have stabilized.

9 RESIDUAL IMPACTS AFTER MITIGATION

Construction activities associated with the Lakeshore BRT will require permanent land alternation, in-water works, and re-vegetation of the study areas. This will result in an isolated, temporary disturbance and loss of habitat while construction is taking place; however, the long-term impacts associated with this project are expected to create no net negative impact once the new vegetation has reached maturity, and the channel design has been completed. It is assumed that restoration efforts, including enhancements to fish habitat and passage, restoration of terrestrial and riparian habitat using native species, and subsequent monitoring and invasive species control will be sufficient to offset negative impacts resulting from disturbance and/or removal of mature habitat due to project works.

The greatest potential impacts are associated with the removal of vegetation within the significant woodlands and valleylands of Etobicoke Applewood Creek, and Serson Creek, as well as in-water works within Applewood Creek and Serson Creek. However, it was noted that edge effect within proximity to the Lakeshore Road corridor profoundly influences the edge composition of adjacent habitat. As a result, these areas are predominantly dominated by non-native and/or invasive flora (commonly European Buckthorn and Manitoba Maple).

Tree removals will result in a short-term disturbance to the area as well as permanent habitat alteration. The majority of natural vegetation being removed is existing edge habitat. It has been recommended within the mitigation measures that a tree preservation plan and replanting plan be created for those areas disturbed. This should include a replacement of trees with species approved by TRCA and/or CVC in accordance with the arborist plan as well as native seed mix. It has also been recommended that a snag survey be performed surrounding Applewood and Etobicoke creeks to identify candidate bat snag trees within the construction area. If the prescribed mitigation measures are followed, then the compensation planting of new, native, vegetation within the area is anticipated to result in higher-value wildlife habitat and promote establishment of native genetic material that will result in net-positive long-term impacts to the local and regional environment.

In-water works will include the lengthening of the Applewood and Serson Creek culverts which will result in the alteration of fish habitat within the culvert extension areas. It has been suggested that natural channel design be employed for channel improvements to better tie-into the culvert at the upstream and downstream ends to provide added stability and enhance fish passage. Consideration should be given to

extending natural channel design beyond the anticipated areas of impact if it would serve to improve overall channel stability or enhance fish passage. A qualified professional in fluvial geomorphology should be consulted for design, and consultation with aquatic and terrestrial ecologists should be completed to ensure appropriate habitat improvements. If mitigation measures are followed, there should be no long-term negative impacts to fish or fish habitat.

10 NEXT STEPS

10.1 Permitting

At the detailed design stage, permits and approvals from various agencies will need to be obtained prior to commencing works within the study area. Specifically:

- **TRCA Permit:** any works with the regulation limit (under Ontario Regulation 166/06) will require a permit through the TRCA.
- **CVC Permit:** any works with the regulation limit (under Ontario Regulation 160/06) will require a permit through the CVC.
- **City of Mississauga Tree Removal Permit:** a Tree Removal Application will need to be completed and provided to the City with an arborist report.
- **DFO Self-assessment:** The determination of risk for death of fish or HADD to fish habitat is typically done through a self-assessment process. The self assessment lists a number of criteria which identify whether or not the project may result in death of fish or HADD of fish habitat (DFO 2021). If the self assessment indicates that the project cannot avoid death of fish or HADD of fish habitat, then a formal request for review must be submitted to DFO.
- **ESA Permit:** It is recommended that an Information Gathering Form (IGF) be completed and submitted to MECP to formally assess potential impacts to SAR, including SAR bats and open-area bird species (Bobolink, Eastern Meadowlark). Depending on the outcome of the IGF and additional surveys for SAR (see Section 10.2) an Overall Benefit permit under Section 17 (2) (c) of the ESA may be required to avoid contravention of the ESA. It identifies permits for activities which may contravene the ESA. An application package for an Overall Benefit permit will require the completion of an IGF, an Avoidance Alternatives Form (AAF) and a Permit Application Form. It is recommended that MECP be consulted during detailed design, approximately one year prior to initiation of site preparation and construction activities at the site to confirm that work to obtain the necessary permits and approvals is understood, and that changes to species listings, or applicable legislation/regulations have been addressed. The extent and nature of the proposed disturbance, as depicted on detailed design drawings, must be evaluated by the MECP before a decision can be made regarding permit

requirements. Additional field work or screening may be necessary to confirm the proposed works will not have an impact on SAR.

10.2 Future Work

The impact assessment detailed within this report is based on preliminary design details. Potential impacts and recommended mitigation should be revisited at the detailed design stage of the project as designs are finalized to ensure that negative impacts are minimized or eliminated through implementation of appropriate mitigation or compensation measures.

It is recommended that the following be completed in advance of finalizing construction documents to ensure requirements under the ESA are appropriately addressed and sufficient time is available to obtain the necessary permits. At the detailed design stage, the following additional studies are recommended:

- An IGF is recommended to be submitted to MECP to formally assess potential impacts to SAR.
- A snag survey within any treed habitat where tree removal is anticipated should be completed to identify if there are any candidate snag trees which may be utilized by bats and may support SWH. Those trees identified as high-quality snag habitat should be protected where feasible.
- If impacts to candidate or confirmed SWH cannot reasonably be avoided, impact mitigation strategies specific to impacted SWH should be addressed as guided by the Significant Wildlife Habitat Mitigation Support Tool (MNR 2014).
- If impacts are anticipated to suitable habitat that may support arboreal-roosting SAR bats (Little Brown Myotis, Northern Myotis, Tricoloured Bat), species-specific surveys will be required to determine presence/absence. Suitable survey protocols and scope are to be determined through consultation with MECP. If impacts to confirmed Bobolink or Eastern Meadowlark habitat are anticipated, an Overall Benefit permit application will need to be completed in consultation with MECP to ensure no contravention of the ESA.
- If impacts are anticipated to suitable habitat that may support open-area SAR birds (Bobolink, Eastern Meadowlark), species-specific surveys will be required to determine presence/absence. Suitable survey protocols and scope are to be determined through consultation with MECP. If impacts to confirmed Bobolink or Eastern Meadowlark habitat are anticipated, an Overall Benefit permit application will need to be completed in consultation with MECP to ensure no contravention of the ESA.
- Consultation with MECP with regards to the candidate SAR bat maternity roost habitat, if present. MECP will confirm if additional bat acoustic surveys should be completed to confirm the presence or absence of potential SAR bats in an individual tree or forested area identified as potential maternity roosting habitat that will be impacted or removed. If SAR bats are present, approval for SAR bat

habitat removal from the MECP will be required. Overall benefit permitting for SAR bats may include installation of compensation measures (i.e., bat boxes) to enhance bat roosting habitat adjacent to where habitat is removed.

- Additional screening as required based on the future changes to species' listings or habitat regulations of the ESA.

11 CONCLUSION

Matrix Solutions Inc. was retained by HDR Corporation and City of Mississauga to complete an NEA as part of the Lakeshore Transportation Studies. The studies include three (3) infrastructure projects in the Lakeview, Port Credit, and Clarkson communities that build from the 2019 Lakeshore Connecting Communities Transportation Master Plan. These studies include the Lakeshore BRT Study, Lakeshore Complete Street Study, and the New Credit River AT Bridge Study.

This NEA report focused on the Lakeshore BRT study area to characterize the existing conditions through a background review and site investigation results, evaluate the significant heritage features and functions, determine what potential impacts the proposed design may have on significant features or functions, and recommend measures to avoid or mitigate the potential impacts.

Matrix combined information from the ecological field studies with relevant information from previous background studies and current field studies to identify significant features within the study areas. The results indicated a wide range of terrestrial and aquatic species and habitat features present or likely present within the study areas. In the analysis of significance and function, several natural heritage features were identified, which included significant valleylands, significant woodlands, potential SWH, fish and fish habitat, and potential SAR habitat.

The greatest potential impacts are associated with the removal of vegetation within the significant woodlands and valleylands of Etobicoke and Applewood Creek, as well as in-water works within Applewood Creek and Serson Creek. Tree removals will result in short term disturbance to the area. The majority of natural vegetation being removed is existing edge habitat. It has been recommended within the mitigation measures that a tree preservation plan and replanting plan be created for those areas disturbed. This should include a replacement of trees according to the arborist report, with appropriate native species for the area, as well as native seed mix. It has also been recommended that a snag survey be performed surrounding Applewood and Etobicoke creeks to identify candidate bat snag trees within the construction area. If the prescribed mitigation measures are followed, then the compensation planting of new, native, vegetation within the area should result in no long-term impacts to the environment.

