Environmental Impact Study

Merulla Properties

2935 & 2955 Mississauga Road

City of Mississauga

July 2017

Prepared for:

G. Merulla Inc.

by

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With C. Portt and Associates, Fisheries Biologists

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1. INTRODUCTION

1.1. Background

Site Location

The two Merulla Properties are located at 2935 and 2955 Mississauga Road, City of Mississauga, Regional Municipality of Peel. Specifically, they are situated at the southeast corner of Mississauga Road and Dundas Street West, immediately adjacent to the west bank of the Credit River. Figure 1 shows the locations of the two properties.

Site History

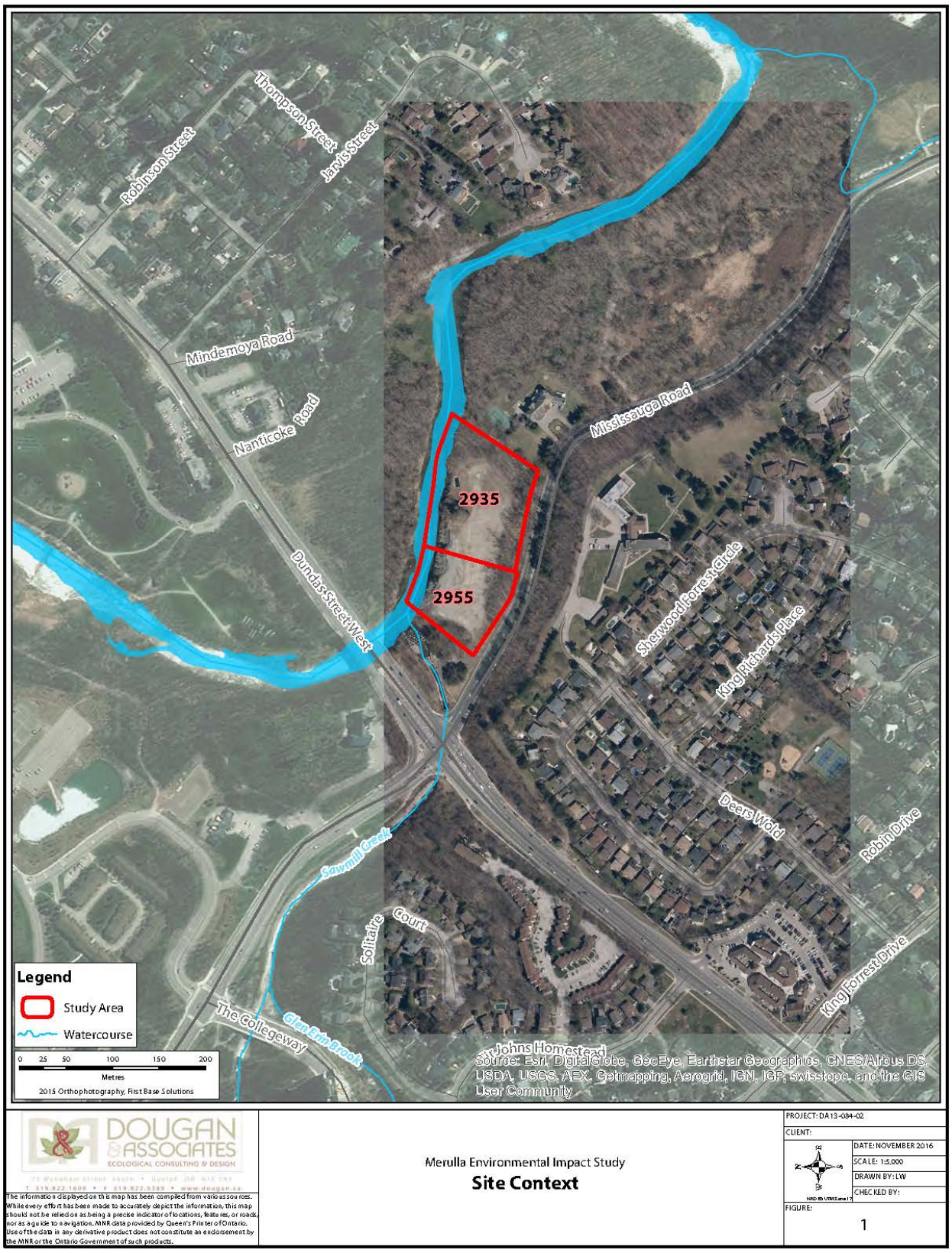
There was historically a commercial land use at 2955 Mississauga Road, which is no longer in evidence. This particular property underwent major changes due to the relocation of the Sawmill Creek confluence with the Credit River into a concrete spillway which now runs parallel to Dundas Street West, which was constructed in the 1970's. Terrain in the overall study area was altered again in 2007-2008 to address public safety and liability issues. Thereafter the regraded site was converted to agricultural uses which continue today. The following is a chronology of the physical and land use changes that have occurred.

- From the early 1950s to the early 1960s, Oughtred's Springbank Fruit Market was situated at 2955 Mississauga Road; Figure 2 shows the location of the commercial building, just south of Dundas Street West. A bridge over Sawmill Creek provided access to a gravel parking lot adjacent Dundas Street. Figure 3 shows that, by 1966, the building had been removed, although the outline of its former foundation is still evident. In 1965, number 2955 was purchased by the Merulla family.

- In 1977, the upper portion the study area was substantially altered when a diversion outfall for Sawmill Creek was constructed by the City of Mississauga. The existing concrete channel, discharging directly into the Credit River, is depicted on Figure 1.

- In January 2007, the current owner of 2955 Mississauga Road, in the interest of public safety and personal liability, removed the upper portion of a prominent ridge formation adjacent to the west bank of the Credit River. In January 2008, the stockpiled materials from that excavation were graded across the site to prepare the central portions of the two properties for agricultural use. In the spring of 2008, the graded area was cultivated and seeded. Agricultural use of the properties continues to this day.

- Before the 2008 grading operation commenced, a siltation control fence was installed to prevent incursion by fill or machinery near the Credit River, the forested area adjacent to Mississauga Road, or the backwater floodplain at the south portion of 2935 Mississauga Road. The fence remains in place today (see Figure 4).



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Merulla Environmental Impact Study

Site Context

PROJECT: DA13-084-02	
CLIENT:	
DATE: NOVEMBER 2016	
SCALE: 1:5,000	
DRAWN BY: LW	
CHECKED BY:	
FIGURE:	1

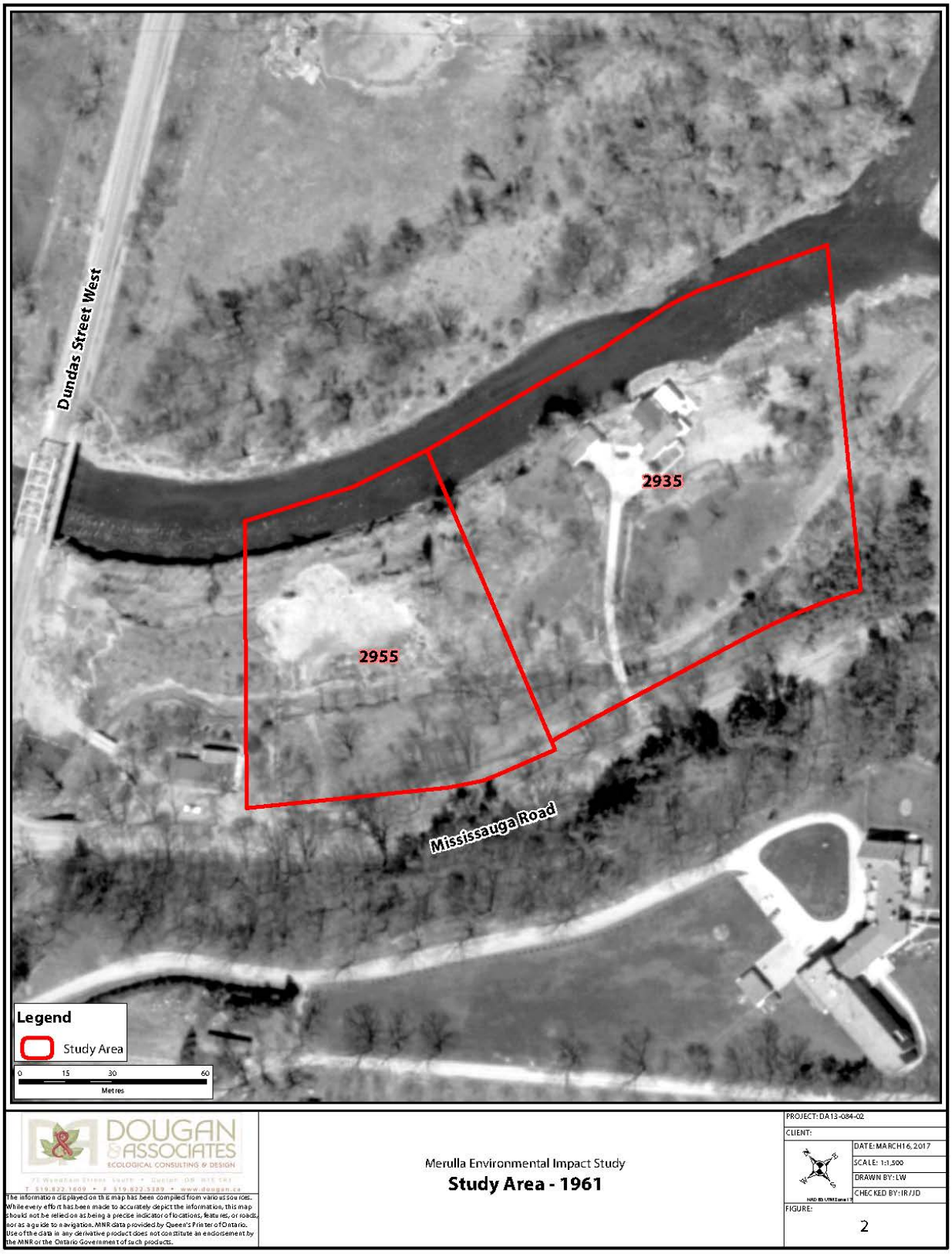
- Figures 2 and 3 show, at number 2935 Mississauga Road, a former detached dwelling and freestanding garage adjacent the Credit River. A driveway provided access to Mississauga Road via a small bridge over Sawmill Creek. The bridge structure is no longer intact, but the concrete abutments are still evident. It is estimated that the house was constructed in the 1940s (Dirk Blyleven, pers. comm.). It was purchased in the mid-1960s by a local businessman who used it as a weekend retreat for his family. It burned to the ground in 1971 and was not reconstructed. Several elements of the former dwelling remain, such as the indoor swimming pool, sections of foundation footings, and the cement floor and partial block wall of the garage. The property was purchased by the current owner in 2003.

- The structural remnants of the former dwelling (indoor pool and footings), plus a 1969 plan of survey and pre-1971 aerial photographs, enabled the location of the former house to be plotted precisely, as shown by the red outline on the preliminary site plan (Figure 4). The current owner intends to construct a new dwelling on the property, but at a location that is environmentally more appropriate.

- Figures 2 and 3 illustrate important historical context concerning the native alignment of Sawmill, Creek: in the 1960's, it flowed through the middle of the subject properties; passing under the driveway bridge, then veered slightly to the east and discharged into Loyalist Creek, a short distance upstream of its mouth by the Credit River.

- In contrast, at this time, the abandoned, remnant channel of Sawmill Creek bent sharply eastward at the southern boundary of 2935 Mississauga Road and connected directly to the Credit River at that location. It would appear, therefore, that the well-defined ravine at the southern boundary of 2935 Mississauga Road is a diversion channel, constructed sometime after 1966 and before 1977 when the diversion outfall at Dundas Street was constructed. It may be deduced, therefore, that the ravine feature is anthropomorphic, not natural, in origin.

- The tree cover on the two properties in 1961 and 1966 was significantly less than today. Figures 2 and 3 show some vegetation at number 2935, some of which could be landscape materials. Today, forest cover is much more extensive, particularly along Mississauga Road and the southern boundary.



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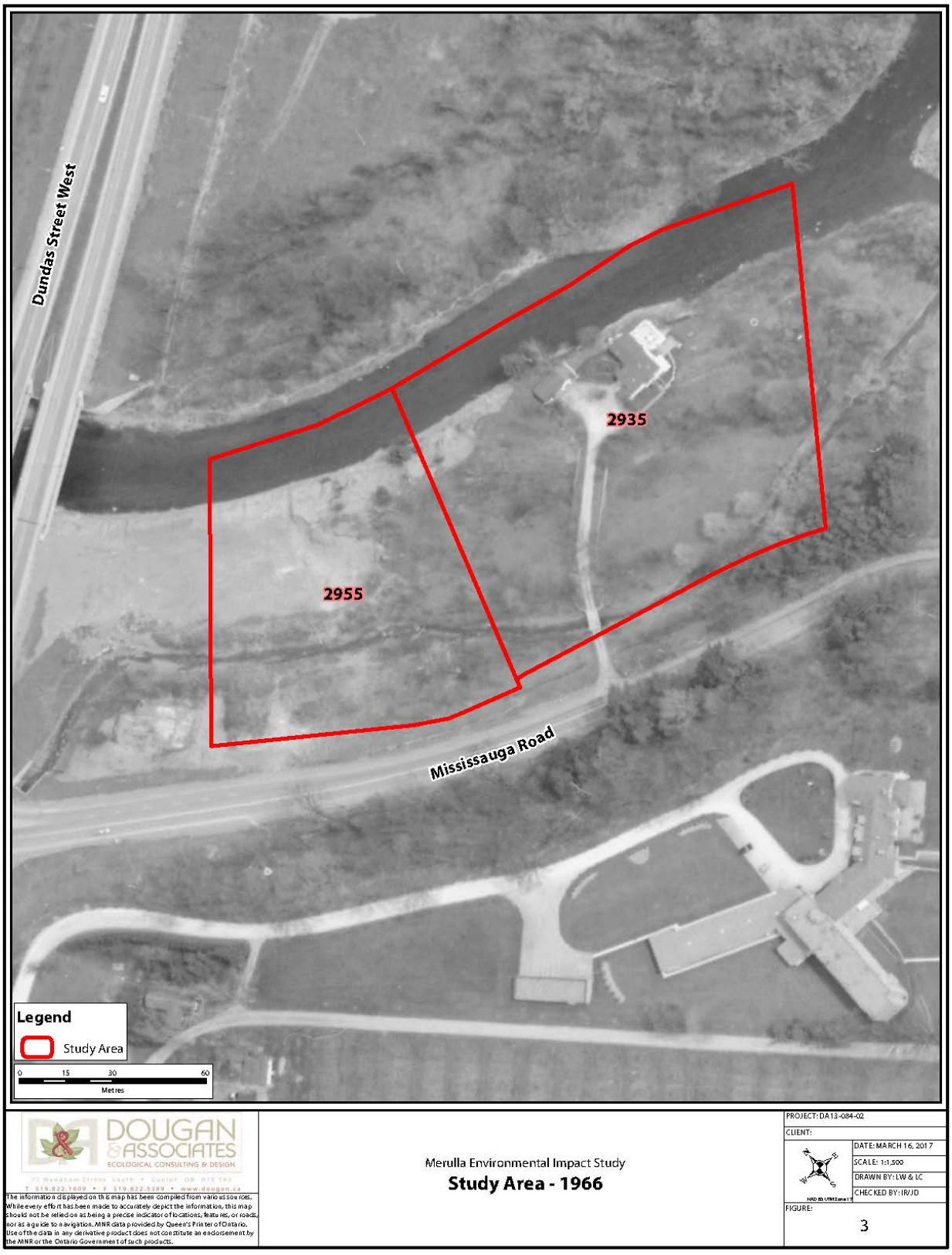
Merulla Environmental Impact Study

Study Area - 1961

PROJECT: DA13-084-02
CLIENT:
DATE: MARCH 16, 2017
SCALE: 1:1,500
DRAWN BY: LW
CHECKED BY: IR/JD
FIGURE: 2



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Merulla Environmental Impact Study
Study Area - 1966

PROJECT: DA13-084-02
CLIENT:
DATE: MARCH 16, 2017
SCALE: 1:1,500
DRAWN BY: LW & LC
CHECKED BY: IR/JD
FIGURE:
3

Environmental Impact Study

Figure 4 illustrates the owner's intended use for the 2935 and 2955 Mississauga Road properties; that is, to develop a single family dwelling on each of the properties, which are lots of record. Dougan & Associates was retained in October 2013 to conduct a preliminary constraint analysis and Species-at-Risk (SAR) screening. The information gleaned from these initial studies was used to scope additional studies undertaken in 2014 and 2017 to gather the natural heritage data that is presented here. This report will contribute to identification of the appropriate final siting of intended development on both properties and identification of any potential ecological issues or constraints (including SAR) that may require mitigation.

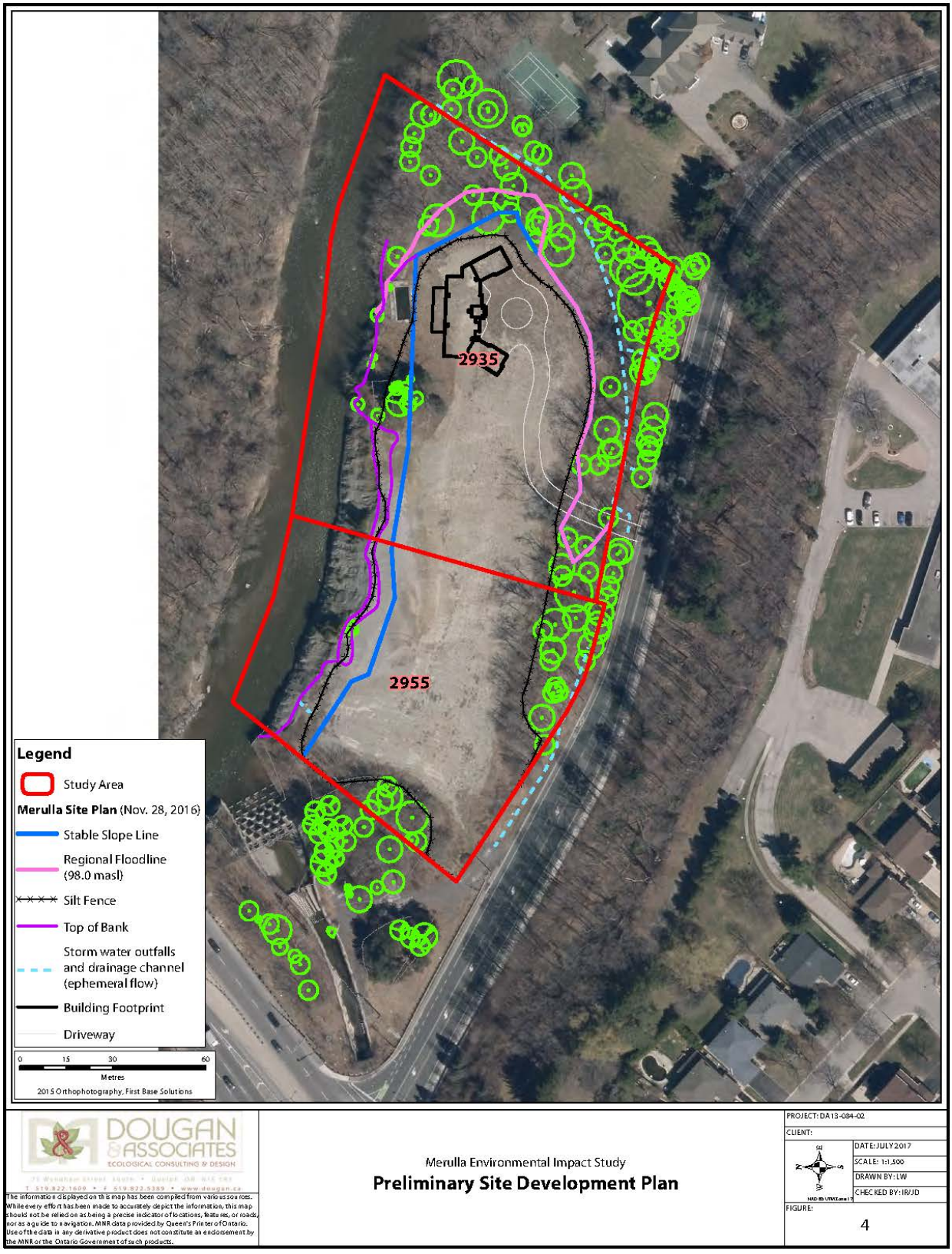
Given the study area location and policies under the Planning Act (1990) and regulations under the Conservation Authorities Act (1990), the City of Mississauga and Credit Valley Conservation (CVC) will require an Environmental Impact Study (EIS) to determine if any adverse impacts could occur to the local natural features and ecological functions, and to identify effective mitigation measures to avoid or offset these potential impacts. In the absence of a planning application (neither site has ever been the subject of a planning or development application by the current owner), we have not consulted with either the City of Mississauga or Credit Valley Conservation (CVC) to obtain direction regarding study requirements. However, we have applied study standards that are otherwise generally consistent with other EIS undertaken in the City of Mississauga and CVC's jurisdiction.

Mapping included with this draft EIS is listed in the Table of Contents.

1.1. DESCRIPTION OF THE PROPOSED DEVELOPMENT

The subject lands comprise 2.13 ha (5.25 acres) of land at 2935 and 2955 Mississauga Road, legally described as Parts of Lots 3 and 4, Range 1 SDS, Racey Tract, City of Mississauga, Regional Municipality of Peel. The properties are currently zoned by the City of Mississauga as G1 and G2. The subject lands are bounded by Mississauga Road to the west, the Credit River to the east, a single-family residential property along Mississauga Road to the south, and Dundas Street West to the north (see Figure 1 and Figure 4, Preliminary Site Plan). The properties extend into the Credit River on the east side. The surrounding land uses include major roadways, low-density residential, and Open Space.

The current proposal for this site includes the construction of one single-family home in the open portion of the southerly property (#2935); access to the property will be from Mississauga Road, following the precise alignment of the former driveway entrance on Mississauga Road. The proposed development will not require any vegetation clearing within the site, with the exception of reinstating the driveway at Mississauga Road. The property is able to connect to City services for water; stormwater and sanitary services will be managed on site (Urbtech Engineering Inc., January 2015). The location of the proposed building and driveway is illustrated on the Preliminary Site Plan (Figure 4).


2935
2955
Legend
Study Area
Merulla Site Plan (Nov. 28, 2016)
Stable Slope Line
Regional Floodline (98.0 masl)
Silt Fence
Top of Bank
Storm water outfalls and drainage channel (ephemeral flow)
Building Footprint
Driveway
0 15 30 60
Metres
2015 Orthophotography, First Base Solutions
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Merulla Environmental Impact Study
Preliminary Site Development Plan
PROJECT: DA13-084-02
CLIENT:
DATE: JULY 2017
SCALE: 1:1,500
DRAWN BY: LW
CHECKED BY: IR/JD
FIGURE:
4

1.2. RELEVANT ENVIRONMENTAL POLICIES AND LEGISLATION

The site is located within the Credit River watershed, in the planning jurisdiction of Credit Valley Conservation, in the Region of Peel, and within the municipal boundary of the City of Mississauga. Both 2935 and 2955 Mississauga Road represent lots of record. Environmental policies relevant to this site are as follows:

- Provincial Policy Statement 2014 (PPS): The Natural Heritage policies in Section 2.1 of the PPS apply; this includes the policies related to significant woodlands, significant valleylands, significant wildlife habitat, significant areas of natural and scientific interest, fish habitat and habitat of endangered and threatened species;
- Region of Peel Official Plan (2014): the lands are located within a Core Area of the Region's Greenlands System, which includes identified Areas of Natural and Scientific Interest and Environmentally Sensitive Areas, as well as fish and wildlife habitat, habitats of threatened and endangered species, wetlands, woodlands, valley and stream corridors, shorelines, natural lakes, natural corridors, and groundwater recharge and discharge areas;
- City of Mississauga Official Plan (July 13, 2016 consolidation): The subject lands are designated Greenlands; those portions within the Regional Storm floodplain and below the long-term stable slope line have a Natural Hazards overlay. In addition, a portion of the properties are within the Significant Natural Area CRR7 of the Natural Areas Survey (2013).
- City of Mississauga Zoning By-law: the floodplain and valley portions of the properties are zoned G1 (Hazard Lands) and the balance is zoned G2 (Natural Areas), including the central core which has no natural features and has been under cultivation since 2008. The current zoning was established in 2010 by an OMB Order. The table below indicates that almost half of the area of the two properties is zoned G1 (Hazard Lands).

Areas of G1 and G2 components
(areas are shown as hectares)

PROPERTY	ZONING BY-LAW DESIGNATIONS		
	G1 (Hazard Lands)	G2 (Natural Areas)	TOTAL
No. 2935	0.73	0.59	1.32
No. 2955	0.24	0.57	0.80
TOTAL	**0.97**	**1.16**	**2.13**

- Under Section 28 of the Conservation Authorities Act, CVC implements and enforces the Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario Regulation 42/06); the lands are regulated by CVC on the basis of their proximity to the Credit River. CVC Watershed Planning and Regulation Policies (2010) apply since the subject properties are entirely within a CVC Regulated Area; a development proposal must conform to the requirements of the CVC's planning and development policies.

The various land use designations and policy-based overlays are described in greater detail below. Figure 5 shows the extent of features as mapped in the documents and schedules including the MNRF-assigned Reginal Area of Natural and Scientific Interest, Region of Peel defined Core Area, City of Mississauga defined Significant Natural Area, and CVC-defined Environmentally Sensitive Area.

Provincial Designations

The Provincial Policy Statement (2014) is the guiding policy framework for municipal planning and protection of natural heritage systems under the Planning Act, and assessment of development based on demonstration of no negative effects to the protected natural features and ecological functions. The subject lands are not located within 120 metres of a Provincially Significant Wetlands (PSW). Other PPS categories that may be present included significant woodlands, significant wildlife habitat, fish habitat, and habitat of endangered and threatened species.

Credit River at Erindale Regional Life Science ANSI

The Province has identified an Area of Natural and Scientific Interest (ANSI), known as the Credit River at Erindale Regional Life Science ANSI, along the Credit River. A second Life Science ANSI, Roy Ivor's Woodlot Life Science ANSI, is located 2.5 km to the west along Sawmill Creek, which is a tributary of the Credit River. Brief descriptions for the two ANSIs can be found on the Natural Heritage Information Centre (NHIC) website.

The Credit River at Erindale Regional Life Science ANSI covers 266 ha of land along the Credit River and its tributaries in the Erindale area of Mississauga. The ANSI extends from Highway 403 on the north, to the vicinity of Blythe Road (south of Dundas Street), a distance of approximately 4 km. It has been documented by the Ministry of Natural Resources and Forestry as representing regionally significant ecological features; limited information regarding these features is available online, however field notes dated October 2004 were obtained from S. Varga of MNRF Aurora District, and ANSI mapping current as of May 2008 was also provided. The Natural Heritage Information Centre (NHIC) summary for this ANSI provides the following description:

> *Steep, wooded river valley and floodplain stretching 6 km in length, south of Streetsville. River floodplain Manitoba maple-willow-black maple, valley slope sugar maple-hemlock-beech and sugar maple-red oak-black cherry and tableland white oak-white pine. Tableland on east side is residential development while west side contains Erindale College, orchards and proposed development. Newly constructed bridge over northern portion of site. Provincially rare sycamore and black walnut and other rare plant sp. Exposed steep shale bedrock in northern portion.*
> *[Hanna 1984]*

The subject ANSI is classified as a Regionally Significant ANSI and receives protection under policies of the Region of Peel Official Plan and City of Mississauga Official Plan. It is not recognized as a Provincially Significant ANSI under the Provincial Policy Statement.

Region of Peel Greenlands System

The Region of Peel Greenlands System is a network of Core Areas and corridors which provides habitat for flora and fauna, allows for movement of these species between different parts of the system, and provides environmental appreciation opportunities for the general public. The study site is identified as part of the Region of Peel Greenland system; it is included within the "Core Areas", defined as containing "*ecological features, forms, and/or functions that provide favourable conditions for uninterrupted natural systems and maximum biodiversity"* (Region of Peel Official Plan, 2014). Relevant features of Core Areas that require consideration here include ANSIs, ESAs, Fish Habitat and Wildlife Habitat, Habitats of Threatened and Endangered Species, Natural Corridors/Valley and Stream Corridors, Shorelines, and Woodlands. Mapping of the location and extent of Core Areas is on Schedule A of the ROP; the entire site is shown within the Core Area. The extent of the Region's Core Areas relative to Mississauga's Green System and Significant Natural Areas is discussed in detail later in this document.

