DILLON CONSULTING

RIVERSIDE SOUTH DEVELOPMENT CORPORATION

Environmental Impact Study

Phase 15B

November 2017 – 14-9916

November 15, 2017

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Phase 15B Environmental Impact Study

Dear Marcel,

The following Environmental Impact Study (EIS) for Phase 15B of Riverside South has been prepared in accordance with the City of Ottawa's EIS guidelines. The report includes both the EIS and the Tree Conservation Report elements as recommended during the pre-consultation meeting on March 31st, 2015. Also appended to the report is the complete Headwater Drainage Feature Assessment required by the Rideau Valley Conservation Authority.

If you have any questions about the report please feel free to contact me to discuss.

DILLON CONSULTING LIMITED

Alexander Zeller, M.Sc.
Associate

Encl.

Our file: 14-9916

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Executive Summary

Dillon Consulting Limited was retained by Riverside South Development Corporation (RSDC) to complete an Environmental Impact Statement (EIS) and Tree Conservation Report (TCR) for the proposed Phase 15B Development, located on part of 4650 Spratt Road, a contiguous parcel of land with frontage on both Spratt Road and River Road, in the City of Ottawa. The primary objective of the EIS and TCR is to evaluate environmental impacts associated with the proposed residential development.

Field surveys consisted of Ecological Land Classification (ELC), Headwater Drainage Feature (HDF) Assessment, breeding bird surveys, amphibian breeding surveys, and a Tree Inventory.

1) The property is not located near any provincially significant wetlands, significant woodlands, areas of natural and scientific interest (ANSIs), or other designated natural heritage system constraints.
2) The majority of the woodland throughout the parcel will likely need to be cleared to accommodate the proposed development. Most trees were determined to be in good health.
3) Potential impacts of development include erosion and sedimentation, and disturbance to breeding birds and bats associated with the removal of woodlands and HDFs from the Study Area. With the implementation of proper mitigation measures, impacts can be avoided and no residual effects are anticipated.
4) Survey results identified Butternut within the Study Area and limited roosting habitat for SAR bats. No other Species at Risk or Species at Risk habitat was identified within the Study Area.

The mitigation and compensation measures proposed in this report have been developed to avoid negative impacts associated with development on the natural environment. Overall, no residual impacts are anticipated as a result of this development provided appropriate mitigation is applied, and therefore there are no expected impediments to development.

It is our opinion that the proposed RSDC Phase 15B Development can be accepted with the condition that:

- Butternut trees which require removal should be assessed by a certified Butternut Health Assessor and registered by submitting a Notice of Activity to the Ministry of Natural Resources and Forestry (Kemptville District);
- The clearing of trees must occur during the winter months to avoid negative impacts on SAR bats;

- The Tree Protection Plan should be updated upon completion of the detailed design of the proposed development;
- RVCA approval is obtained prior to removal of HDFs; and,
- Other mitigation measures recommended herein will be implemented.

1.0 Introduction

1.1 Purpose

Dillon Consulting Limited (Dillon) was retained by Riverside South Development Corporation (RSDC) to complete an Environmental Impact Study (EIS) and Tree Conservation Report for the proposed RSDC Phase 15B Development, located on a contiguous parcel of land with frontage on both Spratt Road and River Road, in the City of Ottawa, Ontario (the "Study Area")(Figure 1).

This EIS and TCR has been prepared to evaluate the potential for environmental impacts associated with the proposed development and to recommend mitigation measures to offset those impacts.

1.2 Background

A pre-consultation meeting was held with the City of Ottawa on March 31st, 2015 where a number of specific requirements were outlined with respect to this study. These requirements include completion of the following:

- Headwater Drainage Features (HDF) Assessment;
- Tree Conservation Report (TCR);
- Breeding bird surveys;
- Amphibian breeding surveys;
- Bobolink and Eastern Meadowlark Surveys; and,
- Whip-poor-will surveys.

This EIS and TCR has been prepared to ensure that the development does not contravene the *Endangered Species Act, 2007* (ESA); to retain as much natural vegetation as possible, including mature trees, stands of trees, and hedgerows; to evaluate potential environmental impacts; and, to develop mitigation plans addressing potential impacts.

Location

The Study Area is located in the community of Riverside South, bounded by Spratt Road to the east and the River Road to the west.

RIVERSIDE SOUTH DEVELOPMENT CORPORATION

PHASE 15B
PART OF 4650 SPRATT ROAD
AND 750 RIVER ROAD

FIGURE 1
STUDY AREA

- Study Area Boundary
- City of Ottawa Natural Heritage Area
- Unevaluated Wetland
- Water Body
- Woodland
- Hedgerow

1:15,000

0 100 200 400 m

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: LK
MAP CHECKED BY: AZ
MAP PROJECTION: NAD 1983 UTM Zone 18N

DILLON CONSULTING

PROJECT: 149916
STATUS: DRAFT
DATE: 2017-10-26

FILE LOCATION: \\dillon.ca\DILLON_DFS\Ottawa\Ottawa CAD\CAD\2014\149916\FROM TORONTO SERVER\mxd\EIS\2017_B\Figure 1 Study Area.mxd

1.3 Property Information

Owner:	Riverside South Development Corporation
Address:	4650 Spratt Road Gloucester-South Nepean Ward
Lot and concession:	Part Lot 22& 23 Concession 1
Property Identification Number(s):	043301453
Zoning:	Development Reserve Zone and Environmental Protection Zone
OP designation:	General Urban Area

Land Use and Zoning

The Study Area falls within the Riverside South CDP. The City of Ottawa's Official Plan has designated the Study Area as a Developing Community and Airport Development Zone containing General Urban Area. The properties are zoned as Development Reserve (DR) and Environmental Protection Zone (EP).

1.4 Study Approach

The following approach has been developed to provide a clear methodological direction towards characterizing the natural environment and assessing the potential for significant species and habitats within the Study Area.

- Policy Framework: This section outlines the policies and legislation that apply to the protection of natural heritage features within the Study Area.
- Natural Heritage and Background Screening: This section provides the detailed background information collected from a variety of natural resource databases to describe the anticipated natural heritage features and significant species that may occur within the Study Area.
- Methodology: This section outlines the specific protocols and methods used in this study to evaluate the natural heritage features and species identified in the background screening.
- Survey Results: This section outlines the results obtained from the field surveys outlined conducted in the Methodology section. This also includes any highlights or notable observations made by the field biologists.

- Description of the Proposed Project: This section provides a brief summary of what the proposed project will be, including the construction activities associated with the proposed development.
- Impact Assessment and Mitigation: This section provides the assessment of potential environmental impacts associated with the proposed project on the natural heritage system, including the natural heritage features and species surveyed in this study. Also included are proposed mitigation measures aimed at reducing or eliminating potential impacts to natural heritage features. Where mitigation may not be possible, compensation may be proposed. This section will also identify any future permitting or agency authorization that maybe required before the project can proceed.
- Summary and Conclusions: This section provides a brief summary of the study's findings, outlines any notable provisions, and provides Dillon's general recommendation on whether this project should proceed as planned.

2.0 Policy Framework

Various regulatory agencies and legislative authorities have established a number of governing policies outlined below, in an effort to protect ecological features and functions. Table 1 lists the policies and legislation that apply to the protection of natural heritage features within the Ottawa area and supporting guidance documents and resources respective to each policy. The scope of this report evaluates the natural features governed by the policies outlined in Table 1.

TABLE 1: POLICIES, LEGISLATION AND BACKGROUND RESOURCES SEARCHED

Policy / Regulations	Guidelines and Supporting Documents
Federal Government of Canada	
Migratory Birds Convention Act (1994)	Environment and Climate Change Canada
Species at Risk Act (2002)	Federal Species at Risk Public Registry, accessed October 2017
Species at Risk Act (2002)	Fisheries and Oceans Canada (DFO) · *Distribution of Fish Species at Risk mapping July 2017*
Province of Ontario	
Provincial Policy Statement (2014)	Ministry of Natural Resources and Forestry (MNRF) Kemptville District Main Contact: Aaron Foss, Fish and Wildlife Technical Specialist · *Records requested directly from MNRF Kemptville District relating to natural features and wildlife species (Appendix A)*
	MNRF Natural Heritage Information Centre (NHIC) · *Species of Conservation Concern* · *Species at Risk* · *Natural heritage features*
	Ecological Land Classification for Southern Ontario, First Approximation and its Application 2008
	Natural Heritage Reference Manual, Second Edition, March 2010
	MNRF Significant Wildlife Habitat Technical Guide (2000) · *Significant Wildlife Habitat Eco-region 6E Criterion Schedules, 2015*
	Ontario Reptile and Amphibian Atlas- online data accessed (accessed online, 2017)
	Ontario Butterfly Atlas- online data accessed (accessed onlineOctober 2017)
	Atlas of the Mammals of Ontario Date 2013
Ontario *Endangered Species Act* (2007)	MNRF Species at Risk in Ontario (SARO) List (O.Reg. 230/08), Sept. 2017
	MNRF Kemptville District · *Received Species at Risk occurrence records*
	MNRF NHIC · *Species at Risk occurrence records*
	Ontario Breeding Birds Atlas (OBBA)- (accessed online 2017)
	Ontario Reptile and Amphibian Atlas- online data accessed (accessed online 2017)

City of Ottawa	
City of Ottawa Official Plan (2014)	Schedules B, K, and L1, consolidated to 2014 City of Ottawa's "geoOttawa" online mapping service
	Environmental Impact Statement Guidelines, 2nd Edition (2012)
	Protocol for Wildlife Protection During Construction (2015)
Conservation Authority	
Conservation Authorities Act, Ontario Regulation 174/06	Rideau Valley Conservation Authority (RVCA) · *Floodplain mapping* *Evaluation, Classification and Management of Headwater Drainage Features Guidelines (Toronto Region Conservation Authority (TRCA) & Credit Valley Conservation (CVC), 2014)*

3.0 Natural Heritage Background Screening

A desktop review of the property indicates that the Study Area is agricultural land, with large areas of forest and scrubland (Figure 2). A review of available historic aerial photos indicates that the area has been agricultural since at least 1976, but much of the land within the Study Area is no longer in active agricultural use and has been left to naturalize over time. The surrounding area is primarily agricultural with recent development to the north along Earl Armstrong Road and River Road.

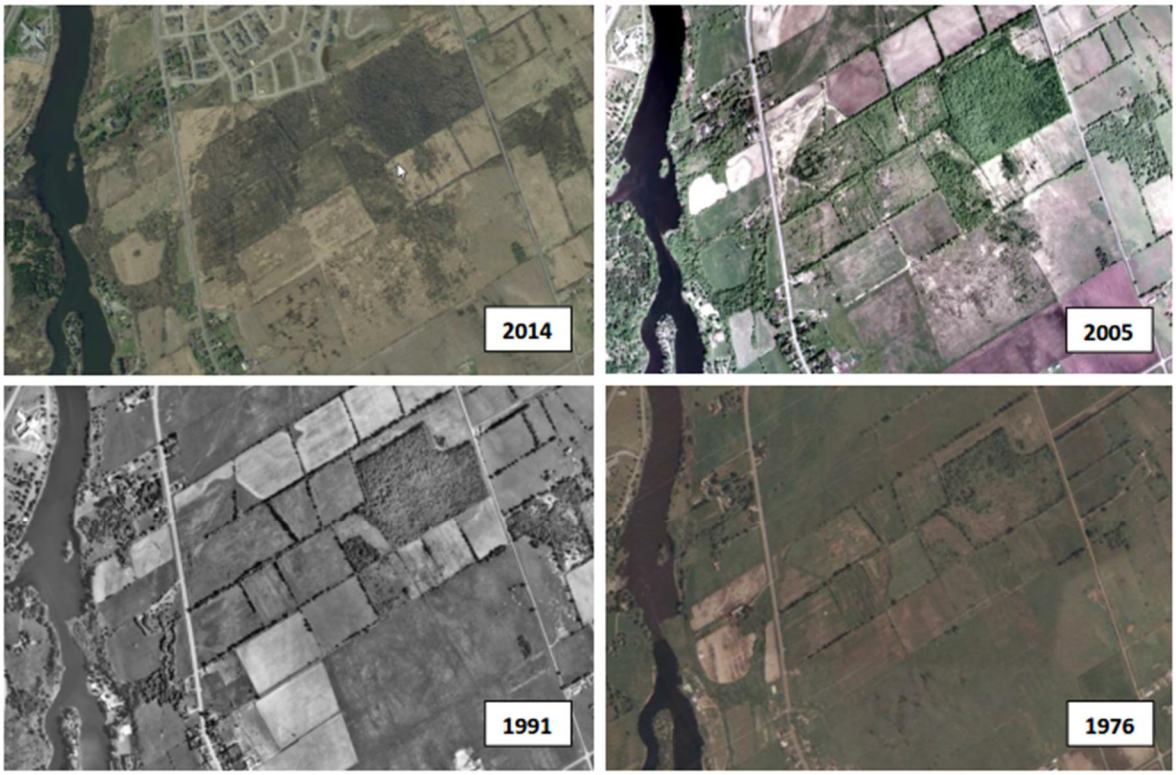


FIGURE 2: LAND USE CHANGES OVER TIME

The following section provides a summary of the existing environmental conditions within the Study Area. This information provides the background information upon which the EIS and TCR is based.

3.1 Landforms, Soils and Geology

The Study Area lies over Lower Ordovician bedrock consisting of dolostone and sandstone (Ministry of Northern Development and Mines 1991). The physiography of the area is described as clay plains with scattered drumlins (MNRF 1984). Soils within the Study Area are comprised of medium to slightly acidic, moderately coarse to medium textured, marine estuary veneer, overlying neutral, moderately fine to fine textured marine material. They also include fluvium in abandoned river channel floors and terraces (Canada Department of Agriculture 1976). The more eastern portions of the Study Area also consist of mildly alkaline, coarse to medium textures, stony, glacial till (Canada Department of Agriculture 1976).

3.2 Aquatic Environment

The Study Area lies within the Lower Rideau Subwatershed, which flows north into the Ottawa River (RVCA 2012). The watershed has been widely studied by the City of Ottawa and Conservation Authority due to development pressure within the Lower Rideau Subwatershed. Studies include the *Lower Rideau Subwatershed Report* (RVCA 2012), and associated catchment reports, including the Rideau River-Hog's Back catchment in which the Study Area is located.

3.3 Natural Heritage Features

A number of natural heritage features require consideration for protection under the Ontario Provincial Policy Statement (Ontario Ministry of Municipal Affairs and Housing, 2014) and are administered by the City of Ottawa and is consistent with relevant provincial and federal legislation. These features are:

- Provincially Significant Wetlands (PSW);
- Significant woodlands;
- Significant valleylands,
- Areas of Natural and Scientific Interest (ANSI);
- Significant wildlife habitat;
- Species at Risk habitat; and,
- Fish habitat.

3.3.1 Wetlands

A review of the City of Ottawa online mapping service "geoOttawa" and provincial natural heritage mapping (MNRF, 2017) indicate that no Provincially Significant Wetlands are present within Study Area. However, an unevaluated treed wetland with the eastern section of the Study Area was identified (Figure 1). This was confirmed by the Information Request Response provided by the MNRF in October 2, 2014 (Appendix A).

3.3.2 Woodlands

A desktop review of the property identified a number of terrestrial vegetation communities within the vicinity of the Study Area (Figure 1). These communities include: a treed wetland, woodlands, meadows and a thicket. Given the size of the woodland, meadow and swamp communities identified, they may be evaluated as significant based on the Natural Heritage Reference Manual standards (MNRF, 2005).