In-water works will include the lengthening of the Serson and Applewood Creek Culverts which will result in the alteration of fish habitat within the culvert extension areas. It has been suggested that natural channel design be employed for channel improvements to better tie-into the culvert at the upstream and

downstream ends to provide added stability and enhance fish passage. A qualified professional in fluvial geomorphology should be consulted for design, and consultation with aquatic and terrestrial ecologists should be completed to ensure appropriate habitat improvements. If mitigation measures are followed, there should be no long-term negative impacts to fish or fish habitat.

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APPENDIX A
Desktop Species Results

TABLE A1 Lakeshore Bus Rapid Transit Study Species Inventory from Desktop Study

Species		Conservation Rank				Source							
Common Name	Scientific Name	Provincial (S-rank)	National (SARA)	Provincial (ESA)	Local (L-rank)	NHIC 1km Map Squares - 17PJ1625, 17PJ1626, 17PJ1627, 17PJ1726, 17PJ1727	DFO SAR Mapping (2020)	Ontario Reptile and Amphibian Atlas - 17PJ12	Atlas of the Mammals of Ontario	Ontario Breeding Bird Atlas (OBBA) - 17PJ12	Ontario Butterfly Atlas - 17PJ12	Goldier (2016) Natural Environment Constraints Assessment	MECP Information Request (2021)
AMPHIBIANS													
American Toad	<i>Bufo americanus</i>	S5			L4			x					
Eastern Red-backed Salamander	<i>Plethodon cinereus</i>	S5			L3			x					
Gray Treefrog	<i>Hyla versicolor</i>	S5			L2			x					
Green Frog	<i>Rana clamitans</i>	S5			L4			x					
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	S2	END	END	L1			x					
Northern Leopard Frog	<i>Lithobates pipiens</i>	S5			L3			x					
Red-spotted Newt	<i>Notophthalmus viridescens viridescens</i>	S5			L2			x					
Spotted Salamander	<i>Ambystoma maculatum</i>	S4			L1			x					
REPTILES													
Blanding's Turtle	<i>Emydoidea blandingii</i>	S3	THR	THR	L1	x		x				x	
Dekay's Brownsnake	<i>Storeria dekayi</i>	S5			L4			x					
Eastern Gartersnake	<i>Thamnophis sirtalis</i>	S5			L4			x					
Eastern Milksnake	<i>Lampropeltis triangulum</i>	S4	SC		L3			x				x	
Eastern Musk Turtle	<i>Sternotherus odoratus</i>	S3	SC	SC	L3							x	
Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	S4	THR	SC	L3							x	
Midland Painted Turtle	<i>Chrysemys picta marginata</i>	S4	SC		L3	x		x				x	
Northern Map Turtle	<i>Graptemys geographica</i>	S3	SC	SC	L2			x				x	
Northern Watersnake	<i>Nerodia sipedon sipedon</i>	S5			LX			x					
Red-bellied Snake	<i>Storeria occipitomaculata</i>	S5			L3			x					
Red-eared Slider	<i>Trachemys scripta</i>	SNA			L+			x					
Ring-necked Snake	<i>Diadophis punctatus</i>	S4			LX			x					
Snapping Turtle	<i>Chelydra serpentina</i>	S3	SC	SC	L3	x		x				x	
MAMMALS													
American Badger (Southwestern Ontario Population)	<i>Taxidea taxus jacksoni</i>	S1	END	END	-				x				
Beaver	<i>Castor canadensis</i>	S5			L4				x				
Big Brown Bat	<i>Eptesicus fuscus</i>	S4			L4				x				
Coyote	<i>Canis latrans</i>	S5			L4				x				
Deer Mouse	<i>Peromyscus maniculatus</i>	S5			L4				x				
Eastern Chipmunk	<i>Tamias striatus</i>	S5			L4				x				
Eastern Cottontail	<i>Sylvilagus floridanus</i>	S5			L4				x				
Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	S5			L5				x				
Eastern Small-footed <i>Myotis</i>	<i>Myotis leibii</i>	S2S3	END	END	-				x				x
Eastern Red Bat	<i>Lasiurus borealis</i>	S4			LX				x				
Ermine	<i>Mustela erminea</i>	S5			L3				x				
Hairy-tailed Mole	<i>Parascalops breweri</i>	S4			L3				x				
Hoary Bat	<i>Lasiurus cinereus</i>	S4			LX				x				
House Mouse	<i>Mus musculus</i>	SNA			L+				x				
Little Brown <i>Myotis</i>	<i>Myotis lucifugus</i>	S4	END	END	L4				x			x	x
Long-tailed weasel	<i>Mustela frenata</i>	S4			LX				x				
Masked Shrew	<i>Sorex cinereus</i>	S5			L3				x				
Meadow Jumping Mouse	<i>Zapus hudsonius</i>	S5			L3				x				
Meadow Vole	<i>Microtus pennsylvanicus</i>	S5			L4				x				
Mink	<i>Mustela vison</i>	S4			L4				x				
Muskrat	<i>Ondatra zibethicus</i>	S5			L4				x				

Species		Conservation Rank				Source							
Common Name	Scientific Name	Provincial (S-rank)	National (SARA)	Provincial (ESA)	Local (L-rank)	NHIC 1km Map Squares - 17PJ1625, 17PJ1626, 17PJ1627, 17PJ1726, 17PJ1727	DFO SAR Mapping (2020)	Ontario Reptile and Amphibian Atlas - 17PJ12	Atlas of the Mammals of Ontario	Ontario Breeding Bird Atlas (OBBA) - 17PJ12	Ontario Butterfly Atlas - 17PJ12	Goldier (2016) Natural Environment Constraints Assessment	MECP Information Request (2021)
Northern <i>Myotis</i>	<i>Myotis septentrionalis</i>	S3	END	END	-				x			x	x
Northern Short-tailed Shrew	<i>Blarina brevicauda</i>	S5			L3				x				
Norway Rat	<i>Rattus norvegicus</i>	SNA			L+				x				
Porcupine	<i>Erethizon dorsatum</i>	S5			L2				x				
Raccoon	<i>Procyon lotor</i>	S5			L5				x				
Red Fox	<i>Vulpes vulpes</i>	S5			L4				x				
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	S5			L4				x				
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	S4			-				x				
Smoky Shrew	<i>Sorex fumeus</i>	S5			L3				x				
Snowshoe Hare	<i>Lepus americanus</i>	S5			LX				x				
Southern Flying Squirrel	<i>Glaucomys volans</i>	S4			LX				x				
Star-nosed Mole	<i>Condylura cristata</i>	S5			L3				x				
Striped Skunk	<i>Mephitis mephitis</i>	S5			L5				x				
Tricolored Bat	<i>Perimyotis subflavus</i>	S3?	END	END	-				x				
Virginia Opossum	<i>Didelphis virginiana</i>	S4			L4				x				
White-footed Mouse	<i>Peromyscus leucopus</i>	S5			L4				x				
White-tailed Deer	<i>Odocoileus virginianus</i>	S5			L4				x				
Woodchuck	<i>Marmota monax</i>	S5			L5				x				
Woodland Jumping Mouse	<i>Napaeozapus insignis</i>	S5			L2				x				
BIRDS													
Alder Flycatcher	<i>Empidonax alnorum</i>	S5B			L3					x			
American Black Duck	<i>Anas rubripes</i>	S4			L3					x			
American Crow	<i>Corvus brachyrhynchos</i>	S5B			L5					x			
American Goldfinch	<i>Spinus tristis</i>	S5B			L5					x			
American Kestrel	<i>Falco sparverius</i>	S4			L4					x			
American Redstart	<i>Setophaga ruticilla</i>	S5B			L4					x			
American Robin	<i>Turdus migratorius</i>	S5B			L5					x			
American Woodcock	<i>Scolopax minor</i>	S4B			L3					x			
Baltimore Oriole	<i>Icterus galbula</i>	S4B			L5					x			
Bank Swallow	<i>Riparia riparia</i>	S4B	THR	THR	L3	x				x		x	
Barn Swallow	<i>Hirundo rustica</i>	S4B	THR	THR	L4	x				x		x	
Belted Kingfisher	<i>Megaceryle alcyon</i>	S4B			-					x			
Black-and-white Warbler	<i>Mniotilta varia</i>	S5B			L2					x			
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	S5B			L3					x			
Black-capped Chickadee	<i>Poecile atricapilla</i>	S5			L5					x			
Blue Jay	<i>Cyanocitta cristata</i>	S5			L5					x			
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	S4B			L4					x			
Blue-winged Teal	<i>Anas discors</i>	S4			L3					x			
Bobolink	<i>Dolichonyx oryzivorus</i>	S4B	THR	THR	L3	x				x		x	
Brown Creeper	<i>Certhia americana</i>	S5B			L4					x			
Brown Thrasher	<i>Toxostoma rufum</i>	S4B			L3					x			
Brown-headed Cowbird	<i>Molothrus ater</i>	S4B			L5					x			
Canada Goose	<i>Branta canadensis</i>	S5			L5					x			
Carolina Wren	<i>Thryothorus ludovicianus</i>	S4			L4					x			
Cedar Waxwing	<i>Bombycilla cedrorum</i>	S5B			L5					x			
Cerulean Warbler	<i>Setophaga cerulea</i>	S2B	END	THR	L2							x	