Although the Regional Official Plan does not describe how each Core Area of the System was identified, the study site was likely included because it is located within the Credit River valley, is part of the Credit River at Erindale Regional ANSI, City of Mississauga NAS CRR7, and CVC Environmentally Sensitive Area No. 7.

Regional Policy 2.3.2.6 prohibits development and site alteration within Core Areas of the Greenlands System, except for "*a new single residential dwelling on an existing lot of record, provided that the dwelling would have been permitted by the applicable planning legislation or zoning by-law on the date of approval of this Plan*." This policy also states that:

> *"The area municipalities are directed to adopt appropriate policies to allow the exceptions subject to it being demonstrated that there is no reasonable alternative location outside of the Core Area and the use, development or site alteration is directed away from the Core Area feature to the greatest extent possible; and the impact to the Core Area feature is minimized and any impact to the feature or its functions that cannot be avoided is mitigated through restoration or enhancement to the greatest extent possible."*

The 2935 and 2955 Mississauga Road properties are existing lots of record, and therefore fall under this exemption. Development is being proposed outside the areas of woodland, floodplain, and valley slopes. The EIS addresses the appropriateness of the development sites on the two lots of record.

Peel OP Section 2.3.2.6 also states: *"In addition to the above policies, permitted exceptions within significant wetlands, significant coastal wetlands and significant habitat of threatened and endangered species within the Core Areas of the Greenlands System, may only be considered in accordance with provincial and federal legislation and policies (e.g. Endangered Species Act)".* The study site does not include any significant wetlands or significant coastal wetlands and was not determined to provide significant habitat for endangered or threatened species, or to function as critical wildlife habitat. This is fully considered within the later sections of the EIS.

City of Mississauga Official Plan (2015)

The natural heritage policies in Section 6.3 of the City of Mississauga's Official Plan (2015) address the protection of the City's Green System. Schedule 1a "Urban System – Green System" indicates the entire site, and the river itself as part of the Green System. A major portion of the woodlands in the study area are currently mapped as 'Natural Area' within NAS CRR7, which qualifies as a "Significant Natural Area" under City policies. The criteria for designation as a Significant Natural Site are outlined in Policy 6.3.12 and although the OP does not describe how each NAS component was identified to be included, the study site:

- Is located immediately adjacent to the west bank of the Credit River;
- Is part of lands identified as the Credit River at Erindale Regional ANSI, and Credit River at Erindale Environmentally Sensitive Area #7;
- Contains fish habitat in the Credit River which adjoins the site;
- contains woodland which is part of a complex that is greater than 0.5 ha in size, which is located within 30 metres of a major watercourse.

Other identified natural heritage attributes and functions that trigger City policies are discussed later in the EIS, based on the background and field studies; these are discussed in Section 4.5 of this report.

<u>City of Mississauga Significant Natural Area NAS CRR7</u>

The City-identified NAS CRR7 is a 92.82 ha natural area which extends from Dundas Street West in the north to a hydro right-of-way (ROW) to the south (see Figure 5b). CRR7 includes the valley of Loyalist Creek between Robin Drive and Mississauga Road, as well as the lower reaches of Sawmill Creek, and its confluence with the Credit River. The topography, soils, and biota of CRR7 vary greatly because the natural area comprises tablelands, valley slopes, floodplains, creeks, and the Credit River. The Merulla lands include features described in the NAS factsheet as wooded slope (FOD5-1 dry-fresh sugar maple – oak deciduous forest type) with floodplain (FOD7-3 fresh – moist willow lowland deciduous forest type) in the Credit River floodplain. CRR7 is considered significant because of a number of factors, including the presence of locally, regionally, provincially, and federally significant species, high Floristic Quality Index (FQI) and native mean coefficient, its relatively large size, its linkage and flood storage roles within the Credit River system, and its ANSI designation.

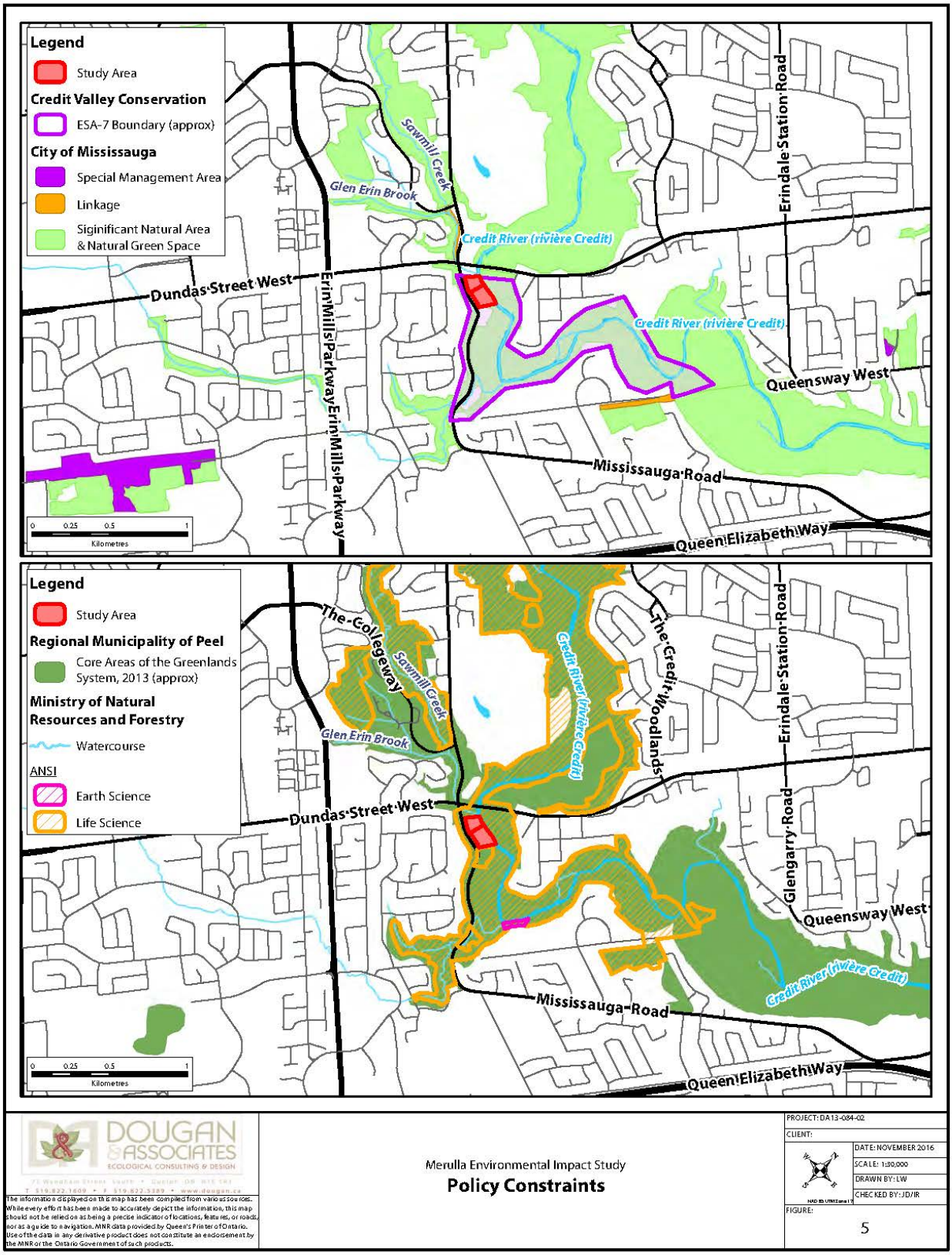
Credit Valley Conservation

The site is located within the Credit River at Erindale Environmentally Sensitive Area #7 which was originally mapped by Ecologistics (1979). Relevant criteria recognized for the overall ESA in that document included:

1.2 Hydrologically / Hydrogeologically significant
2.1 Rare or endangered indigenous species.
2.2 Unusual and / or significant value
3.3 Habitat for rare species
4.2 Maintain significant natural system
5.1 High aesthetic value

Figure 5 shows the general location of the site with respect to background mapping of designated environmental policy features (Core Areas, Significant Natural Area CRR7, ESAs, ANSIs). The site is entirely within the regulated area of Credit Valley Conservation, which is based on a distance extending 120 metres from watercourses, wetlands and steep slopes. Site alteration or development within a regulated area requires a permit from CVC.

CVC has completed a Credit River Watershed Natural Heritage System (CVC, 2014a, 2014b, 2015a) study and supporting GIS analysis which, if adopted by member municipalities, would guide the NHS approach utilized in official plans, including the consideration of features, linkages, enhancement, and buffers. To date the CVC system approach has not been adopted by the Region of Peel or the City of Mississauga. Watershed-level and municipality-level mapping is provided on the CVC website; the valleylands that contain the subject lands are rated under many of the CVC criteria as 'high functioning' which generally conforms to the ESA and ANSI designations that are already in place. The lands are within the Credit River valleylands, highlighted in the CVC study as a 'Regional and Provincial Corridor'; this is analogous to the Region's Greenlands designation, as shown on CVC Figure A36. A 'Potential Wetland Creation Tract' is shown in the general area of the subject lands on Figure A42. There is generally a good fit between our understanding of the subject lands and the various criteria that were applied. However, Figure 4-2 (Mapped Credit River Watershed Natural Heritage System) in the Phase 4 Final Implementation Report shows the NHS as well as 'Agriculture, Open Space or Urban' lands, but does not identify the existing agricultural area that is present on the subject lands, although clearly visible on aerial photos.


Legend
Study Area
Credit Valley Conservation
ESA-7 Boundary (approx)
City of Mississauga
Special Management Area
Linkage
Siginificant Natural Area & Natural Green Space
Sawmill Creek
Glen Erin Brook
Credit River (rivière Credit)
Erindale Station Road
Dundas Street West
Erin Mills Parkway
Queensway West
Mississauga Road
Queen Elizabeth Way
0 0.25 0.5 1
Kilometres
Legend
Study Area
Regional Municipality of Peel
Core Areas of the Greenlands System, 2013 (approx)
Ministry of Natural Resources and Forestry
Watercourse
ANSI
Earth Science
Life Science
The Gulleyway
Sawmill Creek
Glen Erin Brook
Credit River (rivière Credit)
The Credit Woodlands
Erindale Station Road
Glengarry Road
Dundas Street West
Queensway West
Credit River (rivière Credit)
Mississauga Road
Queen Elizabeth Way
0 0.25 0.5 1
Kilometres
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Merulla Environmental Impact Study
Policy Constraints
PROJECT: DA13-084-02
CLIENT:
DATE: NOVEMBER 2016
SCALE: 1:30,000
DRAWN BY: LW
CHECKED BY: JD/IR
FIGURE:
5

1.3. EIS REQUIREMENT

The subject site has been identified in the City of Mississauga's Natural Areas Survey as within site CRR7, which is a significant natural site associated with the Credit River at Erindale ESA and ANSI (see Figure 5). It is within a Core Area of the Region of Peel Greenlands system. It is also located entirely within the area regulated by CVC. On this basis, an Environmental Impact Study is required to address the policies of the City, Region and CVC.

City OP Policy 6.3.27 states:

> *"Development and site alteration as permitted in accordance with the Greenlands designation within or adjacent to a Significant Natural Area will not be permitted unless all reasonable alternatives have been considered and any negative impacts minimized. Any negative impact that cannot be avoided will be mitigated through restoration and enhancement to the greatest extent possible. This will be demonstrated through a study in accordance with the requirements of the Environmental Assessment Act. When not subject to the Environmental Assessment Act, an Environmental Impact Study will be required."*

City OP Policy 6.3.33 states:

> *"Environmental Impact Studies will delineate the area to be analysed, describe existing physical conditions, identify environmental opportunities and constraints, and evaluate the ecological sensitivity of the area in relation to a proposal. It will also outline measures to protect, enhance, restore and expand the Natural Heritage System and associated ecological functions. Environmental Impact Studies will be prepared to the satisfaction of the City and appropriate conservation authority."*

The site-specific delineation of the boundaries of Significant Natural Area and ESA is reliant on the EIS, and must be approved by the City and Conservation Authority. The delineation of regional ANSIs relies on MNRF mapping which may be adjusted from time to time by the MNRF, who are not typically engaged in reviews of development submissions under the Planning Act. For this project we are reliant on MNRF mapping as provided in 2008 by S. Varga; the vintage of mapping provided at that time was dated May 2005. Later in the EIS we discuss the factors and criteria which were considered in the delineation of the Significant Natural Area, ESA and regional Life Science ANSI.

Policy 6.3.24 provides recommendations for the protection, enhancement, restoration and expansion of the Natural Heritage System by:

a) *ensuring that development in or adjacent to the Natural Heritage System protects and maintains* ***natural heritage features*** *and their ecological functions through such means as tree preservation, appropriate location of building envelopes, grading, landscaping, and parking and amenity area locations;*
b) *placing those areas identified for protection, enhancement, restoration and expansion in public ownership, where feasible;*

c) *using native plant materials and non-invasive species, and reducing and/or eliminating existing invasive, non-native plant species to improve ecological value and the sustainability of indigenous vegetation, where appropriate;*
d) *retaining areas in a natural condition and/or allowing them to regenerate to assume a natural state;*
e) *the promotion of stewardship within privately and publicly owned lands within the Natural Heritage System;*
f) *controlling activities that may be incompatible with the retention of the Natural Heritage System and associated ecological functions; and*
g) *regulation of encroachment into the Natural Heritage System and other public open spaces.*

The purpose of the EIS is to determine the potential impacts of the development proposal on the natural features and their ecological functions, to ensure that the proposal will maintain or enhance the ecological functions of the areas in question. In the absence of a development application, the City and CVC were not requested to review and comment on study terms-of-reference and were not consulted during the study process. Nonetheless, our approach generally reflects basic standards for EIS conducted under the PPS (2014), City of Mississauga Official Plan, and the CVC Regulation. It also addresses compliance with the Endangered Species Act (2007).

2. DESCRIPTION OF THE ENVIRONMENT

2.1. PHYSICAL SETTING

The two Merulla lots of record are located near the southeast corner of Mississauga Road and Dundas Street West, immediately adjacent to the west bank of the Credit River. The Credit River and Sawmill Creek frame the site to the east and north, respectively; an estate property lies to the south, while the western limit is defined by Mississauga Road, which is set within the Credit River valley at the base of a steep forested ravine slope. As discussed below, in the past 40 years there have been significant alterations to the tributary connections, their floodplains to the north and south, and local hydrology, driven largely by major road and floodway infrastructure. Also, from approximately 1970 to 1972, the Ontario Water Resources Commission (OWRC) constructed a sanitary sewer trunk under the bed of the Credit River. These initiatives have significantly altered areas that are within the areas mapped as significant by the Province, Region, City and Credit Valley Conservation.

2.2. GEOLOGY, PHYSIOGRAPHY, & SOILS

The topography in the general site vicinity varies from steep valley walls and bluffs (slopes 40-50 percent) to undulating tableland and floodplain. Grey shales of the Georgian Bay Formation are visible along portions of valley walls. The bedrock depth varies from 7.5 metres to more than 15 metres in sites to the west. There are modern river deposits in the floodplain as well as historic Lake Iroquois beach deposits. The shore-bluff features of the Credit River at Erindale represent the divide between the Iroquois Plain and South Slope physiographic regions (Chapman and Putnam, 1984; Parish Aquatic Services, 2016). Four soil types are present in this portion of the Credit River valley: Fox sand loam (well drained); Brockport clay loam (well drained); Bookton sand loam (well drained); and Mississauga clay loam (poorly drained). Sections of the valley wall show evidence of seepage. Two creeks outlet into the Credit River in the vicinity of the study area: Sawmill Creek to the immediate north, and Loyalist Creek to the south.

Geotechnical studies were undertaken by Terraprobe (2008; 2010), which determined a stable slope limit; this is shown on Figure 4 (in Section 1.1).

2.3. HYDROLOGY & HYDROGEOLOGY

The subject lands drain towards Mississauga Road where runoff is captured in a swale feature (no longer a natural watercourse) which runs southward to a man-made ravine at the southern limit of the properties which was constructed some time prior to 1975 (Parish Aquatic Services, 2016) and outlets to the Credit River. Under Regional Storm conditions, the floodwaters of the Credit River flow into the ravine, creating a backwater condition and a passive floodplain. The elevation of the Credit River floodplain at this location is represented by the 98.0-metre contour elevation. That elevation was staked-out on-site by means of a detailed topographic survey conducted in 2007. That surveyed line is shown on Figure 4 (in Section 1.1).

As discussed in the previous section, the site overlays shale with varied depths of riverine and associated surficial deposits. No wetlands are present on site or in the immediate vicinity, and no evidence of seasonal or permanent groundwater discharge was noted at the surface on the property; the depth to groundwater was determined to range from 2.2. to 7.5 metres below ground surface, with the shallower depth close to the floodplain at the south end of the site. This is anticipated to generally reflect the ambient level of the Credit River (Terraprobe 2008).

Parish Aquatic Services (2016) has completed an extensive analysis of historical aerial photographs to determine the status of hydrologic features. This revealed the following history of watercourse changes on or near the Merulla properties from 1954 to the present:

- Aerial photography taken in 1954 indicates that the creek flowed behind a building (possibly, Oughtred's Springbank Fruit Market) situated on number 2955, coursed through the middle of number 2935, and then turned abruptly eastward to discharge into the Credit River. A driveway from Mississauga Road to the dwelling on 2935 crossed the creek channel by means of a concrete bridge structure.
- By 1961, the commercial use was more established at number 2955. Figure 2 shows a gravel parking lot at Dundas Street and a pedestrian bridge over Sawmill Creek to a frame building housing Oughtred's Springbank Fruit Market. Within the subject properties, the alignment of Sawmill Creek had not changed; however, south of 2935, the channel had been straightened so that it discharged into Loyalist Creek, not the Credit River. That modified alignment was still present in 1966 (see Figure 3).
- By 1975, the residence at 2935 was razed by a major fire, while the fruit market and the pedestrian bridge over Sawmill Creek no longer existed at 2955. Significantly, the confluence of Sawmill Creek had been moved northward to outlet into the Credit River rather than Loyalist Creek.
- In 1976-77 a major outfall diversion channel was constructed for Sawmill Creek, located just north of the properties, running parallel to Dundas Street West and outletting upstream of the two properties. The former channel of Sawmill Creek was filled in across 2955, to the limit of a historic laneway off Mississauga Road, and the portion on 2935 moved into a ditch adjacent to Mississauga Road. However, the hydraulic functions of this lower reach were significantly altered as the flows from Sawmill Creek had been diverted. The poorly defined ditch that is currently evident running parallel to Mississauga Road was created to address local drainage when the outfall diversion channel was constructed at Dundas Street.
- By 1985, the aerial photographs show no evidence of any remnants of the former channel of Sawmill Creek on either property, except for the reconstructed diversion channel at the southerly boundary of 2935.

Parish Aquatic Services (2016) confirmed that the ditch along Mississauga Road captures runoff from a very limited catchment area; that is, only the subject properties and, via three culverts, Mississauga Road adjacent the properties and the slope on the west side. As a result, the ditch has minimal flow, and "is no longer considered to be a natural watercourse" (Parish, p. 11). Due to the backwater effect, the drainage

ditch and reconstructed outfall channel are subject to flooding under Regional Storm conditions. The limits of the floodplain are defined by the 98.0 m contour, which was surveyed in 2007. That surveyed line, together with the stable slope line, serves to demarcate the G1 and G2 zones stablished in the Zoning By-law and identified on the preliminary site plan (Figure 4).

2.4. ECOSYSTEM FUNCTIONS AND SITE CONTEXT

Ecological features are a site's biophysical characteristics, while ecological functions are the natural processes (physical, chemical, biological) that are associated with these natural features. The subject properties, in their current state, function as part of the Credit River corridor which is a major regional system; this discussion will focus on the functions of the site itself. The site's ecological functions include and potential changes related to development include (format adapted from Costanza et al., 1997):

Water Interception and Regulation

Water interactions include interception of precipitation, seasonal storage in vegetation and soils, and release through runoff and evapotranspiration and runoff. The deciduous forest community, successional cover, and seasonal agricultural cover intercept rain water and some surface runoff and serve to infiltrate some of the precipitation before surplus runoff makes its way towards the Credit River. The site receives surface runoff from the adjacent Mississauga Road due to the presence of curbs, gutters and two culverts. Alteration of land cover with introduction of impervious surfaces will affect the water balance at the local site scale; measures that retain water and moderate runoff will minimize or offset this impact.

Soil Development & Nutrient Cycling

Soil development includes the capture and storage of minerals, nutrients and organic matter over time, and their transformation by biophysical processes (erosion, deposition, organic decay, plant, animal and microbial interactions). The habitats which have regenerated on the site serve to cycle nutrients through the decomposition of leaf litter, fallen tree limbs, and animal matter, which through decay builds and maintains the soil structure and fertility. The canopy trees, shrubs and groundcovers contribute new biomass each growing season, which stores nutrients, adds structure and contributes to moisture retention in the soil. Removal of the existing canopy trees, disturbance of natural cycles, and construction of impermeable structures on the site can affect the water balance and could negatively affect the site's soil and nutrient functions. Measures that protect and enhance cover over time will prevent these impacts.

Air Quality Management & Climate Regulation

Air quality management occurs through interception of particles, and conversion through photosynthesis of carbon dioxide and water to carbohydrates, while releasing oxygen to the atmosphere. Climate regulation includes moderation of local microclimate extremes, and contribution to local and regional climate stability. The mature vegetation on the study site is beneficial to local air quality and climate regulation; measures that protect and enhance cover over time will maintain or enhance local climate benefits.

Disturbance Regulation

Disturbance regulation is an ecosystem's ability to withstand and recover from disturbances such as storms, drought, human encroachment and natural disasters (such as pest and disease infestations). The site's current plant communities, with maturing vegetation and relatively few invasive species despite the urban context, appears to be relatively resilient to disturbance under current conditions, which include active agriculture. The long-term health and stability of the vegetation can be increased by minimizing impacts to root zones of existing forest cover, limiting human activities to specified areas, and increasing permanent cover in the farmed portions The floodplain community is younger with more shrub and herbaceous cover than the forested community, and is more adapted to changes in the landscape. Emerald Ash Borer is eliminating most of the white and green ash, transitioning cover to other species, particularly maples. Restoration of historic plant species diversity where it is deficient would contribute to enhanced disturbance regulation over time.

Provision of Wildlife Habitat & Refugia

The site's natural habitats provide opportunities for foraging and refugia for a number of wildlife species. These species include those that reside in the Credit River corridor as well as seasonal migrants. The site setting is within an area that has been altered by human activities for more than 50 years; the site was extensively cleared and occupied for residential and agricultural uses. Major infrastructure upgrades including roads and drainage alterations have occurred within and adjacent to the site since the 1960's. Current ecological features and ecological functions reflect this history and landscape context. As discussed in the "Significant Wildlife Habitat" section of this document (Section 4.3), given the landscape context of the site and its relatively small size, its functional value is primarily associated with the river corridor. Building on the existing site resources, improvements to features, functions and species sustainability can be achieved.

The protection and enhancement of natural features and ecological functions are addressed under Section 2.1 of the Provincial Policy Statement (2014), which guides the natural heritage policies of the Region of Peel and City of Mississauga Official Plans. Compliance with these policies is required, and the balance of the EIS is devoted to defining the existing natural heritage system, assessing impacts of proposed development including options to avoid or mitigate impacts, and determining whether the development is acceptable under these policies.

2.5. AQUATIC RESOURCES

The Credit River is one of the most popular angling rivers in Ontario. A coldwater fishery in the upper watershed provides fishing opportunities for Brown Trout and Brook Trout, and the lower watershed in which the Merulla property is situated is known for its runs of Chinook Salmon and Rainbow Trout from Lake Ontario. Atlantic Salmon were extirpated from Lake Ontario in the 1890's, but have recently been reintroduced, and have been part of the fall spawning run of fish in the Credit River in recent years (CVC 2015b).

The river habitat adjacent to the Merulla property is typical of that found throughout the lower Credit River, extending upstream from the QEW for about 35 km. It is a meandering watercourse set within a broad valley feature, composed of relatively shallow riffles and deeper runs. The complexity of flow-sorted coarse substrates and site-specific flow conditions provides a wide variety of instream habitats for a diverse community of resident fishes and spawning fishes from Lake Ontario.

3. METHODOLOGY

3.1. BACKGROUND REVIEW

The following steps were undertaken to identify known natural heritage resources from the study area vicinity.

a. Species-at-Risk screening

An Information Request Form was submitted to Aurora District MNRF on November 4, 2013, which generated a response from David Denyes, Assistant Species at Risk Biologist, on November 5, 2013 (see Appendix 5). Since the Endangered Species Act is administered by MNRF outside of the Planning Act approval process, it was advantageous to proceed with this screening as no specific development application is required to initiate the process, and the outcome will ensure that any specialized surveys that are required to satisfy MNRF will be integrated with the EIS studies in spring of 2014. Therefore, the MNRF response letter details all Species at Risk (SAR) that have been documented by MNRF in the general vicinity of the Merulla Properties as of fall 2013. The work plan followed for this Environmental Impact Study addressed all of the identified SAR at that time.

b. Natural Heritage Information Centre (NHIC) database query

The NHIC database was queried in April 2016 for significant species occurrences on file in the area surrounding the Merulla properties. The 1 km X 1 km squares containing the properties as well as all those surrounding the properties were checked for records; the nine (9) squares queried were 17PJ0270/71/72, 17PJ0280/81/82, and 17PJ0290/91/92. The NHIC records include Species-at-Risk species as well as species that are considered S1 to S3 status, which indicates that they are provincially rare and potentially declining in the province.

c. Review of Orthophotography

A series of historic aerial photographs were provided to Dougan & Associates by the client's planner that show the property from 1944, 1954, 1963, 1966, 1975, and 1977. Other photographs of the property from previous land owners (circa 1958) were also provided. Photographs of noteworthy geomorphologic features on the properties were provided from January 12, 2007 (F. Merulla) and January 14, 2007 (City

of Mississauga arborist). Parish Aquatic Services (2016) has provided a detailed review of the changes to watercourses and surface cover, based on a review of aerial photographs from 1954 to the present.

d. Other documents reviewed

The following additional documents were included in the background review:

- *Credit River Floodline Analysis, Merulla/Ferko Properties – Credit River Downstream of Dundas St., City of Mississauga* (Parish Geomorphic, 2002);
- *Geotechnical Investigation, Slope Stability and Streambank Erosion Analysis, 2935 & 2955 Mississauga Road, Mississauga, Ontario* (Terraprobe, 2008);
- *Addendum – Geotechnical Investigation, 2935 & 2955 Mississauga Road, Mississauga, Ontario* (Terraprobe, 2010);
- CVC Memorandum regarding the Merulla Property from Scott Sampson, Senior Natural Heritage Ecologist at Credit Valley Conservation (June 5, 2009);
- Various correspondence with the client with the Region of Peel;
- Merulla Property Restoration Plan (Ecoplans, 2008);
- Flood Line Mapping, Credit River, City of Mississauga (2005);
- Environmentally Significant Areas mapping and data from Credit Valley Conservation;
- Site Inspection Checksheets from October 17 and October 27, 2004, for the overall Credit River at Erindale Life Science ANSI (Steve Varga, MNRF);
- Correspondence from Steve Varga, MNRF (undated but likely 2008), regarding the most current mapping of the Credit River at Erindale Regional Life Science ANSI;
- Proposed Terms of Reference to Revise the ANSI and ESA Boundaries – 2935 & 2955 Mississauga Road, City of Mississauga, Regional Municipality of Peel (letter to Mr. Brock Criger, Manager, Regional Municipality of Peel, dated February 1, 2011);
- Geomorphic Review and Assessment of Pre-diversion Sawmill Creek Corridor: 2955 & 2935 Mississauga Road (Parish Aquatic Services, 2016);
- Functional Servicing Brief, Merulla Residence, 2935 Mississauga Road, ON (Urbtech Engineering Inc., 2016).