3.3.3 Valleylands

No significant valleylands were identified within or adjacent to the Study Area.

3.3.4 Areas of Natural and Scientific Interest

No ANSIs were identified within or adjacent to the Study Area.

3.3.5 Significant Wildlife Habitat

The Significant Wildlife Habitat Technical Guide (MNRF, 2000) defines Species of Conservation Concern as globally, nationally, provincially, regionally, or locally rare (S-Rank of S2 or S3) but does not include SAR (listed as endangered or threatened under the ESA, 2007). A review of the MNRF background data suggests that significant wildlife habitat for breeding birds, reptiles, fish and butterflies may occur in association with woodland, wetland and meadow communities within the Study Area. In addition, several Species of Conservation Concern, also have the potential to occur within or adjacent to the Study Area (Table 2).

TABLE 2: SPECIES OF CONSERVATION CONCERN IDENTIFIED WITHIN THE GENERAL VICINITY OF THE STUDY AREA

SCIENTIFIC NAME	COMMON NAME	ESA	S-RANK[1]	INFO SOURCE[2]
Chlidonias niger	Black Tern	SC	S3B	MNRF
Contopus virens	Eastern Wood-Pewee	SC	S4B	MNRF, OBBA
Ammodramus savannarum	Grasshopper Sparrow	SC	S4B	OBBA
Falco peregrinus	Peregrine Falcon	SC	S3B	MNRF
Asio flammeus	Short-eared Owl	SC	S2N, S4B	MNRF, OBBA
Hylocichla mustelina	Wood Thrush	SC	S4B	MNRF, OBBA
Coturnicops noveboracensis	Yellow Rail	SC	S4B	MNRF
Chelydra serpentina	Snapping Turtle	SC	S3	MNRF, ON
Graptemys geographica	Northern Map Turtle	SC	S3	MNRF, ON
Thamnophis sauritus septentrionalis	Eastern Ribbonsnake	SC	S3	MNRF
Lampropeltis triangulum	Eastern Milksnake	---	S3	MNRF, ON
Moxostoma valenciennesi	Greater Redhorse	---	S3	NHIC

SCIENTIFIC NAME	COMMON NAME	ESA	S-RANK[1]	INFO SOURCE[2]
Ichthyomyzon fossor	Northern Brook Lamprey (Great Lakes - Upper St. Lawrence populations)	SC	S3	MNRF
Moxostoma carinatum	River Redhorse	SC	S2	MNRF
Danaus plexippus	Monarch	SC	S2N, S4B	MNRF, TEA

[1]S-Rank is an indicator of commonness in the Province of Ontario. A scale between 1 and 5, with 5 being very common and 1 being the least common. [2]Information sources include: MNRF = Ministry of Natural Resources and Forestry; OBBA = Ontario Breeding Bird Atlas; ON = Ontario Nature: Ontario Reptile and Amphibian Atlas; SARA = Species at Risk Act; TEA = Toronto Entomologists' Association; --- denotes no information or not applicable.

3.3.6 Species at Risk

A desktop review of available information sources identified a number of SAR listed as endangered and threatened under the provincial *ESA*, 2007 with potential to occur within the vicinity of the Study Area see Table 3.

TABLE 3: SPECIES AT RISK IDENTIFIED AS POTENTIALLY OCCURRING WITHIN THE VICINITY OF THE STUDY AREA

SCIENTIFIC NAME	COMMON NAME	ESA	S-RANK[1]	INFORMATION SOURCE[2]
Riparia riparia	Bank Swallow	THR	S4B	MNRF, OBBA
Hirundo rustica	Barn Swallow	THR	S4B	MNRF, OBBA
Dolichonyx oryzivorus	Bobolink	THR	S4B	MNRF, NHIC, OBBA
Chaetura pelagica	Chimney Swift	THR	S4B, S4N	MNRF, OBBA
Sturnella magna	Eastern Meadowlark	THR	S4B	MNRF, OBBA
Ixobrychus exilis	Least Bittern	THR	S4B	MNRF
Caprimulgus vociferus	Whip-poor-will	THR	S4B	MNRF
Emydoidea blandingii	Blanding's Turtle	THR	S3	MNRF, ON
Sternotherus odoratus	Eastern Musk Turtle	SC	S3	MNRF, ON
Myotis lucifugus	Little Brown Myotis	END	S4	MNRF
Pipistrellus subflavus	Tri-colored Bat	END	S3	MNRF
LICHENS				
Leptogium rivulare	Flooded Jellyskin	---	S3	MNRF
VASCULAR PLANTS				
Juglans cinerea	Butternut	END	S3?	MNRF

[1]S-Rank is an indicator of commonness in the Province of Ontario. A scale between 1 and 5, with 5 being very common and 1 being the least common. [2]Information sources include: MNRF = Ministry of Natural Resources and Forestry; NHIC = Natural Heritage Information Centre; OBBA = Ontario Breeding Bird Atlas; ON = Ontario Nature: Ontario Reptile and Amphibian Atlas; --- denotes no information or not applicable.

Species at Risk Habitat

A review of current and historic aerial photos of the property was used to identity candidate SAR habitat based on the habitat requirements defined by the MNRF. A preliminary site investigation further guided determinations for candidate SAR habitat. This review indicated:

- No wetlands containing shallow water with an abundance of water plants typically associated with Blanding's Turtle habitat was identified during preliminary site investigation within 250 meters (Category 'C' habitat) of the Study Area.
- No marshes with standing slow moving water for Eastern Musk Turtle habitat were identified during preliminary site investigation within the Study Area.
- The presence of the unevaluated wetland (swamp) habitat within the Study Area may provide potential habitat for Western Chorus Frog;
- No cattail or densely vegetated marsh features were identified for Least Bittern habitat during preliminary site investigation within the Study Area.
- Wooded areas identified on the property could provide habitat for Butternut trees and Flooded Jellyskin;
- Wooded areas and structures within the Study Area may provide suitable habitat for SAR bats and Whip-Poor-Will;
- The presence of meadows observed on aerial photos may provide marginal Bobolink and Eastern Meadowlark habitat within the Study Area; and
- No suitable structures (e.g. open barns, bridges, chimneys, culverts, or water towers) were identified on, or within 200m of the Study Area during preliminary site investigation for Bank Swallow, Barn Swallow or Chimney Swift nesting habitat.

The Species at Risk habitat identified above with minor updates from 2017 is consistent to those originally identified in the 2014 MNRF's response to the information request (*Appendix A*). An updated MNRF information request was submitted on October 8, 2017.

3.3.7 Fish Habitat

The Study Area is located in proximity to the Rideau River Development is not proposed within 30 m of the High Water Mark in accordance with the City of Ottawa's aquatic setbacks, and RVCA's floodplain regulation limit. Background mapping suggests that there may be agricultural ditches within the Study Area flowing toward the Rideau River which may provide marginal fish habitat.

3.4 Trees

A review of aerial photos suggests that the Study Area contains several wooded areas and fencerows that contain a mix of mature and young trees.

3.5 Wildlife Habitat

In addition to the SAR noted above, a review of current and historic aerial photos of the Study Area was used to identify potential wildlife habitat. A number of likely fauna common to the City of Ottawa rural and urban areas are known to live in the habitats present within the property, these species may include:

- Mammals: raccoons, squirrels, rabbits, groundhogs, foxes, coyotes, etc.;
- Reptiles & Amphibians: garter snakes, snapping turtles, painted turtles, green frog, gray tree frogs, among others;
- Fish: various warm and cool water bait fishes;
- Aquatic insects: water strider, whirligig beetle, damselfly, dragonfly, mosquitoes; and/or,
- Other: crayfish, clams, snails, leeches, cicadas, and butterflies.

3.6 Other Development Constraints

A review of the City of Ottawa's Natural Heritage System mapping (2012) indicates that this property is located within a part of the City of Ottawa's Natural Heritage System (Schedule L1, consolidated to 2014). The portion of the Natural Heritage System is located in the eastern section of the Study Area. Urban Natural Area (UNA) #99, Spratt Road Woods is identified in the Study Area. However, The City of Ottawa relinquished interest in this woodland in 2013 and the area is no longer considered an asset by the city.

3.7 Scope of Work

To evaluate potential natural features within the Study Area, the following surveys were required based on the description of the natural environment. These surveys establish baseline conditions within the site and enable the assessment of potential negative impacts resulting from the proposed development.

Aquatic Environment

- Headwater Drainage Features Assessment

Natural Heritage Features

- Ecological Land Classification (ELC)
    - Vegetation survey
    - Woodland delineation
    - Identification of potential significant wildlife habitat
    - Wetland identification and mapping
- Significant wildlife habitat
    - Breeding bird surveys
    - Amphibian breeding surveys

- Species at Risk
    - Butternut search
    - Flooded Jellyskin search
    - SAR bats assessment
    - Whip-poor-will (crepuscular) surveys
    - Western Chorus Frog (amphibian) surveys
    - Identification of potential Species at Risk and Species at Risk habitat

Trees

- Tree survey

Incidental Wildlife

- Visual and auditory observations of wildlife during all field studies

4.0 Methodology

4.1 Fieldwork

Fieldwork conducted for the EIS and TCR took place between September 2014, and August 2015 when weather conditions and timing were deemed suitable based on the survey protocols being implemented (Table 4). Fieldwork consisted of ELC of vegetation communities, Tree Inventory, HDF Assessment, breeding bird surveys, crepuscular and amphibian breeding surveys. Any incidental wildlife observations made during the surveys were also documented. Curricula Vitae of key staff involved in the project have been included in *Appendix B*. The following sub-sections outline the survey methodologies used in the EIS and TCR.

TABLE 4: DATES AND TIMES OF FIELD SURVEYS

Date	Time	Personnel	Weather Conditions	Air Temp (°C)	Purpose
September 29, 2014	08:00	M. Seabert	Clear, light breeze, no precipitation	23	ELC and Tree Inventory
September 30, 2014	08:00	M. Seabert	Clear, light breeze, no precipitation	16	ELC and Tree Inventory
April 29, 2015	8:00	W. Moore; K. McLean	Clear, light breeze, no precipitation	13	Headwater Stream Assessment #1a
April 30, 2015	8:00	W. Moore; K. McLean	Clear, light breeze, no precipitation	13	Headwater Stream Assessment #1b
May 7, 2015	21:30	K. Robinson	Clear, light breeze, no precipitation	18	Amphibian Survey #1, Incidental Wildlife
May 27, 2015	05:55	J. Harris	Partially cloudy, light breeze, no precipitation	21	Breeding Bird Survey #1, Incidental Wildlife
May 27, 2015	21:45	K. Robinson	Mostly clear, light cloud cover, no precipitation	24	Amphibian Survey #2, Incidental Wildlife
June 18, 2015	05:45	J. Harris	Cloudy, light breeze, no precipitation	13	Breeding Bird Survey #2, Incidental Wildlife
June 24, 2015	22:30	W. Moore; K. Robinson	Mostly clear, light cloud cover, no precipitation	17	Amphibian Survey #3, Whip-poor-will Survey #1, Incidental Wildlife
July 3, 2015	13:20	W. Moore; B. Gottfried	Sunny, slight breeze	17	Electrofishing
July 9, 2015	02:20	W. Moore; K. Robinson	Clear, slight breeze, no precipitation	15	Whip-poor-will Survey #2
July 28, 2015	13:30	W. Moore; K. Robinson	Sunny, no precipitation	34	Headwater Stream Assessment #2

Date	Time	Personnel	Weather Conditions	Air Temp (°C)	Purpose
August 13, 2015	08:00	M. Wolosinecky	Cloudy, slight breeze, no precipitation	26	Tree Survey
October 19, 2017	13:00	C. Edington	Slightly cloudy, moderate breeze, no precipitation	13	ELC and Tree Inventory Validation, Incidental Wildlife

4.2 Aquatic Assessment

An HDF Assessment was conducted within Study Area based on requirements from the RVCA. This assessment was completed in conjunction with the EIS. This study can be found in its entirety in Appendix C.

4.3 Natural Heritage Features

4.3.1 Vegetation Communities

Vegetation was characterized using the ELC system for Southern Ontario (Lee et al., 1998) in order to describe and map ecological communities to the vegetation level. The ecological community boundaries were determined through the review of aerial photography and then further refined through on-site vegetation surveys. In addition to the vegetation survey, a soil assessment was conducted using a hand auger to identify the soil moisture class within the ecosystem.

The ELC protocol recommends that a vegetation community be a minimum of 0.5 ha in size before it is defined. Patches of vegetation less than 0.5 ha or disturbed/planted vegetation were described to the community level only. In some instances, where vegetation is less than 0.5 ha, but appears relatively undisturbed and clearly fits within an ELC vegetation type, the more refined classification was used. In early 2007, the MNRF refined their original vegetation type codes to more fully encompass the vast range of natural and cultural communities across Southern Ontario. Through this process many new codes have been added while some have changed slightly. These new ELC codes have been used for reporting purposes in this study as they are more representative of the vegetation communities within the Study Area.

Vegetation Survey

Vegetation was surveyed in tandem with ELC surveys, a list of plant species was compiled and all plant information compiled as part of other surveys was included in the list. This provides a botanical inventory for the Study Area.

4.3.2 Wetlands

Background review and MNRF Information Request Response identified an unevaluated wetland area to occur within the Study Area. Wetlands within the Study Area are considered southern wetlands based on their location south of the northern limit of Ecoregions 5E, 6E, and 7E as shown on Figure 1 of the *Provincial Policy Statement*, 2014. Wetlands within the Study Area were delineated using the ELC system for Southern Ontario (Lee et al., 1998).

4.3.3 Woodlands

The woodlands within the Study Area were assessed for significance following the updated guidelines outlined in the City of Ottawa Official Plan Amendment No. 179 (Section 2.4.4 of the Official Plan) indicates the following:

Significant woodlands defined as the following:

i. Any treed area meeting the definition of woodlands in the Forestry Act, R.S.O 1990, c. F.26 or forest in Ecological Land Classification for Southern Ontario; and

ii. In the rural area, meeting any one of the criteria in the Natural Heritage Reference Manual, as assessed in a subwatershed planning context and applied in accordance with Council-approved guidelines, where such guidelines exists; or

iii. In the urban area, any area 0.8 hectares in size or larger, supporting woodland 40 years of age and older at the time of evaluation.

If the criteria outlined above are met, the woodland is considered significant. Vegetation communities within the property were identified using the ELC system for Southern Ontario (Lee et al., 1998) system down to vegetation type.

4.3.4 Significant Wildlife Habitat

Breeding bird and amphibian breeding surveys were undertaken to identify potential significant wildlife habitat and to provide a baseline assessment of the relative abundance of birds and amphibians within the Study Area.

Breeding Bird Survey

Diurnal breeding bird surveys conducted within the Study Area followed the methods outlined in the Ontario Breeding Bird Atlas Guide for Participants (Cadman et al 2007), and were completed in late May and mid-June of 2015 (two surveys). Specifically, breeding bird surveys consisted of ten minute point counts that were used to establish quantitative estimates of bird abundance in habitat types within the Study Area. To supplement the surveys, area searches of the habitat were completed using binoculars to observe species presence and breeding

activity. Area searches involved noting all individual bird species and their corresponding breeding evidence while traversing the habitat on foot.