Species		Conservation Rank				Source							
Common Name	Scientific Name	Provincial (S-rank)	National (SARA)	Provincial (ESA)	Local (L-rank)	NHIC 1km Map Squares - 17PJ1625, 17PJ1626, 17PJ1627, 17PJ1726, 17PJ1727	DFO SAR Mapping (2020)	Ontario Reptile and Amphibian Atlas - 17PJ12	Atlas of the Mammals of Ontario	Ontario Breeding Bird Atlas (OBBA) - 17PJ12	Ontario Butterfly Atlas - 17PJ12	Goldner (2016) Natural Environment Constraints Assessment	MECP Information Request (2021)
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	S5B			L3					x			
Chimney Swift	<i>Chaetura pelagica</i>	S4B, S4N	THR	THR	L4	x				x		x	
Chipping Sparrow	<i>Spizella passerina</i>	S5B			L5					x			
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	S4B			L5					x			
Common Grackle	<i>Quiscalus quiscula</i>	S5B			L5					x			
Common Nighthawk	<i>Chordeiles minor</i>	S4B	THR	SC	L3					x		x	
Common Yellowthroat	<i>Geothlypis trichas</i>	S5B			L4					x			
Cooper's Hawk	<i>Accipiter cooperii</i>	S4			L4					x			
Downy Woodpecker	<i>Picoides pubescens</i>	S5			L5					x			
Eastern Kingbird	<i>Tyrannus tyrannus</i>	S4B			L4					x			
Eastern Meadowlark	<i>Sturnella magna</i>	S4B	THR	THR	L3	x				x		x	
Eastern Phoebe	<i>Sayornis phoebe</i>	S5B			L5					x			
Eastern Screech-Owl	<i>Megascops asio</i>	S4			L4					x			
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	S4B			L3					x			
Eastern Wood-pewee	<i>Contopus virens</i>	S4B	SC	SC	L4	x				x		x	
European Starling	<i>Sturnus vulgaris</i>	SNA			L+					x			
Field Sparrow	<i>Spizella pusilla</i>	S4B			L4					x			
Gadwall	<i>Anas strepera</i>	S4			L4					x			
Golden-crowned Kinglet	<i>Regulus satrapa</i>	S5B			L3					x			
Gray Catbird	<i>Dumetella carolinensis</i>	S4B			L4					x			
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	S4B			L4					x			
Great Horned Owl	<i>Bubo virginianus</i>	S4			L4					x			
Green Heron	<i>Butorides virescens</i>	S4B			L4					x			
Hairy Woodpecker	<i>Picoides villosus</i>	S5			L4					x			
Henslow's Sparrow	<i>Ammodramus henslowii</i>	S1B	END	END	LX	x						x	
Hooded Merganser	<i>Lophodytes cucullatus</i>	S5B			L4					x			
Horned Lark	<i>Eremophila alpestris</i>	S5B			L3					x			
House Finch	<i>Haemorhous mexicanus</i>	SNA			L+					x			
House Sparrow	<i>Passer domesticus</i>	SNA			L+					x			
House Wren	<i>Troglodytes aedon</i>	S5B			L5					x			
Indigo Bunting	<i>Passerina cyanea</i>	S4B			L4					x			
Killdeer	<i>Charadrius vociferus</i>	S5B, S5N			L4					x			
Least Bittern	<i>Ixobrychus exilis</i>	S4B	THR	THR	L2							x	
Least Flycatcher	<i>Empidonax minimus</i>	S4B			L4					x			
Louisiana Waterthrush	<i>Parkesia motacilla</i>	S2B	THR	THR	L2							x	x
Loggerhead Shrike	<i>Lanius ludovicianus</i>	S1B	-	END	L1							x	
Mallard	<i>Anas platyrhynchos</i>	S5			L5					x			
Mourning Dove	<i>Zenaidura macroura</i>	S5			L5					x			
Mourning Warbler	<i>Geothlypis philadelphia</i>	S4B			L3					x			
Mute Swan	<i>Cygnus olor</i>	SNA			L+					x			
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	S5B			L3					x			
Northern Cardinal	<i>Cardinalis cardinalis</i>	S5			L5					x			
Northern Bobwhite	<i>Colinus virginianus</i>	S1?B	END	END	L1							x	
Northern Flicker	<i>Colaptes auratus</i>	S4B			L4					x			
Northern Harrier	<i>Circus hudsonius</i>	S4B			L2					x			
Northern Mockingbird	<i>Mimus polyglottos</i>	S4			L4					x			

Species		Conservation Rank				Source							
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Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	S4B			L4					x			
Northern Waterthrush	<i>Parkesia noveboracensis</i>	S5B			L3					x			
Orchard Oriole	<i>Icterus spurius</i>	S4B			L5					x			
Peregrine Falcon	<i>Falco peregrinus</i>	S3B	SC	SC	L4	x				x		x	
Pileated Woodpecker	<i>Dryocopus pileatus</i>	S5			L3					x			
Pine Warbler	<i>Setophaga pinus</i>	S5B			L4					x			
Purple Martin	<i>Progne subis</i>	S4B			L4					x			
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	S4			L4					x			
Red-breast Nuthatch	<i>Sitta canadensis</i>	S5			L4					x			
Red-eyed Vireo	<i>Vireo olivaceus</i>	S5B			L4					x			
Red-necked Grebe	<i>Podiceps grisegena</i>	S3B, S4N			L3					x			
Red-tailed Hawk	<i>Buteo jamaicensis</i>	S5			L5					x			
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	S4			L5					x			
Ring-billed Gull	<i>Larus delawarensis</i>	S5B, S4N			L4					x			
Ring-necked Pheasant	<i>Falcpennis canadensis</i>	S5			L+					x			
Rock Dove	<i>Columba livia</i>	SNA			L+					x			
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	S4B			L4					x			
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	S5B			L4					x			
Savannah Sparrow	<i>Passerculus sandwichensis</i>	S4B			L4					x			
Scarlet Tanager	<i>Piranga olivacea</i>	S4B			L3					x			
Sharp-Shinned Hawk	<i>Accipiter striatus</i>	S5			L3					x			
Short-eared Owl	<i>Asio flammeus</i>	S4?B, S2S3N	SC	SC	LX								x
Song Sparrow	<i>Melospiza melodia</i>	S5B			L5					x			
Sora	<i>Porzana carolina</i>	S4B			L3					x			
Spotted Sandpiper	<i>Actitis macularia</i>	S5			L4					x			
Swamp Sparrow	<i>Melospiza georgiana</i>	S5B			L4					x			
Tree Swallow	<i>Tachycineta bicolor</i>	S4B			L4					x			
Tufted Titmouse	<i>Baeolophus bicolor</i>	S4			-					x			
Turkey Vulture	<i>Cathartes aura</i>	S5B			L5					x			
Veery	<i>Catharus fuscescens</i>	S4B			L2					x			
Virginia Rail	<i>Rallus limicola</i>	S4B			L3					x			
Warbling Vireo	<i>Vireo gilvus</i>	S5B			L5					x			
White-breasted Nuthatch	<i>Sitta carolinensis</i>	S5			L4					x			
White-throated Sparrow	<i>Zonotrichia albicollis</i>	S5B			L3					x			
Willow Flycatcher	<i>Empidonax traillii</i>	S5B			L4					x			
Wood Duck	<i>Aix sponsa</i>	S5			L4					x			
Wood Thrush	<i>Hylocichla mustelina</i>	S4B	THR	SC	L3	x				x		x	
Yellow Warbler	<i>Setophaga petechia</i>	S5B			L5					x			
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	S5B			L3					x			
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	S4B			L3					x			
INSECTS													
Acadian Hairstreak	<i>Satyrium acadica</i>	S4			-						x		
American Lady	<i>Vanessa virginiensis</i>	S5			-						x		
Atlantis Fritillary	<i>Speyeria atlantis</i>	S5			-						x		
Azure sp.	<i>Celastrina sp.</i>	-			-						x		
Banded Hairstreak	<i>Satyrium calanus</i>	S5			-						x		