3.2. VEGETATION SURVEYS

Vegetation communities were categorized on the site using the Ecological Land Classification (ELC) system (Lee et al. 1998). Targeted site visits for ELC and botany were undertaken on October 9 and 31, 2013, June 19, 2014, and May 10, 2017; daytime visits on other dates included incidental observations of vegetation conditions. The ELC polygons are summarized on Figure 6. Vascular plant species recorded during these visits are presented in Appendix 3 along with species status information (native or introduced, CVC and provincial/national rarity rankings, etc.).

3.3. WILDLIFE SURVEYS

An initial site visit was conducted on October 9, 2013, to review the site with Dirk Blyleven, Principal, Beacon Planning Services, and Frank Merulla, property owner. During the visit, preliminary screening for potential wildlife Species at Risk habitat was conducted, as well as searches for other potential wildlife constraints to development.

Breeding birds

Two breeding bird surveys were conducted on May 26 and June 9, 2014, following the protocols outlined by the Ontario Breeding Bird Atlas (OBBA 2001). This protocol stipulates that the surveys be conducted between sunrise and 10:00 a.m., between May 24 and July 12, during appropriate weather conditions (i.e. light winds, no heavy rains).

Amphibians

Two nocturnal amphibian surveys were conducted on the site on April 26 and May 28, 2014. Two survey points were covered on each survey. The surveys followed protocols outlined by the Ontario Marsh Monitoring Program (BSC, 2003). The MMP protocol dictates that these two surveys be conducted from April 15 to 30 (first survey) and May 15 to 31 (second survey), and should occur between sunset and midnight on nights where the wind is light (less than 15 kph) and the temperature at least 5 ˚C and 10˚C, respectively. A June survey was not conducted as there are no ponded features present on the site that would warrant the late season survey.

Snapping Turtles

Snapping turtle surveys were conducted on four dates in 2014: May 6, May 26, June 9, and June 20. The surveys took place in the morning, under fair weather conditions, where turtles would be more likely active. The entire site was searched for any activity, including checking all gravel and sand sites on the property for any signs of nesting activity. This was done twice in June after recent rainfall events, when females are more likely to be building nests.

Eastern Milksnake

Four surveys for Eastern Milksnake were undertaken on the property in 2014: May 6, May 26, June 9, and June 20. The methodology followed draft protocols provided by the Guelph District OMNRF, dated June 2013 (OMNRF 2013). The methodology parameters, as per the protocol, were as follows:

- Active hand searching was conducted over the entire site, with objects such as rocks, logs, and other cover, turned over and replaced;
- Careful attention was paid to areas on the property such as along forest edges, and around compost, rock and woody debris piles, old foundations, and any bedrock fractures;
- Surveys were done between late April and late June;

- All surveys occurred on sunny days, with air temperatures between 8ºC and 25ºC (when overcast, with temperatures above 15 ºC);
- Four surveys (minimum required by protocol is three) were conducted, with three of the four surveys separated by at least 14 days (20 and 14 days, respectively); the fourth survey was 11 days after the third.

Artificial cover boards were not utilized as the current protocol stipulates against it unless they can be placed at least two or three years ahead (if placed any less time than this, negative results are considered inconclusive). Note that the Eastern Milksnake surveys were undertaken as, at the outset of the project in 2013, the species was considered Special Concern (provincially). However, the species was delisted by MNRF in 2015 and is no longer considered a SAR.

Table 1. Summary of field investigations in 2013, 2014, and 2017.

Date	Observer	Time	Weather Conditions	Purpose
October 9, 2013	J. Dougan, I. Richards	---	---	Reconnaissance survey; botany and wildlife habitat assessment
October 31, 2013	D. White	---	---	ELC survey and botanical survey
April 26, 2014	N. Assad	20:45 – 21:05	Light winds, 6 – 7 °C	Nocturnal amphibian survey
May 6, 2014	I. Richards	08:45 – 10:30	Partly cloudy, light east winds, 9 - 13 °C	Herpetile survey
May 26, 2014	I. Richards	08:45 – 10:30	Partly cloudy, calm, 9 - 14 °C	Breeding bird and herpetile survey
May 28, 2014	N. Assad	21:40 – 21:50	Calm, 17 °C	Nocturnal amphibian survey
June 9, 2014	I. Richards	05:50 – 07:15	Clear, calm, 14 - 16 °C	Breeding bird and herpetile survey
June 19, 2014	K. Beauchamp, W. Frise	---	---	ELC survey and botanical survey
June 20, 2014	I. Richards	09:00 – 10:00	Partly cloudy, light north winds, 15 °C	Herpetile survey
September 17, 2014	G. Coker	---	---	American Eel habitat assessment
May 10, 2017	J. Dougan, C. Myrdal	10:15 – 15:30	Partly cloudy, 11 °C	ELC update and spring botanical survey

3.4. AQUATIC RESOURCES

The site was visited by a senior fisheries biologist on September 17, 2014, to assess the in-stream habitat along the Credit River. Since there are known records of American Eel (Endangered in Ontario) for this stretch of the Credit River, the habitat assessment had a particular focus on this species, with the objective of supporting an impact assessment for the proposed development plan.

3.5. SIGNIFICANT WILDLIFE HABITAT ASSESSMENT

The Provincial Policy Statement (2014) prohibits development within areas identified as supporting Significant Wildlife Habitat (SWH) unless it can be demonstrated that there will be no negative effects. The Ontario Ministry of Natural Resources has produced the Significant Wildlife Habitat Technical

Guide (SWHTG) and a decision support system to assist municipalities with identifying significant natural heritage features to ensure that land use planning is conducted in compliance with the natural heritage policies of the PPS. D&A screened the survey data against the criteria provided in the SWHTG to identify, describe and prioritize potential significant wildlife habitat within the study area.

Using a combination of ELC, wildlife and vegetation surveys and other notes from field investigation the site was examined for the presence of important wildlife habitat as defined by the *Significant Wildlife Habitat Technical Guide* (OMNR 2000) and the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (OMNRF 2015).

In addition, the Region of Peel and Town of Caledon prepared a SWH list with specific criteria for the environmental conditions in their planning areas; the full study was presented in the *Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study* (North-South Environmental et al. 2009). Figure 5 in the Amendment 21B to the ROP includes the relevant SWH categories. The underlying criteria are very similar to those prepared by the MNRF, however there are some small differences and some criteria (e.g. numbers) provided for some categories and indicator species. The Merulla site was also examined and screened against these SWH criteria.

The screening results for potential SWH (per MNRF criteria) are summarized in Appendix 2.

3.6. SPECIES AT RISK SCREENING

A screening of all Species at Risk (SAR) flora and fauna that have been reported to occur in the City of Mississauga through 2015 was undertaken. The known habitats for these wildlife species were screened against the habitats contained within the subject lands, based on 2013 and 2014 field investigations, with the likelihood of their presence being indicated. The full screening is presented as Appendix 4.

3.7. SIGNIFICANT NATURAL AREA, CORE AREA, ESA AND ANSI BOUNDARY REVIEW

Figure 5a illustrates the available mapping of the Region of Peel Core Area, the City Green System, the City NAS mapping, approximate boundaries of ESA #7, and the Credit River at Erindale Regional Life Science ANSI, derived from CVC (1995) and MNR (2008) mapping. Based on field studies, a recommended boundary for the Significant Natural Area is discussed later is this report and shown on Figure 7.

As identified in Sections 1.3 and 2.5, the study area is currently located within the Credit River at Erindale Environmentally Significant Area (ESA #7); this ESA was originally identified in the *Credit River Watershed Environmentally Significant Areas* Study (Ecologistics 1979). At that time, the overall area satisfied six of the 10 ESA criteria, which are as follows (the six bolded criteria are those that were deemed to be satisfied in ESA #7):

- Distinctive or unusual landform;
- **Hydrologically/hydrogeologically significant;**
- **Rare or endangered indigenous species;**
- **Unusual and/or significant value;**
- Remnant of a particular ecosystem;
- Unusually high diversity of species;
- **Habitat for rare species;**
- Sufficiently large to afford habitat;
- **Contributes to the maintenance of natural systems;**
- **High aesthetic value.**

The ESA descriptions were updated by CVC in the *Credit Watershed ESA Update Report* (1995). According to Ecologistics (1979) (page 8), the delineation of the ESA boundary "*should be regarded as preliminary, subject to change only on the basis of appropriate field studies*". Also, CVC policy 5.3.3.2 a (CVC 2010) states that "*the exact limits of ESAs will be determined through site-specific field investigations.*"

The study area, as outlined in EIS Sections 1.3 and 2.5, also falls with the Credit River at Erindale Regional Life Science ANSI; Areas of Natural and Scientific Interest (ANSIs) are administered by MNRF. Accordingly, CVC Policy 5.3.3.3 a states:

"The exact limits of life science ANSIs are to be determined by the Ministry of Natural Resources."

The criteria to define ESAs and ANSIs are not identical; at the time the Credit River at Erindale Regional Life Science ANSI was identified, there was not a set of published criteria to define ANSIs. This ANSI, which extends over a relatively large geographical area, generally conforms to the MNR mission statement for its 1977 survey of natural areas throughout Ontario:

"To identify a series of ecological areas that comprise the spectrum of natural landscapes, environments, and biotic communities in Ontario."

In 2011, MNR released a document entitled "Identification and Confirmation Procedure for Areas of Natural and Scientific Interest" which provided general guidance on ANSI selection and categories. Five selection criteria were listed, as follows:

1. Representation – of geological themes or landform-vegetation features of an ecodistrict.
2. Condition – an assessment of the degree of human-induced disturbances.
3. Diversity – the number of high quality, representative features that exist within a site are assessed.
4. Other ecological considerations – ecological and hydrological functions, connectivity, size, shape, proximity to other important areas, etc.
5. Special features - such as populations of species at risk, special habitats, unusual geological or life science features and educational or scientific value.

MNRF Earth Science or Life Science candidate ANSIs fall into one of three categories: provincially, regionally, or locally significant, based on the consideration of the five evaluation selection criteria. Provincially Significant Life Science ANSIs contain the best examples of the landform/vegetation features of a particular ecodistrict. Since 1996, provincially significant ANSIs have been afforded protection under the *Planning Act* and Natural Heritage policies of the Provincial Policy Statement (PPS), as well as other provincial plans (Niagara Escarpment Plan, Greenbelt Plan, Oak Ridges Moraine Conservation Plan). Regionally Significant ANSIs are the "next best" natural areas that also meet the five evaluation criteria. They are afforded protection in some parts of the province (Niagara Escarpment Plan; Oak Ridges Moraine Conservation Plan; Greenbelt Plan), and in some municipal official plans, such as the Region of Peel and City of Mississauga Official Plans. The Credit River at Erindale Regional Life Science ANSI falls in this category, and is not specifically protected as 'significant' under PPS Section 2.1.

The Ecological Survey of the Niagara Escarpment Biosphere Reserve (NEBR) (OMNR 1996) was a comprehensive document which documented ANSIs associated with the Niagara Escarpment; pages 23-28 of that document contain a detailed methodology of how ANSI's are defined in the landscape, including their boundaries. We understand that the summary published by OMNR (1984) is the only site description account published by OMNRF for the Credit River at Erindale Regional Life Science ANSI (S. Varga, pers. comm., October 2013).

The approach we have applied to recommend an appropriate boundary for the Significant Natural Area, the Credit River at Erindale ESA, and Regional ANSI was to consider:

a) City OP criteria for Significant Natural Areas (which are based on the PPS categories);
b) The ten ESA selection criteria used in CVC studies;
c) The 1977 MNR mission statement (see above), and its five criteria for the identification of ANSIs; and
d) Any additional factors described in the NEBR document (OMNR 1996).

In this setting, the existing natural features, ecological and hydrological functions, and potential or documented special attributes were used to recommend the appropriate boundaries at the site scale. The criteria and analysis are summarized in Tables 6 and 7 (see Section 4.5.2).

As discussed in Section 2.3, the site underwent major changes in cover, hydrologic conditions and landforms that significantly altered its biophysical resources, in the period from 1961 through 2008, with major stream diversion works that were generally coincident with and assignment of the ESA and ANSI designations. The site has been recovering from those perturbations since 2008 and this must be factored into the boundary review and determination.

4. FINDINGS

Background information was used to characterize the natural heritage resources and ecological functions on the subject property. The findings are discussed in the following sections.

4.1. BACKGROUND REVIEW

NHIC Query

A query of the Natural Heritage Information Centre (NHIC) database was undertaken in 2015 for the following eight (8) squares: 17PJ02, 17PJ70/71/72, 17PJ82, and 17PJ90/91/92. The following seven (7) wildlife species were listed for the areas in proximity to the study area: Cerulean Warbler, Bobolink, Eastern Meadowlark, Eastern Musk Turtle (Stinkpot), Eastern Milksnake, Clamp-tipped Emerald, and Tapered Vertigo. These species are discussed below with regard to their current status in the study area:

- Cerulean Warbler (Endangered) – a single historic record (1962); given the habitat availability in and around the study area and its overall very rare status in this part of southern Ontario, this species is very unlikely to be locally extant; none were detected during the 2014 breeding bird surveys and no suitable breeding habitat was observed;
- Bobolink (Threatened) – a record from 2005; this species requires large tracts of open country for breeding (Gahbauer 2007), so is highly unlikely to be present; none were detected during the 2014 breeding bird surveys;
- Eastern Meadowlark (Threatened) – a record from 2005; this species requires areas of open fields and agricultural habitat for breeding (Leckie 2007), so is considered highly unlikely to be present; none were detected during the 2014 breeding bird surveys;
- Eastern Musk Turtle (Stinkpot) (Special Concern) – a record in the vicinity from June 21, 2001; this species is found in shallow, slow-moving waters, usually in lakes and marshes (Harding 1997; McCullough 2002). There is no suitable habitat for this species in the vicinity of the study area so it is highly unlikely to be found on-site. Specific searches for Snapping Turtle and Eastern Milksnake were undertaken in May and June, 2014, under suitable weather conditions, and this species was not detected;
- Eastern Milksnake (Special Concern) – a record in the vicinity from May 9, 1987; given the mostly urban nature of the surrounding lands, and limited habitat on-site (with very little forest edge and old building foundations) it is highly unlikely that it occurs locally. None were found during the dedicated Eastern Milksnake surveys done in the spring and early summer of 2014, following OMNRF protocols (OMNR 2013b);
- Clamp-tipped Emerald (S2S3) – suitable habitat for this species, which consists of shady forest streams with pools and riffles (Catling and Brownell 2000; Jones et al. 2008) does not exist on the site or in adjacent lands, so it is unlikely to be present.

- Tapered Vertigo – a provincially rare species, (not a Species-at-Risk) considered S2S3 (NHIC 2013); this land snail was last recorded from the area in July 1939, and considering the historic nature of this record, it is unlikely that it still occurs locally.

See also Appendix 4 (SAR screening) for more details.

MNRF Information Request

An Information Request Form was submitted to Aurora District MNRF in October 2013, and a response was received on November 5, 2013 (David Denyes, Assistant Species at Risk Biologist; see Appendix 5). The letter lists three (3) Species-at-Risk that have records on file for the study site: Butternut, Snapping Turtle, and American Eel. Therefore, all three of these species were specifically searched for during the 2014 field investigations.

MNRF Information Gathering Form

An Information Gathering Form was submitted to Aurora District MNRF on November 17, 2014. This form outlined the activities proposed for the subject properties and summarized all relevant Species-at-Risk observations that had occurred during field investigations, including any for the three species identified by MNRF via the information request (see above). Based on a review of the information provided in the Information Gathering Form and on subsequent correspondence, Aurora District MNRF concluded that they had "*no further species at risk concerns with the proposed works*" (email from Brittany Ferguson, Fish and Wildlife Technical Specialist, dated December 20, 2014; see Appendix 5).

4.2. FIELD ASSESSMENTS

4.2.1. VEGETATION COMMUNITIES & VASCULAR PLANTS

The vegetation of the Merulla site reflects its location within the Credit River riparian corridor, and within the City of Mississauga, a major urban centre. As discussed in Section 2.3, human occupation of the lands, their location close to two major roads, and multiple alterations to tributary locations and confluences have resulted in significant landform alteration, filling of earlier channels, altered hydrologic catchment areas and flows, in combination with long-standing encroachment of residential, commercial and agricultural uses. These have affected the vegetation community cover present on the property.

Figure 6 and Table 2 summarize identified ELC communities. At present, the most extensive wooded vegetation communities are patches of regenerated deciduous forest and cultural woodland along the west and southeast edges of the property, which are contiguous with larger areas of deciduous forest and woodland extending southward along the Credit River corridor. All of the vegetation communities documented on the property are relatively common within the Southern Ontario landscape; they include regenerated pockets of riparian and lowland forest, eroding open riverside bluffs which are largely of exposed shale and clay with only localized vegetation cover, culturally influenced woodlands, cultural meadow, and anthropogenic cover which includes cleared area (portions of which have been farmed).


5
2935
4
6
10
3
2955
2
7
9
1
8
Legend
Study Area
Vegetation Communities
Anthropogenic (3, 9)
Cultural Meadow (7, 8)
Coniferous Plantation (1)
Mineral Cultural Woodland (2, 4)
Fresh - Moist Sugar Maple - Lowland Ash Deciduous Forest (5)
Fresh - Moist Willow Lowland Deciduous Forest (6)
Open Clay Bluff (10)
0 15 30 60
Metres
2015 Orthophotography, First Base Solutions
DOUGAN & ASSOCIATES
ECOLOGICAL CONSULTING & DESIGN
The information displayed on this map has been compiled from various sources. While every effort has been made to accurately depict the information, this map should not be relied on as being a precise indicator of locations, features, or roads, nor as a guide to navigation. MNR data provided by Queen's Printer of Ontario. Use of the data in any derivative product does not constitute an endorsement by the MNR or the Ontario Government of such products.
Merulla Environmental Impact Study
Vegetation Communities
PROJECT: DA13-084-02
CLIENT:
DATE: MAY 2017
SCALE: 1:1,500
DRAWN BY: LW
CHECKED BY: IR/JD
FIGURE:
6

The content of the factsheet for NAS CRR7 is generally consistent with the findings of the field work completed for this EIS; the most current City mapping (NAS 2013) shows the natural area representing the woodland portion along the south and west margins of the study area; however the open bluff along the river is mapped by the City as forest. A small cultural woodland straddling the northern property boundary (adjacent to the Sawmill Creek spillway, shown as polygon 2 on Figure 6) is excluded from NAS CRR7 on the City mapping.

Based on late spring/early summer and fall botanical surveys, supplemented with observations during other surveys, 167 vascular plant species were detected on the property. Of these, 152 were identified to species level and 15 were identified to genus level. Of the species identified, 86 (56%) were native and 67 (44%) were non-native. The full list of vascular plants documented on site is provided with status information in Appendix 3. Table 3 summarizes vascular plant findings and species status.

No species of global, national or provincial significance were recorded on the property; however, 24 species of regional / local significance were recorded (see Table 3), of which 13 are native species. Eastern Riverbank Wild-rye, Black Oak, Canada Wild-rye, Marsh Blue Violet, Running Serviceberry and White Spruce are ranked as regionally / locally rare within the CVC watershed (Kaiser, 2001) and rare within Peel Region (Varga et al., 2005). Three species ranked uncommon within Peel Region (Varga et al., 2005) were also recorded; Golden Sedge, Spotted Geranium and Swamp Red Currant. Nineteen species considered rare within the City of Mississauga, according to the City's Natural Areas Survey Database (City of Mississauga, 2002) were also recorded on the property. This includes eight native species and ten non-native species. The native species are Downy Serviceberry, Spreading Dogbane, Golden Sedge, Canada Honewort, Eastern Riverbank Wild-rye, Star-flowered Solomon's Seal, Swamp Red Currant, and Black Oak; the non-native species include Goutweed, Thyme-leaved Sandwort, European White Birch, Spiked Sedge, Leafy Spurge, European Ash, European Privet, Black Pine, Sweet Cherry, Common Speedwell and Siberian Squill. Although apparently rare within the City in terms of documented population numbers, non-native species are not considered species of conservation concern and are therefore in this report they are considered as potential invasives.

All but one of the regionally/locally significant species listed above were found within the deciduous forest/woodland, and open bluff habitats on the property. Table 4 provides locations and status for significant species (i.e., rarity status with CVC, Peel Region, and City of Mississauga).

Table 2. ELC Community Assessment Findings

ELC Polygon #	Vegetation Community Code/ Name	Area (ha/% of total site)	Description
1	**CUP3**/ Coniferous Plantation	0.05/2%	Located at the northwest corner of the site, polygon 1 is a remnant of an Austrian Pine (*Plnus nigra*) plantation that sits between the channelized Saw Mill Creek outlet (offsite to the north) and a gravel driveway to the south and east. Deciduous tree species such as Green Ash (*Fraxinus pennsylvanica*), Norway Maple (*Acer platanoides*), Manitoba Maple (*Acer negundo*), Red Oak (*Quercus rubra*) and American Elm (*Ulmus americana*) are emerging in the understory and ground layers. The vegetation composition of this polygon has a large proportion of non-native species.
2	**CUW1**/ Mineral Cultural Woodland	0.07/3%	This small woodland unit is bordered by the driveway entrance, and the channelized Saw Mill Creek, the Credit River and the open portion of the site. This woodland is considered cultural in nature as it is highly disturbed, not of natural origin, and the vegetation composition contains a high proportion of non-native species. The woodland is on steep slopes around the edges and there is extensive evidence of past soil alteration (soil and debris dumping). The overall canopy coverage is approximately 50%, including such species as White Ash (*Fraxinus americana*), Norway Maple, American Elm and Sweet Cherry (*Prunus avium*). The invasive shrubs Tartarian Honeysuckle (*Lonicera tatarica*) and Buckthorn (*Rhamnus cathartica*) are prominent in the understory alongside some native shrubs such as Staghorn Sumac (*Rhus typhina*) and Black Raspberry (*Rubus occidentalis*). The ground layer is dominated by the noxious invasive Garlic Mustard (*Alliaria petiolata*). As of May 2017 Emerald Ash Borer has killed most of the ash trees within this polygon.
3	**ANTH**/ Anthropogenic	1.07/50%	This anthropogenic area is cleared and graded. Our 2014 and 2017 surveys determined this area as having 95% bare soil by coverage, but it has a history of crop tillage. This centrally located area contains the majority of the study area lands, and is bordered with silt fencing. Disturbance-tolerant forbs occur along the edges of the polygon, such as White Sweet Clover (*Melilotus albus*), Canada Goldenrod (*Solidago canadensis*), Birds-foot Trefoil (*Lotus corniculatus*), Yarrow (*Achillea millefolium*), Chicory (*Cichorium intybus*), Canada Thistle (*Cirsium arvense*), Wild Carrot (*Daucus carota*) and Fuller's Teasel (*Dipsacus fullonum*). Tracks of White-tailed Deer were noted traversing this polygon. At the eastern edge of this polygon, beyond the silt fencing, this polygon merges with polygon 10, consisting of open bluff where the land slopes down to the Credit River. On the east end of this polygon there is an abandoned in-ground swimming pool. This pool is used by some wildlife and species noted here include several species of damselflies and dragonflies; Green Frogs and American Toads (adults, tadpoles and egg masses); and a juvenile Snapping Turtle.

ELC Polygon #	Vegetation Community Code/ Name	Area (ha/% of total site)	Description
4	**CUW1**/ Mineral Cultural Woodland	0.04/2%	This small cultural woodland remnant has higher native plant diversity, including locally to regionally significant species immediately adjacent to polygon 10. This polygon was classified as a cultural woodland with relatively low canopy coverage, high level of disturbance, and small size/fragmented condition. This polygon contains a concrete pad, a remnant of past residential uses. The canopy (with only a few trees over 10 cm dbh) is comprised largely of Black and Red Oak (*Quercus velutina* & Q. *rubra*) with a mix of associated tree species such as Bur and White Oaks (*Quercus macrocarpa & Q. alba*), Sugar Maple (*Acer saccharum var. saccharum*), Black Cherry (*Prunus serotina*), Sweet Cherry (*Prunus avium*), Green Ash, Eastern Hop-hornbeam (*Ostrya virginiana*), Trembling Aspen (*Populus tremuloides*), American Basswood (*Tilia americana*), Scotch Pine and Norway Spruce (*Picea abies*). Understory shrubs included Roundleaf Dogwood (*Cornus rugosa*), Juneberries (*Amelanchier arborea and A. spicata*), Chokecherry (*Prunus virginiana*), Red-osier Dogwood (*Cornus sericea*) alongside the invasive Tatarian Honeysuckle. Herbaceous species include Canada Goldenrod, Yarrow, Spreading Dogbane (*Apocynum androsaemifolium*), Rough Cinquefoil (*Potentilla recta*), Canada Bluegrass (*Poa compressa*), King Devil (*Hieracium praealtum*), Field Goldenrod, Heart-leaf Aster (*Symphyotrichum cordifolium*), Ditch-stonecrop (*Penthorum sedoides*) and Pussytoes (*Antennaria* sp.). This is the only evident remnant of dry oak forest that would have historically occupied the river bluffs, which have eroded significantly (see polygon 10).
5	**FOD6-1**/ Fresh – Moist Sugar Maple – Lowland Ash Deciduous Forest	0.19/9%	Polygon 5 is a Fresh-Moist Sugar Maple-Lowland Ash forest fragment located in the southeast corner of the property, which extends off-site. This polygon has a >60% canopy closure with Sugar Maple and Green Ash alongside various associated species such as Paper Birch (*Betula papyrifera*), Black Cherry, American Basswood, Eastern Hop Hornbeam, Eastern Cottonwood (*Populus deltoides*) and Black Maple (*Acer nigrum*). Manitoba Maple is prominent along the banks of the Credit River within this polygon. Various native and introduced shrubs fill the understory including Chokecherry, Gray Dogwood, Rose (*Rosa* sp), Tartarian Honeysuckle, Raspberries (*Rubus spp.*) and Japanese Barberry (*Berberis thunbergii*). The very sparse ground layer includes such species as Yellow Avens (*Geum aleppicum*), Rough Avens (*Geum laciniatum*), Tall Butter-cup (*Ranunculus acris*), Garlic Mustard, Broad-leaved Goldenrod (*Solidago flexicaulis*), and Poison Ivy (*Toxicodendron radicans*). The polygon had very limited spring ephemeral cover on May 10, 2017. A watercourse channel, remnant of the former Sawmill Creek outlet to the Credit River, extends through this polygon from polygon 6.

ELC Polygon #	Vegetation Community Code/ Name	Area (ha/% of total site)	Description
6	**FOD7-3**/ Fresh - Moist Willow Lowland Deciduous Forest	0.35/16%	Polygon 6 is a linear deciduous forest fragment running parallel with Mississauga Road. Although contiguous with the forest of polygon 5, this forest differs in its species composition and disturbance level. As of 2014, the canopy composition had a prominence of exotic tree Willows (*Salix* spp.) with Green Ash, American Basswood, American Elm, native and introduced Maples (*Acer* spp.) and occasional Eastern White Pines (*Pinus strobus*). As of May 2017, the live canopy had shifted significantly due to loss of willow trees during ice storms, and the progress of Emerald Ash Borer infestation. The shrub layer includes Common Buckthorn, Roundleaf Dogwood, Common Red Raspberry (*Rubus idaeus*), Purple Flowering Raspberry (*Rubus odoratus*), Riverbank Grape (*Vitis riparia*) and Japanese Barberry. A relatively rich spring flora was observed in the polygon in May 2017, including Jack-in-the-Pulpit (*Arisaema triphyllum*), Yellow Trout-lily (*Erythronium americanum*), Wood Anemone (*Anemone quinquefolia*), Narrow-leaved Spring Beauty (*Claytonia virginica*) Wild Geranium (*Geranium maculatum*), Yellow Avens, Large-leaved Avens (*Geum macrophyllum*), John's Cabbage (*Hydrophyllum virginianum*), Cut-leaved Toothwort (*Dentaria laciniata*), False Solomon's Seal (*Maianthemum racemosum*), May Apple (*Podophyllum peltatum*), Bloodroot (*Sanguinaria canadensis*), Broad-leaved Goldenrod, Tall meadow Rue (*Thalictrum polygamum*), and Violets (*Viola* sororia, and others). Invasive plants including Garlic Mustard (extensive patches), Goutweed (*Aegopodium podagraria*), Creeping Euonymus (*Euonymus fortunei*), Scilla (*Silla siberica*) and Lily-of-the-Valley (*Convallaria majalis*). Tracks of Raccoon and White-tailed Deer were noted traversing this polygon. This polygon is located beside the busy Mississauga Road, and exhibits various encroachment impacts as evidenced by tossed garbage, cut tree stumps, fill piles, and old concrete. Despite heavy rainfall immediately preceding the May 10, 2017 field visit, minimal flows were observed in the ditch channel, associated with culvert outlets under Mississauga Road.
7 & 8	**CUM1-1**/ Dry – Moist Old Field Meadow	0.03/1%	These two small patches of cultural meadow are located beside the laneway entrance along Mississauga Road, with a mix of early-successional, disturbance-tolerant forbs and grasses. Characteristic species of these small meadows include Canada Goldenrod, White Sweet Clover, Birds-foot Trefoil, Orchard Grass (*Dactylis glomerata*), Kentucky Bluegrass, Creeping Wild-rye (*Elymus repens*) and Wild Carrot (*Daucus carota*). A few woody species have begun to emerge, primarily in polygon 7, including Tartarian Honeysuckle, Norway Maple, Sugar Maple and Trembling Aspen.
9	**ANTH**/ Anthropogenic	Adjacent to site	This polygon is a gravel driveway that fronts onto Mississauga Road and is devoid of vegetation.
10	**BLO1-1/Open Clay Bluff**	0.12/6%	This polygon is a steep (>1:1) clay and shale face which is largely open and eroding, with tree and shrub cover of less than 25%. It extends from the top of bank to the river's edge. It contains patches of immature Eastern White Cedar (*Thuja occidentalis*), Blasam Poplar (*Populus balsamifera*), Hop Hornbeam, and White Birch trees, and several severely leaning/hanging Eastern Hemlock (*Tsuga canadensis*) trees affected by steep grades and erosion. Understorey shrubs include Juneberries (*Amelanchier arborea* and *A. spicata*) and Round-leaved Dogwood. Groundcovers are very limited and include White Sweet Clover and Goldenrod (*Solidago spp.*)Towards the west end, there is growth of Scotch Pine (*Pinus sylvestris*), Gray Dogwood (*Cornus racemosa*), Buckthorn, and Field Goldenrod (*Solidago nemoralis*).