Amphibian Breeding Survey

Amphibian monitoring followed the Marsh Monitoring Program protocol (Bird Studies Canada, 2009). In accordance with the protocol, three different surveys were conducted between April 1 and June 30, with at least two weeks between each survey. Surveys began at least one half hour after sunset during evenings with a minimum night temperature of 5ºC, 10ºC, and 17ºC for each of the three respective surveys. Survey points aligned with the wetland features and vernal pools within the Study Area.

Each amphibian survey generally involved standing at a predetermined station for 3 minutes and listening for frog calls. The calling activity of individuals estimated to be within 100 m of the observation point were documented. All individuals beyond 100 m were recorded as outside the count circle and calling activity was not recorded. Calling activity was then ranked using one of the three abundance code categories:

Code 1: Calls not simultaneous, number of individuals can be accurately counted;
Code 2: Some calls simultaneous, number of individuals can be reliably estimated; and,
Code 3: Calls continuous and overlapping, number of individuals cannot be estimated.

In areas where candidate amphibian habitat exists, vernal pools were also visually examined for egg masses and amphibian larvae in conjunction with other field surveys. These searches occurred between April and June when amphibians were concentrated around suitable breeding habitat.

4.3.5 Species at Risk

Several Species at Risk have been identified with potential to occur within the general vicinity of the Study Area. Surveys were conducted for those species at risk found to possess suitable habitat within the Study Area.

Butternut and Flooded Jellyskin

A search for Butternut trees was included in the tree survey and the vegetation survey done during ELC. The general health, DBH, a GPS coordinate and photo would be recorded if any Butternut trees were observed. A search for Flooded Jellyskin was also undertaken during the ELC.

SAR Bats

General site investigation, tree survey and ELC will help identify if any structures or trees within the study area could be used as roosting habitat or if any candidate hibernacula was present. Any incidental sightings were to be noted.

Whip-poor-will

Crepuscular bird surveys were completed within the Study Area to identify potential whip-poor-will activity within the Study Area. These surveys followed the Nightjar Monitoring Protocol provided by the MNRF (2011) and consisted of point counts where suitable habitat for target species occur and were accessible (Figure 3). In addition, any incidental sightings during breeding bird surveys and other site investigations were to be noted.

Bobolink and Eastern Meadowlark

As little suitable habitat was identified within the Study Area, specific surveys for Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*) were not required. Observations for these species or their habitat was completed during the breeding bird surveys under section 4.3.4, above.

RIVERSIDE SOUTH DEVELOPMENT CORPORATION

PHASE 15B
PART OF 4650 SPRATT ROAD
AND 750 RIVER ROAD

FIGURE 4
SURVEY LOCATIONS

- Study Area Boundary
- Crepuscular Bird Survey Point Count Location
- Breeding Bird Point Count Location
- Amphibian Breeding Survey Point Count Location

1:4,000

0 50 100 200 m

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM
MAP CHECKED BY: WM
MAP PROJECTION: NAD 1983 UTM Zone 18N

DILLON CONSULTING

PROJECT: 149916
STATUS: DRAFT
DATE: 2017-10-25

FILE LOCATION: \\dillon.ca\DILLON_DFS\Ottawa\Ottawa CAD\CAD\2014\149916\FROM TORONTO SERVER\mxd\EIS\2017_B\Figure 4 Survey Locations.mxd

4.4 Trees

4.4.1 Tree Inventory

Within the Study Area, trees greater than 10 cm Diameter at Breast Height (DBH) were surveyed following the City of Ottawa's TCR guidelines. Large stands of trees were assessed as a whole based on species composition and basal area as per standard ELC protocol. All Large Trees (50 cm DBH or greater), were surveyed by an approved professional as outlined in the City of Ottawa's guidelines. The survey for all Large Trees included the identification of species, DBH, condition, and location. Trees measuring less than 50 cm DBH were estimated based on their density, average size, and overall health.

4.5 Incidental Wildlife

A wildlife assessment within the property was completed through incidental observations while on site. Any incidental observations of wildlife were noted, as well as other wildlife evidence such as dens, tracks, and scat. For each observation notes, and when possible, photos were taken. These observations also helped validate our conclusions on the ecological function of the Study Area.

5.0 Survey Results

The following sections outline the findings from the field surveys and characterize the existing conditions within the Study Area.

5.1 Aquatic Environment

Several ephemeral watercourses were identified within the Study Area during the HDF Assessment (see *Appendix C*). These features primarily consist of old agricultural ditches within woodland that was once used for farming.

The site drains north and west towards the Rideau River, with tributaries conveying flow from spring thaw and heavy rain events downstream toward the river.

Full results from the HDF Assessment are outlined in *Appendix C*. Key findings from the assessment include the following:

1. Three HDFs within the Study Area were assessed to have Contributing Functions with a management recommendation of "Mitigation". In general, these features can be removed and replicated elsewhere (e.g., in the form of stormwater management infrastructure) provided pre-development flows are maintained.
2. Other HDFs within the Study Area were assessed to have Limited Functions with a management recommendation of "No Management Required". In general, these features can be removed with no specific mitigation or compensation required.

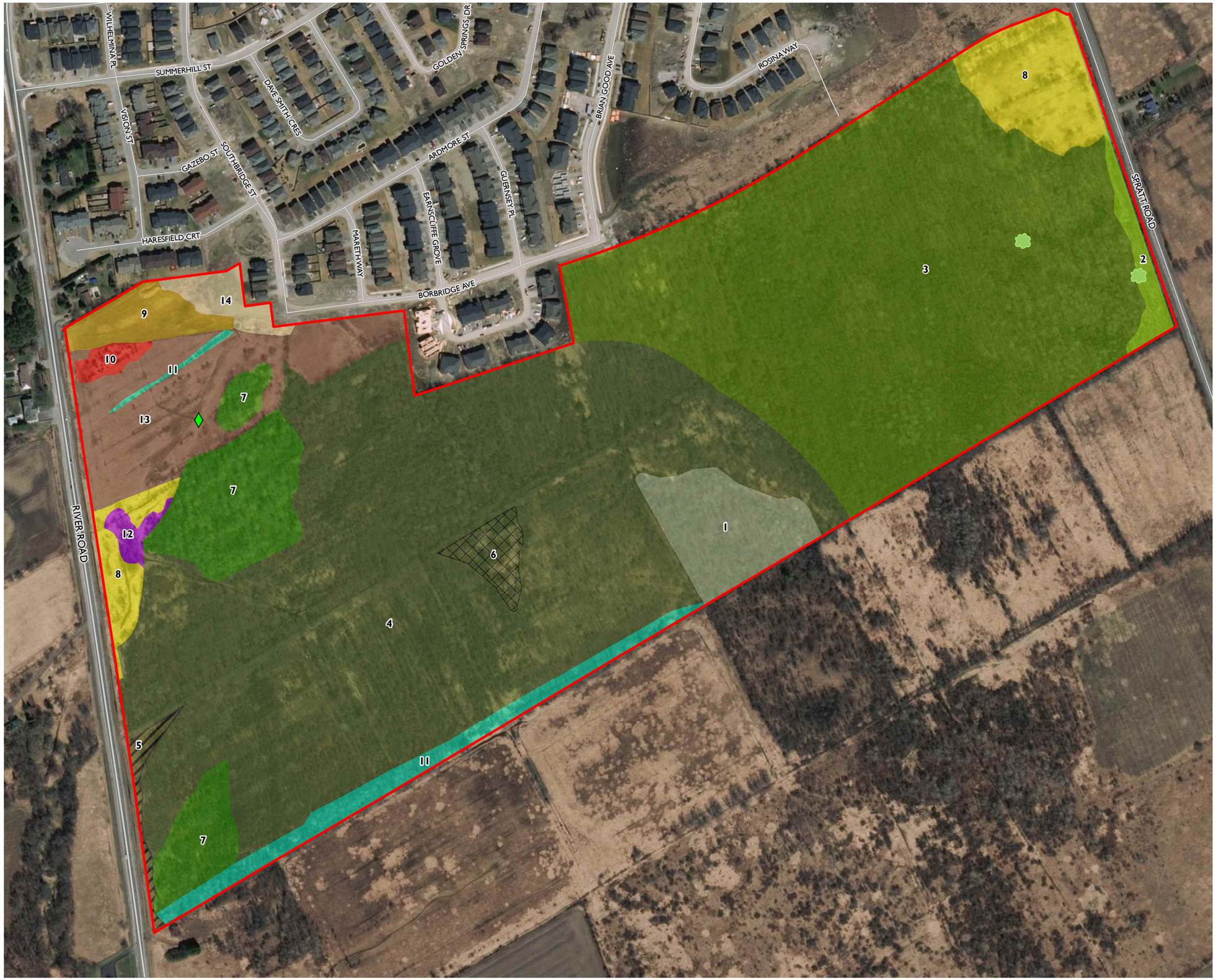
5.2 Natural Heritage Features

5.2.1 Ecological Land Classification

The ELC surveys identified a total of 11 terrestrial communities within the Study Area, all of which are considered natural vegetation communities. The major land use within the Study Area is recreational as it contains all-terrain vehicle trails throughout the woodland and meadow areas. The site was once used for agriculture but has now naturalized into woodland, meadow and thicket communities.

The location, type, and boundaries of these communities are delineated in Figure 4. All vegetation communities surveyed within the Study Area are considered common in Ontario. Table 5 outlines the communities documented during ELC surveys and summarizes the dominant vegetation cover. Reference photos for each of the plant communities observed can be found in *Appendix D*. A list of plant species observed during the field studies is included in *Appendix E*.

Site investigations identified 11 terrestrial communities within the Study Area.



RIVERSIDE SOUTH DEVELOPMENT CORPORATION

PHASE 15B
PART OF 4650 SPRATT ROAD
AND 750 RIVER ROAD

FIGURE 5
EXISTING CONDITIONS AND CONSTRAINTS

- Study Area Boundary
- Butternut Observation
- Barn Swallow Flyover Observation

Ecological Land Classification

1. FODM4: Fresh - Dry Upland Deciduous Forest
2. FODM5 - 2: Dry - Fresh Sugar Maple - Beech Deciduous Forest
3. FODM6-1: Fresh - Moist Sugar Maple - Lowland Ash Deciduous
4. FODM7-2: Fresh - Moist Green Ash-Hardwood Lowland Deciduous
5. *MEMM3: Dry - Fresh Mixed Meadow*
6. *SWDM2-2: Green Ash Mineral Deciduous Swamp Type*
7. FODM8-1: Fresh - Moist Poplar Deciduous Forest
8. MEGM4: Fresh - Moist Graminoid Meadow
9. MEMM4: Fresh - Moist Mixed Meadow
10. SWT: Thicket Swamp
11. TAGM5: Fencerow
12. THDM5: Fresh - Moist Deciduous Thicket
13. Cut Field
14. Exposed Soil

1:4,000

0 50 100 200 m

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM/LJK
MAP CHECKED BY: WM
MAP PROJECTION: NAD 1983 UTM Zone 18N

DILLON CONSULTING

PROJECT: 149916
STATUS: DRAFT
DATE: 2017-10-26

FILE LOCATION: \\dillon.ca\DILLON_DFS\Ottawa\Ottawa CAD\CAD\2014\149916\FROM TORONTO SERVER\mxd\EIS\2017_B\Figure 5 Existing Conditions and Constraints_Oct25.mxd

TABLE 5: ECOLOGICAL LAND CLASSIFICATION

ELC CODE	CLASSIFICATION	SOILS	AREA (HA)	VEGETATION	COMMENTS	APPENDIX C, PHOTO #
FODM4	Fresh-Moist Upland Deciduous Forest	Humic Soils (A Horizon); fine Sand (B Horizon)	1.64	Wild Black Cherry (*Prunus serotina*), Eastern Hop-hornbeam (*Ostrya virginiana*), and Trembling Aspen (*Populus tremuloides*) were the dominant tree species with Bur Oak (*Quercus macrocarpa*), Green Ash (*Fraxinus pennsylvanica*), White Ash (*Fraxinus americana*), American Basswood (*Tilia americana*), American Elm (*Ulmus americana*), American Beech (*Fagus grandifolia*), and Eastern White Cedar (*Thuja occidentalis*) associates. Shrub cover consisted primarily of Common Buckthorn (*Rhamnus cathartica*) with Hawthorn species (*Crataegus sp*). Ground cover consisted primarily of Spike-rush species (*Eleocharis sp*), Moss species (*Moss sp*), and Sedge species (*Carex sp*) with Nettle species (*Urtica sp*), Currant species (*Ribes sp*), Aster species (*Symphyotrichum sp*), Grass species (*Grass sp*), Swamp Aster (*Symphyotrichum puniceum var. puniceum*), Common Yarrow (*Achillea millefolium*), Sensitive Fern (*Onoclea sensibilis*), and Virginia Creeper (*Parthenocissus quinquefolia*) associates.	Polygon: 1	1
FODM5-2	Dry-Fresh Sugar Maple-Beech Deciduous Forest	NA	0.45	Sugar Maple (*Acer saccharum*), American Beech (*Fagus grandifolia*) and Trembling Aspen (*Populus tremuloides*) were dominant tree species with American Basswood (*Tilia americana*), American Elm (*Ulmus americana*), Green Ash (*Fraxinus pennsylvanica*) and Northern Red Oak (*Quercus rubra*) associates. Undercanopy cpver included juvenile species of the above with rare occurrences of Common Buckthorn (*Rhamnus cathartica*). Ground cover consisted primarily of sparse occurences of Common Lady Fern (*Athyrium filix-femina*).	Polygon: 2	13
FODM6-1	Fresh-Moist Sugar Maple Lowland Ash Deciduous Forest	Humic Soils (A Horizon); Sandy Loam (B Horizon)	16.81	Sugar Maple (*Acer saccharum*) was the dominant tree species with Green Ash (*Fraxinus pennsylvanica*), Wild Black Cherry (*Prunus serotina*), North American Beech (*Fagus grandifolia*), Eastern Hop-hornbeam (*Ostrya virginiana*), and Paper Birch (*Betula papyrifera*) associates. Ground cover consisted primarily of Spike-rush species (*Eleocharis sp*), Sedge species (*Carex sp*), and Grape species (*Vitis sp*) with Moss species (*Moss sp*), Sensitive Fern (*Onoclea sensibilis*), Canada Wild-ginger (*Asarum canadense*), Wood Fern species (*Dryopteris sp*), Horsetail species (*Equisetum sp*), Currant species (*Ribes sp*), and Eastern Marsh Fern (*Thelypteris palustris*) associates.	Polygon: 3	14
FODM7-2	Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest	Sandy Loam (A Horizon); Sandy Clay Loam (B Horizon)	21.57	Green Ash (*Fraxinus pennsylvanica*) is the dominant tree species with Trembling Aspen (*Populus tremuloides*), Red Maple (*Acer rubrum*), Bur Oak (*Quercus macrocarpa*), and Silver Maple (*Acer saccharinum*) associates. Shrub cover consists of Common Buckthorn (*Rhamnus cathartica*), Red-osier Dogwood (*Cornus sericea ssp sericea*), and Honeysuckle species (*Lonicera sp*). Sedge species (*Carex sp*), Grass species (*Grass sp*), Goldenrod species (*Solidago sp*) and Sensitive Fern (*Onoclea sensibilis*) were the dominant ground cover species with Horsetail species (*Equisetum sp*), Swamp Aster (*Symphyotrichum puniceum var. puniceum*), Vetch species (*Vicia sp*), Milkweed species (*Asclepias sp*), and Annual Ragweed (*Ambrosia artemisiifolia*) associates.	Polygon: 4	2
-MEMM3	*Fresh-Dry Mixed Meadow*	*Silty Sand*	*0.40*	Grass species (*Grass sp*) and Goldenrod species (*Solidago sp*) were the dominant ground cover species with Swamp Aster (*Symphyotrichum puniceum var. puniceum*), Nettle species (*Urtica sp*), Grape species (*Vitis sp*), Vetch species (*Vicia sp*), Sedge species (*Carex sp*), Milkweed species (*Asclepias sp*), Aster species (*Symphyotrichum sp*), and Wild Carrot (*Daucus carota*) associates. Manitoba Maple (*Acer negundo*) and Common Buckthorn (*Rhamnus cathartica*) were the tree and shrub species observed.	*Inclusion within Polygon 4 [*Polygon: 5]	5