Species		Conservation Rank				Source							
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Black Swallowtail	<i>Papilio polyxenes</i>	S5			-						x		
Cabbage White	<i>Pieris rapae</i>	SNA			-						x		
Checkered White	<i>Pontia protodice</i>	SNA			-						x		
Clouded Sulphur	<i>Colias philodice</i>	S5			-						x		
Cloudless Sulphur	<i>Phoebis sennae</i>	SNA			-						x		
Columbine Duskywing	<i>Erynnis lucilius</i>	S4			-						x		
Common Buckeye	<i>Junonia coenia</i>	SNA			-						x		
Common Ringlet	<i>Coenonympha tullia</i>	S5			-						x		
Common Wood-Nymph	<i>Cercyonis pegala</i>	S5			-						x		
Compton Tortoiseshell	<i>Nymphalis l-album</i>	S5			-						x		
Crossline Skipper	<i>Polites origenes</i>	S4			-						x		
Dun Skipper	<i>Euphyes vestris</i>	S5			-						x		
Eastern Comma	<i>Polygonia comma</i>	S5			-						x		
Eastern Tiger Swallowtail	<i>Papilio glaucus</i>	S5			-						x		
Edwards' Hairstreak	<i>Satyrium edwardsii</i>	S4			-						x		
European Skipper	<i>Thymelicus lineola</i>	SNA			-						x		
Eyed Brown	<i>Lethe eurydice</i>	S5			-						x		
Fiery Skipper	<i>Hylephila phyleus</i>	SNA			-						x		
Harvester	<i>Feniseca tarquinius</i>	S4			-						x		
Hickory Hairstreak	<i>Satyrium caryaevorus</i>	S4			-						x		
Hobomok Skipper	<i>Poanes hobomok</i>	S5			-						x		
Least Skipper	<i>Ancyloxypha numitor</i>	S5			-						x		
Little Wood-Satyr	<i>Megisto cymela</i>	S5			-						x		
Little Yellow	<i>Pyrisitia lisa</i>	SNA			-						x		
Marine Blue	<i>Leptotes marina</i>	SNA			-						x		
Meadow Fritillary	<i>Boloria bellona</i>	S5			-						x		
Monarch	<i>Danaus plexippus</i>	S2N, S4B	SC	SC	-						x	x	
Mottled Duskywing	<i>Erynnis martialis</i>	S2	END	END	-						x	x	
Mourning Cloak	<i>Nymphalis antiopa</i>	S5			-						x		
Northern Broken-Dash	<i>Wallengrenia egeremet</i>	S5			-						x		
Northern Cloudywing	<i>Thorybes pylades</i>	S5			-						x		
Northern Crescent	<i>Phyciodes cocyta</i>	S5			-						x		
Northern Pearly-Eye	<i>Lethe anhedon</i>	S5			-						x		
Orange Sulphur	<i>Colias eurytheme</i>	S5			-						x		
Painted Lady	<i>Vanessa cardui</i>	S5			-						x		
Pearl Crescent	<i>Phyciodes tharos</i>	S4			-						x		
Peck's Skipper	<i>Polites peckius</i>	S5			-						x		
Question Mark	<i>Polygonia interrogationis</i>	S5			-						x		
Red Admiral	<i>Vanessa atalanta</i>	S5			-						x		
Red-spotted Purple	<i>Limenitis arthemis astyanax</i>	S5			-						x		
Sachem	<i>Atalopedes campestris</i>	SNA			-						x		
Silver-spotted Skipper	<i>Epargyreus clarus</i>	S4			-						x		
Silvery Blue	<i>Glaucopsyche lygdamus</i>	S5			-						x		
Silvery Checkerspot	<i>Chlosyne nycteis</i>	S5			-						x		
Striped Hairstreak	<i>Satyrium liparops</i>	S5			-						x		
Unicorn Clubtail	<i>Arigomphus villosipes</i>	S3			-	x							

Species		Conservation Rank				Source							
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Viceroy	<i>Limenitis archippus</i>	S5			-						x		
White Admiral	<i>Limenitis arthemis arthemis</i>	S5			-						x		
Wild Indigo Duskywing	<i>Erynnis baptisiae</i>	S4			-						x		
FISH													
American Eel	<i>Anguilla rostrata</i>	S1?	-	END	-	x						x	
Lake Sturgeon (Great Lakes - Upper St. Lawrence River population)	<i>Acipenser fulvescens pop. 3</i>	S2	SC	END	-	x						x	
Redside Dace	<i>Clinostomus elongatus</i>	S2	END	END	-	x						x	
Shortnose Cisco	<i>Coregonus reighardi</i>	SH	END	END	-							x	
PLANTS													
American Chestnut	<i>Castanea dentata</i>	S1S2	END	END	-								x
White Wood Aster	<i>Eurybia divaricata</i>	S3	THR	THR	-							x	
Butternut	<i>Juglans cinerea</i>	S3	END	END	L3	x						x	

Definitions, Acronyms and Symbols

Species at Risk

Species of Conservation Concern

National and Provincial At Risk Status

Species at Risk Act (SARA; 2002) and Endangered Species Act (ESA; 2007)

EXP - Extirpated

END - Endangered

THR - Threatened

SC - Special Concern

NAR - Not at Risk

Provincial S-rank

Natural Heritage Information Centre (NHIC). 2021 Provincial status of plants, wildlife and vegetation communities database. <https://www.ontario.ca/page/natural-heritage-information-centre#section-3>. OMNR, Peterborough.

Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These rankings are based on the total number of extant Ontario populations and the degree to which they are potentially or actively threatened with destruction. These ranks are not legal designations. S4 and S5 species are generally uncommon to common in the province. Species ranked S1-S3 are considered to be rare in Ontario.

S1: Critically Imperiled (i.e. fewer than 5 occurrences in the nation and/or province)

S2: Imperiled (i.e. fewer than 20 occurrences in the nation and/or province)

S3: Vulnerable (i.e. 20-80 occurrences in the nation and/or province)

S4: Apparently Secure (uncommon, but not rare in the nation and/or province)

S5: Secure (common, widespread and abundant in the nation and/or province)

SNA: Not Applicable (species is not a suitable target for conservation activities)

SHB: Breeding is not confirmed in Ontario

S#S#: Range Rank (range of uncertainty about the status of the species or community)

S#?: Rank is Uncertain

S?: Not Ranked Yet

B: Breeding migrants/vagrants

N: Non-breeding migrants/vagrants

Species		Conservation Rank				Source							
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Local L-rank

Toronto and Region Conservation Authority (TRCA). 2017. Annual local occurrence and local rank update for 2017: terrestrial species and vegetation communities

- L5:** able to withstand high levels of disturbance; generally secure throughout the jurisdiction, including the urban matrix. May be of very localized concern in highly degraded areas.
- L4:** able to withstand some disturbance; generally secure in rural matrix; of concern in urban matrix.
- L3:** able to withstand minor disturbance; generally secure in natural matrix; considered to be of regional concern.
- L2:** unable to withstand disturbance; some criteria are very limiting factors; generally occur in high-quality natural areas, in natural matrix; probably rare in the TRCA jurisdiction; of concern regionally.
- L1:** unable to withstand disturbance; many criteria are limiting factors; generally occur in high-quality natural areas in natural matrix; almost certainly rare in the TRCA jurisdiction; of concern regionally.
- LX:** extirpated from our region with remote chance of rediscovery. Presumably highly sensitive.
- LH:** hybrid between two native species. Usually not scored unless highly stable and behaves like a species (e.g. *Equisetum x nelsonii*).
- L+:** exotic. Not native to TRCA jurisdiction. Includes hybrids between a native species and an exotic.
- L+?:** origin uncertain or disputed, i.e. may or may not be native.
- pL :** found in natural cover, but only as planted, not regenerating.