Table 3. Summary of Vascular Plant Survey Findings

Criteria	#	Notes
Total # of Vascular Plant Species	167	
Number of species identified to species level	152	An additional 15 plants were identified to genus level.
Number (%) of native species: Number (%) of non-native species	86 (56%) 67 (44%)	The relatively high percentage of non-native species is attributable to the anthropogenically disturbed nature of the property.
Nationally significant species	0	No species ranked END, THR or SC by COSEWIC were recorded on the property
Provincially significant species	0	No species ranked END, THR or SC by SARO, or S1 - S3 by NHIC were recorded on the property.
Regionally/ locally significant species	**13 (native spp. only)**	**CVC Watershed:** Eastern Riverbank Wild-rye (*Elymus riparius),* Black Oak *(Quercus velutina)*, Canada Wild-rye (*Elymus canadensis),* Marsh Blue Violet (*Viola cucculata),* Running Serviceberry (*Amelanchier spicata),* White Spruce (*Picea glauca)* **Peel Region (rare or uncommon):** Eastern Riverbank Wild-rye*,* Black Oak*,* Canada Wild rye, Marsh Blue Violet, Running Serviceberry, Spotted Geranium (*Geranium maculatum),* Golden Sedge (*Carex aurea),* Swamp Red Currant *(Ribes triste),* White Spruce **City of Mississauga (0, 1, or 2):** Black Oak (*Quercus velutina)*, Black Pine, Canada Honewort (*Cryptotaenia canadensis),* Common Speedwell (*Veronica officinalis-I),* Downy serviceberry (*Amelanchier arborea)*, Eastern Riverbank Wild-rye, European Ash (*Fraxinus excelsior-I),* European Privet (*Ligustrum vulgare-I),* European White Birch (*Betula pendula-I),* Golden Sedge*,* Goutweed (*Aegopodium podograria-I)*, Leafy Spurge (*Euphorbia esula-I),* Siberian Squill (*Scilla siberica-I)*, Spiked Sedge (*Carex spicata-I)*, Spreading Dogbane (*Apocynum androsaemifolium)*, Star-flowered False Solomon's Seal (*Maianthemum stellatum),* Swamp Red Currant, Sweet Cherry (*Prunus avium-I),* Thyme-leaved Sandwort (*Arenaria serpyllifolia-I)*

Table 4. Locations of Vegetation Species of Local/Regional Conservation Concern

Species	Location (ELC Polygon #)	Comments
Downy Serviceberry (*Amelanchier arborea*)	4, 10	This shrub typically grows in open rocky woods, wooded slopes and bluffs as represented by polygons 4 and 10.
Running Serviceberry (*Amelanchier spicata*)	4,10	This shrub prefers dry, sandy plains and savannas, and was observed in polygons 4 and 10.
Spreading Dogbane (*Apocynum androsemifolium*)	4	This perennial prefers sandy or gravelly habitats and was found in polygon 4
Golden Sedge (*Carex aurea*)	4, 5	This small sedge, somewhat disturbance tolerant, can be found in open or shaded areas (Hipp, 2008). At the property is was found as a rare occurrence in the ground layer of polygons 4 and 5.
Canada Honewort (*Cryptotaenia canadensis*)	2, 6	This small forb of the carrot family prefers deciduous forests and swamps (Voss & Reznicek, 2012). It was found in low-lying pockets within the ground layer of polygons 2 and 6.
Canada Wild-rye (*Elymus canadensis*)	5	This grass is drought tolerant and can inhabit forest edges, meadows and rocky bluffs. It was detected close to the riverbank in polygon 5
Eastern Riverbank Wild-rye (*Elymus riparius*)	5	This grass species was recorded near the river shoreline in the ground layer of ELC polygon 5.
Spotted Geranium (*Geranium maculatum*)	6	This woodland flower was recorded as a rare occurrence in polygon 6
Star-flowered False Solomon's Seal (*Maianthemum stellatum*)	5, 6	This perennial can thrive in partial shade and along woodland edges, and was detected as a rare occurrence in polygons 5 and 6.

Species	Location (ELC Polygon #)	Comments
Black Oak (*Quercus velutina*)	4	This deciduous tree species, typically occurs on dry sandy sites (Farrar, 1995); it is associated with the ridge above the river.
White Spruce (*Picea glauca*)	4	This species was likely planted.
Swamp Red Currant (*Ribes triste*)	6	This low shrub, identified during the June 2014 field visit, was recorded as a rare occurrence within the understory of ELC polygon 6.
Marsh Blue Violet	6	This wildflower of forests and wet areas was identified in polygon 6.

4.2.2. WILDLIFE CHARACTERIZATION

As summarized in Section 2.4, additional wildlife surveys were conducted in 2014, including breeding bird surveys, nocturnal amphibian surveys, and targeted surveys for Species-at-Risk (Eastern Milksnake and Snapping Turtle). The results are summarized below.

Breeding birds

Twenty-five (25) species of birds were detected in 2014 during the breeding bird surveys, with 19 species tallied on both May 26 and June 9. An additional five (5) species were detected during other surveys in May and June. Of the 30 species observed, 25 of them were likely breeding on-site or in the local area, with five (5) of them – Common Loon, Double-crested Cormorant, Great Blue Heron, Black-crowned Night-Heron, and Ring-billed Gull – noted flying over the site only. One of the 25 potential breeding species is introduced (non-native): European Starling (*Sturnus vulgaris*). Of the remaining 24 species, one (1) of them is considered a Species at Risk (SAR): Bank Swallow *(Riparia riparia*), which is designated as "Threatened" at both a federal level (COSEWIC 2016) and a provincial level (OMNRF 2016). At a provincial level, all of the 24 native breeding species have been assigned an Srank of either S4 or S5 by the Natural Heritage Information Centre (NHIC 2015b), which indicates that their provincial populations are "apparently secure" or "secure", respectively (NHIC 2016a).

At a regional level, five (5) species – Belted Kingfisher, Northern Flicker, Eastern Kingbird, Bank Swallow, and Baltimore Oriole – have been designated by Partners in Flight as priority species in BCR 13 (Lower Great Lakes/St. Lawrence plain) (OPIF 2008); BCR 13, the Lower Great Lakes – St. Lawrence Plain, corresponds roughly with the area south of the Canadian Shield. The Ontario Landbird Conservation Plan, from which the list of priority landbird species was obtained, is a coalition of government agencies and organizations led by Environment Canada Ontario Region (EC) and the Ontario Ministry of Natural Resources and Forestry (OMNRF), in partnership with Bird Studies Canada (BSC).

At a local level, six (6) species are of conservation concern within the Credit River Valley watershed (CVC 1997): Killdeer, Belted Kingfisher, Eastern Kingbird, Bank Swallow, Gray Catbird, and Common Grackle. In addition, all 24 species have L-Ranks of L4 or L5 in the adjacent Toronto and Region Conservation Authority, indicating that they are not of conservation concern. Finally, in adjacent Halton County, 23 of the 24 species are considered either common or abundant breeding species, with the one exception being Northern Rough-winged Swallow, which is classified as uncommon (Dwyer 2006).

The Ontario Ministry of Natural Resources and Forestry (OMNR 2000) considers one (1) of the breeding bird species as being area sensitive: White-breasted Nuthatch. This indicates that the species requires large areas of suitable habitat for its long-term survival and is therefore more sensitive to development.

The highest level of breeding evidence obtained during the surveys was "confirmed" breeding (OBBA 2001). This was evidenced by the observation of fledged young (code FY). This evidence was collected for Mallard and Killdeer. The next highest level of breeding evidence was of "probable" breeding (OBBA 2001), as evidenced by pairs of birds (code P) or territorial males (code T, as evidenced by a singing male being present at the same location at least seven days apart). This evidence was the highest level obtained for eight (8) species. The next highest level of breeding evidence was "possible" breeding (OBBA 2001), as seen with singing males (code S) or birds being present in appropriate breeding habitat during the breeding season (code H). This evidence was the highest breeding level for 15 species, with nine (9) of these detected singing (S), and the other six (6) present in suitable habitat (H), but not singing or displaying territoriality.

For application of the Migratory Birds Convention Act (MBCA 1994), 19 of the 25 species recorded as at least possibly breeding are protected under the Act. As such, it means that it is illegal to harm or kill these species, or to harm or destroy their nests and nesting habitat. The six (6) species that are afforded no protection under the Act are Red-tailed Hawk, Blue Jay, American Crow, European Starling, Red-winged Blackbird, and Common Grackle.

For application of the Endangered Species Act (ESA) and the Species at Risk Act (SARA), there was one Species-at-Risk detected on the site: Bank Swallow, which is considered "Threated" at a federal level (COSEWIC 2016) and a provincial level (OMNRF 2016). This species is discussed as follows:

- Bank Swallow – up to six (6) birds were seen foraging mostly over the Credit River, but also over the eastern edge of the property, on both breeding bird surveys and the May 6 and June 20 herpetile surveys. The birds are definitely breeding somewhere along the Credit River, however a thorough check on all dates of the bluffs along the eastern edge of the property revealed no active nesting taking place. Therefore, the birds are not nesting on-site or within 120 metres of the site, but likely further north along the Credit River. In addition, if this species does nest in the future in these banks, the proposed development will have no impact to these physical features and therefore no negative impacts on this species.

For full details on the breeding bird surveys for this site, please see Appendix 1.

Herpetofauna

No amphibians were detected during any of the surveys. Full details regarding the two surveys are as summarized in Table 5.

Table 5. Summary of Nocturnal Amphibian Call Surveys

April 26, 2014				
Max. Wind Speed = 18.6 km/h		**Low. Temperature =** 6.5 °C		**Relative Humidity** = 61.1%
Survey Point	**Description**	**Orientation**	**Amphibians Detected**	**Background Noise Level***
1	East of Mississauga Road	95°	None	2
2	East of Mississauga Road	190°	None	3
May 28, 2014				
Max. Wind Speed = 0.0 km/h		**Low. Temperature =** 16.8 °C		**Relative Humidity** = 71.4%
Survey Point	**Description**	**Orientation**	**Amphibians Detected**	**Background Noise Level***
1	East of Mississauga Road	136°	None	2
2	East of Mississauga Road	208°	None	3

*Background Noise Level Codes: 0=No appreciable effect; 1= Slightly affecting sampling; 2=Moderately affecting sampling; 3= Seriously affecting sampling; 4=Profoundly affecting sampling (Bird Studies Canada, 2009)

No Snapping Turtles were located during the targeted surveys. The adjacent Credit River is shallow and fast flowing in this area, with no associated riparian wetlands present. Therefore, it is unlikely that large adult Snapping Turtles would forage or overwinter near the property and, even though potential nesting habitat occurs in gravel/sand areas on-site, it is unlikely that they nest here. However, a young Snapping Turtle was detected on June 19, 2014, in the old concrete swimming pool at the former residential site. Given the date and the size of the animal, it clearly was not a young of the year. It does demonstrate that the property is utilized occasionally by animals that have likely dispersed from adjacent areas.

No Eastern Milksnake were detected during the surveys and are unlikely to occur on the site, especially considering the highly urbanized nature of the surrounding area (see Section 4.1 and Appendix 4).

Incidental wildlife

Four (4) species of mammals were detected during the field investigations: Gray Squirrel, Coyote, Raccoon, and White-tailed Deer. All of these species are considered common and widespread in southern Ontario and the local region.

Eastern Gartersnake was detected during the herpetile surveys; this species is common and widespread, both locally and on a regional and provincial level.

As outlined above, a young Snapping Turtle was observed in the old concrete swimming pool on the site in 2014, demonstrating that this species can utilize the site for juvenile dispersal and foraging. Although no amphibians were heard during the nocturnal amphibian surveys, adult and tadpoles of Green Frog and adult American Toads were observed in the old swimming pool, indicating that local breeding does occur. Clearly, this is not ideal amphibian habitat, and the number and diversity of species that occur here would not be considered significant. Both American Toad and Green Frog are common and widespread species in all of southern Ontario and are not of conservation concern at any jurisdictional level, including CVC, TRCA, and adjacent Halton Region. However, the presence of a young turtle and frogs using anthropogenic

structures indicates their presence in the vicinity, and the likelihood that appropriate habitat features could be introduced on the site that would benefit these and other species.

4.2.3. AQUATIC CHARACTERIZATION

The subject property is located along the west side of the Credit River, approximately 53 m southeast (downstream) from the Dundas Street Bridge. The river is approximately 23-28 m wide in the vicinity of the property. The property fronts along the Credit River for approximately 213 m, with the upstream 110 m of shoreline being an almost vertical bank of shale rock in the lower portion near the water, with a steep-sloped cap of looser shale/clay material (see Photograph 1 (of 4) in Appendix 7). The remaining downstream section of bank is a much lower soil bank with tree cover (Photograph 2). The proposed development, consisting of single family homes on two large lots, has planned set-backs of a minimum of 10 m from the long-term stable top of bank (including applicable stability and erosion setbacks), following the Credit Valley Conservation Watershed Planning and Regulation Policies (2010). No in-water work is anticipated to develop the site.

The only aquatic species at risk known to occur here is the American Eel (*Anguilla rostrata*). It is known from the Credit River historically, and has been captured in the river in recent years (Erling Holm, R.O.M., pers. comm.). At this time, it is not protected under the federal Species at Risk Act (http://www.sararegistry.gc.ca. November 1, 2014), but is classified as Endangered under the Ontario Endangered Species Act (http://www.ontario.ca/environment-and-energy/species-riskontario-list, November 2, 2014) which provides legal protection for the species and its habitat.

Habitat use by eels is extremely diverse, and eels are frequently reported as habitat generalists in freshwater (MacGregor et al., 2013). Wiley et al. (2004) evaluated the importance of 17 physical habitat, chemical, and biological variables on the density of American Eels in 5 major Maryland river basins. While the results of Wiley et al. (2004) were generally consistent with other studies suggesting a general lack of significant stream habitat associations, velocity-depth diversity was identified as the only important habitat variable positively correlated with eel density (Wiley et al., 2004). American Eels also exhibit daily, seasonal, and ontogenetic (e.g. size/age) variation in habitat use (Johnson and Nack, 2013). Vegetation and interstitial spaces such as found in rock piles, logs and other complex structures, as well as deciduous leaf litter, are important to eels as cover, especially during daylight hours (MacGregor et al., 2013). Eels in small tributaries have been observed moving downstream in the fall to areas of mud or silt bottoms where eels are known to burrow into the mud to overwinter (MacGregor et al., 2013).

The instream habitat in the Credit River adjacent to the subject property consists of low to moderately sloped shallow riffles and runs, and shallow pools (Photographs 3 and 4). In the upstream portion of the river adjacent to the subject property the substrate is bedrock along the west bank toe of slope, with cobble and gravel extending almost across the river in the form of a bar at the upstream end of the property (Photograph 3). Downstream of the bar, the bedrock extends approximately half way across the river from the west bank, with cobble/gravel along the east side. Adjacent to the lower half of the property, the river is generally shallow riffle with cobble/gravel substrate (Photograph 4). The instream

habitat can be characterized as fairly diverse, with more gravelly portions and variable velocities associated with the bar potentially providing spawning habitat for suckers and migratory salmonids from Lake Ontario. This section of river provides a moderate variety of substrates with interstitial spaces as well as moderately variable depth and velocity conditions that could provide average habitat for American Eel. Eel likely migrate through this area during their life cycle.

4.3. SIGNIFICANT WILDLIFE HABITAT ASSESSMENT

Based on the background review and field investigations, candidate Significant Wildlife Habitat is evident on the site per MNRF criteria (OMNR 2000; OMNRF 2015) and also Region of Peel (Category C6) for Habitats for Species of Conservation Concern – Locally Significant Species (13 native plant species with local to regional significance, associated with ELC polygons 4, 5, 6 and 10; status based on CVC watershed lists, a draft GTA draft list that includes Peel Region (Varga et al. 2005), and the City of Mississauga's NAI rarity list). The Region's SWH categories are from Figure 5 of the Region of Peel Official Plan (Region of Peel 2011), which were based on North-South Environmental et al. 2009.
While MNRF SWH is not triggered for Animal Movement Corridors, the site vicinity constitutes "Secondary Corridor" e.g. major river valley (based on Region of Peel Criterion D in Figure 5 of ROP). Appendix 2 summarizes the screening of potential categories per MNRF (OMNR 2000; OMNRF 2015).

For animal movement corridors, the MNRF only lists categories for White-tailed Deer and amphibians; significant movement corridors do not exist on the site for either of these groups (see Appendix 2). The Region's SWH criteria recognize general movement corridors (category D, page 109), which include the two groups listed above but also other mammals and wildlife. The criteria also identify three scales of general movement corridors (primary, secondary and tertiary), which indicates that this site is adjacent to a secondary movement corridor (Credit River). Given the habitat conditions on the site, presence of busy urban roadways (Mississauga Road and Dundas Street), and the close proximity of suburban areas to the west, south and east, the site vicinity contains significant barriers that disfavor its ranking as a major wildlife movement corridor even though it is within the Credit River valley.

The Region and MNRF SWH criteria differ somewhat for other categories. Unlike the MNRF, the Region and Peel and Town of Caledon SWH criteria (per North-South Environmental et al. 2009) provides specific criteria for category A2 (colonial bird nesting sites), where Bank Swallow is listed as an indicator species (page 89). Their significance criteria list 30 pairs or nests so the number of birds detected along the Credit River would not meet that criteria. In any event, no SWH was identified in this category meeting either standard.

4.4. SPECIES AT RISK SCREENING

As noted earlier, the query of the MNRF database via an information request revealed records of the following SAR: American Eel, Butternut, and Snapping Turtle. As such, these three species were specifically

surveyed for in 2014 and the results are presented elsewhere in this report (see Sections 4.2 and 4.3). A single Snapping Turtle was observed during the field investigations (one young animal in the abandoned swimming pool) and a discussion regarding this species is found in Section 4.2.2. In addition, as presented in the results of the breeding bird survey, Bank Swallow (Threatened) was observed along the Credit River and is likely nesting in bluffs located upstream from the properties.

The following is an analysis of other SAR known to occur in the City of Mississauga that, though not found during the field investigations and not having any records in the NHIC or MNRF databases, could occur locally. As such, their potential status on the site and in adjacent lands is considered given the proximity of the Credit River and the habitats found on site.

- Barn Swallow (Threatened) – this species may be present locally as there is some open foraging habitat and there are suitable structures for nesting in the vicinity. However, no birds were detected during the 2014 field investigations and there are no suitable nesting structures found on the site.
- Milksnake (formally Special Concern) – a historic record (1987) for this species was found in the NHIC database; surveys following MNRF-endorsed protocols were undertaken in 2014 and no snakes were found. See Section 4.1 and Appendix 4 for details.
- Monarch (Special Concern) – this species may be present on the site during fall migration in non-significant numbers. No stands of Common Milkweed (its hostplant) were found during surveys, so it is not present as a breeding species.
- Bobolink (Threatened) – there are records for this open country species in the NHIC database. However, there is no suitable habitat on site (see section 4.1).
- Chimney Swift (Threatened) – although there were no records found in either the NHIC or the MNRF databases, it is likely that this species breeds within the City of Mississauga. However, no birds were detected during the 2014 field investigations and there are no suitable nesting sites (chimneys or open cavity trees larger than 50 cm dbh) on the site; in addition, no trees are going to be removed as part of the proposed development.
- Eastern Meadowlark (Threatened) – there are records for this open country species in the NHIC database. However, there is no suitable habitat on site (see section 4.1).
- Eastern Spiny Softshell (Threatened) – although there were no records found in either the NHIC or MNRF databases for this species, it may occur in the adjacent Credit River. However, no works are proposed within the valley or river, and there will be no adverse impacts to these environs from the proposed development.

Four species of Endangered bats are known to occur in southern Ontario and likely also from the City of Mississauga: Eastern Small-footed Myotis (*Myotis leibii*), Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*). As outlined in Section 4.3 and Appendix 2 (SWH assessment), there are no suitable overwintering sites for any of these four species on site, or other habitats on-site that would be considered significant from a SWH perspective (e.g. Seasonal Concentration Areas of Animals: Bat Hibernacula and Bat Maternity Colonies). Any suitable large trees

(25+ cm dbh with snags) for setting up maternity roosts are located to the south of the proposed development and will not be negatively impacted; no large trees are proposed for removal because of this development. In addition, there are no buildings on the site that may be used by bats for roosting. As such, we do not recommend any further habitat assessments for bats or acoustic surveys for their detection.

Based on NHIC records, the following plant species are known from the general vicinity and potential habitat for them could be present on or adjacent to the site; as such, they are discussed as follows:

- American Chestnut (Endangered) – only lowland, secondary growth habitat is present on the site which is highly unlikely to support re-sprouting of this species; none were detected during the field investigations.
- American Columbo (Endangered) – only marginal habitat for this species is present on the site; none were detected during the field investigations.
- Butternut (Endangered) – potential habitat is present on or adjacent to the site; MNRF has records in the vicinity for Butternut in their database, but vegetation surveys specifically targeting this species in 2014 did not find any specimens.
- Eastern Flowering Dogwood (Endangered) – only lowland, secondary growth habitat is present on the site which is highly unlikely to support re-sprouting of this species; none were detected during field investigations.
- Red Mulberry (Endangered) – only lowland, secondary growth habitat is present on the site which is highly unlikely to support re-sprouting of this species; none were detected during field investigations.

Appendix 4 contains comprehensive screening for SAR as well as provincially rare species that are on record with NHIC.

4.5. SIGNIFICANT NATURAL AREA, CORE AREA, ESA, AND ANSI BOUNDARY REVIEW

4.5.1. POLICY CONSTRAINTS

Section 1.3 summarized the policy frameworks that apply to the subject properties based on Provincial, Regional, City, and CVC policy guidance. The EIS has assessed features and ecological functions on a site-specific basis. In our opinion, the following policy triggers are represented/not represented on the site in accordance with the categories defined (under the guidance of PPS 2014) in the Region and City Official Plans, and CVC Regulation.

<u>Region of Peel Official Plan</u>

- Significant woodland is present, considering the overall extent of continuous forest extending onto adjacent lands, which exceed 4 ha, representing Greenlands NAC (Natural Area and Corridors) woodlands as defined in OP Table 1 referenced in section 2.3.2.2 (c) in the Regional OP;

however, no woodlands representing Potential Natural Areas and Corridors are present, based on definitions in Table 1;

- Significant valleyland of the Credit River is present which encompasses the property, meeting several Core Valley and Stream Corridor criteria defined in OP Table 2 (Criteria and Thresholds for the Identification of Core Valley and Stream Corridors) referenced in section 2.3.2.2 (h) in the Region of Peel OP;
- Significant wildlife habitat is present per section 2.3.2.9 (c) and Figure 5 (Criteria and thresholds for the identification of significant wildlife habitat) in the Region of Peel OP; includes locally/regionally significant plants (OP Category C6) associated with natural polygons 5, 6 and 10 and Secondary Corridor (Category D);
- Fish habitat is present in the Credit River immediately adjacent to the property and is protected as per section 2.3.2.9 (d) in the Region of Peel OP;
- No evaluated provincially or non-provincially significant wetlands or coastal wetlands are present in the vicinity which are protected per section 2.3.2.9 (a) of the Region of Peel OP.;
- No provincially significant areas of natural and scientific interest are present; a regional ANSI is present which is protected per section 2.3.2.9 (e) of the Region of Peel OP.
- No habitat(s) of endangered species and threatened species is present in the area proposed for development; habitat of an Endangered species is present within 120 m the area proposed for development (i.e. habitat of American Eel, Endangered in Ontario).

<u>City of Mississauga Official Plan (2015)</u>

The natural heritage policies in Section 6.3 of the City of Mississauga's Official Plan (2015) address the protection of the City's Green System; Schedule 1a "Urban System – Green System" indicates that the entire site, and the river itself, are part of the Green System. A major portion of the woodlands in the study area are currently mapped as 'Natural Area' within NAS CRR7, which qualifies as a "Significant Natural Area" under City policies. The criteria for designation as a Significant Natural Site are outlined in Policy 6.3.12, and although the OP does not describe how each NAS component was identified to be included, the study site:

- Is located within the valley lands of the main branch of the Credit River; the property extends across the west bank of the Credit River;
- Is within lands identified as the Credit River at Erindale Regional ANSI, and Credit River at Erindale Environmentally Sensitive Area #7, which are protected under City policies 6.3.12 (a) and (b);
- <u>Does not</u> contain habitat(s) of endangered species and threatened species in the area proposed for development; however, habitat of an Endangered species is present within 120 m the area proposed for development (i.e. habitat of American Eel, Endangered in Ontario).
- Contains fish habitat in the Credit River which adjoins the site;
- Contains significant wildlife habitat as defined in the Region of Peel Official Plan;
- Contains significant woodlands (ELC polygons 5 and 6) which are part of a woodland complex that is greater than 0.5 ha in size, which is located within 30 metres of a major watercourse; these woodlands represent secondary growth that does not qualify as old growth (greater than or equal to 100 years old); the woodlands support a significant linkage function as part of forested habitat along the Credit River;
- <u>Does not</u> contain provincially significant wetlands or other wetlands greater than 0.5 ha.
- Is located within the significant valleyland of the Credit River as defined in Region of Peel policies.

The lands identified as the City's G1 (Hazard Lands) zoning by the OMB in 2010 reflect the protected area limits of the floodplain and stable slope limits, and also encompass a major portion of the woodlands. Areas with G2 (Natural Areas) zoning are predominantly cultivated field with some natural and cultural woodlands at the perimeter.

CVC Regulation (Ontario Regulation 42/06)

The CVC Regulation of Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses, under Ontario Regulation 42/06), applies to the entire site. The lands are regulated by CVC based on their proximity to the Credit River, location partially within its floodplain (i.e., lands zoned as G1 by the City of Mississauga), and there are steep slopes present. Figure 4 indicates the proposed development at #2935, as well as the regional floodline and stable slope line. Other relevant constraint features are discussed in Section 4.5.2 and shown on Figure 7 (Recommended SNA Boundary).

4.5.2. BOUNDARIES

As outlined in EIS Section 3.7, the Merulla Properties study area was evaluated as to its appropriateness for inclusion within the City's Significant Natural Area NAS CRR7, the Credit River at Erindale ESA, and Credit River at Erindale Regional Life Science ANSI using Official Plan, CVC and MNRF criteria, respectively. This section is primarily focused on the ESA, ANSI and SNA designations and boundaries; the Regional Core Areas and City of Mississauga Significant Natural Area definitions are based on the respective Official Plans which reflect the municipal interpretation of PPS-defined significance criteria; these are addressed in further detail in Section 4.6. In the case of the Core Areas/SNA and ESA, this EIS is intended to define the appropriate boundaries at the site-specific level.