ELC CODE	CLASSIFICATION	SOILS	AREA (HA)	VEGETATION	COMMENTS	APPENDIX C, PHOTO #
- SWDM2-2	*Inclusion: Green Ash Mineral Deciduous Swamp Type*	*Sandy Loam (A Horizon); Sandy Clay Loam (B Horizon)*	*0.47*	Green Ash (*Fraxinus pennsylvanica*) was the dominant tree species with Trembling Aspen (*Populus tremuloides*), Red Maple (*Acer rubrum*), and Bur Oak (*Quercus macrocarpa*) associates. Shrub cover consists of Common Buckthorn (*Rhamnus cathartica*), Red-osier Dogwood (*Cornus sericea ssp sericea*), and Honeysuckle species (*Lonicera sp*). Ground cover consisted of Grass species (*Grass sp*), Goldenrod species (*Solidago sp*) as the dominant species with Sedge species (*Carex sp*), Horsetail species (*Equisetum sp*), Swamp Aster (*Symphyotrichum puniceum var. puniceum*), Vetch species (*Vicia sp*), Milkweed species (*Asclepias sp*), and Annual Ragweed (*Ambrosia artemisiifolia*) associates.	*Inclusion within Polygon 4 [Polygon: 6]*	6
FODM8-1	Fresh-Moist Poplar Deciduous Forest	Loamy fine Sand (A Horizon); Loamy medium Sand (B and C Horizons)	3.07	Trembling Aspen (*Populus tremuloides*) was the dominant tree species with Red Maple (*Acer rubrum*), Paper Birch (*Betula papyrifera*), and Bur Oak (*Quercus macrocarpa*) associates. Shrub cover consisted of Common Buckthorn (*Rhamnus cathartica*), Staghorn Sumac (*Rhus hirta*). Ground cover was primarily Sensitive Fern (*Onoclea sensibilis*) and Horsetail species (*Equisetum sp*) with Grape species (*Vitis sp*), Goldenrod species (*Solidago sp*), Wood Fern species (*Dryopteris sp*), Moss species (*Moss sp*), Sedge species (*Carex sp*), and Canada Wild-ginger (*Asarum canadense*) associates.	Polygon: 7	3
MEGM4	Fresh-Moist Graminoid Meadow	Humic Soils (A Horizon); Silty Clay Loam (B Horizon)	2.20	Grass species (*Grass sp*) and Reed Canary Grass (*Phalaris arundinacea*) were the dominant ground cover species with Swamp Aster (*Symphyotrichum puniceum var. puniceum*), New England Aster (*Symphyotrichum novae-angliae*), Clover species (*Trifolium sp*), Vetch species (*Vicia sp*), Burdock species (*Arctium sp*), and Goldenrod species (*Solidago sp*) associates. Willow species (*Salix sp*), American Elm (*Ulmus americana*), and Red Maple (*Acer rubrum*) were the tree and shrub species present.	Polygon: 8	4
MEMM4	Fresh-Moist Mixed Meadow	N/A	0.73	Grass species (*Grass sp*), Goldenrod species (*Solidago sp*), Swamp Aster (*Symphyotrichum puniceum var. puniceum*) and New England Aster (*Symphyotrichum novae-angliae*) dominant with Burdock species (*Arctium sp*), Common Cattail (*Typha latifolia*), Goldenrod species (*Solidago sp*) associates.	Polygon: 9	15
SWT	Thicket Swamp	Humic Soils (A Horizon); Silty Clay Loam (B Horizon)	0.21	Grass species (*Grass sp*) and Reed Canary Grass (*Phalaris arundinacea*) were the dominant ground cover species with Swamp Aster (*Symphyotrichum puniceum var. puniceum*), New England Aster (*Symphyotrichum novae-angliae*), Clover species (*Trifolium sp*), Vetch species (*Vicia sp*), Burdock species (*Arctium sp*), and Goldenrod species (*Solidago sp*) associates. Willow species (*Salix sp*), American Elm (*Ulmus americana*), and Red Maple (*Acer rubrum*) were the tree and shrub species present.	Polygon: 10	8
TAGM5	Fencerow	N/A	1.35	White Ash (*Fraxinus americana*), Green Ash (*Fraxinus pennsylvanica*), and Silver Maple (*Acer saccharinum*) were the dominant tree species with Bur Oak (*Quercus macrocarpa*), American Elm (*Ulmus americana*), and Trembling Aspen (*Populus tremuloides*). Shrub cover consisted of Common Buckthorn (*Rhamnus cathartica*). Ground cover was the dominant species with Currant species (*Ribes sp*), Horsetail species (*Equisetum sp*), Goldenrod species (*Solidago sp*), Nettle species (*Urtica sp*), Moss species (*Moss sp*), Grape species (*Vitis sp*), Sensitive Fern (*Onoclea sensibilis*), Wood Fern species (*Dryopteris sp*), Reed Canary Grass (*Phalaris arundinacea*), Vetch species (*Vicia sp*), Aster species (*Symphyotrichum sp*), Canada Wild-ginger (*Asarum canadense*).	Polygon: 11	9

ELC CODE	CLASSIFICATION	SOILS	AREA (HA)	VEGETATION	COMMENTS	APPENDIX C, PHOTO #
THDM5	Fresh-Moist Deciduous Thicket	Loamy fine Sand (A Horizon); Loamy medium Sand (B and C Horizons)	0.20	Common Buckthorn (*Rhamnus cathartica*) and Red-osier Dogwood (*Cornus sericea ssp sericea*) were the dominant shrub species. Green Ash (*Fraxinus pennsylvanica*), Silver Maple (*Acer saccharinum*), and Bur Oak (*Quercus macrocarpa*) were the dominant tree species with Willow species (*Salix sp*), Paper Birch (*Betula papyrifera*), and Red Maple (*Acer rubrum*) associates. Ground cover consists primarily of Reed Canary Grass (*Phalaris arundinacea*), Grass Species (*Grass sp*), Goldenrod Species (*Solidago sp*), and Sedge species (*Carex sp*) with Swamp Aster (*Symphyotrichum puniceum var. puniceum*), Vetch species (*Vicia sp*), Horsetail species (*Equisetum sp*), Aster species (*Symphyotrichum sp*), Currant species (*Ribes sp*), Burreed species (*Sparganium sp*) associates.	Polygon: 12	10
-	Cut Field	NA	3.13	Grass species (*Grass sp*) and Reed Canary Grass (*Phalaris arundinacea*) were the dominant ground cover species with Swamp Aster (*Symphyotrichum puniceum var. puniceum*), New England Aster (*Symphyotrichum novae-angliae*), Clover species (*Trifolium sp*), Vetch species (*Vicia sp*), Burdock species (*Arctium sp*), and Goldenrod species (*Solidago sp*) associates. Willow species (*Salix sp*), American Elm (*Ulmus americana*), and Red Maple (*Acer rubrum*) were the tree and shrub species present. Field is being regularly maintained by cutting operations evidenced by site investigations and 2017 aerial photos.	Polygon: 13	11, 12
-	Exposed Soil	NA	0.45	Disturbed soils with scattered occurrences of pioneer forb species.	Polygon: 14	--

5.2.2 Wetlands

The area identified as an unevaluated wetland by the City of Ottawa (Figure 1) was assessed during the ELC survey. The moisture regime analysis was by two borehole samples taken in 2014 and ELC validation in 2017 resulted in the area being classified as a Fresh-moist Sugar Maple Forest. Two small wetland pockets were identified within the Study Area during site investigation. One is located in the south central portion of the site as an inclusion to the Green Ash Forest and the other lies between a Graminoid Meadow and forested areas located in the northwest portion of the Study Area (Figure 4).

There are no significant wetlands present within the Study Area.

5.2.3 Woodlands

Woodlands identified within the Study Area are large and located adjacent to agricultural ditches. Some of the woodlands within the Study Area achieve prerequisite designation as a woodland as set out in the Forestry Act, R.S.O 1990, c. F.26 and as forest in Ecological Land Classification for Southern Ontario. In addition, the woodlands comprise of interior habitat and may contain individual tree specimens achieving 40 years of age; however, none of the sites contain mature contiguous forest systems 40 years of age or older (evidenced by historical photos in Section 2.0). Furthermore, the Study Area is not within the rural area as set out by Schedule B of the City of Ottawa Official Plan. Therefore, the areas within the Study Area are not defined as Significant Woodlands.

There are no significant woodlands present within the Study Area.

5.2.4 Valleylands

There are no significant valleylands present within the Study Area.

5.2.5 Areas of Natural or Scientific Interest

There are no ANSIs present within the Study Area.

5.2.6 Significant Wildlife Habitat

The MNR outlines the criteria for areas to be considered significant wildlife habitat in the Ecoregion 6E Criterion Schedule (2015).

See *Appendix F* for a detailed screening of Species of Conservation Concern identified in Table 2. The results of the field surveys as they apply to significant wildlife habitat are detailed below.

There are no significant wildlife habitats within the Study Area.

Breeding Bird Surveys

The results of the breeding bird surveys identified a total of 35 bird species which were observed or heard within the Study Area. Table 6 lists all bird species observed during breeding bird surveys in 2015. With the exception of Barn Swallow, all 35 bird species observed are regarded as common breeders (S4 or S5) in Ontario (NHIC 2012), or are non-native species and are not ranked (SNA). The majority of the bird species observed are habitat generalists and will nest in a wide variety of open and edge habitats. All species observed are common within the Ottawa area albeit Barn Swallow (listed as *Threatened* under the ESA).

With the exception of Barn Swallow, all birds observed within the Study Area are common to Ontario and none are considered area sensitive.

TABLE 6: BIRDS OBSERVED JUNE – JULY 2015

AREA SENSITIVE	SCIENTIFIC NAME	COMMON NAME	BREEDING STATUS	ABUNDANCE ON PROPERTY	PROVINCIAL STATUS	OBSERVED/ HEARD	COMMENTS
--	*Agelaius phoeniceus*	Red-winged Blackbird	Possible	Rare	S5B	Observed	
Yes	*Bonasa umbellus*	Ruffed Groused	Possible	Rare	S5B	Heard	
--	*Cardinalis cardinalis*	Northern Cardinal	Possible	Rare	S5B	Observed/Heard	
Yes	*Carduelis tristis*	American Goldfinch	Possible	Sparse	S5B	Heard	X
Yes	*Catharus fuscescens*	Veery	Possible	Sparse	S5B	Heard	
Yes	*Catharus guttatus*	Hermit Thrush	Possible	Rare	S4B	Heard	
--	*Colaptes auratus*	Northern Flicker	Possible	Rare	S4B	Heard	
--	*Contopus virens*	Eastern Wood-pewee	Possible	Rare	S5B	Heard	
--	*Corvus brachyrhynchos*	American Crow	Possible	Rare	S5	Heard	
--	*Cyanocitta cristata*	Blue Jay	Possible	Rare	S5	Heard	S
--	*Dumetella carolinensis*	Gray Catbird	Possible	Rare	S5B	Heard	
Yes	*Empidonax alnorum*	Alder Flycatcher	Possible	Common	S5B	Heard	
--	*Geothlypis trichas*	Common Yellowthroat	Probable	Common	S5B	Observed/Heard	P
Yes	*Hirundo rustica*	Barn Swallow	Possible	Rare	S5	Observed	X
--	*Hylocichla mustelina*	Wood Thrush	Possible	Rare	S5B	Heard	
--	*Icterus galbula*	Baltimore Oriole	Possible	Sparse	S4B	Observed/Heard	X
--	*Meleagris gallopavo*	Wild Turkey	Possible	Rare	SNA	Heard	
--	*Melospiza georgiana*	Swamp Sparrow	Confirmed	Sparse	S4B	Observed/Heard	FL
--	*Melospiza melodia*	Song Sparrow	Confirmed	Common	S5	Observed/Heard	CF, P
Yes	*Mniotilta varia*	Black-and-white Warbler	Possible	Rare	S5B	Heard	
--	*Pheucticus ludovicianus*	Rose-breasted Grosbeak	Possible	Rare	S5	Observed	X
--	*Picoides pubescens*	Downy Woodpecker	Possible	Rare	S4B	Heard	
--	*Picoides villosus*	Hairy Woodpecker	Possible	Rare	S4B	Heard	S

AREA SENSITIVE	SCIENTIFIC NAME	COMMON NAME	BREEDING STATUS	ABUNDANCE ON PROPERTY	PROVINCIAL STATUS	OBSERVED/ HEARD	COMMENTS
--	*Poecile atricapillus*	Black-capped Chickadee	Possible	Sparse	S5B	Heard	
--	*Quiscalus quiscula*	Common Grackle	Possible	Rare	S4	Heard	
Yes	*Sayornis phoebe*	Eastern Phoebe	Possible	Rare	S4B	Heard	
Yes	*Seiurus aurocapilla*	Ovenbird	Possible	Rare	S4	Heard	
--	*Setophaga pensylvanica*	Chestnut-sided Warbler	Possible	Rare	S5B	Heard	
--	*Setophaga petechia*	Yellow Warbler	Possible	Rare	S5B	Heard	
Yes	*Setophaga ruticilla*	American Redstart	Possible	Rare	S4B	Heard	
--	*Sphyrapicus varius*	Yellow-bellied Sapsucker	Possible	Rare	S5B	Heard	
--	*Sturnus vulgaris*	European Starling	Possible	Rare	S5	Observed	X
--	*Turdus migratorius*	American Robin	Possible	Sparse	S4B	Observed/Heard	X, S
--	*Vireo olivaceus*	Red-eyed Vireo	Possible	Sparse	S5B	Heard	
--	*Zonotrichia albicollis*	White-throated Sparrow	Possible	Rare	S5B	Heard	

Notes:
Breeding Bird Codes from Breeding Bird Atlas of Ontario (Cadman *et al.* 2007)
Observed
X Species observed in its breeding season (no breeding evidence)
Possible
H Species observed in its breeding season in suitable nesting habitat
S Singing male(s) present, or breeding calls heard, in suitable nesting habitat in breeding season
Probable
P Pair observed in suitable nesting habitat in nesting season
T Permanent territory presumed through registration of territorial song, or the occurrence of an adult bird, at the same place, in breeding habitat, on at least two days a week or more apart, during its breeding season.
D Courtship or display, including interaction between a male and a female or two males, including courtship feeding or copulation
V Visiting probable nest site
A Agitated behaviour or anxiety calls of an adult
B Brood Patch on adult female or cloacal protuberance on adult male
N Nest-building or excavation of nest hole, except by a wren or a woodpecker
Confirmed
NB Nest-building or excavation of nest hole by a species other than a wren or a woodpecker

DD Distraction display or injury feigning
NU Used nest or egg shells found (occupied or laid within the period of the survey)
FL Recently fledged young (nidicolous species) or downy young (nidifugous species), including incapable of sustained flight
FY Confirmed feeding young
AE Adult leaving or entering nest sites in circumstances indicating occupied nest
FS Adult carrying fecal sac
CF Adult carrying food for young
NE Nest containing eggs
NY Nest with young seen or heard

Amphibian Breeding Habitat Survey

The two species observed are common within the Ottawa area. In accordance with the Ecoregion 6E Criterion Schedule (MNRF 2015), the Study Area is considered under amphibian breeding forest habitat as potential habitat which was located within forest polygons. Breeding habitats must contain at least two of the listed frog species with at least 20 individuals (adults or egg masses) of each species; or, at least two of the listed frog species with Call Code 3 in order for the habitat to be significant.