APPENDIX B
Site Photographs



*Matrix Solutions Inc.
June 2, 2021*

1. The Etobicoke Creek watercourse looking upstream at the Lakeshore Road East overpass.



*Matrix Solutions Inc.
June 4, 2021*

2. The shale bar on the western side of Etobicoke Creek watercourse looking upstream at the Lakeshore Road East overpass.



*Matrix Solutions Inc.
June 4, 2021*

3. A photograph of the eastern side of Etobicoke Creek watercourse looking downstream at the Lakeshore Road East overpass and the pedestrian underpass of Etobicoke Creek Trail



*Matrix Solutions Inc.
June 2, 2021*

4. The Etobicoke Creek watercourse looking downstream at the eastern bank.



*Matrix Solutions Inc.
June 2, 2021*

5. The Applewood Creek watercourse looking upstream at the Lakeshore Road East overpass.



*Matrix Solutions Inc.
June 4, 2021*

6. The Applewood Creek watercourse looking upstream on the north side of Lakeshore Road East.



*Matrix Solutions Inc.
June 2, 2021*

7. The Applewood Creek watercourse looking downstream at the northwest side of the Lakeshore Road East overpass.



*Matrix Solutions Inc.
June 4, 2021*

8. The Applewood Creek watercourse looking downstream on the south side of the Lakeshore Road East overpass.



*Matrix Solutions Inc.
June 4, 2021*

9. The Serson Creek watercourse looking at the east bank on the south side of Lakeshore Road East.



*Matrix Solutions Inc.
June 4, 2021*

10. The Serson Creek watercourse looking upstream from the north side of Lakeshore Road East.



*Matrix Solutions Inc.
June 4, 2021*

11. The Serson Creek watercourse looking downstream at the north side of Lakeshore Road East. .



*Matrix Solutions Inc.
June 2, 2021*

12. The Serson Creek watercourse looking downstream on the south side of Lakeshore Road East.

APPENDIX C
Flora Inventory Results

	ESA	SARA	L-rank	S-rank	Within Etobicoke Creek Channel (MAM2)	Upland Forest Adjacent to Etobicoke Creek (CUW1)	Cultural Thicket North of Marie Curtis Dogpark (CUT1)	Upland Thickety Adjacent to Etobicoke (CUT1)	Parkette at Start of A (Remnant Forest Pockets) (CUW1)	Etobicoke River Treed Corridor (FOD7/CUW1)	Inland Woodlot by Marie Curtis (FOD4)	Open CUM West of Etobicoke Creek (CUM1)	Shrubby Treed Near Big Open Meadow (CUW1)	Linear Woodlot Adjacent to Applewood Creek (FOD9-2)	Open Area East of Applewood (CUM1-1)	Applewood North Thicket (CUT1 - N)	Within Applewood Channel (MAM2-10)	Serson Creek Woodlot Corridor (CUW1)	Serson Creek Channel (MAM2-10)	CUM by Hydro Corridor (CUM1)	CUW/CUH by Hydro Corridor (CUW1)	
English Plantain			L+	SNA			x		x	x		x	x								x	
Field Bindweed			L+	SNA																	x	
Foxtail Barley			L+	S5?																	x	
Fowl Blue Grass			L5	S5		x															x	x
Garlic Mustard			L+	SNA		x		x	x	x	x		x	x				x				x
Giant Ragweed			L5	S5						x												
Green Foxtail			L+	SNA																	x	
Ground Ivy			L+	SNA			x		x	x				x							x	x
Hawkweed			L+	SNA																	x	
Herb Robert			L+?	S5					x	x	x											
Kentucky Blue Grass			L+	SNA								x			x						x	x
Leafy Spurge			L+	SNA																		x
Mugwort			L+	SNA		x	x						x									
Narrow-leaved Cattail			L+	SNA	x														x			
Orchard Grass			L+	SNA			x	X	x	x		x	x	x	x						x	x
Oxeye Daisy			L+	SNA	x		x								x						x	
Perforated St. John's Wort			L+	SNA							x	x			x						x	
Philadelphia Fleabane			L5	S5						x		x	x									x
Phragmites			L+	SNA	x																	
Plumeless Thistle			L+	SNA			x				x											
Poison Ivy			L5	S5										x								
Prickly Lettuce			L+	SNA																		x
Purple Loosestrife			L+	SNA						x			x									
Purslane			L+	SNA																		
Quackgrass			L+	SNA						x	x	x			x						x	x
Red Clover			L+	SNA					x			x	x		x						x	
Reed-canary Grass			L+?	S5	x	x						x	x				x	x	x		x	x
Rough Cinquefoil			L+?	SNA													x	x			x	x
Small-flower Agrimony			L5	SNA					x													
Smooth Bedstraw			L+	SNA														x				x
Smooth Brome			L+	SNA					x			x		x	x			x			x	x
Smooth Crabgrass			L+	SNA																		
Sow Thistle			L+	SNA		x			x		x	x	x		x			x			x	x
Spotted Jewelweed				S5										x					x			
Spotted Knapweed			L+	SNA									x									
Spotted Water Hemlock				S5		x																
Stickseed				S5									x									
Stinging Nettle			L+	SNA	x	x	x		x		x			x								
Stinkweed			L+	SNA																	x	
Sweet Cicily			L+	SNA														x				
Tall/Canada Goldenrod				S5	x	x	x			x	x	x		x	x							x
Tall Buttercup			L+	SNA						x												x
Tansy			L+	SNA							x										x	
Teasel			L+	SNA							x	x										
Timothy			L+	SNA			x					x			x						x	
Tufted Vetch			L+	SNA		x				x		x	x	x	x						x	x
Water Smartweed			L4	S5												x						
White Champion			L+	SNA								x										
White Clover			L+	SNA					x			x	x		x						x	
Wild Asparagus			L+	SNA		x																
Wild Red Raspberry			L5	S5										x								
White Sweet-clover			L+	SNA	x	x						x									x	
White Vervain			L5	S5																		
Wild Carrot			L+	SNA		x			x		x	x	x		x			x			x	x
Wild Mint			L5	S5	x				x	x				x					x			

	ESA	SARA	L-rank	S-rank	Within Etobicoke Creek Channel (MAM2)	Upland Forest Adjacent to Etobicoke Creek (CUW1)	Cultural Thicket North of Marie Curtis Dogpark (CUT1)	Upland Thickety Adjacent to Etobicoke (CUT1)	Parkette at Start of A (Remnant Forest Pockets) (CUW1)	Etobicoke River Treed Corridor (FOD7/CUW1)	Inland Woodlot by Marie Curtis (FOD4)	Open CUM West of Etobicoke Creek (CUM1)	Shrubby Treed Near Big Open Meadow (CUW1)	Linear Woodlot Adjacent to Applewood Creek (FOD9-2)	Open Area East of Applewood (CUM1-1)	Applewood North Thicket (CUT1 - N)	Within Applewood Channel (MAM2-10)	Serson Creek Woodlot Corridor (CUW1)	Serson Creek Channel (MAM2-10)	CUM by Hydro Corridor (CUM1)	CUW/CUH by Hydro Corridor (CUW1)
Witchgrass			L5	S5																	
Yarrow			L+	SNA								x	x								
Yellow Avens			L5	S5		x		X	x	x			x	x							
Yellow Rocket			L+	SNA																	

Definitions, Acronyms and Symbols

National and Provincial At Risk Status

Species at Risk Act (SARA; 2002) and Endangered Species Act (ESA; 2007)

EXP - Extirpated; **END** - Endangered; **THR** - Threatened; **SC** - Special Concern; **NAR** - Not at Risk

Provincial S-rank

Natural Heritage Information Centre (NHIC). 2021 Provincial status of plants, wildlife and vegetation communities database. <https://www.ontario.ca/page/natural-heritage-information-centre#section-3>. OMNR, Peterborough.

Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These rankings are based on the total number of extant Ontario populations and the degree to which they are potentially or actively threatened with destruction. These ranks are not legal designations. S4 and S5 species are generally uncommon to common in the province. Species ranked S1-S3 are considered to be rare in Ontario.