The ESA evaluation results are presented in Table 6; they indicate that all of the criteria are still met in the overall ESA and to some extent by features on the subject properties. None of the key criteria attributes in evidence are exclusive to the property, nor would they be negatively impacted by the proposed development at the overall ESA scale. There is opportunity for site-specific enhancement of conditions that support some criteria, given the history of alterations both on site and in the general vicinity.

The MNRF has defined the subject ANSI as a Regional ANSI, which, unlike a Provincial ANSI, is not specifically protected under the PPS, but protected under the Region of Peel and City of Mississauga Official Plans. Published MNRF documents (MNR 1984) contain only a brief description of the subject ANSI including specific notation by Hanna (1980) describing two key features:

> *"Steep, wooded river valley and floodplain stretching 6 km in length, south of Streetsville. River floodplain Manitoba maple-willow-black maple, valley slope sugar maple-hemlock-beech and sugar maple-red oak-black cherry and tableland white oak-white pine. Tableland on east side is residential development while west side contains Erindale College, orchards and proposed development. Newly constructed bridge over northern portion of site. Provincially rare sycamore and black walnut and other rare plant sp. Exposed steep shale bedrock in northern portion."*

Table 6. Evaluation of Merulla Properties using CVC ESA selection criteria

Selection Criteria for Credit River at Erindale ESA	Satisfied by Ecologistics (1979) / CVC (1995)?	Does Merulla Property satisfy criteria in 2016?	Relevance to Merulla Properties site	
			How will feature/function be impacted?	How will the impact to feature/function be protected or otherwise mitigated?
Distinctive or unusual landform	No / No	No	No impact	Existing landform maintained
Hydrologically/hydrogeologically significant	Yes / Yes	Yes	No impact	Floodplain protected outside of development area
Rare or endangered indigenous species	Yes / Yes	Yes	Locally significant plants present in woodland on site	Woodland to be protected and buffered.
Unusual and/or significant value	Yes / Yes	Yes	Valley significance not impacted	Cover restoration and enhancement will contribute net benefits for valley cover.
Remnant of a particular ecosystem	No / No	No	No impact	Existing ecosystem maintained and enhanced
Unusually high diversity of species	No / No	No	No impact	Existing ecosystem maintained and enhanced
Habitat for rare species	Yes / Yes	Yes	Locally significant plants present in woodland on site	Woodland to be protected and buffered.
Sufficiently large to afford habitat	No / No	No	No impact	Existing ecosystem maintained and enhanced
Contributes to the maintenance of natural systems	Yes / Yes	Yes	Extent of disturbed land will be reduced	Cover restoration and enhancement will contribute net benefits to habitat quality and functions
High aesthetic value	Yes / Yes	Yes	Urban valley aesthetics will be compatible with existing surroundings	Cover restoration and enhancement will contribute net benefits for aesthetics

Regarding the Sycamore and Black Walnut, a memo to Beacon Planning Services from MNRF Biologist Steve Varga (undated letter from circa 2008; see Appendix 5) indicated that both species are no longer considered provincially rare. The reference to exposed bedrock does not apply to the ANSI south of Dundas Street. Since the notable features identified by Hanna in 1980 do not apply to the subject properties, the only criterion for identification of *the Credit River at Erindale* as a *Regional ANSI* is the 1977 mission statement; that is, it represents an interesting natural landscape/environment/biotic community. However, the NEBR document (MNR 1996) summarizes more comprehensive criteria that were utilized to assess ANSIs associated with the Niagara Escarpment. Table 7 summarizes these criteria, their applicability to this site, and potential impacts; impacts and mitigation are discussed in Section 5.

In our interpretation, the primary significance of the identified SNA/Green System, Core Area, ESA, and ANSI features is their affiliation with the Credit River valley. The terrestrial and aquatic habitats in evidence are related to that context, although both terrestrial and key hydrologic features have been significantly modified by infrastructure works, major alteration of Sawmill Creek, site grading, and past land uses. The Core Areas/SNA, ESA, and ANSI encompass many built features and occupied uses, including urban uses that already existed at the time when the ESA and ANSI were designated, and some of which have been modified and expanded since that time. Our review confirms that the key criteria represented by the ESA and ANSI are still relevant despite surrounding urbanization as well as site specific changes already documented on the subject properties.

Table 7 – Evaluation of ANSI boundary for Merulla Properties using MNRF ANSI Criteria as outlined in NEBR (MNR 1996)

EVALUATION CRITERIA	APPLICABILITY TO MERULLA PROPERTIES	IMPACT TO ANSI WITH MERULLA PROPERTIES REMOVED
Representation:		
Landform Features	• No remaining landform on site is the best representation of any particular landform feature in the general; removal of a major portion of ridge adjacent to river occurred in 2007-08	• No additional negative impact to ANSI; significant areas of ANSI still exist within its overall boundaries • Remnants of ridge feature are still present within modified ANSI boundary, including plant community remnants
Vegetation	• No substantive representations of major vegetation community types defined for ANSI are present on the site	• Removal of portions of site from ANSI will not have negative impacts to any significant vegetation communities; potential for enhancement
Diversity:		
Number of Landform Units	• Relatively small number; none specific to the site	• The diversity of landforms within the ANSI will not be reduced by exclusion of portions of site from the ANSI
Number of Vegetation Community Types	• Relatively small number; none specific to the site	• The diversity of Vegetation Community Types will not be reduced for the overall ANSI with exclusion of portions of site from the ANSI; potential for enhancement
Number of Vascular Plants, Breeding Bird and Reptile and Amphibian Taxa	• Relatively small number for each group; no species found during field investigations are specific to site (i.e. they would all be found elsewhere within overall ANSI)	• The diversity of vascular plants, breeding birds, reptiles, and amphibians will not be reduced for the overall ANSI with exclusion of portions of site from the ANSI; potential for enhancement
Special Features:		
Endangered or Threatened Taxa	• None were found to be breeding or otherwise reliant on the site	• No negative impacts will result to any Endangered or Threatened taxa found within the ANSI
Significant Vascular Plants, Breeding Bird, Mammal, Reptile and Amphibian Species	• Snapping Turtle (Special Concern) using site for dispersal (young animals); may be nesting but no evidence found during 2014 field investigations	• No negative impacts will result to any significant flora/fauna found within the rest of ANSI; potential for enhancement
Significant Vegetation Community Types	• None were found on the site	• No negative impacts; potential for enhancement
Condition:		
QUALITY		
Extent of Old-growth Forest	• None occur on the site	• Not applicable
Extent of White Cedar Cliff Ecosystems	• None occur on the site	• Not applicable
Extent of Older, Undisturbed Forests	• None occur on the site	• Not applicable
Extent of Post-fire Successional Forests	• None occur on the site	• Not applicable
STRESSES		
Adjacent Aggregate Extraction	• No such activity occurs in adjacent areas	• Not applicable
Trail Impacts	• Informal trail occurs along edge of Credit River valley	• Removal/closure of trail will have no negative impact on rest of ANSI; this may reduce erosion/disturbance by decreasing pedestrian use
Cottage and Residential Impacts	• Existing residences directly to south; the two proposed residences will have no negative impact on adjacent ANSI (as per mitigation measures recommended in EIS)	• Proposed residences will have no negative impact on the rest of the ANSI (as per mitigation measures recommended in EIS)
Recent Selective Logging	• No selective logging has occurred on the site	• Not applicable
Recent Grazing	• No grazing occurs on the site or on adjacent lands	• Not applicable
Introduced Plant Species	• Introduced plant species are already widespread on the site	• Introduced species will not be increased with exclusion of portions of site from the ANSI; potential for management and

EVALUATION CRITERIA	APPLICABILITY TO MERULLA PROPERTIES	IMPACT TO ANSI WITH MERULLA PROPERTIES REMOVED
		enhancement
Habitat Loss by Invasive Plants	• Some invasive plants occur on the site; proposed development will not cause habitat loss	• Invasive species will not be increased with exclusion of portions of site from the ANSI; potential for management and enhancement
Fragmentation by Roads / Railways	• No roads or railways exist or are proposed on the site; Mississauga Road fragments the ANSI immediately to the south and Dundas Street East immediately to the west	• ANSI already has numerous roads within and adjacent to it; the influence of these features will not change as a result of removing portions of the Merulla site from the ANSI
Ecological Function:		
Size	• The Merulla site is very small (< 5 ha)	• Excluding portions of the Merulla site from the ANSI would not significantly reduce its overall size (nor its ecological functions)
Extent of Forest Interior	• None present on the site	• None present within the entire ANSI
Forest-interior Bird Species	• None were recorded during 2014 breeding bird surveys	• Unlikely to be present within the ANSI
Hawk and Owl Species	• None were recorded during 2014 breeding bird surveys	• Species may be present within ANSI; no change in populations will be caused by excluding portions of the Merulla site from the ANSI; potential for enhancement
Corridor Length along Escarpment	• Not applicable	• Not applicable
Presence of Corridors Lateral to Escarpment	• Not applicable	• Not applicable
Size of Mega-woodland Connected to Site	• Not applicable	• Not applicable
Extent of Open Water	• None present on the site; Credit River is adjacent	• Credit River represent open water within the ANSI; not affected by proposed development
Groundwater Discharge Area	• Site is not a groundwater discharge area	• ANSI groundwater discharge areas not affected by proposed development
Headwater Source	• Site not a headwater source	• There is no headwater source within the ANSI
Presence of an Entire Watershed	• Site does not represent an entire watershed	• An entire watershed is not contained within the ANSI
Presence of Great Lakes Shorelines	• No Great Lakes shorelines are present at site	• No Great Lakes shorelines are within the ANSI
Presence of Inland Lake Shores	• No inland lake shores are present at site	• No inland lake shores are present within the ANSI

With respect to the Core Area/SNA policies in effect, the consideration of development, potential impacts, and their mitigation is the responsibility of the EIS. Based on our understanding of the history of the two properties, and familiarity with comparable situations, development of a single-family residence on each property is environmentally feasible and consistent with Region, City, CVC, and MNRF designations due to existing policy for lots of record. Therefore, we recommend using identified natural features and ecological functions, and appropriate protective standards, to define potential development envelopes for the permitted uses, and mitigation measures for the protection and enhancement of ecological functions.

Figure 7 presents our recommended boundary for the City's Significant Natural Area (CRR7) based on site-specific studies. It encompasses the significant woodland represented by ELC polygons 5 and 6, and and significant wildlife habitat of the open bluff represented by polygon 10. This boundary also represents the limits of natural features that fulfill CVC's ESA criteria, and the natural components of the regional ANSI.

4.6. ECOLOGICAL FEATURES AND FUNCTIONS

Section 2.4 generally defined ecological features and specific ecological functions that potentially relate to the subject lands. As discussed in other sections, historically the properties have undergone major changes to vegetation cover, soils and hydrology since settlement, with the most intensive changes to landforms and hydrology being those that occurred in the 1960s, late 1970s and in 2007-08. The woodland cover (see Figure 6) represents secondary growth (lowland deciduous forest, cultural meadow, cultural plantation, and cultural woodland) that is located along the east, west and south margins of the property. The remainder of the land is open and has been tilled; areas adjacent to the Credit River contain bluffs and remnants of a ridge feature that was significantly altered in 2007, and which has limited vegetative cover, representing mostly eroded clay and shale bedrock.

Although wooded portions along the south and east margins represent part of the historic floodplain of Sawmill Creek (as well as a backwater to the regional event floodplain of the Credit), no wetlands are present on the site or in the immediate vicinity. Groundwater investigations detected water table between 2.2 and 7.5 metres below the surface, roughly equating to the river elevation; there are no significant groundwater resources associated with the site. The documented regional floodline (98.0 masl) is contained within the forest area, which has benefits particularly for more frequent flood events due to stable, relatively diverse woodland cover, and species adapted to periodic inundation. This represents a significant hydrological feature that is regulated by CVC.

As the main branch of a watercourse draining directly to Lake Ontario, the Credit River valley containing the subject lands meets the Region's criterion in Table 2 of the Official Plan for 'Core Valley and Stream Corridor Component' of the Greenlands System.

The largest woodlands on the site, represented by ELC polygons 5 and 6, are part of a relatively extensive block of woodland occupying the lower valley and floodplain between Dundas Street and Blythe Road.


2935
2955
Mississauga Road
Legend
Study Area
Recommended Significant Natural Area Boundary
Silt Fence
Top of Bank
Tagged Trees (from Site Plan)
0 15 30 60
Metres
2015 Orthophotography, First Base Solutions
DOUGAN & ASSOCIATES
ECOLOGICAL CONSULTING & DESIGN
The information displayed on this map has been compiled from various sources. While every effort has been made to accurately depict the information, this map should not be relied on as being a precise indicator of locations, features, or roads, nor as a guide to navigation. MNR data provided by Queen's Printer of Ontario. Use of the data in any derivative product does not constitute an endorsement by the MNR or the Ontario Government of such products.
Merulla Environmental Impact Study
Recommended Significant Natural Area CRR7 Boundary
PROJECT: DA13-084-02
CLIENT:
DATE: JULY 2017
SCALE: 1:1,500
DRAWN BY: LW
CHECKED BY: IR/JD
FIGURE:
7

More than 10 ha in size, this forested area qualifies as significant woodland, as defined by the City of Mississauga, based on its overall area, site context (i.e., portions are located within 30 metres of the Credit River), linkage to other woodland cover (triggering City policies), and presence of uncommon to locally rare species as documented in the present study. It also meets several the Region's criteria for 'Core' and 'Natural Areas and Corridors', defined in Table 1 of Region of Peel Official Plan, including: size (=/> 4 ha), woodland supporting a significant linkage function, woodland within 100 m to another significant feature (Credit River), and (in part) woodland within 30 m of a watercourse. However, the on-site portion of woodland does not meet the Region's criteria for age or significant communities. The forest cover provides local microclimate moderation, capturing and storing carbon as well as air-borne contaminants, and serving as a moisture sink which supports hydrologic functions and nutrient cycling. Smaller cultural woodlands (polygons 2 and 4) do not represent significant woodlands based on their limited area; polygon 2 has had significant disturbances and is largely located on piles of debris dumped over many years. Polygon 10 and a portion of polygon 4 contain interesting botanical elements of ridge habitat but also contains building remnants such as a concrete floor, adjacent to an abandoned concrete swimming pool.

Existing fragmentation of the larger woodlands by the river channel, by urban infrastructure (major roads and the Sawmill Creek outlet diversion structure), and existing residential development, limits its value to area sensitive forest species; there is no forest interior present on site or in the immediate vicinity (i.e. forest with interior areas more than 100 m, or more conservatively 200 m, from an edge); only one urban-adapted area sensitive species, White-breasted Nuthatch, was detected during the breeding bird surveys. The background noise created by urban uses is likely a key factor affecting utilization by a broader range of more sensitive species. The enhancement of forest edge structure would likely be beneficial to birds and other wildlife, helping to adjust to ongoing stressors such as Emerald Ash Borer which is affecting lowland forests in southern Ontario.

The existing topography and soil conditions on the site are generally conducive to soil conservation and water quality management, as the majority of the property area drains towards the wooded floodplain forest and swale at the perimeter. Gradual succession of woody cover along the steep bluffs down to the river will have multiple benefits for erosion management and wildlife cover enhancement, adding resilience to the local landscape and potential habitat for locally uncommon to rare species.

4.7. SUMMARY OF OPPORTUNITIES & CONSTRAINTS

The principal constraints on the site include the Credit River and its floodplain, the associated fish habitat, significant woodlands, and significant wildlife habitat; these are summarized above in Section 4.5.1. The properties represent a constrained area based on policies of the Province, Region and City, that in other circumstances could preclude any development. However, Official Plan policies of the Region and City contain exemptions that permit a single residence on each lot of record; if the development can occur with no negative effects to the natural features and ecological functions that are evident, it may provide opportunities to address some of the negative changes which have occurred in the past.

The properties are entirely regulated by CVC, requiring a permit under their policies for any development or site alteration. Key policy constraints are the river, regional floodline, and stable slope setback.

Key opportunities include:

- Effective landscaping to provide stable cover throughout the properties for the long term, increasing canopy cover and adding species diversity that has been reduced in the urban context over decades of change, including the recent entry of Emerald Ash Borer;
- Providing plantings in the buffer to the existing woodland, to add species diversity with value to wildlife, and to enhance woodland biodiversity and resilience;
- Protecting the riverside bluffs, adding successional plants where feasible, reinforcing linkage functions, managing active erosion, and providing cover for wildlife utilizing the river corridor;
- Providing habitat and structures for key wildlife species, through plantings and structural elements such as gravel piles for turtle nesting, bat boxes, and snake hibernacula; and
- Managing runoff to protect water quality, providing opportunities for infiltration, and using clean runoff where feasible for habitat enhancement.

5. IMPACT ASSESSMENT

This impact assessment summarizes key environmental constraints and sensitivities associated with the site's physical and biological resources, evaluates the potential impacts of the proposed development on these resources (including adjacent lands), and provides a mitigation strategy.

5.1. IMPACT EVALUATION

This impact evaluation is based on a review of the most current site plan (October 2016), existing background information, and D&A's aquatic, vegetation, and wildlife findings. The relative sensitivity of the site's natural heritage features and ecological functions of the properties and environs has been summarized in earlier sections based on current knowledge and policies.

The impact analysis evaluates the potential impacts of the proposal on these features and functions and offers recommendations for impact avoidance and mitigation. The findings of the general and site-specific impact analysis are discussed in the following sections and are summarized in Table 8. The table identifies the proposed development activities, and future occupancy, potential impacts on natural features and functions, recommended mitigation and monitoring, and residual effects.

5.2. IMPACTS OF PROPOSED DEVELOPMENT

The proposal for this site includes the following: a single-family detached dwelling is proposed for 2935 Mississauga Road and the same is intended for the 2955 Mississauga Road property. Access to the 2935 property would replace an abandoned culvert crossing from Mississauga Road, while 2955 would rely on a new driveway entrance extending through a small cultural meadow area. The latter entrance would be located beyond the upper limit of the swale, and does not require a culvert. Apart from the driveway entrance, proposed development will occur entirely on the open portion of the properties (zoned G2).

CVC policy generally requires a development setback from the Hazard Land portions of the site (zoned G1). Figure 8 shows all setbacks and defines an overall Limit to Development. All proposed development conforms with the slope stability setback, and the regional floodline except for the 2935 driveway onto Mississauga Road, which will span the regional floodline. Ancillary structures such as a patio are permitted within the 10 m slope stability setback.

Development of the properties for residential uses will not affect the extent of forest within the ESA/ANSI/Natural Area, or any provincially or locally rare fauna or flora. The former ridge feature has been modified on the study site, and the bluff within the study site has been identified for protection through the determination of the stable slope line plus 10 m setback as shown on Figure 8.

This plan is consistent with Regional Policy 2.3.2.6 in that it is outside the site-specific Core Natural Area and avoids impacts to the woodland cover and its functions, in compliance with the following provisions:

"The area municipalities are directed to adopt appropriate policies to allow the exceptions subject to it being demonstrated that there is no reasonable alternative location outside of the Core Area and the use, development or site alteration is directed away from the Core Area feature to the greatest extent possible; and the impact to the Core Area feature is minimized and any impact to the feature or its functions that cannot be avoided is mitigated through restoration or enhancement to the greatest extent possible."

Figure 8 indicates a recommended 10 m buffer from the dripline of significant woodlands comprised by ELC polygons 5 and 6. The Oct. 2016 site plan shows encroachment by the garage and driveway round-about into this buffer; this can be readily addressed by shifting the building and driveway footprints out of the buffer.

The access for the 2935 driveway would use remnants of an existing structure that can be upgraded with minimal and temporary effects on tree canopy. The 2955 property driveway can be routed through a meadow opening. The development is therefore located within the 120 m adjacent lands to specific natural features including the significant woodlands, significant wildlife habitat, and fishery of the Credit River. It is unlikely to generate off-site impacts as water resources can be readily managed on site, minimal clearing is proposed, and factors such as artificial light, and noise are either readily mitigated or nominal in extent compared with those already evident in the local urban setting.

5.2.1. PHYSICAL RESOURCES

No significant impacts to the site's geology or physiography are expected as no extensive grading or excavation will occur apart from foundations of buildings and installation of septic tanks and tile beds. The appropriate use of erosion control measures and stormwater management best practices will avoid the potential for increased runoff and soil erosion. The development respects a stable slope stability setback determined by Terraprobe (2008, 2010).

5.2.2. VEGETATION

Direct impacts from the construction of the buildings and driveways will not result in the loss of any existing natural forest or woodland vegetation, apart from localized removals to reinstate the driveway culvert. There is debris and invasive cover in the vicinity of the crossing, that can be remediated during construction. Potential indirect impacts to vegetation resources may include a slight increase in runoff due to increased impervious cover, and localized erosion or construction impacts to trees adjacent to work areas. If standard tree protection and erosion control measures are implemented at the requisite development setback from the stable slope line or Regional storm floodline, these impacts are fully avoidable. Encroachment from future residents may result in trampling of vegetation, compaction in root zones and the spread of invasive species. This can be addressed through buffer plantings and education of residents. Existing invasive species can be mapped for removal. Locally uncommon or rare plant species, which are affiliated with the bluffs and woodlands, are located outside the proposed development area and can be protected through buffering and avoidance of encroachments. Removal of the concrete pad, abandoned swimming pool, and other remnants of the former dwelling, offer opportunities for habitat enhancement.

Figure 8 indicates a recommended 10 m buffer from the dripline of significant woodlands comprised by ELC polygons 5 and 6. The Oct. 2016 Preliminary Site Plan shows localized encroachment by the garage and driveway round-about into this buffer; this can be readily addressed by shifting the building and driveway footprints out of the buffer.

5.2.3. WILDLIFE

The proposed site plan will not directly impact wildlife as no existing forest or open country habitat will be removed. The field investigations and interpretation of guiding documents determined that two categories of significant wildlife habitat are present (Habitat for Species of Conservation Concern, and Secondary Corridor). Given the small size of the site, along with its location directly adjacent to busy urban arterial roads, diminish its wildlife habitat value because sensitive wildlife species typically require more isolated habitats with less human disturbance. Movement of species through the valley will not be further limited by the low density development that is proposed, and may be locally improved given proposed setbacks and enhancements.

With regard to Species at Risk wildlife, two species were detected: Bank Swallow and Snapping Turtle. Bank Swallow was observed along the Credit River, foraging along a considerable stretch. There was no evidence that this species is nesting along the river bluffs on the north edge of the property, however it is possible that nesting could occur in future considering the nature of the banks present. The proposed development requires adequate setbacks from the river based on floodplain and slope stability, and therefore will have no impacts to these bluffs or adjacent foraging areas. Snapping Turtle was not found to be nesting on the site despite numerous searches at appropriate times; the single young animal detected likely dispersed from other areas where nesting occurs and was found essentially 'trapped' in the concrete swimming pool that belonged to the former residence that burned down in 1971. As such, the proposed developments will not negatively impact this species. There is an opportunity to introduce appropriate nesting sites for this species.

5.2.4. AQUATIC RESOURCES

The proposed development is subject to a 10 metre development setback from the stable slope line, as stipulated by the Credit Valley Conservation Watershed Planning and Regulation Policies (2010). This results in a minimum of 25 m separation from the Credit River as estimated from the site plan provided to us (David Small Designs, Preliminary Site Plan, October 2016). The Credit River Fisheries Management Plan (MNR and CVC, 2002) stipulates a minimum buffer of 15 m for this portion of the river, which will be contained within the 25 m setbacks addressing CVC Policy requirements. No in-water works are proposed, therefore there are no anticipated negative impacts to the aquatic habitat in the adjacent Credit River. As such, American Eel will not be negatively impacted by this project.

5.2.5. SIGNIFICANT FEATURES

The proposed development will have no direct impact on the surrounding significant areas, namely the Credit River at Erindale ESA, ANSI, and Natural Area. Potential indirect impacts on this significant area due

to the development of the study site include the reintroduction of human residency to the site that was formerly present until the early 1970's.

5.3. OPPORTUNITIES FOR MITIGATION AND COMPENSATION

General approaches to avoid and mitigate common impacts of residential development are summarized in Table 8. Based on a background review and field investigations of natural heritage features associated with the study area, appropriate naturalization is proposed around significant woodlands, on slopes and open portions of the regional floodplain which will allow protection, restoration, and enhancement of the natural heritage features and functions of the floodplain communities. Figure 8 summarizes the limit of development and extent of recommended setbacks/buffers, which are discussed in detail below.

The development plan offers several opportunities to enhance the natural features and ecological functions on the site through relatively simple measures. These include:

Physical resources

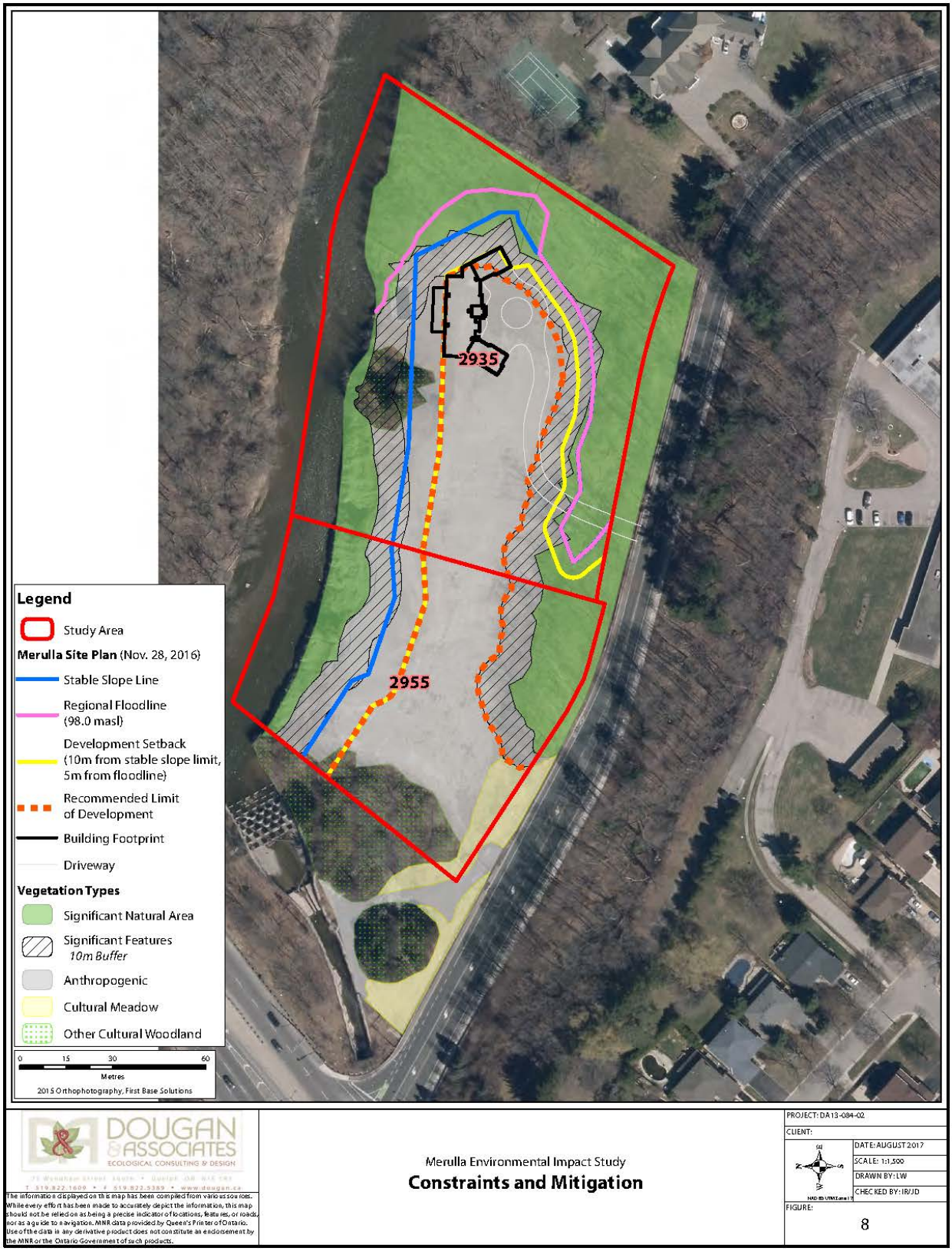
General vegetation cover can be improved through appropriate landscaping, which will address areas where soils are currently disturbed, with remediation using topsoil amendment and appropriate planting. This will have net benefits in terms of sediment management and water quality draining towards the swale. Low Impact Development (LID) facilities are feasible to add local infiltration; no-maintenance LIDs can be included within development setbacks/buffers as part of the enhanced cover in those areas.