Table 5 lists the two amphibian species observed within 100m of point counts during amphibian breeding surveys in 2015.

TABLE 7: AMPHIBIAN SPECIES OBSERVED

SCIENTIFIC NAME	COMMON NAME	NUMBER OF OBSERVATIONS	ESA 2007	S-RANK
Hyla versicolor	Gray Tree frog	Numerous*	---	S5
Pseudacris crucifer	Spring Peeper	1	---	S5

*Call Code 3: Calls continuous and overlapping, number of individuals cannot be estimated.

Gray Tree frogs and Spring Peepers are a listed species under Amphibian Breeding Habitat for Woodlands. Due to only one of these observed listed frog species achieving a "Call Code 3", habitat in the Study Area does not satisfy significant habitat requirements.

There is no significant habitat for amphibian breeding within the Study Area.

5.2.7 Species at Risk

Barn Swallow

Initial site investigations of the Study Area found there to be a lack of suitable habitat for Barn Swallow (*Hirundo rustica*). One incidental Barn Swallow flyover observation was noted during a breeding bird survey within the Study Area. A desktop review of the area did not identify any nesting structures suitable to provide Category 1 Barn Swallow habitat identified within 200m of the Study Area. Further site investigations confirmed desktop review conclusions. The surrounding area mainly consists of new-build residential properties with the Rideau River to the west. Therefore it is likely that this individual was passing through the site.

There is no significant habitat for Barn Swallows within the Study Area.

Butternut

Two Butternut trees were identified within woodlands in the eastern section of the Study Area (Figure 4) during tandem Tree Inventory and ELC surveys.

Two Butternut trees were identified within the Study Area.

SAR Bats

Two species of bats, the Little Brown Bat (*Myotis lucifugus*) and Tri-colored Bat (*Pipistrellus subflavus*) were identified as having the potential to occur within the Study Area. Habitat surveys completed during ELC investigations indicated a limited number of candidate maternity roost trees were present within the Study Area.

No buildings or structures were identified as potential roosting or hibernacula habitat were identified within the Study Area; furthermore, no bats were observed during any of the field surveys.

There is the potential for limited tree roosting habitat within the Study Area.

Whip-poor-will Surveys

Whip-poor-will surveys were conducted in June and July of 2015 at the request of the City of Ottawa. During these surveys no Whip-poor-wills were heard calling.

No Whip-poor-will were observed within the Study Area.

Bobolink and Eastern Meadowlark

No Bobolink or Eastern Meadowlark was observed during breeding bird surveys conducted within the Study Area. 2017 field surveys observed that the meadow habitat is succeeding to shrub thicket, resulting in less suitable habitat. In addition, the area in the northwestern portion of the study area is cut regularly, providing no suitable habitat for Bobolink or Eastern Meadowlark.

No Bobolink or Eastern Meadowlark were observed within the Study Area.

5.2.8 Fish Habitat

A total of four tributaries to the Rideau River were evaluated for potential fish habitat within the Study Area during the HDF Assessment conducted in 2015. The assessment determined that no important fish habitat is present within the Study Area. This is due to the ephemeral nature of the features. The potential for fish passage to and from the Rideau River downstream of the site is unknown.

No significant fish habitat is present within the Study Area.

5.3 Trees

The two largest woodlands within the Study Area (Figure 5) were found to be dominated by mid-aged Sugar Maple, Green Ash and Trembling Aspen with American Beech, Eastern Hop-hornbeam, Paper Birch and Silver Maple associates. The most eastern woodland (FODM6-1) contained the most mature stands of trees within the Study area, while the western woodland (FODM7-2) can be described as a mid-age stand of trees. Figure 2 supports these findings as the eastern woodland can be seen experiencing natural succession from lack of cultural maintenance earliest. The largest western woodland contained two inclusions, a small central wetland pocket (SWDM2-2), and a western perimeter meadow (MEMM3). Within these forests the most mature trees are associated with old fencerows which can be seen in aerial photos.

The other small woodlands (Figure 5) are surrounded by the large western woodland and dominated by Trembling Aspen, Eastern Hop-hornbeam and Wild Black Cherry with Bur Oak, Paper Birch, Red Maple associates. These woodlands exhibited a mix of young, mid-age and mature trees in good to fair condition. The most eastern small woodland (FODM5-2) was dominated by Sugar Maple and American Beech with American Basswood, America Elm and Green Ash associates. This woodland also contains mature trees associated with old fencerows.

The majority of the trees identified within the Study Area were found to be in good health and are considered common to the Ottawa area. The only notable exception is the two Butternut trees described in section 5.2.9 above.

TABLE 8: TREE SPECIES WITHIN THE STUDY AREA

SCIENTIFIC NAME	COMMON NAME	NOTES
Acer negundo	Manitoba Maple	Found within meadow
Acer rubrum	Red Maple	Found throughout property
Acer saccharinum	Silver Maple	Found throughout property
Acer saccharum	Sugar Maple	Found throughout property

SCIENTIFIC NAME	COMMON NAME	NOTES
Acer x freemanii	Freeman's Maple	Found within woodland
Betula papyrifera	Paper Birch	Found within woodland
Carpinus caroliniana	Blue-beech	Found within woodland
Fagus grandifolia	American Beech	Found within woodland
Fraxinus americana	White Ash	Found along fencerow and within woodland
Fraxinus nigra	Black Ash	Found within woodland
Fraxinus pennsylvanica	Green Ash	Found throughout property
Juglans cinerea	Butternut	Found within woodland
Populus tremuloides	Trembling Aspen	Found throughout property
Quercus macrocarpa	Bur Oak	Found throughout property
Salix sp	Willow Species	Found throughout property
Thuja occidentalis	Eastern White Cedar	Found within woodland
Tilia americana	American Basswood	Found within woodland
Ulmus americana	American Elm	Found throughout property

The Study Area contains several forest stands characterized by mature trees with an overall health as "Good". Butternut trees were identified within the Study Area. With the exception of two Butternut trees, none of the trees identified within the Study Area are identified as Species at Risk.

RIVERSIDE SOUTH DEVELOPMENT CORPORATION

PHASE 15B
PART OF 4650 SPRATT ROAD
AND 750 RIVER ROAD

FIGURE 6
TREE INVENTORY

- Study Area Boundary
- Woodland
- *Deciduous Swamp Inclusion*

1:4,000

0 50 100 200 m

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM
MAP CHECKED BY: WM
MAP PROJECTION: NAD 1983 UTM Zone 18N

DILLON CONSULTING

PROJECT: 149916
STATUS: DRAFT
DATE: 2017-10-30

FILE LOCATION: \\dillon.ca\DILLON_DFS\Ottawa\Ottawa CAD\CAD\2014\149916\FROM TORONTO SERVER\mxd\EIS\2017_B\Figure 6 Tree Inventory.mxd

5.4 Incidental Wildlife

Incidental wildlife species observed in the property are listed in Table 9 below. All species observed are common in the Ottawa area and have an S-Rank of S4 or S5.

TABLE 9: INCIDENTAL WILDLIFE SPECIES OBSERVED WITHIN THE STUDY AREA

Scientific Name	Common Name	Resident/Visitor	Evidence
BIRDS			
Hirundo rustica	Barn Swallow	Visitor	Visual Observation
Poecile atricapillus	Black-capped Chickadee	Resident	Visual Observation
Contopus virens	Eastern Wood-pewee	Resident	Visual Observation
Zonotrichia albicollis	White-throated Sparrow	Visitor	Visual Observation
Turdus migratorius	American Robin	Visitor	Visual Observation
Picoides villosus	Hairy Woodpecker	Resident	Visual Observation
Colaptes auratus	Northern Flicker	Visitor	Visual Observation
Melospiza melodia	Song Sparrow	Resident	Visual Observation
Dumetella carolinensis	Gray Catbird	Visitor	Visual Observation
HERPTILES			
Pseudacris crucifer	Spring Peeper	Resident	Heard

A number of common wildlife species inhabit the environments found within the Study Area. With the exception of Barn Swallow, none of the other species observed are considered rare or Species at Risk.

6.0 Description of the Proposed Project

Figure 6 illustrates the draft concept plan for this community, consisting of residential units in the form of approximately single family dwellings and stacked townhomes.

Property Construction

The development of this property will include the following major project components:

- Surveying and staking out the development;
- Clearing and grading property to accommodate construction;
- Installation of storm water drainage network and related infrastructure;
- Excavation to accommodate underground utilities including water, sewer, gas, and hydro;
- Paving roadways;
- Excavation and construction of houses;
- Landscaping and fencing; and,
- On-going usage and maintenance.

RIVERSIDE SOUTH DEVELOPMENT CORPORATION

PHASE 15B
PART OF 4650 SPRATT ROAD
AND 750 RIVER ROAD

FIGURE 3
DRAFT SITE PLAN

Study Area Boundary
Site Plan

1:4,000

0 50 100 200 m

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S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM
MAP CHECKED BY: WM
MAP PROJECTION: NAD 1983 UTM Zone 18N

DILLON CONSULTING

PROJECT: 149916
STATUS: DRAFT
DATE: 2017-10-25

FILE LOCATION: \\dillon.ca\DILLON_DFS\Ottawa\Ottawa CAD\CAD\2014\149916\FROM TORONTO SERVER\mxd\EIS\2017_B\Figure 3 Draft Site Plan.mxd

7.0 Impact Assessment and Mitigation

The following sections outline general measures that should be considered to mitigate the impacts associated with the development of the property (Figure 7). This includes both construction related mitigation measures and mitigation measures to address impacts associated with occupancy of the development.

Setbacks from watercourses and natural heritage features shown on Figure 7 were determined based on policies and related guidance documents outlined in Table 1.

7.1 Aquatic Environment

Tributaries within the Study Area were assessed to management recommendations of either 'No Management Required' or 'Mitigation' of features. Since no important hydrology or fish habitat functions were identified, none of the HDFs within the Study Area will require 'Protection' in accordance with the *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (TRCA & CVC 2014).

Impacts to the aquatic resources within the site are possible where water features are being removed for development purposes. Details of potential impacts have been identified and evaluated as part of the HDF Assessment (*Appendix C*). Mitigation has been incorporated into the design of the site to ensure there are no impacts to the storage capacity of the watershed (i.e., stormwater management, enhancement of existing water features etc.). Further, the stormwater management design for the development will replicate conveyance and habitat functions of removed HDFs, where required, to maintain riparian and terrestrial functions within the Study Area.

Permits may be required from the RCVA for removal of these watercourses. All required permits will be obtained prior to construction activities around water within the Study Area.

RIVERSIDE SOUTH DEVELOPMENT CORPORATION

PHASE 15B
PART OF 4650 SPRATT ROAD
AND 750 RIVER ROAD

FIGURE 7
ENVIRONMENTAL IMPACTS

- Study Area Boundary
- Butternut Tree Removed
- Site Plan
- Removed Headwater Drainage Feature
- 30m Setback

Habitat Removed

- Woodland Removed

1:4,000

0 50 100 200 m

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: LK
MAP CHECKED BY: WM
MAP PROJECTION: NAD 1983 UTM Zone 18N

DILLON CONSULTING

PROJECT: 149916
STATUS: DRAFT
DATE: 2017-10-25

FILE LOCATION: \\dillon.ca\DILLON_DFS\Ottawa\Ottawa CAD\CAD\2014\149916\FROM TORONTO SERVER\mxd\EIS\2017_B\Figure 7 Environmental Impacts.mxd

7.1.1 Impacts

Potential impacts, or loss of functions as identified in the HDF Assessment, are possible where features are being removed. Potential impacts are as follows:

- Loss of HDFs with contributing functions;
- Loss of contributing fish habitat;
- Loss of general amphibian breeding habitat;
- Reduction in seasonal water flow into the Rideau River and water storage potential within the Study Area; and,
- Reduction in water quality within the Study Area and within the Rideau River.

7.1.2 Mitigation

Pre-construction Mitigation

- Obtain all necessary permits and approvals that may be required from the RVCA prior to work.

It is not anticipated that DFO review will be required for this development proposal.

Mitigation during construction

- Limit of development shall be maintained reflecting the environmental setbacks illustrated in Figure 7;
- Heavy duty silt fencing (OPSD 219.130) and/ or other equivalent erosion and sediment control measures should be installed around the perimeter of the work area to clearly demarcate the development area and prevent erosion and sedimentation into adjacent habitats. Erosion and sediment control measures should be monitored regularly to ensure they are functioning properly and if issues are identified should be dealt with promptly;
- Stockpiling of excavated material should not occur outside the delineated work area. If stockpiling is to occur outside of this area, silt fencing should be used to contain any spoil piles to prevent sedimentation into adjacent areas.
- A spill response plan should be developed and implemented as required;
- It is recommended that dewatering ponds (OPSD219.240) or similar standards should be implemented to avoid sedimentation and erosion in adjacent areas. If dewatering requires more than 50,000 L of water to be pumped per day, appropriate permits must be obtained from the Ministry of Environment and Climate Change prior to the dewatering; and,
- A stormwater management plan should be developed and implemented which maintains pre-development surface water flows to adjacent lands (quantity, quality, infiltrations, conveyance patterns, and seasonality of water flow).

Mitigation has been incorporated into the design of the site to ensure there are no impacts to the storage capacity of the watershed. Details of potential impacts have been identified and evaluated as part of the HDF Assessment (Appendix C).

7.2 Natural Heritage Features

7.2.1 Terrestrial Vegetation Communities

The following are the potential impacts and recommended mitigation and compensation measures to avoid impacts to adjacent terrestrial vegetation communities associated with the clearing of the treed communities within the Study Area.

Impacts

Impacts on native vegetation communities associated with the proposed development may result from removal of mature trees and woodlands, and meadow areas. Potential impacts to vegetation communities as a result of development include the following:

- The permanent loss of native vegetation associated with forested area;
- Permanent reduction in forest cover within the City;
- The permanent loss of habitat for wildlife dependent upon the terrestrial communities;
- Accidental damage or loss of trees as a result of site alteration or construction activities;
- Erosion and sedimentation into adjacent vegetation communities; and,
- Loss of native diversity due to increased presence of non-native invasive species after development.

<u>Removal of Vegetated Lands</u>

- Loss of 49.1 ha of terrestrial communities (Figure 7). This includes;
    - 3.33 ha of Meadow;
    - 0.41 ha of Thicket;
    - 44.01 ha of Woodland; and,
    - 1.35 ha of Fencerow.