S1: Critically Imperiled (i.e. fewer than 5 occurrences in the nation and/or province)

S2: Imperiled (i.e. fewer than 20 occurrences in the nation and/or province)

S3: Vulnerable (i.e. 20-80 occurrences in the nation and/or province)

S4: Apparently Secure (uncommon, but not rare in the nation and/or province)

S5: Secure (common, widespread and abundant in the nation and/or province)

SNA: Not Applicable (species is not a suitable target for conservation activities)

SHB: Breeding is not confirmed in Ontario

S#S#: Range Rank (range of uncertainty about the status of the species or community)

S#?: Rank is Uncertain

S?: Not Ranked Yet

B: Breeding migrants/vagrants

N: Non-breeding migrants/vagrants

Local L-rank

Toronto and Region Conservation Authority (TRCA). 2017. Annual local occurrence and local rank update for 2017: terrestrial species and vegetation communities

L5: able to withstand high levels of disturbance; generally secure throughout the jurisdiction, including the urban matrix. May be of very localized concern in highly degraded areas.

L4: able to withstand some disturbance; generally secure in rural matrix; of concern in urban matrix.

L3: able to withstand minor disturbance; generally secure in natural matrix; considered to be of regional concern.

L2: unable to withstand disturbance; some criteria are very limiting factors; generally occur in high-quality natural areas, in natural matrix; probably rare in the TRCA jurisdiction; of concern regionally.

L1: unable to withstand disturbance; many criteria are limiting factors; generally occur in high-quality natural areas in natural matrix; almost certainly rare in the TRCA jurisdiction; of concern regionally.

LX: extirpated from our region with remote chance of rediscovery. Presumably highly sensitive.

LH: hybrid between two native species. Usually not scored unless highly stable and behaves like a species (e.g. *Equisetum x nelsonii*).

L+: exotic. Not native to TRCA jurisdiction. Includes hybrids between a native species and an exotic.

L+?: origin uncertain or disputed, i.e. may or may not be native.

pL : found in natural cover, but only as planted, not regenerating.

APPENDIX D
Breeding Bird Results

APPENDIX E
Species at Risk and Species of Conservation Concern
Habitat Assessment

TABLE E1 Species at Risk Assessment Table

Common Name	Scientific Name	ESA	SARA	Habitat Requirements	Observations and Likelihood of Occurrence Within Study Area
Flora (3)					
American Chestnut	<i>Castanea dentata</i>	END	END	This species prefers dryer upland deciduous forests with sandy, acidic to neutral soils ¹ .	Unlikely- habitat is found within the study area, however, this species was not identified within the tree inventory.
Butternut	<i>Juglans cinerea</i>	END	END	This species prefers moist, well-drained soil, often found along streams. Also found on well-drained gravel sites. ¹	Unlikely- suitable habitat for this species is present within the study area, however, this species was not identified during the tree inventory.
White Wood Aster	<i>Eurybia divaricata</i>	THR	THR	This species grows in open, dry to moist deciduous forests dominated by Sugar Maple and American Beech trees. Often found mixed in with other asters. It does best in well-drained soils, partial to full shade, and areas with a low-level of disturbance. It is found in a small number of sites in the Niagara region. ³	Unlikely- This species was not observed during field studies.
Insects (1)					
Mottled Duskywing	<i>Erynnis martialis</i>	END	END	Tends to live in dry habitats with sparse vegetation including open barrens, sandy patches within woodlands and alavrs. ¹	Unlikely- the study area lacks suitable habitat for this species.
Birds (13)					
Bank Swallow	<i>Riparia riparia</i>	THR	THR	Nest in burrows in natural and human made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable. ¹	Unlikely- the study area lacks suitable habitat for this species.
Barn Swallow	<i>Hirundo rustica</i>	THR	THR	Have a preference for farmlands or rural areas but are also found in open forests or in close proximity to water for feeding. They prefer buildings or other manmade structures to construct their nests on. ¹	Confirmed Foraging within the study area. No nests were observed during the field study. It is anticipated that the birds use the creek for foraging.
Bobolink	<i>Dolichonyx oryzivorus</i>	THR	THR	Bobolink historically lived in North American tallgrass prairie and other open meadows. Since the clearing of native prairies in Ontario, Bobolinks have started residing in hayfields. They live in large, open expansive grasslands with dense ground cover, hayfields, meadows, or fallow fields or marshes and often build their nests on the ground in dense grasses. ¹	Potential- study area contains a large meadow habitat between Applewood Creek and Etobicoke Creek (CUM1).
Cerulean Warbler	<i>Setophaga cerulea</i>	THR	END	During breeding seasons this species is in mature, deciduous forests with large, tall trees and an open understory. In late summer the migrate to South America. ³	Unlikely- the study area lacks suitable habitat for this species.
Chimney Swift	<i>Chaetura pelagica</i>	THR	THR	Prior to European settlement, Chimney Swift nested on cave walls and in hollow trees and cavities in old growth forests. More recently they have been found to prefer areas near urban settlement and nest or roost in chimneys and other manmade structures with a preference for areas near water. ¹	Confirmed- Species was heard flying over the study area. There are no candidate chimneys within the study area. It is anticipated that the birds use the creek for foraging.
Common Nighthawk	<i>Chordeiles minor</i>	SC	THR	Commonly found on open ground, clearings in dense forests or ploughed fields. They are also found on gravel beaches or barren areas with rocky soils, open woodlands, and flat gravel roofs. ¹	Unlikely- the study area lacks suitable habitat for this species.
Eastern Meadowlark	<i>Sturnella magna</i>	THR	THR	Prefer open, grassy meadows, farmland, pastures, hayfield or grasslands with elevated singing perches. They are also found on cultivated land, in weedy areas, or in old orchards with nearby open grassy areas greater than 10 ha in size. ¹	Potential- study area contains a large meadow habitat between Applewood Creek and Etobicoke Creek (CUM1).
Henslow's Sparrow	<i>Ammodramus henslowii</i>	END	END	Prefers extensive, dense, tall grasslands but has been found in abandoned farm fields, pastures and wet meadows. ³	Unlikely- the study area lacks suitable habitat for this species.
Least Bittern	<i>Ixobrychus exilis</i>	THR	THR	Can be found in a variety of wetland habitats with a strong preference for cattail marshes with a mix of open pools and channels. Nests are almost always built in dense stands of vegetation near open water. ³	Unlikely- the study area lacks suitable habitat for this species.
Louisiana Waterthrush	<i>Parkesia motacilla</i>	THR	THR	Species prefers steep, forested ravines with fast-flowing streams ³ .	Unlikely- habitat is not found within the study area
Loggerhead Shrike	<i>Lanius ludovicianus</i>	END	-	Lives in fields or alvars with short grass with a preference for pasture or other grasslands with scattered low trees and shrubs. Requires spiny, multi-branched shrubs but barbed wire fencing is also suitable for impaling prey. ³	Unlikely- the study area lacks suitable habitat for this species.
Northern Bobwhite	<i>Colinus virginianus</i>	END	END	Live in savannahs, grasslands, abandoned farm fields, bushy fencerows and similar sites. In severe winter conditions bobwhites may move to a small forest area. ³	Unlikely- the study area lacks suitable habitat for this species.
Wood Thrush	<i>Hylocichla mustelina</i>	SC	THR	Prefer mature deciduous and mixed (conifer/deciduous) forests with moist stands of trees, well developed undergrowth, and tall trees for singing perches. These birds prefer large forests but will also use smaller stands of trees. They build their nests in living saplings, trees or shrubs, usually Sugar Maple or American Beech. ¹	Unlikely- the study area lacks suitable habitat for this species.