Vegetation

Naturalization of buffers with native edge species, and selective planting to promote the succession of bluff cover will contribute significantly to the amount and diversity of vegetative cover, habitat attributes, and erosion control. The remnants of the ridge vegetation community, which are evident in the north portion of ELC polygon, and in portions of the open bluff of polygon 10, can be utilized as a model to diversify with site setbacks and buffers with appropriate species that are found in similar valley habitats elsewhere in the ESA and ANSI. Table 2 identified invasive species within woodland units; these can be targeted for control or removal. The landscaping of the active areas of the residential site can also be managed to avoid invasive species and to introduce a range of adapted native tree, shrub and groundcover species, compliant with CVC watershed guidelines. The property boundary between lots can support focused tree and shrub planting that will add screening as well as local habitat value for species establishment and movement.

Buffer

The Significant Natural Area Buffer shown on Figure 8 will provide for adequate protection of the defined Significant Natural Area and will promote restoration of the forest edges. When combined with other setbacks, the buffer has a minimum width of 10 m, offering restoration and enhancement opportunities in an extensive area (i.e. up to 20 m from open bluffs, and 10 m from the significant woodland dripline).


2935
2955
Legend
Study Area
Merulla Site Plan (Nov. 28, 2016)
Stable Slope Line
Regional Floodline (98.0 masl)
Development Setback (10m from stable slope limit, 5m from floodline)
Recommended Limit of Development
Building Footprint
Driveway
Vegetation Types
Significant Natural Area
Significant Features 10m Buffer
Anthropogenic
Cultural Meadow
Other Cultural Woodland
0 15 30 60
Metres
2015 Orthophotography, First Base Solutions
DOUGAN & ASSOCIATES
ECOLOGICAL CONSULTING & DESIGN
The information displayed on this map has been compiled from various sources. While every effort has been made to accurately depict the information, this map should not be relied on as being a precise indicator of locations, features, or roads, nor as a guide to navigation. MNR data provided by Queen's Printer of Ontario. Use of the data in any derivative product does not constitute an endorsement by the MNR or the Ontario Government of such products.
Merulla Environmental Impact Study
Constraints and Mitigation
PROJECT: DA13-084-02
CLIENT:
DATE: AUGUST 2017
SCALE: 1:1,500
DRAWN BY: LW
CHECKED BY: IR/JD
FIGURE:
8

The recommended limit to development addresses all hazardlands, integrates several compounded buffers, and offers two key mitigation opportunities:

- A restoration and enhancement zone along the Credit River comprised of the bluff in polygon 10 (included in the recommended SNA boundary), plus 10 m stable slope setback, which overall encompasses the 15 m setback from the riverbank, and 10 m buffer to the recommended SNA.
- A 10 m development buffer from Significant Woodland, which also addresses a 5 m setback from the regional floodline; this area will allow edge restoration and enhancement of the woodland, which has been affected by Emerald Ash Borer as well as ice storm damage.

As noted, the restoration and enhancement zone is widest along the edge of the Credit River Valley where regeneration will achieve the most benefits. Detailed design of the restoration and enhancement measures, including location-specific species composition and density of restoration planting, will be determined for each property in conjunction with preparation of a recommended Landscape Plan required in conjunction with the Site Development Plan approval process.

The integrated limit of development depicted on Figure 8 addresses the OMB approved G1 and G2 zone limits, serving to protect both the Hazard Lands and Significant Natural Area components of the property.

Wildlife

Wildlife habitat functions will improve with the enhancement of woody cover on the disturbed areas of the properties. Reinforcement of feature edges will encourage use by animals migrating through the area. Native shrub species that attract foraging songbirds and small mammals will form part of the buffer plantings. Native groundcovers seeded into naturalized areas will attract butterflies and other pollinators. Targeted habitat enhancement for significant species could include:

- Maintenance of the bluffs facing the river to encourage Bank Swallow nesting and growth of adapted plant species such as Riverbank Wild Rye (Falconer et al. 2016);
- Provision of gravel and/or sand nesting areas for turtles, and hibernacula structures for snakes, placed within buffer areas;
- Provision of bat roosting boxes in areas adjacent to the Credit River.

Significant features

As discussed in Section 4.5, the detailed analysis of ESA, ANSI, Core Feature and Significant Natural Area criteria determined that the key criteria will continue to be met if development occurs in compliance with Region of Peel and City of Mississauga policies for lots of record. Values relevant to the Credit River valley can be readily reinforced through the protection of woodlands, enhancement of bluff and meadow communities, and specialized wildlife habitat creation measures as summarized above.

Table 8. Recommended Strategies to Avoid or Mitigate Potential Impacts.

Development Activity	Potential Direct Impacts	Potential Indirect Impacts	Recommended Avoidance or Mitigation
Clearing & Grubbing	• The majority of the area being utilized for the two proposed residences is already cleared; a small area of forest will need to be trimmed to restore the driveway culvert for 2935. • Vegetation clearing will be very limited and is unlikely to contribute to any erosion. • Clearing and grading operations may disturb wildlife and interfere with nesting birds if conducted in the breeding season.	• Loss of vegetation cover (if any) will result in the minor reduction in evapotranspiration. • Partial vegetation clearing of the natural cover in the area of the proposed driveway will potentially cause a localized reduction in canopy habitat (essentially, one tree).	• The installation and maintenance of approved sediment and erosion control measures in any susceptible areas close to works will address potential erosion impacts to slopes and prevent sediment from entering the swale that drains towards the Credit River. • Clearing and grading operations should occur outside the nesting period (April 15 to July 31); nest surveys should be conducted if clearing activity is proposed in this period to avoid disturbance or destruction of active nests of bird species protected under the Migratory Birds Convention Act. • Buffers along the Credit River, the regional floodline, and from the dripline of woodlands will prevent impacts to the river and canopied portions of the site. • New habitats created or enhanced in the buffer areas will create a net gain in overall canopy and habitat diversity compared to existing conditions.
Grading	• Grading activities will alter landforms and drainage. Details are addressed in the draft grading plan • Grading activities may make portions of the site temporarily more susceptible to erosion, resulting in increased sediment runoff to watercourses.	• Changes to vegetation cover and increased impervious cover could affect infiltration rates into the shallow groundwater system • Grading may result in redirection of surface flows but pre-development water balance will be effectively maintained. • Grading may result in increased sediment runoff, thereby affecting the quantity and quality of runoff contributions to watercourses. • Noise from grading operations may cause temporary disturbance to wildlife. • Sediment fences will impede or block small terrestrial species movement.	• Ensure that spatial distribution of runoff management and infiltration is optimized to match the infiltration potential of the soils that are present; use CVC approved LID methods. • Enhance vegetated buffers to improve infiltration • A mitigation plan for erosion and sediment control will be required by the City and CVC. Implement and monitor erosion and sediment control plan. • Control access and movement of equipment. • Time grading activities to avoid the most sensitive periods of habitat use by amphibians and birds (March to July). • Clearing and grading operations should occur outside the nesting period (April 15 to July 31); nest surveys should be conducted if clearing activity is proposed in this period to avoid disturbance or destruction of active nests of bird species protected under the Migratory Birds Convention Act. • Provide condition for removal of sediment control fences within 12 months after completion of grading.

Development Activity	Potential Direct Impacts	Potential Indirect Impacts	Recommended Avoidance or Mitigation
Servicing (e.g. driveways, water, septic, hydro services)	• Potential impacts from erosion and sedimentation, potential direct impacts to swale feature. • Water service bedding can potentially intercept groundwater and alter subsurface drainage patterns; however, the modest supply pipe size will limit this effect.	• Potential for sediment related impacts to water quality and fish habitat.	• Provide enhanced vegetated buffers and setbacks within the defined Limit to Development (see Figure 8). • An erosion and sediment control plan will be required by the City and CVC. Implement and monitor erosion and sediment control plan. • Time grading activities to avoid the most sensitive periods of habitat use by amphibians and birds (March to July); re-establish vegetation cover as soon as possible. • Design underground services to minimize impacts on local groundwater flows. • Design and implement naturalized plantings on riverside bluffs, using adapted native species (groundcovers and woody materials).
Building Construction	• Potential for contaminated runoff to enter adjacent natural areas. • Increased noise levels will affect wildlife temporarily.	• Construction access may result in increased sediment runoff, thereby affecting the quantity and quality of runoff contributions to watercourses. • Construction often results in litter such as waste lumber and plastics, which degrade natural habitats.	• Maintain fenced buffers between development and sensitive natural features • A mitigation plan for erosion and sediment control will be required by the City and CVC. Implement and monitor erosion and sediment control plan. • Manage construction waste during and post construction.
Occupancy	• Potential contaminants to water bodies from domestic and automotive chemicals, swimming pool chemicals. • Potential for introduction of non-native and invasive plants. • Increased level of human activity and encroachment in proximity to natural features.	• Potential for contamination of watercourses. • Loss of wildlife habitat functions, species populations, and overall biodiversity. • Increased levels of human activity typically result in increased noise, light and general disturbance of wildlife. • Artificial lighting may affect wildlife behaviour within adjoining natural features.	• Establish dense vegetated buffers with naturalized cover; landscape plan to be prepared as condition. • Provide appropriate naturalistic fencing to allow wildlife movements while deterring human passage • Educate landowners to: o Use native or non-invasive species in landscaping. o Avoid improper use of fertilizers and other chemicals. o Discourage encroachments into vegetated buffers such as dumping of compost or pool effluent. • Utilize exterior lighting that minimizes light spillage.

6. CONCLUSIONS AND RECOMMENDATIONS

The natural heritage resources of the property are largely reflective of the site's setting within the Credit Valley watershed and the intruding urban fabric of the City of Mississauga. The subject property currently consists of native deciduous forest and an open area, with a mix of native and introduced species. There has been extensive alteration to landforms associated with the outlets of the Sawmill and Loyalist Creeks.

The proposed development at 2935 Mississauga Road will potentially impact the site through the construction of residences and driveways and associated grading works. It is anticipated that all of the existing woodland will be retained in accommodating the proposed building, subject to addressing recommendations in this EIS. Indirect impacts that may occur include compaction of roots of remaining trees, future encroachment by residents, and the introduction of invasive species through future gardens. These impacts and their mitigation are discussed in Section 5.

In our opinion, the development application is compliant with City Policy 6.3.24 as it:

- protects and maintains **natural heritage features**;
- recommends use of native plant materials for restoration and enhancement of habitats, and the use of non-invasive species;
- Retains existing natural habitats and provides for significant enhancement through buffer creation, planting and addition of specialized wildlife habitat features, that will benefit key wildlife groups, vegetation communities and corridor functions;
- Retains all woodlands, floodplain and slope areas, and provides buffer zones and the required setbacks from the Credit River, slopes and significant woodlands;
- Places appropriate deterrent fencing / plantings along the woodland buffers to discourage encroachment; and
- Recommends stewardship education materials for the future property owners.

The proposed development also is compliant with Regional Policy 2.3.2.6 with regard to development on lots of record that are in the vicinity of Core Areas as it effectively minimizes impacts based on multidisciplinary direction.

Based on a background review and field investigations of natural heritage features associated with the study area, ecologically and policy-based Limit of Development is recommended that incorporates buffers and setbacks to protect the various natural heritage features and functions, slopes, and the floodplain. Additional recommendations to limit, mitigate and compensate for potential impacts include:

- All construction activities are to be monitored to ensure that impacts to natural features are avoided;
- Install and maintain silt fencing adjacent to construction sites prior to and during all construction works to minimize siltation into floodplain;

- Conduct clearing of vegetation within the site as part of site preparation in the late fall or winter months (September – March) to avoid the nesting/breeding seasons of birds;
- Consider use of no maintenance Low-Impact Development storm water management techniques;
- Install deterrent fencing and/or plantings along buffers to discourage future encroachment into natural areas;
- Plant or direct seed native vegetation in buffers, disturbed areas, and strategic property lines to enhance and diversify these areas;
- Monitor restoration plantings to ensure effectiveness;
- Provide residents with educational materials about the natural areas and how to avoid negative impacts to the vegetation.

There are no anticipated negative impacts to the aquatic habitat in the adjacent Credit River; as such, American Eel will not be negatively impacted by this project.

In conclusion, it is our opinion that the proposed development will not have significant adverse effects on the features or functions of the ESA, ANSI, Core Area, and Significant Natural Area if our recommendations are implemented. The significant and sensitive resources of the property and adjacent lands will be protected and enhanced consistent with policies. The implementation of recommended protection, mitigation, and restoration measures will permanently enhance a landscape impacted by historic disturbances, accommodating low density residential uses as well as key wildlife habitat functions.

Respectfully submitted by:

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APPENDICES 1-4

Appendix 1. Summary of wildlife observations for the Merulla Properties
Appendix 2. Significant Wildlife Habitat screening (per MNRF criteria) for the Merulla Properties
Appendix 3. Summary of Vascular Plant Observations for the Merulla Properties
Appendix 4. Species at Risk (SAR) screening for the Merulla Properties

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Appendix 1 - Summary of 2014 and 2017 wildlife observations for the Merulla Properites

Common Name	Scientific Name	Conservation Status								Covered by MBCA (1994)	Area Sensitivity (OMNR 2000)	Breeding Evidence (OBBA 2001)	Incidental Sightings (May & June 2014, May 2017)	Breeding Bird Surveys	
		National	Provincial		Regional	Local									
		COSEWIC (2016)	MNRF (2016)	Srank (2016)	BCR 13 Priority Sp. (OPIF 2008)	Credit Watershed (CVC 1997)	Halton Region Status (Dwyer 2006)	Halton Residency Status (Dwyer 2006)	TRCA L-Rank (Nov 2013)					26-May-14	09-Jun-14
Herpetiles:															
American Toad	*Bufo americanus*	---	---	S5	n/a	n/a	Abundant	resident	n/a	n/a	n/a	n/a	R		
Green Frog	*Lithobates clamitans*	---	---	S5	n/a	n/a	Abundant	resident	n/a	n/a	n/a	n/a	R		
Snapping Turtle	*Chelydra serpentina*	SC	SC	S3	n/a	n/a	Common	resident	n/a	n/a	n/a	n/a	1		
Eastern Gartersnake	*Thamnophis sirtalis sirtalis*	---	---	S5	n/a	n/a	Abundant	resident	n/a	n/a	n/a	n/a	1		
Birds:															
Mallard	*Anas platyrhynchos*	---	---	S5	---	---	abundant	resident	L5	Y	---	CONFIRMED		1X	5H, 5FY
Common Loon	*Gavia immer*	NAR	NAR	S5	---	---	uncommon migrant	casual summer resident	---	Y	---	---		2X	1X
Double-crested Cormorant	*Phalacrocorax auritus*	NAR	NAR	S5	---	---	---	abundant resident	L3	N	---	---	2X		
Great Blue Heron	*Ardea herodias*	---	---	S4	---	CC	common	common summer resident	L3	Y	---	---	1X		1X
Black-crowned Night-Heron	*Nycticorax nycticorax*	---	---	S3	---	CC	uncommon	local summer resident	L3	Y	---	---	1X		
Red-tailed Hawk	*Buteo jamaicensis*	NAR	NAR	S5	---	---	common	resident	L5	N	---	POSSIBLE			1H
Killdeer	*Charadrius vociferus*	---	---	S5	---	CC	common	summer resident	L5	Y	---	CONFIRMED		2T, 2FY	2T, 2FY
Ring-billed Gull	*Larus delawarensis*	---	---	S5	---	---	---	abundant resident	L4	Y	---	---			R
Mourning Dove	*Zenaida macroura*	---	---	S5	---	---	abundant	resident	L5	Y	---	POSSIBLE	1S		
Belted Kingfisher	*Megaceryle alcyon*	---	---	S4	PLS	CC	common	summer resident	L4	Y	---	PROBABLE	1H		1P
Northern Flicker	*Colaptes auratus*	---	---	S4	PLS		common	summer resident	L4	Y	---	PROBABLE		2H, 1P	1H
Eastern Kingbird	*Tyrannus tyrannus*	---	---	S4	PLS	CC	common	summer resident	L4	Y	---	POSSIBLE		1H	
Red-eyed Vireo	*Vireo olivaceus*	---	---	S5	---	---	abundant	summer resident	L4	Y	---	PROBABLE	1S	1S	1T
Blue Jay	*Cyanocitta cristata*	---	---	S5	---	---	abundant	resident	L5	N	---	POSSIBLE	R	1H	1S, 2H
American Crow	*Corvus brachyrhynchos*	---	---	S5	---	---	abundant	resident	L5	N	---	POSSIBLE	1X		1S, 1H
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	---	---	S4	---		uncommon	summer resident	L4	Y	---	POSSIBLE		4H	4H
Bank Swallow	*Riparia riparia*	THR	THR	S4	PLS	CC	common	local summer resident	L4	Y	---	POSSIBLE	6H	6H	2H
White-breasted Nuthatch	*Sitta carolinensis*	---	---	S5	---	---	common	resident	L4	Y	AS	POSSIBLE		1S	
House Wren	*Troglodytes aedon*	---	---	S5	---	---	common	summer resident	L5	Y	---	POSSIBLE		1S	
American Robin	*Turdus migratorius*	---	---	S5	---	---	abundant	resident	L5	Y	---	PROBABLE	1S, 1H	1P, 1S, 1H	
Gray Catbird	*Dumetella carolinensis*	---	---	S4	---	CC	common	summer resident	L4	Y	---	PROBABLE	1S	1H	1T
European Starling	*Sturnus vulgaris*	---	---	SNA	---	---	abundant	Introduced; resident	---	N	---	POSSIBLE		1H	
Chipping Sparrow	*Spizella passerina*	---	---	S5	---	---	common	summer resident	L5	Y	---	POSSIBLE	1S		
Song Sparrow	*Melospiza melodia*	---	---	S5	---	---	abundant	summer resident	L5	Y	---	PROBABLE	2S	2S	2T, 1S
Northern Cardinal	*Cardinalis cardinalis*	---	---	S5	---	---	common	resident	L5	Y	---	POSSIBLE	2S	2S	2S
Indigo Bunting	*Passerina cyanea*	---	---	S4	---	---	common	summer resident	L4	Y	---	POSSIBLE	1S		
Red-winged Blackbird	*Agelaius phoeniceus*	---	---	S4	---	---	abundant	summer resident	L5	N	---	POSSIBLE	R	3H	R
Common Grackle	*Quiscalus quiscula*	---	---	S5	---	CC	abundant	summer resident	L5	N	---	POSSIBLE	R		7X
Baltimore Oriole	*Icterus galbula*	---	---	S4	PLS	---	common	summer resident	L5	Y	---	PROBABLE	1S	1S	1T
American Goldfinch	*Spinus tristis*	---	---	S5	---	---	abundant	resident	L5	Y	---	PROBABLE	1P	1S	
Mammals:															
Gray Squirrel	*Sciurus carolinensis*	---	---	S5	n/a	n/a	common	resident	n/a	n/a	n/a	n/a	R		
Coyote	*Canis latrans*	---	---	S5	n/a	n/a	common	resident	n/a	n/a	n/a	n/a	R		
Raccoon	*Procyon lotor*	---	---	S5	n/a	n/a	common	resident	n/a	n/a	n/a	n/a	R		
White-tailed Deer	*Odocoileus virginianus*	---	---	S5	n/a	n/a	common	resident	n/a	n/a	n/a	n/a	R		

WEATHER AND SURVEY TIMES:

Breeding bird survey (BBS) 1 - May 26, 2014; 06:45 - 09:00; clear, calm, 14 °C
Breeding bird survey (BBS) 2 - June 9, 2014; 05:50 - 07:15; partly cloudy, calm, 12 °C

LEGEND:

CODES:

H – species observed in its breeding season in suitable nesting habitat.
T – permanent territory presumed through registration of territorial song on at least two days, a week or more apart, at the same place.
S – singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat.
P – pair observed in their breeding season in suitable nesting habitat.
FY - fledged young observed
A – agitated behaviour displayed by adult
CF – adult carrying food
X – species observed but not in appropriate breeding habitat or flying over
R – species recorded

STATUS:

COSEWIC: THR - Threatened; SC - Special Concern; NAR - assessed and deemed to be not at risk; --- = not assessed as population secure
OMNR: THR - Threatened; SC - Special Concern; NAR - assessed and deemed to be not at risk; --- = not assessed as population secure
Provincial Sranks: S3 - vulnerable; S4 - apparently secure; S5 - secure; SNA - non-native exotic
OPIF: PLS - Priority Landbird Species
TRCA L-Ranks: level of conservation concern from L1 (most concern) to L5 (generally secure and of least concern)
CVC: CC - Species of Conservation Concern

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Appendix 2: Screening for Known or Candidate Significant Wildlife Habitat (per MNRF criteria) – Merulla Properties, Mississauga

Significant Wildlife Habitat Type	SWH present on site or in adjacent lands (within 120 m)?	Rationale (Habitat Presence or Absence)	Additional field studies required?
Seasonal Concentration Areas			
Deer Yarding Areas (as identified by MNRF)	No	No areas identified by MNRF on site or in adjacent lands	No
Deer Winter Concentration Areas (as identified by MNRF)	No	No areas identified by MNRF on site or in adjacent lands	No
Colonial Bird Nesting Habitat: Herons (tree/shrub)	No	No suitable habitats were detected on site or in adjacent lands during field visits; no indicator species detected during breeding bird surveys.	No (Breeding Bird Survey (BBS) conducted - May & June 2014)
Colonial Bird Nesting Habitat: Terns (ground)	No	No suitable habitats were detected on site or in adjacent lands during field visits; no indicator species detected during breeding bird surveys.	No (BBS conducted - May & June 2014)
Colonial Bird Nesting Habitat: Swallows (Cliff/Bank)	No	Banks present along east side of site (on Credit River); up to 6 Bank Swallows seen but no evidence of nesting in these banks or within 120 metres on river; banks likely too gravelly to support nest burrows; site and adjacent lands used for foraging only.	No (BBS conducted - May & June 2014)
Waterfowl Stopover and Staging: Aquatic	No	No suitable habitats were detected on site or in adjacent lands during field visits.	No
Waterfowl Stopover and Staging: Terrestrial	No	No suitable habitats were detected on site or in adjacent lands during field visits.	No
Waterfowl Over Wintering Areas (as identified by MNRF District Office)	No	No suitable habitats were detected on site or in adjacent lands during field visits; none identified by MNRF.	No
Migratory Butterfly Stopover Areas	No	Site 4.6 km from Lake Ontario shoreline; site too urbanized with no open meadows or nectar sources; highly unlikely to support significant numbers of migratory butterflies.	No
Landbird Migratory Stopover Areas	No	Site 4.6 km from Lake Ontario shoreline; migrants would use Credit River valley as corridor to move inland from shoreline areas; however, unlikely to occur in	No

Significant Wildlife Habitat Type	SWH present on site or in adjacent lands (within 120 m)?	Rationale (Habitat Presence or Absence)	Additional field studies required?
		significant numbers as habitat very limited on-site and in adjacent lands.	
Shorebird Migratory Stopover Area	No	No suitable habitats were detected on site or in adjacent lands during field visits.	No
Raptor Winter Feeding/Roosting	No	No suitable habitats were detected on site or in adjacent lands during field visits.	No
Reptile Hibernacula	No	No suitable habitats were detected on site or in adjacent lands during field visits.	No (Conducted - May 2014)
Bat Hibernacula	No	No suitable habitats for hibernating were found on site or in adjacent lands.	No (Conducted - May & June 2014)
Bat Maternity Colonies	No	Very little habitat with trees of adequate dbh on site and in adjacent lands; no foraging habitat found locally so unlikely present. No trees are being removed owing to the proposed development.	No
Bat Migratory Stopover Area	No	Site 4.6 km from Lake Ontario shoreline; migrant bats could use Credit River valley as corridor although numbers likely insignificant; MNRF has not determined thresholds/criteria for this category	No
Rare Vegetation Communities			
Alvar	No	None identified on site or in adjacent lands.	No
Prairie	No	None identified on site or in adjacent lands.	No
Savannah	No	None identified on site or in adjacent lands.	No
Rare Forest Types	No	None identified on site or in adjacent lands.	No
Cliff/ Talus	No	None identified on site or in adjacent lands.	No
Rock Barrens	No	None identified on site or in adjacent lands.	No
Sand Barrens	No	None identified on site or in adjacent lands.	No
Rare ELC communities	No	None identified on site or in adjacent lands.	No
Specialized Habitats for Wildlife			
Woodland Area Sensitive (Interior Forest) Breeding Bird Habitat	No	No interior forest (greater than 200 m from edge and 30+ hectares/60+ years old) is present on site or in adjacent lands; no indicator species were detected during the 2014 breeding bird surveys	No (BBS conducted – May & June 2014)
Open Country Breeding Bird Habitat	No	No suitable habitat available on site or in adjacent lands; no indicator species detected during breeding bird surveys.	No (BBS conducted – May & June 2014)

Significant Wildlife Habitat Type	SWH present on site or in adjacent lands (within 120 m)?	Rationale (Habitat Presence or Absence)	Additional field studies required?
Old Growth Forest	No	None identified on site or in adjacent lands.	No
Mast Areas	No	None identified on site or in adjacent lands.	No
Forests of High Diversity	No	None identified on site or in adjacent lands.	No
Amphibian Woodland Breeding Habitat	No	No suitable habitats were detected on site or in adjacent lands during field visits. No indicator species detected during Nocturnal Amphibian Surveys.	No (NAS conducted – April & May 2014)
Amphibian Wetland Breeding (includes Bullfrog concentration areas) Habitat	No	No suitable habitats were detected on site or in adjacent lands during field visits. Non-significant numbers of one indicator species detected during Nocturnal Amphibian Surveys.	No (NAS conducted – April & May 2014)
Turtle Nesting Habitat	No	Suitable sites, with sand and gravel with good aspect, were found on-site; no turtles detected nesting during turtle surveys.	No (Turtle surveys conducted – May & June 2014)
Turtle Overwintering Habitat	No	No suitable habitats were detected on site or in adjacent lands during field visits.	No
Woodland/Specialized Raptor Nesting Habitat	No	No suitable woodlands or conifer plantations on site or in adjacent lands; no indicator species detected during breeding bird surveys.	No (BBS conducted – May & June 2014)
Bald Eagle Nesting, Foraging, and Perching Habitat	No	No suitable nest trees (i.e. supercanopy) were detected on site or in adjacent lands; no Bald Eagles (or nests) detected during breeding bird surveys; species likely forages along Credit River during year.	No (BBS conducted – May & June 2014)
Osprey Nesting, Foraging, and Perching Habitat	No	No Ospreys or nests were detected on site or in adjacent lands during breeding bird surveys; species likely forages along Credit River in spring and fall migration.	No (BBS conducted – May & June 2014)
Bald Eagle Wintering Areas	No	Credit River valley likely too small and frozen to support this species in winter; wintering population found along Lake Ontario shoreline.	No
Seeps and Springs	No	None identified detected on site or in adjacent lands.	No
Waterfowl Nesting Habitat	No	No suitable habitats were detected on site or in adjacent lands during field visits; no	No (BBS conducted –

Significant Wildlife Habitat Type	SWH present on site or in adjacent lands (within 120 m)?	Rationale (Habitat Presence or Absence)	Additional field studies required?
		waterfowl species seen during breeding bird surveys (BBS).	May & June 2014)
Marsh Breeding Bird Habitat	No	No suitable habitats were detected on site or in adjacent lands during field visits; no indicator species detected during 2014 breeding bird surveys (BBS).	No (BBS conducted – May & June 2014)
Wildlife Movement Corridors			
Deer Movement Corridors	No	Site and adjacent areas too urbanized to support significant movement corridor; small numbers likely move through site and along Credit River.	No
Amphibian Movement Corridors	No	No suitable habitat available on site so would not support significant movement corridor; small numbers of amphibians likely move along the Credit River valley.	No
Habitats of Species of Conservation Concern			
Declining Guilds: Shrub land bird habitat	No	No suitable habitats were detected on site or in adjacent lands during field visits.	No
Terrestrial Crayfish Habitat	No	No suitable habitats were detected on site or in adjacent lands during field visits.	No
ESA Special Concern Species			
	No	Monarch (SC) may occur occasionally as a migrant but not in significant numbers nor as a breeder (no Common Milkweed was detected on site during surveys); one young Snapping Turtle was found but there is no overwintering habitat present and no evidence of nesting was detected.	No
S1 – S3 Provincially Ranked Species			
	No	No S1-S3 species are likely to occur as breeders on the site; none were detected during surveys during field investigations.	No (Surveys conducted – April, May & June 2014)
G1 – G3 Globally Ranked Species			
	No	No G1-G3 Globally Ranked Species were identified on site or in adjacent lands and none are expected to occur.	No