7.2.2 Mitigation

Mitigation during construction

The installation and maintenance of standard erosion and sediment control measures should be implemented to protect the terrestrial environment outside of the development area, including the following:

- Heavy duty silt fencing (OPSD 219.130) should be installed around the perimeter of the work area to clearly delineate the development from the adjacent habitat. This will prevent encroachment into natural features and minimize the likelihood of animals entering the construction area. Erosion and sediment control measures should be monitored regularly to ensure they are functioning properly and if issues are identified should be dealt with promptly;
- Stockpiling of excavated material should not occur outside the delineated work area. If stockpiling is to occur outside of this area, silt fencing should be used to contain any spoil piles to prevent sedimentation into adjacent areas;
- If dewatering is required it is recommended that dewatering ponds (OPSD219.240) or similar standards should be implemented to avoid sedimentation and erosion in adjacent areas. If dewatering requires more than 50,000 L of water to be pumped per day, appropriate permits must be obtained from the Ministry of Environment and Climate Change prior to the dewatering; and,
- Machinery will arrive on site in a clean condition and will be maintained free of fluid leaks, invasive species, and noxious weeds; and,
- All excess construction material will be removed from site, and the area restored with seeding of native species upon project completion.

Mitigation after occupation

- Provide new homeowners with lists of locally appropriate native species for use in landscaping, along with information on the negative impacts of non-native species;
- Installation of garbage bins in public spaces adjacent the woodlot; and,
- The addition of signage intended to discourage littering.

With the mitigation measures outlined above, while forest and woodland communities on the property are not considered significant, the nature and extent of the impacts will result in a decrease in forest cover and associated habitats.

7.2.3 Significant Natural Features

There are no significant natural features identified in the Study Area.

7.2.4 Breeding Birds

Impacts

The anticipated vegetation removal, construction activities, and the future land use associated with the proposed development will likely have a negative impact on breeding birds within the property. From the draft site plan provided, forest, woodland and meadow within the Study Area will be permanently removed to accommodate the proposed development. This will

result in a loss of potential nesting and foraging habitat. The following direct and indirect impacts on breeding birds are possible as a result of the proposed development:

- The permanent loss of nesting and foraging habitat will likely result from the clearing of vegetation within the property;
- Potential physical harm to birds or bird's nests during clearing and construction activities;
- Predation by household cats during occupation; and,
- The increased potential for bird window strikes following construction.

Mitigation

The following mitigation measures are intended to address the potential impacts associated with the proposed development on breeding birds.

Construction Mitigation

- Clearing of vegetation should be avoided during the breeding bird season, between April 15th and August 31st.
- As noted above, the restoration and replanting of native vegetation along the proposed development perimeter should be considered. This will provide habitat to breeding birds and should be a significant improvement.

Mitigation after occupation

- Planting of native landscaping trees and shrubs that will encourage the presence of song birds throughout the community.
- Owner environmental awareness packages could be provided to all new residences with information on how to support breeding birds. This information could include:
  - Impacts of cat predation on bird populations and the importance of keeping household cats indoors;
  - Mitigation options for reducing the potential bird strikes with windows (e.g., falcon silhouette stickers for windows); and,
  - Section 7.6.2 outlines further mitigation methods outlined in *Protocol for Wildlife Protection during Construction* by the City of Ottawa (2015).

With the mitigation measures outlined above, the impact to breeding bird populations within the Study Area is minor.

7.2.5 Amphibians

Impacts

The proposed development will have negligible impact on the two amphibian species identified during the field survey. The impact to amphibian populations within the Study Area is minor.

The following direct and indirect impacts on amphibians are possible as a result of the proposed developments:

- Potential physical harm to amphibians during clearing and construction activities; and,
- Potential physical harm as a result from road mortality after road construction and occupancy of the development.

Mitigation

The following mitigation measures are intended to address the potential impacts associated with the proposed development on amphibians.

Construction Mitigation

- Silt fencing should be installed around the perimeter of the entire project area prior to site activities as part of erosion and sediment control measures, to prevent amphibians and other wildlife from entering the site. Fencing should be maintained throughout the life cycle (until land is permanently stabilized) of the project and repaired if damaged by machinery; and,
- Section 7.6.2 outlines further mitigation methods outlined in Protocol for Wildlife Protection during Construction by the City of Ottawa (2015).

Mitigation after occupation

- As few amphibians were identified during field surveys, no on-going mitigation is necessary after occupation of the development.

With the mitigation measures outlined above, the impact to amphibian populations within the Study Area is minor.

7.2.6 Species at Risk

Butternut and potential SAR bat habitat was identified within the Study Area. Butternut can be registered by submitting a Notice of Activity to the MNRF. This should be submitted before development activities commence.

The following are potential impacts and recommended mitigation and compensation measures to avoid impacts to Species at Risk and Species at Risk habitat within the Study Area.

Impacts

Potential impacts to Species at Risk within the development area include the following:

- Loss of two Butternut trees; and,
- The loss of roost habitat of SAR bats within the Study Area.

Mitigation

- The most current Species at Risk information available will be reviewed in comparison with EIS findings immediately prior to commencement of on-site activities to confirm that all known Species at Risk in the area have been adequately addressed in the EIS;
- Clearing of trees should be avoided during the active season for bats, between March 15th and November 15th. Conduct vegetation clearing such that existing connections to adjacent areas are maintained until the final stage of clearing, so wildlife can use these connections to leave the site;
- Periodic environmental monitoring should be considered to reduce the potential for negative impacts on SAR during construction activities;
- Contractors and other on-site workers should be briefed on appropriate measures to reduce human-wildlife conflict during work activities; and,
- If a Species at Risk is observed, the MNRF will be contacted as soon as possible to provide further direction if impacts are anticipated.

Butternut trees which require removal should be assessed by a certified Butternut Health Assessor and registered by submitting a Notice of Activity to the MNRF.

No SAR permitting is anticipated for SAR bats for development of the property if tree clearing occurs outside the active window noted above.

7.2.7 Fish Habitat

Impacts to fish habitat within the site are possible where water features are being removed for development purposes. The details of these potential impacts have been identified and evaluated as part of the HDF Assessment (*Appendix C*) and are summarized below.

Permits may be required from the RCVA for removal of these watercourses. All required permits will be obtained prior to construction activities around water within the Study Area.

Impacts

Potential impacts, or loss of functions as identified in the HDF Assessment, are possible where features are being removed. Potential impacts are as follows:

- Loss of contributing fish habitat;
- Reduction in seasonal water flow into the Rideau River and water storage potential within the Study Area; and,
- Reduction in water quality within the Study Area and within the Rideau River.

Mitigation

See Section 7.1.2 above.

With the mitigation measures outlined above, the impact to Fish Habitat within the Study Area is minor.

7.3 Trees

A review of the proposed site plan indicates that a number of medium aged non-significant trees, associated with the woodlands on the site, will likely be removed to accommodate the proposed development. In general, trees within the Study Area are healthy specimens.

Impacts

It is expected that the majority of the trees within the woodlot will be removed to accommodate the proposed development. The following are impacts associated with the removal of trees;

- Loss of 45 hectares of mid-aged deciduous forest;
- Reduction in the number of mature trees within the area;
- Loss of genetic diversity for healthy mature trees;
- Loss of most productive trees;
- Loss of general wildlife habitat (e.g. song birds, small mammals, etc.); and,
- Accidental damage or loss of trees as a result of site alteration or construction activities.

Mitigation

Mitigation before construction

The mitigation measures outlined below should be considered to reduce the potential impacts on trees within the Study Area. These include:

- An updated Tree Protection Plan should be produced to determine if any trees can be retained following the completion of the detailed design, particularly for the large school and park blocks identified on the site plan; and,
- The updated site plan should include tree planting recommendations consistent with the City of Ottawa's target for increased canopy cover.

Mitigation during construction

The mitigation measures outlined below should be implemented to minimize the potential negative impacts to mature trees and otherwise retainable trees. Mitigation requirements outlined by the City of Ottawa only apply to Distinctive Trees (>50cm DBH) within the Urban Area and should be applied to all retainable trees where possible. These mitigation measures include the following:


TREE PROTECTION FENCE

- A tree protection fence should be constructed around all retainable trees. The tree protection fence should be constructed at the Critical Root Zone (CRZ) boundary. This boundary is defined by the City of Ottawa's tree conservation by-law as the DBH (in cm) multiplied by 10;
- Tree protection fences can be constructed around more than one tree provided the CRZ is protected;
- The existing grading around all retainable trees or woodlands must be maintained. It is not permissible to add fill or otherwise alter the grading within the CRZ;
- Ensure exhaust fumes from construction equipment is not directed towards the canopy of any trees;
- Do not attach any signs or notices to any tree
- Do not place any material or equipment within the tree protection zone; and,
- All Green Ash trees removed should be treated as infected by the Emerald Ash Borer beetle and appropriately disposed of so as not to infect other areas of the city.

It is recommended that the above compensation requirements be revisited following detailed design of the proposed development to account for any subtle changes in the development area which can occur following the draft approval stage. This update to the Tree Conservation Report can be included in the required landscaping detailed design.

7.4 Wildlife

Since mostly common wildlife species were observed during field studies and mitigation measures are in place, impacts of development on wildlife should be minor or negligible. Some inadvertent impacts on local wildlife maybe associated with construction activities for this development.

7.4.1 Impacts

Potential impacts to wildlife as a result of the development include the following:

- Displacement, injury, or death resulting from contact with heavy equipment during clearing and grading activities;
- Disturbance to wildlife as a result of noise associated with construction activities, particularly during breeding periods; and,

- Conflict between wildlife and humans or domestic pets following development, including predation, mortality from vehicles, and poisoning.

7.4.2 Mitigation

Mitigation during construction

The best practices outlined in the *Protocol for Wildlife Protection during Construction* (City of Ottawa, 2015) should be followed during all construction activities associated with the development. The following measures are consistent with the protocol:

- Minimize impacts to breeding birds by clearing naturalized vegetation outside of the breeding bird season (April 1 – August 31). Should any clearing be required during the breeding bird season, nest searches conducted by a qualified person must be completed 48 hours prior to clearing activities. If nests are found, work within 10 m of the tree should cease until the nest has fledged. If no nests are present, clearing may occur. This is in accordance with the federal *Migratory Birds Convention Act*;
- Pre-stress the area on a regular basis leading up to construction to encourage wildlife to leave the area before construction starts. Other recommendations for pre-stressing are outlined in the *Protocol for Wildlife Protection during Construction* (City of Ottawa 2015);
- Orange snow fencing should be installed around the perimeter of the work area to clearly demarcate the development area and prevent wildlife from entering the construction zone. Fencing should be monitored regularly to ensure it is functioning properly and if issues are identified then it should be dealt with promptly;
- Ensure perimeter fencing does not prevent wildlife from leaving the site during clearing activities by clearing the area prior to installing the fence;
- Wildlife located within the construction area will be re-located to an area outside of the development into an area of appropriate habitat, as necessary;
- Construction crews working on site should be educated on local wildlife and take appropriate measures for avoiding wildlife; and,
- Should an animal be injured or found injured during construction they should be transported to an appropriate wildlife rehabilitation center for care with a small donation of money to help pay for the care (a local facility is the Rideau Valley Wildlife Sanctuary).

Mitigation after occupation

- Provide Owner Awareness Package to all new residents. This information could include:
    - Impacts of cat predation on bird populations and the importance of keeping household cats indoors;
    - Legal restrictions of uncontrolled pets;

- The risks of feeding wildlife; and
- Mitigation options for reducing the potential bird strikes with windows (e.g., falcon silhouette stickers for windows).

With the mitigation measures outlined above, the impact to Wildlife within the Study Area is minor.

8.0 Cumulative Impacts

As this RSDC Phase 15 Development is a part of a rapidly expanding area, cumulative impacts must also be considered in the context of the local environment. The RSDC Phase 15 Development Study Area and surrounding lands have been historically agricultural dating back to at least 1976. As a result, woodlands within the Study Area are early successional (with the exception of the forest within the eastern portion of the Study Area) and few other habitat features within the Study Area. Fragmentation and lack of connection between remnant vegetation communities and other natural features limits the potential for significant features and wildlife habitat within the local area.

In addition to the mitigation measures listed above which were developed in consideration of cumulative impacts, the following mitigation should be considered to address the cumulative impacts resulting from the proposed development. To mitigate the impacts associated with a net increase in impermeable surfaces, the following measures are recommended:

- Promote the use of rain capture systems like rain barrels; and,
- Promote the use of permeable landscaping materials during the landscaping.

9.0 Summary and Conclusions

This report outlines the environmental impacts associated with the construction and long-term occupation of the RSDC Phase 15B Development, located at 4800 Spratt Road (Figure 1). A brief summary of the key potential impacts that may occur as a result of the proposed project, the recommended mitigation measures to address these impacts.

Impacts include the removal of 45 hectares of forest habitat, loss of local native vegetation, loss of HDFs, and loss of general habitat for birds, bats and other native wildlife.

The mitigation and compensation measures proposed in this report have been developed to avoid negative impacts associated with development on the natural environment. Overall, no residual impacts are anticipated as a result of this development provided appropriate mitigation is applied, and therefore there are no expected impediments to development.

The MNRF will be contacted to discuss next steps for Species at Risk within the Study Area to ensure that the development does not contravene the ESA (2007). This will likely involve registering Butternut by submitting a Notice of Activity. No other SAR permitting is required at this time.

All HDFs with a status of Mitigation will be mitigated appropriately (e.g., incorporated into stormwater system etc.).

It is our opinion that the proposed RSDC Phase 15B Development can be accepted with the condition that:

- Butternut trees which require removal should be assessed by a certified Butternut Health Assessor and registered by submitting a Notice of Activity to the Ministry of Natural Resources and Forestry (Kemptville District);
- The clearing of trees must occur during the winter months to avoid negative impacts on SAR bats;
- The Tree Protection Plan should be updated upon completion of the detailed design of the proposed development;
- RVCA approval is obtained prior to removal of HDF features; and,
- Other mitigation measures recommended herein will be implemented.

This study was completed by Alex Zeller, M.Sc. (Biology) with technical and field assistance provided by Whitney Moore, Kevin Robinson, and Jonathan Harris. Résumés of key staff are included in *Appendix A*.

The results and findings of this study have been reported without bias or prejudice. The conclusions of this study are based on our own professional opinion substantiated by the findings of this study and have not been influenced in any way.

Alex Zeller, M.Sc.
Ecologist and Project Manager
Dillon Consulting Limited

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Appendix A

MNRF Information Request

Ministry of Natural Resources

Kemptville District
P.O. Box2002
10 Campus Drive
Kemptville, ONK0G 1J0

Tel.: (613) 258-8204
Fax.: (613) 258-3920

Ministère des Richesses naturelles

District de Kemptville
CP 2002
10 Campus Drive
Kemptville, ONK0G 1J0

Tél.: (613) 258-8204
Téléc.: (613) 258-3920

Thu. Oct 2, 2014

Alex Zeller
Dillon Consulting
177 Colonnade Rd, Suite 101
Ottawa
K2E 7J4
(613) 745-6338 ext 3011
azeller@dillon.ca

Attention: Alex Zeller

Subject: Information Request - Developments
Project Name: Proposed residential development at 4650 Spratt rd. and 750 river Rd
Site Address:
Our File No. 2014_GLO-2806

Natural Heritage Values
The Ministry of Natural Resources (MNR) Kemptville District has carried out a preliminary review of the area in order to identify any potential natural resource and natural heritage values.