Common Name	Scientific Name	ESA	SARA	Habitat Requirements	Observations and Likelihood of Occurrence Within Study Area
Mammals (5)					
American Badger	<i>Taxidea taxus jacksoni</i>	END	END	Badgers are found in a variety of habitats, such as tall grass prairie, sand barrens and farmland. These habitats provide badgers with small prey, including groundhogs, rabbits and small rodents. ³	Unlikely- habitat is not found within the study area.
Eastern Small-footed Myotis	<i>Myotis leibii</i>	END	END	In the spring and summer, eastern small-footed bats will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. These bats often change their roosting locations every day. At night, they hunt for insects to eat, including beetles, mosquitos, moths, and flies. In the winter, these bats hibernate, most often in caves and abandoned mines. ³	Unlikely- habitat is not found within the study area.
Little Brown Myotis	<i>Myotis lucifugus</i>	END	END	During the day they roost in trees and buildings. They often select attics, abandoned buildings, and barns for summer colonies where they can raise their young. Little Brown Myotis hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing. ¹	Potential- the study area contains snag tree habitat adjacent to a watercourse and is considered suitable habitat for this species.
Northern Myotis	<i>Myotis septentrionalis</i>	END	END	Live in boreal forests, choosing to roost under loose bark and in the cavities of trees. Northern Myotis hibernate from October or November to March or April, most often in caves or abandoned mines. ¹	Potential- the study area contains snag tree habitat adjacent to a watercourse and is considered suitable habitat for this species.
Tricoloured Bat	<i>Perimyotis subflavus</i>	END	END	During the summer, the Tri-colored Bat is found in a variety of forested habitats. It forms day roosts and maternity colonies in older forest and occasionally in barns or other structures. They forage over water and along streams in the forest. Tri-colored Bats eat flying insects and spiders gleaned from webs. They overwinter in caves where they typically roost by themselves rather than part of a group. ³	Potential- the study area contains snag tree habitat adjacent to a watercourse and is considered suitable habitat for this species.
Herpetofauna (2)					
Blanding's Turtle	<i>Emydoidea blandingii</i>	THR	THR	Lives in shallow water, normally in large wetlands and shallow lakes with abundant aquatic macrophytes. ¹	Unlikely- the study area lacks suitable habitat for this species
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	END	END	Adults live in moist, loose soil, under logs or in leaf litter. ³	Unlikely- habitat is not found within the study area.
Fish (4)					
American Eel	<i>Anguilla rostrata</i>	END	-	This species utilizes a wide range of habitats which include saltwater and freshwater habitats. ²	Potential- this species was recently captured within Etobicoke Creek.
Lake Sturgeon (Great Lakes population)	<i>Acipenser fulvescens</i>	END	-	Live almost exclusively in freshwater lakes and rivers with soft bottoms of mud, sand or gravel. Usually at a depth of 5 to 20 meters and spawn in shallow, fast-flowing water with gravel and boulders at the bottom. ³	Unlikely- Suitable habitat was not present and there is no recent record of this species within the study area
Redside Dace	<i>Clinostomus elongatus</i>	END	END	Prefers pools and slow-moving areas of small streams and headwaters with a gravel bottom. ¹	Unlikely- Suitable habitat was not present and there is no recent record of this species within the study area
Shortnose Cisco	<i>Coregonus reighardi</i>	END	END	It is only found in the Great Lakes of North America. ³ Although the DFO SAR mapping indicate this species is a record for the Credit River within the study area, NHIC notes it as a historical record (SH rank) as this species has not been reported in Lake Ontario since 1964 despite significant sampling efforts ⁴ .	Unlikely- Suitable habitat was not present and there is no recent record of this species within the study area

¹ Endangered Species Act (ESA)

² Species at Risk Act (SARA)

³ Species at Risk in Ontario (MECP 2020)

⁴ Fisheries and Oceans Canada (DFO 2012)

REFERENCES

Fisheries and Oceans Canada (DFO). 2012. *Recovery Strategy for the Shortnose Cisco (Coregonus reighardo) in Canada*. Species at Risk Act Recovery Strategy Series. vi + 16 pp. Ottawa, Ontario. 2012.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2020. *Species at Risk in Ontario List*. Last updated November 9, 2020. <http://www.ontario.ca/environment-and-energy/species-risk-ontario-list>

TABLE E2 Species of Conservation Concern Assessment Table

Common Name	Scientific Name	S-rank	ESA	SARA	Habitat Requirements	Observations and Likelihood of Occurrence Within Study Area
Insects (2)						
Monarch	<i>Danaus plexippus</i>	S2N, S4B	SC	SC	Most abundant where milkweed plants and breeding habitat are widespread including the north shores of Lake Ontario and Lake Erie. ³	Potential- Meadow habitat is present within the study area
Unicorn Clubtail	<i>Arigomphus villosipes</i>	S3	-	-	This species utilizes still, ponded water for breeding and foraging. ⁵	Unlikely- the study area lacks suitable habitat for this species.
Flora (1)						
Ohio Buckeye (Shademaster)	<i>Aesculus glabra</i>	S1	-	-	This species is a bottomland species usually found on moist soils on floodplains. ⁵	Confirmed- This species was observed within the study area, however, the species noted were planted and therefore not considered to have significant wildlife habitat.
Birds (4)						
Eastern Wood-pewee	<i>Contopus virens</i>	S4B	SC	SC	Most abundant in intermediate-age mature forest stands with little understory and vegetation. Lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. ³	Potential- suitable habitat is present within the study area.
Peregrine Falcon	<i>Falco peregrinus</i>	S3B	SC	SC	Usually nest on tall, steep cliff ledges close to large bodies of water but have adapted well to cities, nesting on ledges of tall buildings. ³	Unlikely- the study area lacks suitable habitat for this species.
Red-necked Grebe	<i>Podiceps grisegena</i>	S3B, S4N	-	-	Winters along seacoasts, bays, and estuaries. In migration, found on lakes, ponds, and rivers. Nests mainly on shallow, freshwater lakes (>2 ha) or shallow protected marsh areas and secluded bays of larger lakes, usually with at least some emergent vegetation and fish populations. ⁵	Unlikely- the study area lacks suitable habitat for this species.
Short-eared Owl	<i>Asio flammeus</i>	S4?B, S2S3N	-	-	Species nests in open areas such as grasslands, marshes and tundra. ³	Unlikely- habitat is not found within the study area.
Herpetofauna (4)						
Eastern Musk Turtle	<i>Sternotherus odoratus</i>	S3	SC	SC	Found in ponds, lakes, marshes, and rivers that are slow-moving with abundant emergent vegetation and muddy bottoms. Nesting habitat must be close to the water, exposed to direct sunlight in soil, decaying vegetation, rotting wood, in muskrat lodges, open ground or in rock crevices. Mostly along the southern edge of the Canadian Shield and throughout Southwestern and Eastern Ontario. ³	Unlikely- the study area lacks suitable habitat for this species.
Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	S4	SC	THR	Usually close to water especially in marshes with frogs and small fish. Hibernate in burrows or rock crevices. ³	Potential- suitable habitat is present within the study area.
Northern Map Turtle	<i>Graptemys geographica</i>	S3	SC	SC	Found in rivers and lakeshores. Will bask on emergent rocks and fallen trees. Hibernates on the bottom of deep, slow-moving rivers. Requires high quality water that support mollusc prey. ³	Potential- suitable habitat is present within the study area.
Snapping Turtle	<i>Chelydra serpentina</i>	S3	SC	SC	Prefer shallow water where they can hide under mud and leaf litter. Nesting sites are usually along stream in gravelly or sandy areas but they will use man-made structures including gravelling shoulders, dams and aggregate pits. ³	Potential- suitable habitat is present within the study area.

1 *Endangered Species Act (ESA)*

2 *Species at Risk Act (SARA)*

3 *Species at Risk in Ontario (MECP 2020)*

4 *Species at Risk Public Registry (Government of Canada 2021)*

5 *Nature Serve (Nature Serve 2021)*

REFERENCES

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2020. *Species at Risk in Ontario List*. Last updated November 9, 2020. <http://www.ontario.ca/environment-and-energy/species-risk-ontario-list>

Government of Canada. 2021. *Species at Risk Public Registry, Species List*. Modified September 26, 2021. <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/species-list.html>

NatureServe. 2021. *NatureServe Explorer*. Accessed August 2021. <https://explorer.natureserve.org/>