Significant Wildlife Habitat Type	SWH present on site or in adjacent lands (within 120 m)?	Rationale (Habitat Presence or Absence)	Additional field studies required?
Locally Significant Species			
	Candidate	24 Locally Significant Species of plants were identified within ELC polygons 4, 5, 6, and 10; see Section 4.3 of report for details.	No (Surveys conducted – April, May & June 2014 and May 2017)

Appendix 3 – Summary of flora observations for the Merulla Properties

	Scientific Name	Common Name	National Status	Provincial Status		Regional/Local Status			Additional Species Information		
			COSEWIC	MNR SARO	S-Rank	Peel	Mississauga	CVC	CC	CW	Native Status
1	*Acer negundo*	Box Elder			S5					-2	N
2	*Acer nigrum*	Black Maple			S4?				7	3	N
3	*Acer platanoides*	Norway Maple			SNA					5	I
4	*Acer saccharinum*	Silver Maple			S5				5	-3	N
5	*Acer saccharum var. saccharum*	Sugar Maple			S5				4	3	N
6	*Achillea millefolium*	Yarrow			S5						N
7	*Aegopodium podagraria*	Goutweed			SNA		1			774	y
8	*Alliaria petiolata*	Garlic Mustard			SNA						y
9	*Amelanchier arborea*	Downy Serviceberry			S5		2		3	677	y
10	*Amelanchier laevis*	Allegheny Service-berry			S5	U			5	677	y
11	*Amelanchier stolonifera*	Running Serviceberry			S4?	R3		R/L		677	I
12	*Anemone quinquefolia*	Wood Anemone			S5						I
13	*Antennaria howellii*	Pussy-toes			S5						y
14	*Apocynum androsaemifolium*	Spreading Dogbane			S5						y
15	*Arctium lappa*	Greater Burdock			SNA						y
16	*Arctium minus*	Lesser Burdock			SNA				5	823	N
17	*Arenaria serpyllifolia*	Thyme-leaf Sandwort			SNA		2			578	y
18	*Arisaema triphyllum*	Jack-in-the-pulpit			S5						y
19	*Asclepias syriaca*	Kansas Milkweed			S5					5	I
20	*Asparagus officinalis*	Garden Asparagus-fern			SNA					3	N
21	*Berberis thunbergii*	Japanese Barberry			SNA					4	I
22	*Berberis vulgaris*	European Barberry			SNA				3	532	N
23	*Betula papyrifera*	Paper Birch			S5				2	2	N
24	*Betula pendula*	European White Birch			SNA		1			-4	N
25	*Bromus inermis*	Awnless Brome			SNA						y
26	*Cardamine concatenata*	Cutleaf Toothwort			S5				3	637	y
27	*Carex aurea*	Golden-fruited Sedge			S5	U	2		4	-4	I
28	*Carex blanda*	Woodland Sedge			S5				3		I

	Scientific Name	Common Name	National Status	Provincial Status		Regional/Local Status			Additional Species Information		
			COSEWIC	MNR SARO	S-Rank	Peel	Mississauga	CVC	CC	CW	Native Status
29	*Carex pensylvanica*	Pennsylvania Sedge			S5				5	857	I
30	*Carex spicata*	A Sedge			SNA		2			5	y
31	*Cichorium intybus*	Chicory			SNA					5	y
32	*Circaea lutetiana*	Southern Broadleaf Enchanter's Nightshade			S5						N
33	*Cirsium arvense*	Canada Thistle			SNA					3	N
34	*Claytonia virginica*	Narrow-leaved Spring Beauty			S5				3	575	I
35	*Convallaria majalis*	European Lily-of-the-valley			SNA				5	875	N
36	*Cornus racemosa*	Stiff Dogwood			S5				2	-2	N
37	*Cornus rugosa*	Roundleaf Dogwood			S5				6	5	N
38	*Cornus sericea*	Red-osier Dogwood			S5						y
39	*Coronilla varia*	Common Crown-vetch			SNA				5	685	y
40	*Crataegus crus-galli*	Cockspur Hawthorn			S5				4		N
41	*Cryptotaenia canadensis*	Canada Honewort			S5		2		5		N
42	*Dactylis glomerata*	Orchard Grass			SNA					3	I
43	*Daucus carota*	Wild Carrot			SNA					5	I
44	*Dipsacus fullonum*	Fuller's Teasel			SNA						y
45	*Elymus canadensis*	Canada Wild Rye			S4S5	E		R/L	1	858	N
46	*Elymus repens*	Creeping Wild-rye			SNA					3	y
47	*Elymus riparius*	River Wild-rye			S4?	R3	1	R/L	7	-3	N
48	*Equisetum arvense*	Field Horsetail			S5						N
49	*Erigeron philadelphicus*	Philadelphia Fleabane			S5						I
50	*Erythronium americanum*	Yellow Trout-lily			S5						y
51	*Euonymus alatus*	Winged Spindle-tree			SNA						I
52	*Euphorbia esula*	Leafy Spurge			SNA		2			5	I
53	*Fagus grandifolia*	American Beech			S4				6	3	y
54	*Fragaria virginiana*	Virginia Strawberry			S5						I
55	*Fraxinus americana*	White Ash			S5				4	3	I
56	*Fraxinus excelsior*	European Ash			SNA		1			798	N

	Scientific Name	Common Name	National Status	Provincial Status		Regional/Local Status			Additional Species Information		
			COSEWIC	MNR SARO	S-Rank	Peel	Mississauga	CVC	CC	CW	Native Status
57	*Fraxinus pennsylvanica*	Green Ash			S5				3	-3	N
58	*Geranium maculatum*	Wild Crane's-bill			S5	U			3		N
59	*Geum aleppicum*	Yellow Avens			S5				2	-1	y
60	*Geum laciniatum*	Rough Avens			S4				4	-3	I
61	*Geum macrophyllum*	Large-leaved Avens			S5				9	-4	I
62	*Glechoma hederacea*	Ground Ivy			SNA					3	I
63	*Hesperis matronalis*	Dame's Rocket			SNA					5	N
64	*Hieracium praealtum*	King Devil			SNA						y
65	*Hydrophyllum virginianum*	John's Cabbage			S5				6	-2	N
66	*Hypericum perforatum*	A St. John's-wort			SNA					5	I
67	*Impatiens capensis*	Spotted Jewel-weed			S5				4	-3	N
68	*Juglans nigra*	Black Walnut			S4				5	3	y
69	*Leucanthemum vulgare*	Oxeye Daisy			SNA					5	N
70	*Ligustrum vulgare*	European Privet			SNA		2		1	798	N
71	*Lonicera tatarica*	Tartarian Honeysuckle			SNA					3	N
72	*Lotus corniculatus*	Birds-foot Trefoil			SNA					1	I
73	*Maianthemum racemosum ssp. racemosum*	False Solomon's-seal			S5				3	875	y
74	*Maianthemum stellatum*	Starflower False Solomon's-seal			S5		2		1	875	I
75	*Medicago lupulina*	Black Medic			SNA					1	y
76	*Melilotus albus*	White Sweet Clover			SNA						N
77	*Melilotus officinalis*	Yellow Sweetclover			SNA					3	N
78	*Nepeta cataria*	Catnip			SNA				1	792	N
79	*Ostrya virginiana*	Eastern Hop-hornbeam			S5				4	4	N
80	*Parthenocissus quinquefolia var. quinquefolia*	Thicket Creeper			S4?						N
81	*Parthenocissus vitacea*	Virginia Creeper			S5				3	3	N

	Scientific Name	Common Name	National Status	Provincial Status		Regional/Local Status			Additional Species Information		
			COSEWIC	MNR SARO	S-Rank	Peel	Mississauga	CVC	CC	CW	Native Status
82	*Penthorum sedoides*	Ditch-stonecrop			S5				4	-5	I
83	*Phleum pratense*	Meadow Timothy			SNA					3	I
84	*Picea abies*	Norway Spruce			SNA					5	N
85	*Picea glauca*	White Spruce			S5	R3		L	3	42	N
86	*Pinus nigra*	Black Pine			SNA		1			-5	I
87	*Pinus strobus*	Eastern White Pine			S5				4	3	I
88	*Pinus sylvestris*	Scotch Pine			SNA					5	N
89	*Plantago major*	Nipple-seed Plantain			S5					-1	N
90	*Poa compressa*	Canada Bluegrass			SNA					2	N
91	*Poa pratensis*	Kentucky Bluegrass			S5						I
92	*Podophyllum peltatum*	May Apple			S5				5	3	I
93	*Polygonum cuspidatum*	Japanese Knotweed			SNA				3	579	N
94	*Populus balsamifera*	Balsam Poplar			S5						I
95	*Populus deltoides*	Eastern Cottonwood			S5						I
96	*Populus grandidentata*	Large-tooth Aspen			S5				5	3	N
97	*Populus tremuloides*	Trembling Aspen			S5				2		N
98	*Potentilla recta*	Sulphur Cinquefoil			SNA					5	N
99	*Prunella vulgaris*	Self-heal			S5						y
100	*Prunus avium*	Sweet Cherry			SNA		1			5	N
101	*Prunus serotina*	Wild Black Cherry			S5				3	3	N
102	*Prunus virginiana*	Choke Cherry			S5						N
103	*Quercus alba*	White Oak			S5				6	3	I
104	*Quercus macrocarpa*	Mossy-cup Oak			S5				5	1	N
105	*Quercus rubra*	Northern Red Oak			S5				6	3	I
106	*Quercus velutina*	Black Oak			S4	R3	2	R/L	8	5	N
107	*Ranunculus abortivus*	Kidney-leaved Buttercup			S5				2	-2	I
108	*Ranunculus acris*	Tall Butter-cup			SNA					-2	I
109	*Ranunculus ficaria*	Fig-root Butter-cup			SNA				-2	53	y
110	*Rhamnus cathartica*	Buckthorn			SNA					3	y
111	*Rhus typhina*	Staghorn Sumac			S5						N
112	*Ribes triste*	Swamp Red Currant			S5	U	2		6	-5	y

	Scientific Name	Common Name	National Status	Provincial Status		Regional/Local Status			Additional Species Information		
			COSEWIC	MNR SARO	S-Rank	Peel	Mississauga	CVC	CC	CW	Native Status
113	*Robinia pseudoacacia*	Black Locust			SNA						I
114	*Rosa multiflora*	Multiflora Rose			SNA					3	N
115	*Rubus idaeus ssp. strigosus*				S5					-2	y
116	*Rubus occidentalis*	Black Raspberry			S5				2	5	N
117	*Rubus odoratus*	Purple Flowering Raspberry			S5				3	5	y
118	*Rumex crispus*	Curly Dock			SNA					-1	
119	*Salix alba*	White Willow			SNA				-3	634	y
120	*Salix fragilis*	Crack Willow			SNA					-1	
121	*Sanguinaria canadensis*	Bloodroot			S5				5	4	
122	*Scilla siberica*	Siberian Squill			SNA		2		5	875	
123	*Silene vulgaris*	Maiden's Tears			SNA					5	
124	*Solanum dulcamara*	Climbing Nightshade			SNA						
125	*Solidago altissima*	Tall Goldenrod			S5						y
126	*Solidago caesia*	Blue-stemmed Goldenrod			S5				5	3	
127	*Solidago canadensis*	Canada Goldenrod			S5				1	3	
128	*Solidago flexicaulis*	Broad-leaved Goldenrod			S5				6	3	
129	*Solidago gigantea*	Smooth Goldenrod			S5				4	-3	
130	*Solidago nemoralis*	Field Goldenrod			S5						
131	*Symphyotrichum cordifolium*	Heart-leaf Aster			S5				5	5	
132	*Symphyotrichum lanceolatum*	Panicled Aster			S5						
133	*Taraxacum officinale*	Brown-seed Dandelion			SNA					3	
134	*Thalictrum pubescens*	Tall Meadow-rue			S5				-2	53	
135	*Thuja occidentalis*	Eastern White Cedar			S5				-3	43	
136	*Tilia americana*	American Basswood			S5				4	3	
137	*Tilia cordata*	Little-leaf Linden			SNA						
138	*Toxicodendron radicans*	Poison Ivy			S5						y
139	*Tragopogon dubius*	Meadow Goat's-beard			SNA					5	

	Scientific Name	Common Name	National Status	Provincial Status		Regional/Local Status			Additional Species Information		
			COSEWIC	MNR SARO	S-Rank	Peel	Mississauga	CVC	CC	CW	Native Status
140	*Trifolium repens*	White Clover			SNA					2	
141	*Tsuga canadensis*	Eastern Hemlock			S5				3	42	
142	*Tussilago farfara*	Colt's Foot			SNA					3	
143	*Ulmus americana*	American Elm			S5				3	-2	
144	*Ulmus pumila*	Siberian Elm			SNA				5	551	
145	*Urtica dioica*	Stinging Nettle			S5						
146	*Verbascum thapsus*	Great Mullein			SNA					5	
147	*Veronica officinalis*	Gypsy-weed			SNA		2		5	799	
148	*Veronica persica*	Perscians' Speedwell			SNA					5	
149	*Viburnum acerifolium*	Maple-leaf Viburnum			S5				6	5	
150	*Viburnum opulus*	Guelder-rose Viburnum			SNA					818	
151	*Vicia cracca*	Tufted Vetch			SNA					5	
152	*Viola cucullata*	Marsh Blue Violet			S5	R6		L	-5	618	
153	*Vitis riparia*	Riverbank Grape			S5					-2	
154	*Antennaria sp*	Pussytoes Species									
155	*Aster sp*	Aster Species									
156	*Carex sp*	Sedge Species									
157	*Cirsium sp*	Thistle Species									
158	*Crataegus sp*	Hawthorn Species									
159	*Geum sp*	Avens Species									
160	*Maianthemum sp*	Solomon's Seal Species									
161	*Malus sp*	Apple Species									
162	*Ribes sp*	Currant Species									
163	*Rosa sp*	Rose Species									
164	*Rumex sp*	Dock Species									
165	*Salix sp*	Willow Species									
166	*Solidago sp*	Goldenrod Species									
167	*Viburnum sp*	Viburnum Species									
168	*Viola sp*	Violet Species									

LEGEND

S_Rank: S4 Apparently Secure; S5 Secure; SNA A conservation status rank is not applicable because the species is not a suitable target for conservation activities (e.g. an introduced species, or a species that has been recorded in Ontario but the observations were made at locations far outside the species' usual range); S#? Rank Uncertain

Peel: R rare native species; U uncommon native species; R# number of stations for a rare native species;

Mississauga: 1 = 1 to 3 locations within the City, these species are considered to be regionally significant; 2 = 4 to 10 locations within the City, these species are considered to be regionally significant

CVC: R regionally (GTA) rare; L locally rare

CC: Coefficient of Conservatism is a value (0 to 10) assigned to native species in Ontario based on its degree of fidelity to a specific vegetation community type. The lower this value, the more likely the plant is to be found in a wide variety of plant community types including disturbed sites. The presence of plants with a coefficient of conservatism of 9 or 10 indicates later-successional native plants that have undergone only minor disturbance.

CW: Coefficient of Wetness is a value (-5 to +5) assigned to species in Ontario based on how often it is to occur in wetland habitat. -5 Obligate Wetland; -3 Facultative Wetland; 0 Facultative; +3 Facultative Upland; +5 Obligate Upland

Native Status: N native; I introduced

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Appendix 4 - Species at Risk Screening for the Merulla EIS site

SPECIES	SAR Designation	Key Habitats Used By Species	Status at the Merulla EIS site and adjacent lands (within 120 metres)
AMPHIBIANS			
Jefferson Salamander (*Ambystoma jeffersonianum*)	Endangered	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	**No suitable habitat present on site or on adjacent lands.**
Western Chorus Frog (*Pseudacris triseriata*)	Threatened (federal only)	Permanent freshwater areas, such as marshes, grassy pools, river swamps, meadows, and other open areas	**No suitable habitat present on site or on adjacent lands.**
BIRDS			
Acadian Flycatcher (*Empidonax virescens*)	Endangered	Generally requires large areas of mature, undisturbed forest; avoids the forest edge; often found in well wooded swamps and ravines.	**No suitable habitat present on site or on adjacent lands.**
Bald Eagle (*Haliaeetus leucocephalus*)	Special Concern	Prefers deciduous and mixed-deciduous forest; and habitat close to water bodies such as lakes and rivers; they roost in super canopy trees such as pine.	**No suitable habitat present on site or on adjacent lands.**
Bank Swallow (*Riparia riparia*)	Threatened (federal only)	Low areas along rivers, streams, coasts or reservoirs; nest in natural bluffs and eroding streamside banks, also sand and gravel quarries and road cuts	**Birds were present along the adjacent Credit River; they were not nesting along the cliffs directly adjacent to the site but further west (see report for details).**
Barn Owl (*Tyto alba*)	Endangered	Generally prefers low-elevation, open country; often associated with agricultural lands, especially pasture. Nests are located in buildings, hollow trees and cavities in cliffs.	**No suitable habitat present on site or on adjacent lands; extremely rare in southern Ontario.**
Barn Swallow (*Hirundo rustica*)	Threatened	Prefers farmland, lake/river shorelines, wooded clearings, urban populated areas, rocky cliffs, and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	**Not nesting on-site as no suitable nesting structures present; some residential buildings on adjacent lands may provide nesting habitat but there is a general lack of open foraging habitats in the vicinity. No birds were detected during the breeding bird surveys in 2014.**
Black Tern (*Childonias niger*)	Special Concern	Generally prefers freshwater marshes and wetlands; nests either on floating material in a marsh or on the ground very close to water.	**No suitable habitat present on site or on adjacent lands.**
Bobolink (*Dolichonyx oryzivorus*)	Threatened	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands.	**No suitable habitat present on site or on adjacent lands; note that there are records in NHIC database.**
Canada Warbler (*Wilsonia canadensis*)	Threatened (federal) / Special Concern (provincial)	Generally prefers wet coniferous, deciduous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest.	**No suitable habitat present on site or on adjacent lands.**
Cerulean Warbler (*Dendroica cerulea*)	Endangered (federal) / Threatened (provincial)	Generally found in mature deciduous forests with an open understorey; also nests in older, second-growth deciduous forests.	**No suitable habitat present on site or on adjacent lands; note that there are historic records in the NHIC database.**
Chimney Swift (*Chaetura pelagica*)	Threatened	Historically found in deciduous and coniferous, usually wet forest types, all with a well developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys.	**Not nesting on-site or in adjacent lands as no suitable chimneys or tree cavities available; could forage in skies over site in summer or during migration.**
Common Nighthawk (*Chordeiles minor*)	Threatened (federal) / Special Concern (provincial)	Generally prefers open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nests on flat roof-tops).	**No suitable habitat present on site or on adjacent lands.**

Eastern Meadowlark (*Sturnella Magna*)	Threatened	Generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps.	**No suitable habitat present on site or on adjacent lands; note that there are records in NHIC database.**
Eastern Whip-poor-will *(Caprimlugus vociferus)*	Threatened	Generally prefers semi-open deciduous forests or patchy forests with clearings; areas with little ground cover are also preferred. In winter they occupy primarily mixed woods near open areas.	**No suitable habitat present on site or on adjacent lands.**
Eastern Wood-Pewee (*Contopus virens*)	Special Concern (federal only)	Found in deciduous, mixed woods, or pine plantations; also found in mature woodlands, urban shade trees, roadsides, and orchards; usually found in clearings and forest edges	**Suitable habitat available in adjacent lands (e.g. across Credit River); none were detected during 2014 breeding bird surveys.**
Golden-winged Warbler (*Vermivora chrysoptera*)	Special Concern	Generally prefers areas of early successional vegetation, found primarily on field edges, hydro or utility right-of-ways, or recently logged areas.	**No suitable habitat present on site or on adjacent lands.**
Grasshopper Sparrow (*Ammodramus savannarum*)	Special Concern (federal only)	Open grasslands and prairie with patches of bare ground.	**No suitable habitat present on site or on adjacent lands.**
Henslow's Sparrow *(Ammodramus henslowii)*	Endangered	Generally found in old fields, pastures and wet meadows. They prefer areas with dense, tall grasses, and thatch, or decaying plant material.	**No suitable habitat present on site or on adjacent lands; extirpated from region and extremely rare in southern Ontario.**
Hooded Warbler *(Wilsonia citrina)*	Special Concern	Generally found in the Carolinian Zone, in the interiors of large upland tracts of mature deciduous and mixed forest, and in ravines; can breed in low shrubbery such as raspberry canes.	**No suitable habitat present on site or on adjacent lands.**
King Rail (*Rallus elegans*)	Endangered	Freshwater and brackish marshes and rice fields.	**No suitable habitat present on site or on adjacent lands.**
Least Bittern *(Ixobrychus exilis)*	Threatened	Generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants.	**No suitable habitat present on site or on adjacent lands.**
Loggerhead Shrike (*Lanius ludovicianus*)	Endangered	Generally prefers a combination of pasture or other grassland with scattered low trees and shrubs. They build their nests in small trees or shrubs.	**No suitable habitat present on site or on adjacent lands.**
Louisiana Waterthrush *(Seiurus motacilla)*	Special Concern	Ggenerally inhabits mature forests along steeply sloped ravines adjacent to running water. Prefers clear, cold streams and densely wooded swamps.	**No suitable habitat present on site or on adjacent lands.**
Northern Bobwhite (*Colinus virginianus*)	Endangered	Generally inhabits a variety of edge and grassland type - habitats including non-intensively farmed agricultural lands.	**No suitable habitat present on site or on adjacent lands; extirpated from this area early in previous century.**
Olive-sided Flycatcher (*Contopus cooperi*)	Threatened (federal) / Special Concern (provincial)	Generally prefers natural forest edges and openings adjacent to rivers or wetlands. Commonly nests in conifers such as White and Black Spruce, Jack Pine and Balsam Fir.	**No suitable habitat present on site or on adjacent lands.**
Peregrine Falcon (*Falco peregrinus*)	Special Concern	Mountain ranges, coastlines, river valleys, and increasingly in cities	**No suitable habitat present on site or on adjacent lands.**
Prothonotary Warbler (*Protonotaria citrea*)	Endangered	Hardwood swamps	**No suitable habitat present on site or on adjacent lands.**
Red-Headed Woodpecker *(Melanerpes erythrocephalus)*	Threatened (federal) / Special Concern (provincial)	Generally prefers open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, as well as along beaver ponds and brooks.	**No suitable habitat present on site or on adjacent lands.**
Short-eared Owl *(Asio flammeus)*	Special Concern	Generally prefers a wide variety of open habitats, including grasslands, peat bogs, marshes, sand-sage concentrations, old pastures and agricultural fields.	**No suitable habitat present on site or on adjacent lands.**

Wood Thrush (*Hylocichla mustelina*)	Special Concern (federal only)	Breeds in mature deciduous and mixed forests, most commonly those with American beech, sweet gum, red maple, black gum, eastern hemlock, flowering dogwood, American hornbeam, oaks, or pines; nests less successfully in fragmented forests and suburban parks with enough large trees for a territory; ideal habitat includes trees over 50 feet tall, a moderate understory of saplings/shrubs, an open floor with moist soil and decaying leaf litter, and water nearby.	**No suitable habitat present on site or on adjacent lands.**
Yellow-breasted Chat *(Icteria virens)*	Endangered	Generally prefers dense thickets around wood edges, riparian areas, and in overgrown clearings.	**No suitable habitat present on site or on adjacent lands.**
Yellow Rail (*Coturnicops noveboracensis*)	Special Concern	Shallow marshes and wet meadows.	**No suitable habitat present on site or on adjacent lands.**
FISH			
American Eel (*Anguilla rostrata*)	Endangered	All fresh water, estuaries and coastal marine waters that are accessible to the Atlantic Ocean; 12-mile Creek watershed and Lake Ontario	**Habitat potentially present in adjacent lands (i.e., Credit River); see report for details.**
Redside Dace *(Clinostomus elongatus)*	Endangered	Generally found in pools and slow-moving areas of small headwater streams with a moderate to high gradient.	**No suitable habitat present on site or on adjacent lands.**
INSECTS			
Monarch *(Danaus plexippus)*	Special Concern	Exist primarily wherever milkweed and wildflowers exist, such as abandoned farmland, along roadsides, and other open spaces.	**May occur during migration in non-significant numbers; not likely to breed as Common Milkweed not present.**
Mottled Duskywing (*Erynnis martialis*)	Endangered (federal only)	Open woodland, barrens, prairie hills, open brushy fields, chaparral; larvae feed on New Jersey tea (*Ceanothus americanus*) and redroot (*Ceanothus herbaceus*)	**No suitable habitat present on site or on adjacent lands.**
Rapids Clubtail (*Gomphus quadricolor*)	Endangered	Found along fast-moving streams, with males resting on rocks and vegetation along the edge of the stream; like to hunt along riffle sections of stream	**No suitable habitat present on site or in adjacent lands.**
Rusty-patched Bumble Bee (*Bombus affinis*)	Endangered	Generally inhabits a range of diverse habitats including mixed farmland, sand dunes, marshes, urban and wooded areas; usually nests underground in abandoned rodent burrows.	**No suitable habitat present on site or in adjacent lands.**
West Virginia White (*Pieris virginiensis*)	Special Concern	Generally prefer moist, deciduous woodlands; the larvae feed only on the leaves of the two-leaved toothwort (Cardamine diphylla), which is a small, spring-blooming plant of the forest floor.	**No suitable habitat present on site or in adjacent lands.**
MAMMALS			
American Badger (*Taxidea taxus*)	Endangered	Occurs primarily in grasslands and open areas with grasslands, which can include parklands, farms, and treeless areas; also found in forest glades and meadows, marshes, brushy areas, hot deserts, and mountain meadows	**No suitable habitat present on site or on adjacent lands.**
Eastern Small-footed Myotis (*Myotis leibii*)	Endangered	Overwintering habitat: caves and mines that remain above 0 degrees Celsuis; Maternal roosts: primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses, and under tree bark.	**No suitable habitat for overwintering; no buildings on site for roosting. If any are present utilizing the trees in the southern portions of property, none of these are slated for removal and all are more than 15 metres from proposed building site.**
Grey Fox *(Urocyon cineroargenteus)*	Threatened	Generally prefers deciduous forests, marshes, swampy areas, and urban areas.	**No suitable habitat present on site or in adjacent lands.**
Little Brown Myotis (*Myotis lucifugus*)	Endangered	Overwintering habitat: Caves and mines that remain above 0 C; Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh).	**No suitable habitat for overwintering; no buildings on site for roosting. If any are present utilizing the trees in the southern portions of property, none of these are slated for removal and all are more than 15 metres from proposed building site.**