The MNR works closely with partner agencies and local municipalities in order to establish concurrent approval process and to achieve streamlined and efficient service delivery. The MNR strongly encourages all proponents to contact partner agencies (e.g. MOE, Conservation Authority, etc.) and appropriate municipalities early on in the planning process. This provides the proponent with early knowledge regarding agency requirements and approval timelines.

Natural heritage features and values contribute to the province's rich biodiversity and provide habitat for a variety of species. The following Natural Heritage values were identified:

- Unevaluated Wetland (Not evaluated per OWES)

Municipal Official Plans contain additional information related to natural heritage features. Please see the local municipal Official Plan for more information such as specific policies and direction pertaining to activities which may impact natural heritage features. For planning advice or Official Plan interpretation, please contact the local municipality.

Where natural values and natural hazards exist (e.g., floodplains), there may be additional approvals and permitting required from the local Conservation Authority. The MNR strongly recommends contacting the local Conservation Authority for further information and approvals. Please see the MNR Kemptville Information Guide (2012) for contact information pertaining to Conservation Authorities located within the Kemptville District area.

For additional information and online mapping tools, please see the Natural Heritage Information Centre (NHIC), where additional data and files can be downloaded in both list and digital format. In addition sensitive species information can be requested and accessed through the NHIC at NHICrequests@ontario.ca.

Water

Where the site is adjacent to or contains a watercourses or waterbodies, additional considerations apply. If any in-water works are to occur, there are timing restriction periods for which work in water can take place (see below). Appropriate measures should be taken to minimize and mitigate impact on water quality and fish habitat, including:

- including the installation of sediment and erosion control measures;
- avoiding removal alteration or covering of substrates used for fish spawning, feeding, over-wintering or nursery areas; and
- debris control measures should be put in place to manage falling debris (e.g. spalling).

A work permit from the MNR may be required pending further details regarding the proposed works. No encroachment on the bed or banks of the waterbody (e.g. abutments, embankments, etc.) is permitted until MNR approval and clearance has been issued. In order for MNR staff to determine when a work permit is required, additional information can include:

- Detailed drawings (existing and proposed)
- Location mapping
- Registered Plan survey
- Site photographs
- Public Lands Act Forms - application forms, ownership form and landowner notification form.

The MNR does not have any water quality or quantity data available. We recommend that the Ministry of the Environment be contacted for such data along with the local Conservation Authority. For further information regarding fish habitat and protocols, please refer to the following interagency, document, *Fish Habitat Referral Protocol for* Ontario at: http://www.mnr.gov.ca/264110.pdf

Timing restriction periods in MNR Kemptville District*:

Warmwater	→ March 15 – June 30
	→ March 15 – July 15 for St. Lawrence River & Ottawa River
Coldwater	→ October 1 – May 31
Mixed lakes	→ October 1 – June 30 (Big Rideau & Charleston)

* *Please note: Additional timing restrictions may apply as it relates to Endangered and Threatened Species, including works in both water and wetland areas.*

	FISH SPECIES	TIMING WINDOW
Spring:	Walleye	March 15 to May 31
	Northern Pike	March 15 to May 31
	Lake Sturgeon	May 1 to June 30
	Muskellunge	March 15 to May 31
	Largemouth/Smallmouth Bass	May 1 to July 15
	Rainbow Trout	March 15 to June 15
	Other/Unknown Spring Spawning Species	March 15 to July 15

	FISH SPECIES	TIMING WINDOW
Fall:	Lake Trout	October 1 to May 31
	Brook Trout	October 1 to May 31
	Pacific Salmon	September 15 to May 31
	Lake Whitefish	October 15 to May 31
	Lake Herring	October 15 to May 31
	Other/Unknown Fall Spawning Species	October 1 to May 31

Additional approvals and permits may be required for the proposed works as it relates to the Fisheries Act. Please contact your local Conservation Authority and the Department of Fisheries and Oceans to determine requirements and next steps. Where the Fisheries Act is triggered and habitat compensation, mitigation measures or best management practices are being considered; as the MNR is charged with the management of Provincial fish populations, the MNR requests ongoing involvement in such discussions in order to ensure population conservation. Furthermore, local Conservation Authorities may also have additional approvals for works in and adjacent to water and wetland features. Finally, Transport Canada's Navigable Waters Protection Division may require review and approval of the proposed project. Please contact these local agencies directly for more information.

As per the Natural Heritage Reference Manual (Section 13; OMNR 2010) the MNR strongly recommends that an Ecological Site Assessment be carried out to more thoroughly determine the presence of natural heritage features, and Species at Risk and their habitat located on site. The MNR can provide survey methodology for particular species at risk and their habitats. In addition, the local planning authority may have more details pertaining to the requirements of the assessment process, which will result in allow for the municipality to make planning decisions which are consistent with the Provincial Policy Statement (2005).

Species at Risk

With the new Endangered Species Act (ESA, 2007) in effect, it is important to understand which species and habitats exist in the area and the implications of the legislation. A review of the Natural Heritage Information Centre (NHIC) and internal records and aerial photograph interpretation indicate that there is a potential for the following Threatened (THR) and/or Endangered (END) species on the site or in proximity to it:

- Barn Swallow (THR)
- Blanding's Turtle (THR)
- Bobolink (THR)

- Butternut (END)
- Eastern Meadowlark (THR)
- Little Brown Bat (END)

All Endangered and Threatened species receive individual protection under section 9 of the ESA and receive general habitat protection under Section 10 of the ESA, 2007. Thus any potential works should consider disturbance of possible important habitat (e.g. nesting sites). Please note that as of June 30, 2013 general habitat protection applies to all Threatened and Endangered species. The habitat of these listed species is protected from damage and destruction and certain activities may require authorization(s) under the ESA. Please keep this date in mind when planning any species and habitat surveys

Species receiving General Habitat protection:

- Barn Swallow (THR)
- Blanding's Turtle (THR)
- Bobolink (THR)
- Butternut (END)
- Eastern Meadowlark (THR)
- Eastern Musk Turtle (SC)
- Little Brown Bat (END)

If the proposed activity is known to have an impact on the species mentioned above or any other SAR, an authorization under the Endangered Species Act, 2007 (ESA) may be required. It is recommended that MNR Kemptville be contacted prior to any activities being carried out to discuss potential survey and mitigation measures to avoid contravention of the ESA.

Habitat has been identified within the project area that appears suitable for one or more species listed by SARO as Special Concern (SC). In Addition, one or more Special Concern species has been documented to occur either on the site or nearby. Species listed as Special Concern are not protected under the ESA, 2007. However, please note that some of these species may be protected under the Fish and Wildlife Conservation Act. Species of Special Concern for consideration:

- Easter Wood-Pewee (SC)
- Eastern Musk Turtle (SC)
- Eastern Ribbonsnake (SC)
- Milksnake (SC)
- Monarch (SC)
- Short-eared Owl (SC)
- Snapping Turtle (SC)

If any of these or any other species at risk are discovered throughout the course of the work, and/or should any species at risk or their habitat be potentially impacted by on site activities, MNR should be contacted immediately and operations be modified to avoid any negative impacts to species at risk or their habitat until further direction is provided by MNR.

Please note that information regarding species at risk is based on documented occurrences only and does not include an interpretation of potential habitat within or in proximity to the site in

question. Although this data represents the MNR's best current available information, it is important to note that a lack of information for a site does not mean that additional features and values are not present. i.e.: Species at Risk (SAR) or their habitat could still be present at the location or in the immediate area. It is the responsibility of the proponent to ensure that species at risk are not killed, harmed, or harassed; or their habitat is not damaged or destroyed through the activities carried out on the site. The MNR continues to strongly encourage ecological site assessments to determine the potential for SAR habitat and occurrences. When a SAR or potential habitat for a SAR does occur on a site, it is recommended that the proponent contact the MNR for technical advice and to discuss what activities can occur without contravention of the Act. If an activity is proposed that will contravene the ESA (such as Section 9 or 10), the proponent must contact the MNR to discuss the potential for a permit (Section 17). For specific questions regarding the Endangered Species Act (2007) or SAR, please contact a district Species at Risk Biologist at sar.kemptville@ontario.ca. For more information regarding the ESA (2007), please see attached ESA Information Sheet.

As of July 1, 2013, the approvals processes for a number of activities that have the potential to impact SAR or their habitat were changed in an effort to streamline approvals processes while continuing to protect and sustainably manage Ontario's natural resources. For those activities that require registration with the Ministry, businesses and individuals will be able to do so through a new online system. The online system will also include information to help guide individuals and businesses through the new processes. For further information on which activities are authorized through this new online registration process and how to apply, please refer to the following website: http://www.mnr.gov.on.ca/en/About/2ColumnSubPage/STDPROD_104342.html. General inquiries may be directed towards Kemptville District MNR, while questions and comments involving the new online forms can be directed to the Registry Approvals Service Centre (RASC) at 1-855-613-4256 or mnr.rasc@ontario.ca.

Please note: The advice in this letter may become invalid if:

- The Committee on the Status of Species at Risk in Ontario (COSSARO) re-assesses the status of the above-named species OR adds a species to the SARO List such that the section 9 and/or 10 protection provisions apply to those species.
- Additional occurrences of species are discovered.
- Habitat protection comes into force for one of the above-mentioned species through the creation of a habitat regulation (see general habitat protection above).

This letter is valid until: Fri. Oct 2, 2015

MNR is streamlining and automating its approvals processes for natural resource-related activities. Some activities that may otherwise contravene the ESA may be eligible to proceed without a permit from MNR provided that regulatory conditions are met for the ongoing protection of species at risk and their habitats. There are regulatory provisions for projects that have attained a specified level of approval prior to, or shortly after, the specified species or its habitat became protected under the ESA. There requirements include registering the activity with the Ministry of Natural Resources, taking steps to immediately minimize adverse effects on species and habitat, and developing a mitigation plan. Anyone intending to use this regulatory provision is strongly advised to review

Ontario Regulation 242/08 under the Endangered Species Act, 2007 for the full legal requirements.

For more information please check out the following link http://www.ontario.ca/environment-and-energy/development-and-infrastructure-projects-and-endangered-or-threatened-species

The MNR would like to advise, by way of this letter, that we continue to be circulated on information with regards to this project. If you have any questions or require clarification please do not hesitate to contact me.

Sincerely,

Erin Seabert
Management Biologist
erin.seabert@ontario.ca

Encl.\
-ESA Infosheet
-NHIC/LIO Infosheet

Appendix B

Curricula Vitae

Alexander Zeller, B.ES., M.Sc.

ASSOCIATE
azeller@dillon.ca

PERSONAL PROFILE

Alex is an ecologist with experience in natural resource, urban development, water resources and planning fields. His broad knowledge of ecology, GIS and remote sensing has proved a successful complement to large-scale environmental planning projects.

EDUCATION

M.Sc., Biology, Lakehead University, 2007

B.ES. (Hons), Lakehead University, 2003

RELEVANT EXPERIENCE

NATURAL RESOURCES STUDIES

Project Manager, Golbourn Wetland Complex City of Ottawa, Ontario
Completed a re-evaluation of a large provincially designated wetland complex which included GIS wetland mapping, field data collection (SAR data/photos), peer review, public consultation and a summary report to the City and MNRF. *2016 (completed).*

Terrestrial Biologist, Technical Reviewer & Engagement Specialist, Confidential First Nation Client, Ontario
Conducted a high-level review of an EA report to determine if the Draft EA (and technical baseline studies) adequately addressed potential impacts and proposed mitigation in a manner that is satisfactory to the First Nation. The report included a review of wildlife, vegetation, water resources, air and noise and socio-economics related to Traditional Knowledge and Traditional Land Use. Included two workshops with community representatives and preparation of a summary document and a report. Specific works included reviewing the EA as it related to the Terrestrial Environment and how well the EA addressed potential environmental constraints. *2016 (completed).*

Ecologist, Traditional Knowledge/Traditional Land Use Studies, Rainy River First Nations, Ontario
Completed two supplemental TK/TLU studies for each Nation; one for Rainy River First Nations and one for Naicatchewenin First Nation. The studies focused on cultural/spiritual sites and traditional land uses potentially impacted by the proposed Rainy River Project. The project included TK/TLU workshops/interviews with Elders, validation workshops and a report with overview of findings and GIS files. Specific works included the assistance with the community consultation and the digitizing of TK information into a geospatial format. *2014 (completed).*

Project Manager/Lead Biologist, Ecological Land Classification, National Capital Commission, Ottawa, Ontario
Completed mapping of all ecotypes within the NCC's urban and greenbelt lands to be used for future ecological landscape management projects. The ecological mapping used Ontario Ecological Land Classification and covered an area of ~62 km^2. *2014 (completed).*

GIS Analyst/Biologist, Species at Risk Survey, Defence Construction Canada, CFB Shilo, Manitoba
Completed a survey of 24 possible species at risk in Range Area 9, modelled habitat use by 18 species and completed an internal environmental assessment to plan for digbox training. *2014 (completed).*

Project Manager/Lead Biologist, Species at Risk Screening Study, City of Ottawa, Ontario
Completed this study to identify the potential threat of 489 planned infrastructure projects had to species at risk (SAR). The study also developed tools for the management and implementation of this data. These tools included a suite of mitigation recommendations, a GIS database of the screening results, Google Earth files of all the results to ease accessibility of the spatial data, a document summarizing and illustrating the SAR that may be found and a SAR screening process flowchart. *2014 (completed).*

Project Manager/Lead Biologist, Innes Road Environmental Monitoring, Enbridge Gas Distribution Inc., Ottawa, Ontario
Provided environmental monitoring and environmental awareness training for the pipeline installation along Innes Road. The project developed a bespoke environmental awareness training program to ensure the on staff contractors were aware of the environmental constraints and mitigation measures expected on site. The project also included ongoing construction environmental monitoring to ensure construction complied with mitigation requirements and all potential impacts were minimized. *2014 (completed).*

Project Manager/Biologist, Ottawa West Reinforcement Pipeline Environmental Assessment, Enbridge Gas Distribution Inc., Western Ontario
Conducted an environmental and cumulative effects assessment, detailed biophysical surveys to support environmental authorizations, pre- and post-construction water well monitoring and development of a detailed mitigation strategy for the installation of 20 km of 24 inch natural gas pipeline. Specific works included evaluating the natural heritage system, outlining mitigation requirements, agency consultation and undertaking ecological field surveys as required. *2014 (completed).*

Project Ecologist, Terry Fox Drive Extension, Construction Services, City of Ottawa, Ontario
Completed the construction and contract administration for the 5.4 km extension of Terry Fox Drive including sidewalks, recreational pathways, storm and sanitary sewers, floodplain compensation, preloading, street lighting and traffic signals, utility coordination and environmental features and remediation. Wildlife crossings, turtle fencing and a retaining wall guidance system was installed for animal protection and post-construction monitoring was completed to monitor their effectiveness. *2013 (completed). Environmental Achievement Award, Transportation Association of Canada, 2014.*

Terrestrial Biologist, Rainy River Gold Project Draft Closure Plan Review, Pwi-Di-Goo-Zing Ne-Yaa-Zhing Advisory Services, Ontario
Conducted high-level review of Environmental Assessment Report to determine if the Draft EA adequately addressed potential impacts and proposed mitigation in a manner that is satisfactory to a group of First Nations. The report included a review of wildlife, vegetation, water resources, air and noise and socio-economics related to Traditional Knowledge and Traditional Land Use. Included two workshops with community representatives and preparation of a summary document and a report. *2013 (completed).*