APPENDIX F
Significant Wildlife Habitat Assessment

TABLE F1 Significant Wildlife Habitat Evaluation

Significant Wildlife Habitat Feature	Candidate Significant Wildlife Habitat Description	Presence/Absence Within Part A Study Area
Season Concentrations of Animals		
Waterfowl Stopover and Staging Areas (Terrestrial)	Fields (CUM and CUT) with sheet water during spring	Not Present: Meadow and thicket habitats are present; however no sheet water observed during field investigations.
Waterfowl Stopover and Staging Areas (Aquatic)	Ponds, marshes, lakes, bays, coastal inlets, and watercourses with abundant food supply used during migration (includes MAS, SAS, SAM, SAF, and SWD communities).	Not Present: This habitat is not present within the study area.
Shorebird Migratory Stopover Area	Shorelines of lakes, rivers and wetlands that are seasonally flooded, muddy, and have an unvegetated shoreline (includes BBO, BBS, SDO, SDS, SDT, and MAM communities)	Not Present: This habitat is not present within the Study area.
Raptor Wintering Area	Requires a combination of upland (CUM/CUT/CUS/CUW) and forested area (FOD/FOM/FOC) with a combined area of >20 ha. Fields must be wind swept with limited snow accumulation.	Not Present: This habitat is not present within the Study Area.
Bat Hibernacula	Hibernacula can be found in caves, mine shafts, and karts (includes CCR1, CCR2, CCA1, CCA2 communities).	Not Present: This habitat is not present within the study area.
Bat Maternity Colonies	Maternity colonies are found in mature deciduous (FOD/SWD) or mixed (FOM/SWM) forest communities with >10/ha large diameter snag trees. Trees in early stage of decay (class 1-3) are preferred by female bats.	Potential: FOD communities are present within the study area.
Turtle Wintering Areas	Permanent waterbodies, large wetlands, and bogs or fens with soft substrate that are deep enough to not freeze over the winter. Wintering areas are in the same general area as their core habitat. Includes SW, MA, OA, SA, FEO and BOO communities.	Not Present: Etobicoke Creek is large enough to not freeze over the winter, however within the study area the substrate is shale and cobble.
Reptile Hibernaculum	Hibernation occurs in sites located below the frost line in burrows, rock crevices in any ecosite other than very wet ones. Additionally, conifer or shrub swamps (or depressions in bedrock terrain with sparse trees) may be used as reptile hibernaculum.	Not Present: This habitat is not present within the study area.
Colonially - Nesting Bird Breeding Habitat (Bank/Cliff)	Any site with undisturbed or naturally eroding exposed soil banks including watercourse banks, sandy hills, steep slopes, sand piles, cliff faces, bridge abutments, silos and barns found within CUM, CUT, CUS, BLO, BLS, BLT, CLO, CLS, and CLT communities.	Not Present: This habitat is not present within the study area.
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)	Nest in live or dead standing trees in wetlands, lakes, islands, and peninsulas that are 11-15 m from the ground (including SWM, SWD and FET communities).	Not Present: This habitat is not present within the study area.
Colonially - Nesting Bird Breeding Habitat (Ground)	Any rocky island or peninsula within a lake or large river.	Not Present: This habitat is not present within the study area.
Migratory Butterfly Stopover Area	Requires a combination of fields (CUM/CUT/CUS) and forested area (FOD/FOM/FOC/CUP) that is a minimum of 10 ha and is located within 5 km of Lake Erie or Lake Ontario.	Potential: The forested area surrounding Etobicoke Creek and Applewood Creek are connected by a large cultural meadow that is within 1km of Lake Ontario.

Significant Wildlife Habitat Feature	Candidate Significant Wildlife Habitat Description	Presence/Absence Within Part A Study Area
Landbird Migratory Stopover Areas	All ecosites associated with these community series; FOC, FOM, FOD, SWC, SWM, SWD that are >5 ha in size and are within 5 km of Lake Erie or Lake Ontario.	Potential: Forested areas surrounding all watercourses that are contiguous with forested areas outside of the study area are greater than 5 ha and are within 5km of Lake Ontario.
Deer Winter Congregation Areas	Woodlots (FOC/FOM/FOD/SWC/SWM/SWD) >50 ha in size. However, deer winter congregation areas considered significant are mapped by the Ministry of Natural Resources and Forestry.	Not Present: No mapped Deer Winter Congregation Areas within the study area.
Rare Vegetation Communities		
Cliff and Talus Slopes	A cliff is vertical to near vertical bedrock >3 m in height. A talus slope is rock rubble at the base of a cliff made up of coarse rocky debris. Any Ecological Land Classification (ELC) ecosite within community series TAO, TAS, TAT, CLO, CLS, and CLT.	Not Present: This habitat is not present within the study area.
Sand Barren	Areas of exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion greater than 0.5 ha in size. Usually located within other types of natural habitat such as forests or savannah.	Not Present: This habitat is not present within the study area.
Alvar	Typically, a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. Must be >0.5 ha in size.	Not Present: This habitat is not present within the study area.
Old Growth Forest	Characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of multilayered canopy. Woodland area is >0.5 ha and contains no recognizable forestry activities.	Not Present: This habitat is not present within the study area.
Savannah	A tallgrass prairie that has a tree cover between 25% to 60%. No minimum size required.	Not Present: This habitat is not present within the study area.
Tall Grass Prairie	A tallgrass prairie that has ground cover dominated by prairie grasses and has a tree cover of <25%.	Not Present: This habitat is not present within the study area.
Other Rare Vegetation Communities	Provincially Rare S1, S2, and S3 vegetation communities as listed in Appendix M of the Significant Wildlife Habitat Technical Guide.	Not Present: This habitat is not present within the study area.
Specialized Habitat for Wildlife		
Waterfowl Nesting Area	Upland habitat that is adjacent, and within 120 m, to a wetland (includes ecosites MAS, SAS, SAM, SAF, MAM, SWT, and SWD). Adjacent area should be 120 m wide, so predators have difficulty finding nests.	Not Present: This habitat is not present within the study area.
Bald Eagle and Osprey Nesting/Foraging/Perching	Nesting occurs within forested areas adjacent to lakes, ponds, rivers or wetlands. This includes FOD, FOM, FOC, SWD, SWM, and SWC directly adjacent to riparian areas.	Potential: The forested communities along Etobicoke Creek, Applewood Creek and Serson Creek are directly adjacent to riparian areas. No stick nests, bald eagles or osprey observed within the study area during surveys.
Woodland Raptor Nesting Habitat	Nesting occurs in any forested ecosite that are greater than 30 ha with greater than 4 ha of interior habitat.	Not Present: This habitat is not present within the study area.
Turtle Nesting Areas	Area of exposed mineral soil and gravel adjacent (<100 m) from water, including ecosites MAS, SAS, SAM, SAF, BOO, and FEO.	Not Present: This habitat is not present within the study area.

Significant Wildlife Habitat Feature	Candidate Significant Wildlife Habitat Description	Presence/Absence Within Part A Study Area
Seeps and Springs	Any forested area (with <25% meadow/field/pasture) within the headwaters of a watercourse. Seeps and Springs are identified as areas where ground water comes to the surface.	Not Present: This habitat is not present within the study area.
Amphibian Breeding Habitat (Woodland)	Presence of a wetland, pond, or woodland pools >500 m ² within or 120 m adjacent to a woodland (no minimum size). This includes all ecosites associated with FOD, FOM, FOC, SWC, SWM, SWD communities.	Not Present: This habitat is not present within the study area.
Amphibian Breeding Habitat (Wetland)	Wetland >500 m ² that are typically isolated from (>120 m) from woodland ecosites. Presence of shrubs and logs increase significance. This includes SW, MA, FE, BO, OA, and SA communities.	Not Present: This habitat is not present within the study area.
Woodland Area Sensitive Bird Breeding Habitat	Habitats where interior forest breeding birds are breeding. Typically occurs in large mature trees (>60 years old) in forest stands or woodlots >30 ha. Interior habitat is at least 200 m from the forest edge.	Not Present: This habitat is not present within the study area.
Habitat for Species of Conservation Concern (SCC)		
Marsh Bird Breeding Habitat	All wetland habitat (i.e., MA, SAS, SAM SAF, SW FEO, BOO communities) with shallow water and emergent aquatic vegetation is considered SWH.	Not Present: This habitat is not present within the study area.
Open Country Bird Breeding Habitat	Large grassland areas (includes natural and cultural fields and meadows) that are >30 ha. (Active farmland does not qualify).	Not Present: This habitat is not present within the study area.
Shrub/Early Successional Bird Breeding Habitat	Large field areas (i.e., CUT, CUS and CUW communities) succeeding to shrub and thicket that are >10 ha in size.	Not Present: This habitat is not present within the study area.
Terrestrial Crayfish	Wet meadows and edges of shallow marshes, includes MAM, MAS, SWT, SWD, and SWM communities.	Not Present: This habitat is not present within the study area.
Rare Plant Species	All Special Concern and Provincially Rare (S1 to S3 ranked) plant species.	Not Present: No rare plants were observed within the study area (Appendix F).
Rare Wildlife Species	All Special Concern and Provincially Rare animal species.	Potential: Habitat potential exists for the following species (Appendix F): Monarch, Eastern Wood-Pewee, Eastern Ribbon snake, Northern Map Turtle and Snapping Turtle.
Animal Movement Corridor		
Amphibian Movement Corridor	Movement corridors may be found in all ecosites associated with water that link significant breeding habitat.	Potential: Etobicoke Creek corridor and Applewood Creek corridor are north-south linkages associated with water.

REFERENCES

Ontario Ministry of Natural Resources and Forestry (MNR). 2015. *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E*. Regional Operations Division, Southern Region Resources Section. Peterborough, Ontario. 2015.