Northern Myotis (*Myotis septentrionalis)*	Endangered	Overwintering habitat: Caves and mines that remain above 0 C; Maternal Roosts: Often asssociated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns etc.)	**No suitable habitat for overwintering; no buildings on site for roosting. If any are present utilizing the trees in the southern portions of property, none of these are slated for removal and all are more than 15 metres from proposed building site.**
Southern Flying Squirrel (*Glaucomys volans*)	Special Concern (federal only)	Eastern deciduous forests or mixed forests, especially where large hickory and beech trees are more abundant; also favours maple, poplar, and oak trees. May be present in heavily wooded suburban regions, although rarely in large numbers.	**No suitable habitat present on site or on adjacent lands.**
Tri-coloured Bat (*Perimyotis subflavus*)	Endangered	Overwintering habitat: caves and mines that remain above 0 degrees Celsius; Maternal roosts: can be in trees or dead clusters of leaves or arboreal lichens on trees. May also use barns or similar structures.	**No suitable habitat for overwintering; no buildings on site for roosting. If any are present utilizing the trees in the southern portions of property, none of these are slated for removal and all are more than 15 metres from proposed building site.**
Woodland Vole (*Microtus pinetorum*)	Special Concern	Occurs in deciduous forests, dry fields, and apple orchards, preferring wooded areas with high vertical vegetative stratification, also evergreen shrubs, ground cover, and old fallen logs. Voles are most abundant in deciduous forests with moist, friable soils suitable for burrowing.	**No suitable habitat present on site or on adjacent lands.**
MOLLUSCS (FRESHWATER MUSSELS)			
Eastern Pondmussel (*Ligumia nasuta*)	Endangered	Generally inhabit sheltered areas of lakes or slow streams in substrates of fine sand and mud	**No suitable habitat present on site or on adjacent lands.**
REPTILES			
Blanding's Turtle *(Emydonidea blandingii)*	Threatened	Generally occurs in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. Prefers shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams.	**No suitable habitat present on site or on adjacent lands.**
Common Five-lined Skink (*Plestiodon fasciatus*)	Special Concern	Occur in moist, partially wooded habitat that provides ample cover or inside walls of buildings as well as sites to bask in the sun; found in broken, rocky areas at the northern edge of their range.	**No suitable habitat present on site or in adjacent lands; no recent records from entire region.**
Eastern Hog-nosed Snake (*Heterodon platirhinos*)	Threatened	Generally prefer habitats with sandy, well-drained soil and open vegetative cover, such as open woods, brushland, fields, forest edges and disturbed sites. The species is often found near water.	**No suitable habitat present on site or on adjacent lands.**
Eastern Musk Turtle (Stinkpot) (*Sternotherus odoraturs*)	Special Concern (federal) / Threatened (provincial)	Occurs in rivers, lakes and ponds with a slow-moving current, soft bottom, and shallow water	**No suitable nesting or overwintering areas on site or in adjacent lands. Note that there is a record in NHIC database from 2001.**
Eastern Ribbonsnake *(Thamnophis sauritus)*	Special Concern	Generally occurs along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting.	**No suitable habitat present on site or on adjacent lands.**
Eastern Spiny Softshell (*Apalone spinifera*)	Threatened	Found in rivers with soft bottoms, aquatic vegetation and sandbars or mudflats; occasionally found in lakes or impoundments.	**Habitat potentially present in adjacent lands (i.e., Credit River). If present, will not be negatively impacted by the proposed development.**
Milksnake *(Lampropeltis triangulum)*	Special Concern	Generally occurs in rural areas, where it is most frequently reported in and around buildings, especially old structures. It is also found in a wide variety of habitats, from prairies, pastures, and hayfields, to rocky hillsides and a wide variety of forest types. They must also be in proximity to water, and suitable locations for basking and egg-laying.	**No suitable habitat present on site or on adjacent lands. Only record for this species in NHIC database is historic in nature (1987).**

Northern Map Turtle (*Graptemys geographica*)	Special Concern	Found in large rivers and lakes with slow-moving currents and soft bottoms	**No suitable nesting or overwintering areas on site or in adjacent lands.**
Snapping Turtle *(Chelydra serpentina)*	Special Concern	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	**Young turtles have been documented on site; no nesting detected despite extensive surveys in 2014. See report for details.**
Spotted Turtle *(Clemmys guttata)*	Endangered	Generally prefers the shallow, slow-moving and unpolluted water of ponds, bogs, marshes, ditches, vernal pools and sedge meadows. It can also be found in woodland streams and near the sheltered shores of shallow bays.	**No suitable habitat present on site or on adjacent lands; no recent records from entire region.**
Vascular Plants			
American Chestnut (*Castanea dentata*)	Endangered	Found in deciduous forest communities; this tree prefers arid forests with acid and sandy soils.	**Marginal habitat potentially present, however none were encountered during field surveys.**
American Columbo (*Frasera caroliniensis*)	Endangered	Most commonly associated with open deciduous forested slopes, thickets and clearings; grows in a variety of relatively stable habitats as well as on a wide variety of soils.	**Marginal habitat potentially present. Although species may occur in Halton Region all documented existing populations are far south of the site (COSEWIC, 2006).**
American Ginseng (*Panax quinquefolius*)	Endangered	Grows in rich, moist, undisturbed and relatively mature deciduous woods in areas of neutral soil (such as over limestone or marble bedrock).	**No suitable habitat present on site or on adjacent lands.**
Broad Beech Fern (*Phegopteris hexagonoptera*)	Special Concern	Generally inhabits shady areas of beech and maple forests where the soil is moist or wet.	**No suitable habitat present on site or on adjacent lands.**
Butternut Tree (*Juglans cinerea)*	Endangered	Prefers well-drained, fertile to dry rocky soils in shallow valleys or on gradual slopes. Butternut is intolerent of shade and needs full sun.	**Potential habitat present on site. Species not encountered during field surveys.**
Eastern Flowering Dogwood (*Cornus florida*)	Endangered	Generally grows in deciduous and mixed forests, in the drier areas of its habitat, although it is occasionally found in slightly moist environments; also grows around edges and hedgerows.	**Potential habitat present on site. Species not encountered during field surveys.**
Few-flowered Club-rush (*Trichophorum planifolium*)	Endangered	Generally found in Dry Fresh Oak deciduous forests and Dry Fresh Oak-Maple-Hickory deciduous forests (only found on RBG property).	**Onsite habitat marginally suitable, however it is a highly unlikely occurrence as there are only 2 known populations in Ontario, both located far away from the site (COSEWIC, 2000).**
Green Dragon (*Arisaema dracontium*)	Special Concern	Generally grows in damp deciduous forests and along streams.	**No suitable habitat present.**
Hoary Mountain-Mint (*Pycnanthemum incanum*)	Endangered	Oak savannas and prairies, dry sites.	**No suitable habitat present.**
Red Mulberry (*Morus rubra*)	Endangered	Generally grows in moist forest habitats. In Ontario, these include slopes and ravines of the Niagara Escarpment, and sand spits and bottom lands; can grow in open areas such as hydro corridors.	**Potential habitat present on site. Species not encountered during field surveys.**
Spotted Wintergreen (*Chimaphila maculata*)	Endangered	Generally grow in sandy habitats in dry-mesic oak-pine woods near Great Lakes shoreline.	**No suitable habitat present on site and no records from Halton Region (Oldham & Brinker, 2009).**
White Wood Aster (*Eurybia divaricata*)	Threatened	Generally grows in open, dry, deciduous forests. It has been suggested that it may benefit from some disturbance, as it often grows along trails.	**No suitable habitat present on site and no records from Halton Region (Oldham & Brinker, 2009).**

COSEWIC 2000. COSEWIC assessment and status report on the bashful bulrush Trichophorum planifolium in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 8 pp.
COSEWIC 2006. COSEWIC assessment and update status report on the American Columbo Frasera caroliniensis in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 21 pp.
Oldham, M.J., and S.R. Brinker. 2009. Rare Vascular Plants of Ontario, Fourth Edition. Natural Heritage Information Centre, Ontario Ministry of Natural Resources. Peterborough, Ontario. 188 pp.

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APPENDIX 5

Correspondence with MNRF

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Appendix 5 - MNRF correspondence

From: ESA Aurora (MNRF)
To: Ian Richards
Cc: ESA Aurora (MNRF)
Subject: RE: Information Gathering Form - Merulla Properties, City of Mississauga
Date: December-19-14 3:17:19 PM
Attachments: image001.png

Good afternoon Ian,

Thank you for providing the requested information and detailed accounts of your species observations to our office.

Seeing that the works will not impact the banks of the watercourse adjacent to the property and that an appropriate erosion and sediment control plan will be implemented prior to the commencement of the works and will be maintained throughout the works, we have no further species at risk concerns with the proposed works.

Regards,

Brittany Ferguson
Fish and Wildlife Technical Specialist
Ministry of Natural Resources and Forestry
50 Bloomington Road, Aurora, ON L4G 0L8
Phone: (905)-713-7344
Email: brittany.ferguson@ontario.ca

From: Ian Richards [mailto:irichards@dougan.ca]
Sent: December-18-14 9:31 AM
To: ESA Aurora (MNRF); Ferguson, Brittany (MNRF)
Cc: Jim Dougan; Dirk Blyleven
Subject: RE: Information Gathering Form - Merulla Properties, City of Mississauga

Hello Brittany,

Thank you for providing us with feedback on the Merulla Properties IGF.

Our EIS report for the site has not yet been completed; however, in the impact assessment section we will identify appropriate sediment and erosion controls to be implemented before the development begins.

With regard to Bank Swallow, the two residences proposed for development will have adequate setbacks from the Credit River and associated bluffs; as such, the proposed works will have no negative impacts on these bluffs.

I have filled out the Excel spreadsheet with the four dates when Bank Swallows were observed. The birds were roaming over a long stretch (at least 500 metres) of the Credit River, so the coordinates I indicated are for the approximate centre of their foraging activity.

Please let me know if you require any additional information.

Sincerely,

Ian

Ian Richards, BSc, Cert. Env. Mgmt. & Assessmt.
Wildlife Ecologist

DOUGAN & ASSOCIATES – Ecological Consulting & Design
77 Wyndham Street South, Guelph, ON, N1E 5R3
ph: 519.822.1609 x.29, fax: 519.822.5389
irichards@dougan.ca www.dougan.ca

From: ESA Aurora (MNRF) [mailto:ESA.Aurora@ontario.ca]
Sent: December-17-14 9:37 AM
To: Ian Richards
Cc: ESA Aurora (MNRF)
Subject: RE: Information Gathering Form - Merulla Properties, City of Mississauga

Good morning Ian,

Thank you for providing detailed information regarding the proposed works to occur at 2935 and 2955 Mississauga Road to our office.

We have reviewed your IGF and would like to provide the following questions and comments:

- Please ensure that an appropriate sediment and erosion control plan is put in place prior to the commencement of the works, so as to ensure that no deleterious materials shall enter the watercourse at any point and that there will be no impacts to fish habitat.
- As species surveys were conducted and no Butternuts were confirmed on site, we have no further concerns for this species.
- As Bank Swallow have been recorded in the vicinity of the site, it is probable that the banks of the watercourse provide suitable nesting habitat for the species. Can you confirm that the proposed works will have no impacts to the banks of the watercourse?
- Lastly, could you please populate the attached excel sheet with your records of Bank Swallow? This will allow us to update our district database accordingly.

Thank you,

Brittany Ferguson
Fish and Wildlife Technical Specialist
Ministry of Natural Resources and Forestry
50 Bloomington Road, Aurora, ON L4G 0L8
Phone: (905)-713-7344
Email: brittany.ferguson@ontario.ca

From: Ian Richards [mailto:irichards@dougan.ca]
Sent: November-17-14 11:11 AM
To: ESA Aurora (MNRF)
Subject: Information Gathering Form - Merulla Properties, City of Mississauga

To Aurora District MNRF:

Attached is an Information Gathering Form for the Merulla Properties in the City of Mississauga. Previous correspondence regarding these properties was received from David Denyes, Assistant Species at Risk Biologist, Aurora District OMNR, on November 5, 2013 (attached).

Please let me know if you require any additional information.

Thank you very much and I look forward to your reply.

Sincerely,

Ian

Ian Richards, BSc, Cert. Env. Mgmt. & Assessmt.
Wildlife Ecologist

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Ministry of
Natural Resources
Aurora District Office
50 Bloomington Road
Aurora, Ontario L4G 0L8

Ministère des
Richesses naturelles

Telephone: (905) 713-7400
Facsimile: (905) 713-7361

Ontario

November 5, 2013

Ian Richards
Dougan & Associates
77 Wyndham St. S
Guelph, ON N1E 5R3
Tel: (519) 822-1609 ext. 29
Fax: (519) 822-5389
irichards@dougan.ca

Re: 2935 & 2955 Mississauga Road, Merulla Development
Town of Mississauga, Regional Municipality of Peel

Dear Mr. Richards,

In your email dated November 4, 2013 you requested information on natural heritage features and element occurrences occurring on or adjacent to the above mentioned location.

There are Species at Risk recorded for your study area. We have records of Snapping Turtle, Butternut and American Eel within the vicinity of your site. Some of these species may receive protection under the *Endangered Species Act 2007* and thus, a permit may be required if the work you are proposing could cause harm to these species or their habitat. Please provide additional information on your proposal to our office, and we will assess it to determine whether a permit under the ESA 2007 is required for the works to proceed.

Natural heritage features recorded for your area include the Regionally Significant Credit River at Erindale Life Science ANSI, the Provincially Significant Roy Ivors Woodlot Life Science ANSI and other identified Environmentally Significant Areas.

Absence of information provided by MNR for a given geographic area, or lack of current information for a given area or element, does not categorically mean the absence of sensitive species or features. Many areas in Ontario have never been surveyed and new plant and animal species records are still being discovered for many localities. For these reasons, the NHIC/MNR cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of Ontario.

This species at risk information is highly sensitive and is not intended for any person or project unrelated to this undertaking. Please do not include any specific information in reports that will be available for public record. As you complete your fieldwork in these areas, please report all information related to any species at risk to the NHIC and to our office. This will assist with updating our database.

If you have any questions or comments, please do not hesitate to contact the undersigned at 905-713-7344 or ESA.Aurora@ontario.ca (Attn: David Denyes).

Sincerely,

David Denyes
Assistant Species at Risk Biologist
Ontario Ministry of Natural Resources, Aurora District

Ministry of
Natural Resources
Aurora District Office
50 Bloomington Road West
Aurora, Ontario L4G 3G8

Ministère des
Richesses naturelles

Telephone: (905) 713-7400
Facsimile: (905) 713-7360

Ontario

To: Dirk Blyleven
Beacon Planning Services
3464 Semenyk Court, Unit 213
Mississauga, ON L5C 4P8

Re: Credit River at Erindale Regional Life Science Area of Natural and Scientific Interest

As requested on May 1, 2008, enclosed is the background data the Aurora District, MNR has on the Credit River at Erindale Regional Life Science Area of Natural and Scientific Interest (ANSI). Specifically, enclosed please find the following information:

1) Life Science Areas of Natural and Scientific Interest in Site District 7-4 report published by MNR in September 1984
2) Ontario Base Map showing ANSI boundary
3) 2004 Field Notes
4) Ortho-rectified digital map of the ANSI boundary based on 2005 update

The 1984 MNR report identifies the provincial and regional life science ANSIs in site district 7-4 including the Credit River at Erindale site. Please be advised that Site District 7-4 is now known as Ecodistrict 7E-4. It should be noted that sites identified in the report were subsequently (also in 1984) renamed as Areas of Natural and Scientific Interest (ANSIs). Those named as "Candidate Nature Reserves" became Provincial ANSIs and the remainder of the "Significant Sites" became Regional ANSIs. The Credit River at Erindale Regional ANSI was selected for its river valley features situated on the sand plain portion of the Iroquois Physiographic Region and the shales of the South Slope Physiographic Region.

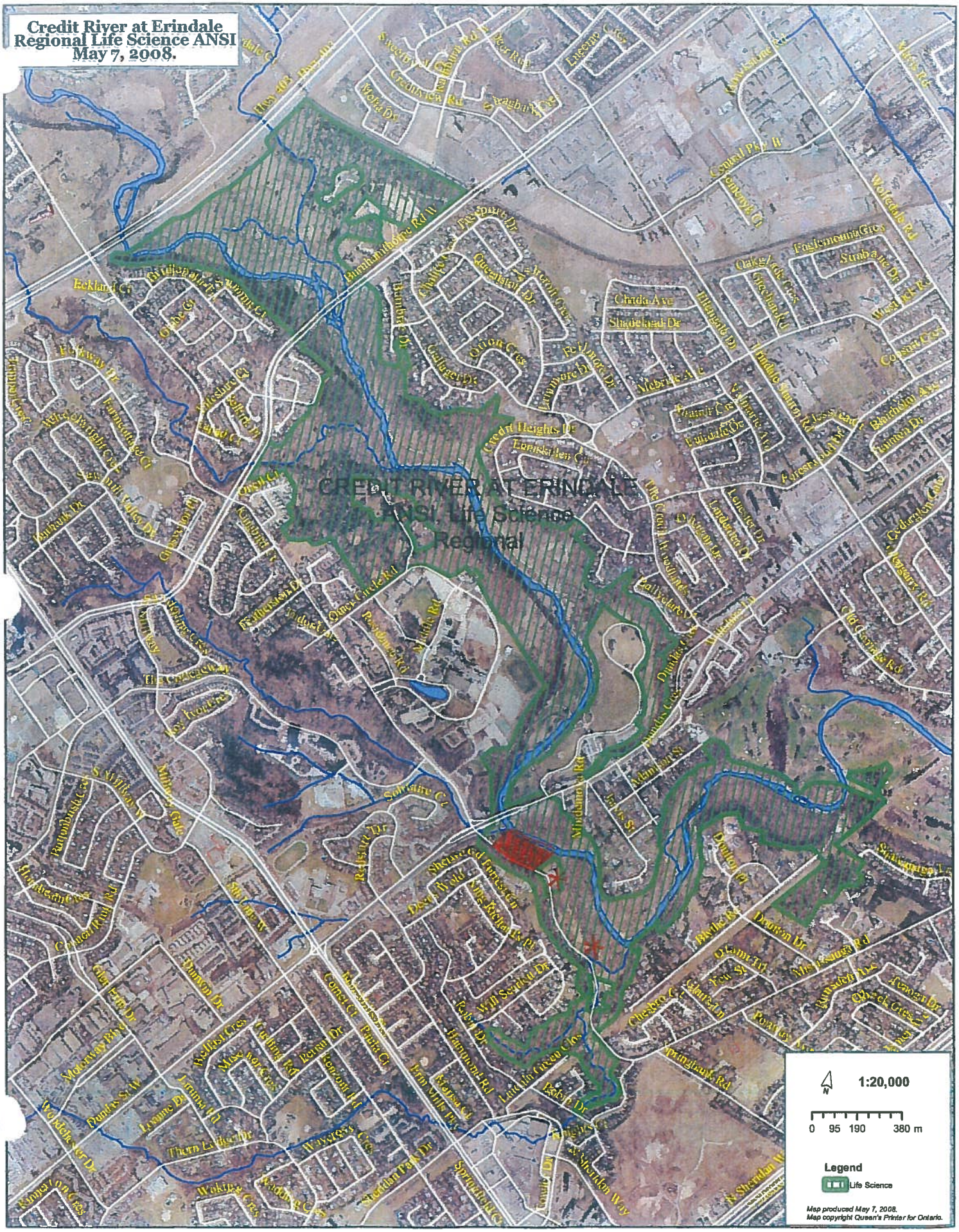
In the text of the report, reference to the Credit River at Erindale Significant Site (now known as a Regional ANSI) is noted on pages 12, 19, 36 and 58 and in the accompanying map. It should be noted that the 1984 report on page 36 identified Sycamore and Black Walnut as provincially rare. However, these species are no longer considered to be provincially rare. Both species are Carolinian or southern species, with Sycamore considered rare in Ecodistrict 7E-4. The boundaries for this ANSI were initially mapped on a 1:50,000 NTS map in 1984, and in the early 1990s, the boundaries were refined onto a 1:10 000 scale Ontario Base Map (see enclosed OBM map). In 2004, fieldwork was carried out on the ANSI by MNR Aurora District. Vegetation community field notes and a plant checklist are enclosed. The plant list includes those noted in the Credit River at Erindale Regional ANSI and at the nearby Roy Ivor's Woodlot Provincial ANSI.

In 2005, based on the 2004 fieldwork, and 2002 ortho-rectified imagery available to MNR, further refinements were made to the ANSI boundary (see enclosed May 7, 2008 image).

If you have any questions on this material one can call (905) 713-7370, FAX: (905) 713-7360, or e-mail me at: steve.varga@ontario.ca

Steve Varga

Steve Varga
Inventory Biologist
Strategic Planning and Information Management Section
Ministry of Natural Resources, Aurora District
50 Bloomington Rd.
Aurora, Ontario
L4G 3G8


Credit River at Erindale
Regional Life Science ANSI
May 7, 2008.
CREDIT RIVER AT ERINDALE
ANSI Life Science
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Life Science
Map produced May 7, 2008.
Map copyright Queen's Printer for Ontario.

SITE DISTRICT 7-4 RIVER VALLEY SYSTEM

EARTH	LIFE	NAME OF AREA	MAP SHEET	UTM REFERENCE
	X	Credit River at Erindale	30M/12	080230

BRIEF DESCRIPTION

Steep, wooded river valley and floodplain stretching 6 km in length, south of Streetsville. River floodplain Manitoba maple-willow-black maple, valley slope sugar maple-hemlock-beech and sugar maple-red oak-black cherry and tableland white oak-white pine. Tableland on east side is residential development while west side contains Erindale College, orchards and proposed development. Newly constructed bridge over northern portion of site. Provincially rare sycamore and black walnut and other rare plant sp. Exposed steep shale bedrock in northern portion.

SOURCES

Hanna, 1980. Airphoto Interpretation; Credit Valley ESA, 1979

FIELD SURVEY (DATE)	EARTH SCIENCE CHECK SHEET	LIFE SCIENCE CHECK SHEET	DATA CARD COMPILED
Sept. 11/80 Hanna			Hanna, 1980

ONTARIO NATURE RESERVES PROGRAM
ENVIRONMENTAL DATA CARD

ONTARIO MINISTRY OF NATURAL RESOURCES
PARK PLANNING BRANCH ENVIRONMENTAL PLANNING SECTION
3rd FLOOR, WHITNEY BLOCK, QUEEN'S PARK, TORONTO, M7A 1W3

EARTH	LIFE	NAME OF AREA	MAP SHEET	UTM REFERENCE
	X	Humber River	30M/13	120540

BRIEF DESCRIPTION

Flat bottomed section of Humber River north of Boyd Conservation Area (Woodbridge) for 4.5 km to MacMichael Collection east of Kleinburg. Willow-balsam poplar-ash-elm floodplain, wet meadow, goldenrod fields, reforested areas and upland sugar maple mixed woods. Several gravel pits in area. Encroaching residential development in north. Deer yard.

SOURCES

Hanna, 1980. Airphoto Interpretation; MNR Sensitive Areas Files

FIELD SURVEY (DATE)	EARTH SCIENCE CHECK SHEET	LIFE SCIENCE CHECK SHEET	DATA CARD COMPILED
Sept. 10/80 Hanna			Hanna, 1980

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PARK PLANNING BRANCH ENVIRONMENTAL PLANNING SECTION
3rd FLOOR, WHITNEY BLOCK, QUEEN'S PARK, TORONTO, M7A 1W3

EARTH	LIFE	NAME OF AREA	MAP SHEET	UTM REFERENCE
	X	Rouge River Central Woodland Valley Complex	30M/14	490520

BRIEF DESCRIPTION

Largest continuous woodland (160 h) remaining in Toronto. Woodland valley complex contains willow-Manitoba maple-cedar bottomland, red oak slopes with hemlock-white cedar and hemlock-white pine-sugar maple-beech-black cherry-red oak tableland. Dissected by Sheppard Avenue. Some residential development on tableland; Hydro Corridor abutts north end. A candidate nature reserve.

SOURCES

Hanna, 1980. Airphoto Interpretation; Riley, 1978 and 1980

FIELD SURVEY (DATE)	EARTH SCIENCE CHECK SHEET	LIFE SCIENCE CHECK SHEET	DATA CARD COMPILED
Sept. 10/80 Hanna			Hanna, 1980

ONTARIO NATURE RESERVES PROGRAM
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PARK PLANNING BRANCH ENVIRONMENTAL PLANNING SECTION
3rd FLOOR, WHITNEY BLOCK, QUEEN'S PARK, TORONTO, M7A 1W3

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APPENDIX 6

Preliminary Site Plan (David Small Designs, October 2016)

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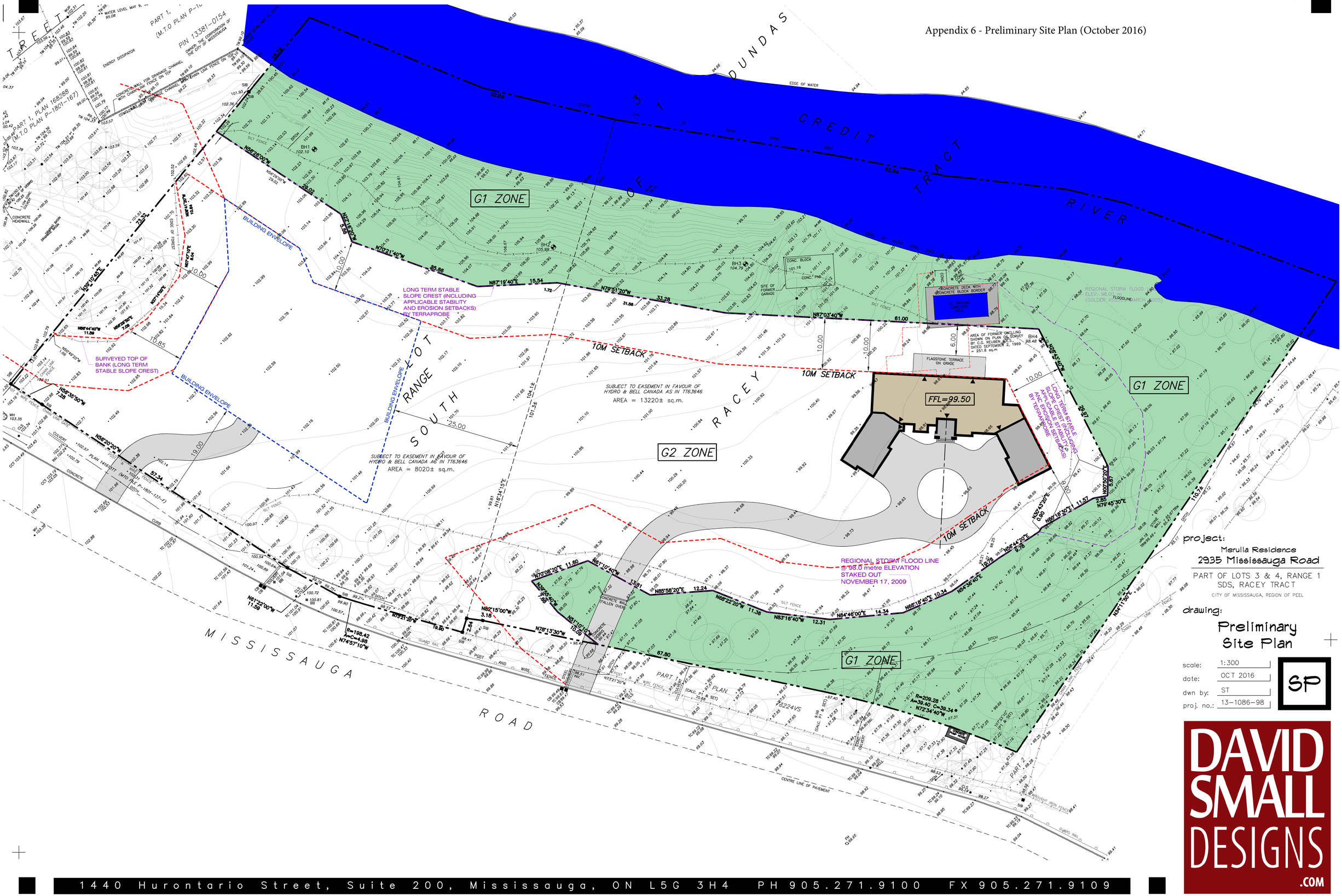
Appendix 6 - Preliminary Site Plan (October 2016)



project:

Merulla Residence
2935 Mississauga Road

PART OF LOTS 3 & 4, RANGE 1
SDS, RACEY TRACT
CITY OF MISSISSAUGA, REGION OF PEEL

drawing:

Preliminary Site Plan

scale: 1:300
date: OCT 2016
dwn by: ST
proj. no.: 13-1086-98

SP

DAVID SMALL DESIGNS .COM

1440 Hurontario Street, Suite 200, Mississauga, ON L5G 3H4 PH 905.271.9100 FX 905.271.9109

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APPENDIX 7

Aquatic Survey Photos

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Photograph 1. Downstream view from the north end of the subject property, showing the shale bank of the Credit River along the subject property. September 17, 2014.

Photograph 2. The low soil bank of the Credit River within the downstream portion of the subject property. September 17, 2014.

Photograph 3. The Credit River adjacent to the upstream half of the subject property, as seen from the high bank. September 17, 2014.

Photograph 4. The shallow riffle habitat in the Credit River adjacent to the downstream half of the subject property. September 17, 2014.