Project Ecologist, Terry Fox Drive, Final Design, City of Ottawa, Ontario
Completely reworked the preliminary design based on geotechnical and species at risk constraints related to the compressed construction schedule. The design, tendering and construction administration process included updating the transportation model, a detailed traffic management plan, public consultation, natural environment inventory, a drainage strategy and stormwater management plan and full-time environmental monitoring. *2013 (completed). Award of Merit - Transportation, Consulting Engineers of Ontario, 2013.*

Lead Landscape Ecologist, Natural Heritage Study, County of Frontenac, Ontario
Completed a study to increase understanding of natural heritage features and systems across the Frontenacs (~4000 km^2). The project included a comprehensive map to identify component environmental features of the natural heritage system; identification of significant areas for protection; policies addressing land use, growth and environmental preservation and conservation; recommendations for restoration and enhancement; and steps to encourage and facilitate private stewardship. *2013 (completed).*

GIS Analyst and Biologist, Westside Creek Wetland Reconfiguration, St. Marys Cement Inc. (Canada), Bowmanville, Ontario
Developed and implemented a ten-year monitoring program for a reconfigured 24.7 ha wetland and 2.8 km creek. The program was developed to understand the impacts on natural populations and confirm that the habitat components were installed and functioning in a satisfactory manner. *2013 (completed).*

Lead Ecologist, Rideau Corridor Landscape Strategy, Parks Canada, Ontario
Completed a landscape character assessment study as a component of an overall landscape strategy for the Rideau corridor from the Ottawa River to Lake Ontario. The Rideau Corridor Landscape Character Assessment combined GIS mapping, visual analysis tools and other desk based research with public consultation and visual preference surveys to identify areas of distinctive landscape character within the Corridor which may be sensitive to physical and visual changes. *2012 (completed).*

Project Ecologist, Birds Creek Secondary Plan, Municipality of Hastings Highlands, Ontario
Developed a secondary plan for the area including a land use study, public consultation, innovative “Healthy Hamlet” approach and urban design. The project included statutory processes including County of Hastings Official Plan amendments and Ministry of Municipal Affairs and Housing liaison. Responsibilities include consultation with public and client, assessing the existing natural resources, assisting in incorporating natural heritage features into the plan and developing GIS mapping for study area. *2012 (completed).*

Ecologist and Spatial Analyst, Greater Toronto Area Reinforcement Pipeline Environmental Assessment, Enbridge Gas New Brunswick Inc., Ontario
Provided environmental and socio-economic constraints and opportunities input for the installation of a reinforced natural gas supply line throughout the GTA. The project included several potential routes followed by additional work to ascertain the feasibility of installation with a marine environment and in northern areas of the GTA. Also provided environmental and due diligence support for the proposed pipeline route and potential alternatives. *2011 (completed).*

Project Ecologist, Infrastructure Master Plan, Town of Perth, Ontario
Reviewed water servicing alternatives in support of a master plan for a proposed new build-out north of Highway 7, including hydraulic analysis of servicing alternatives, including establishing design requirements, water delivery, fire flow, water storage requirements, sewage lift station and cost evaluations. *2011 (completed).*

Project Ecologist, Commercial Vehicle Inspection Facilities (CVIFs) Strategic Plan, Ministry of Transportation, Ontario
Devised a province-wide strategy to increase commercial driver and vehicle safety. The condition assessment reviewed remaining useful life and life-cycle costs for the existing 16 truck inspections stations (TISs) due for reconstruction/upgrade to CVIFs. The project included planning and implementation with site-specific schematic layouts, cost estimates and CVIF conversion options based on present conditions and outlined steps to be taken to manage the conversion of the TISs to CVIFs. *2011 (completed).*

Project Ecologist, Regional Ecology Planning Framework, Regional Municipality of Wood Buffalo, Alberta
Developed an ecological planning framework to aid the municipality in balancing development pressures with municipal-specific environmental conservation goals. Responsible for developing the GIS-based ecological planning model and decision support tools created specifically for the municipality. *2010 (completed).*

Ecologist and Spatial Analyst, Land Use Plan, Tlicho Government, Northwest Territories
Prepared a regional land use plan to guide the management of the 39 000 km^2 Tlicho settled land claim area. The project resulted in a draft plan that accommodates the Tlicho way of life and considers the economic and social well-being of the Nation into the future. Specific works included development of the GIS database and spatial model within the GIS to aid in the production of the final land use plan. This model incorporates traditional indigenous knowledge and ecological features with economic and social influences to identify suitable land use zones. *2010 (completed).*

Project Ecologist, Ecological Area Preservation Strategy, City of Yellowknife, Northwest Territories
Completed a multi-year study to develop a strategy for preserving valued natural areas for city growth over the next 50 years. A GIS based landscape database was developed to provide quantitative and qualitative information needed to guide development decisions affecting natural areas within the urban boundary. Public consultation included interviews, an open house and a community design charette. *2009 (completed).*

Project Ecologist, Satellite Image Classification, Tsuu T'ina First Nation, Calgary, Alberta
Conducted a satellite image classification to update outdated vegetation mapping. Landsat-7 TM data was classified using IDRISI Andes software. Training areas were delineated to represent the various vegetation communities in the image and a maximum likelihood classification method was used to classify the image. The results of the image classification proved to be excellent and corresponded to ground-truth landcover classes very well. *2008 (completed).*

Project Biologist, Matthews Lake Habitat Restoration, Public Works Government Services Canada, Fort Smith, Northwest Territories

Completed the fish habitat restoration and enhancement at work at the lake, as compensation to the loss of fish habitat in lakes and streams associated with a nearby diamond mine development. Post-construction monitoring was also provided. *2007 (completed).*

ENVIRONMENTAL ASSESSMENTS

Project Ecologist, Hickory Street Pedestrian Bridge Environmental Assessment, City of Ottawa, Ontario

Completed an environmental study to address a multi-use pedestrian/cycling crossing of the O-Train corridor near Hickory Street. The project included an environmental screening, alternative design with functional design, public consultation and cost estimates for the preferred option. *2012 (completed).*

Project Ecologist, Kanata Avenue Main Street Environmental Assessment. City of Ottawa, Ontario

Completed a Municipal Class Environmental Assessment study to examine the need for a proposed widening of Kanata Avenue. This suburban road configuration travels through the "heart" of the future Kanata Town Centre, a proposed urban node to the city. The Kanata Town Centre looks to become a focal point of mixed commercial and residential uses, an important transportation hub and institutional and cultural hotspot, with incorporated public open space amenities and employment opportunities. *2014 (completed).*

Project Ecologist, Terry Fox Drive Environmental Assessment Addendum, City of Ottawa, Ontario

Prepared an addendum to the environmental study report. The addendum addressed Phase 1 preliminary design improvements to the alignment and geometric features, stormwater management facilities and natural environment impact mitigation features and grade separation options of a railway. *2008 (completed).*

Project Ecologist, Goulbourn Forced Road Environmental Assessment, City of Ottawa, Ontario

Completed planning and functional design for the widening and upgrade of two interconnected major collector roadways. Both projects were done under "Schedule "C" of the Municipal Class EA guidelines. Specific works included evaluating the natural heritage system, outlining mitigation requirements, facilitation at public open house and undertaking ecological field surveys as required. *2007 (completed).*

Project Ecologist, Eagleson Road/Fernbank Road Environmental Assessment, City of Ottawa, Ontario

Completed planning and functional design studies for widening/upgrade of two interconnected suburban arterial roadways. Both projects were done under "Schedule "C" of the Municipal Class EA guidelines. The study area included residential, park space and recreational land uses along the 1.5 km corridor. Key challenges addressed were the crossing of Monahan Drain and the rural to urban roadway transition. Public consultation comprised three public open houses. *2007 (completed).*

URBAN DEVELOPMENT

Project Manager, Riverside South Phase 12, Urbandale Corporation, Ottawa, Ontario
Completed a planning rationale, environmental impact statement, tree conservation report and headwater stream assessment for a new development in Riverside South. Project work included field surveys, reporting, agency consultation and approval applications. *(ongoing).*

Lead Biologist, Henderson Lands, Lioness Developments Inc., Kemptville, Ontario
Completed a planning rationale, environmental impact statement, tree conservation report and headwater stream assessment for a new development in Kemptville. Project work included field surveys, reporting, agency consultation and approval applications. *(ongoing).*

Lead Biologist, Huntmar Lands - 130 Huntmar Drive, Urbandale Construction Ltd., Ottawa, Ontario
Completed a traffic impact study, environmental impact statement and tree conservation report for a new development in the Kanata West Lands. Project work included field surveys, reporting, agency consultation and approval applications. *(ongoing).*

Project Manager, Riverside South Phase 15, Riverside South Development Corporation, Ottawa, Ontario
Completed a planning rationale, environmental impact statement, tree conservation report and headwater stream assessment for a new development in Riverside South. Project work included field surveys, reporting, agency consultation and approval applications. *(ongoing).*

Project Manager, Riverside South Phase 14, Riverside South Development Corporation, Ottawa, Ontario
Completed a planning rationale, environmental impact statement, tree conservation report and headwater stream assessment for a new development in Riverside South. Project work included field surveys, reporting, agency consultation and approval applications. *(ongoing).*

Project Manager, Riverside South Phase 16, Riverside South Development Corporation, Ottawa, Ontario
Completed an environmental impact statement and headwater stream assessment for a new development in Riverside South. Project work included field surveys, reporting, agency consultation and approval applications. *(ongoing).*

Project Manager, Clark Lands Development, Environmental Impact Statement, Minto Communities Inc., Ottawa, Ontario
Prepared a combined Environmental Impact Statement and Tree Conservation Report in support of a plan of subdivision for a residential development. *(ongoing).*

Project Manager and Lead Biologist, Plotter's Key Development, Minto Communities Inc., Ottawa, Ontario
Completed an Environmental Impact Statement and Tree Conservation Study for a development in Stittsville. The study was completed as part of an application for residential development. The project included species at risk surveys and permitting, mitigation development, a restoration plan and agency consultation. *(ongoing).*

Project Manager and Lead Biologist, Fernbank Lands Development, Richcraft Homes, Ottawa, Ontario

Completed an Environmental Impact Statement and Tree Conservation Study for a development in west Ottawa. The study was completed as part of an application for residential development. The project included species at risk surveys and permitting, mitigation development and agency consultation. *(ongoing).*

Project Manager and Terrestrial Ecologist, Ecological Screening Assessment, Walton Development & Management Inc., Ottawa, Ontario

Documented natural features through background review of secondary sources and field studies to determine potential constraints to development that may exist as a result of the natural environment. Also identified stewardship and enhancement opportunities on a number of properties in southwest Ottawa. *2015 (completed).*

Project Manager, Country Hill Estates, City of Ottawa, Ontario

Completed a Scoped Environmental Impact Statement to specifically address concern for the impact of a rural residential development in south Ottawa on species at risk. *2012 (completed).*

Project Ecologist, Blanding's Turtle Conservation Plan, City of Ottawa, Ontario

Prepared a conservation needs assessment to balance the needs of the endangered species with the pace of planned urbanization in the area of the turtle habitat. Completed a population viability analysis model to assess scenarios of urban growth and turtle management techniques to develop the best scenario with the highest likelihood of success for the turtles over a 500-year period. A comprehensive approach was recommended that integrated urban development with public involvement. *2012 (completed).*

Project Ecologist, On-Street Paid Parking Study, City of Ottawa, Ontario

Identified the parking occupancy rate of ~3,500 paid on-street parking stalls across the city as part of twice annual parking and occupancy and compliance surveys during four weekday time periods and on weekends. *2011 (completed).*

Project Manager, Chapman Mills Environmental Impact Statement, Minto Developments Inc., Ottawa, Ontario

Prepared an environmental impact statement addendum assessing the impact of a residential development on trees and local hydrology within a small woodlot. *2011 (completed).*

EMPLOYMENT HISTORY

DILLON CONSULTING LIMITED

2006 - Present Ecologist, Associate

ONTARIO MINISTRY OF NATURAL RESOURCES

2001 - 2006 Research Technician (Contract)

LAKEHEAD UNIVERSITY

2003 - 2005 Teaching Assistant - Geography and Biology Departments

PROFESSIONAL DEVELOPMENT

Ecological Land Classification Training, Ministry of Natural Resources, 2010

Landscape Ecology, Lakehead University, Thunder Bay, Ontario, 2005

Quantitative Methods in Ecology, Lakehead University, Thunder Bay, Ontario, 2005

Disturbance Ecology, Lakehead University, Thunder Bay, Ontario, 2004

Advanced GIS, Lakehead University, Thunder Bay, Ontario, 2003

Remote Sensing, Lakehead University, Thunder Bay, Ontario, 2003

Water Resource Management, Lakehead University, Thunder Bay, Ontario, 2003

Natural Resource Management, Lakehead University, Thunder Bay, Ontario, 2003

PUBLICATIONS

Gleeson, J., A. Zeller and J.W. McLaughlin. 2006. Peat as a Fuel Source in Ontario: A Preliminary Literature Review, Ontario Forest Research Institute, Forest Research Information Paper 161, Sault Ste. Marie, Ontario.

Zeller, A.J. 2005. Using landscape indices to model environmental gradients within the Mixedwood Boreal Forests of northwestern Ontario, Canada. Poster Presentation at Ontario Ecology and Ethology Colloquium, 2005. Ottawa, Ontario

Whitney Moore, B.Sc.

BIOLOGIST
wmoore@dillon.ca

PERSONAL PROFILE

Whitney is a biologist with experience in reviewing environmental applications and reports for various government agencies using applicable legislation, policies and procedures. She has reviewed natural heritage assessments and species at risk reports for renewable energy projects and work permit applications for shoreline works in Ontario. She is knowledgeable in both terrestrial and aquatic habitats and has expertise in wildlife and habitat protection requirements and worked on projects involving species at risk permitting, writing natural heritage assessment reports and amendments and post-construction mortality monitoring for wind farms.

EDUCATION

B.Sc. (Hons), Biology, Wilfrid Laurier University, 2009

RELEVANT EXPERIENCE

Biologist, Solar Farms, Canadian Solar Solutions Inc., Ontario

Completed Renewable Energy Approval (REA) amendment reports for several solar projects for submission to the Ministry of the Environment. Prepared Notice of Activity forms for the Ministry of Natural Resources species at risk registry and prepared species at risk letters and habitat management plans. A sampling of the solar projects this work was completed for includes:

SunE Demorestville LP
Alfred LP
Aria LP
CItyLights LP
DiscoveryLights LP
EarthLight LP
FotoLight LP
CSI Glenarm LP

Biologist, Dufferin Wind Farm, Dufferin Wind Power Inc.

Coordinated the Ontario Renewable Energy Approvals (REA) process a 49 turbine (100 MW) wind farm and assessed two transmission options - a 30 km 69 kV option and a 40 km 230 kV option. The project included a wind resource assessment, turbine siting, nose assessment, transmission routing, natural heritage assessment, visual assessment, public and agency consultation, and aboriginal consultation.

Biologist, Integrity Digs, Enbridge Gas New Brunswick, Southern Ontario

Completed permit application packages for Integrity Digs in various conservation authority jurisdictions. Completed Environmental Clearance memos for several Integrity Dig sites across southern Ontario.

Biologist, ESLC Wind Farms, GDF Suez Energy
Assisted in obtaining both provincial and federal permits for post-construction mortality monitoring at two wind farms in southern Ontario. Prepared the health and safety plans and assisted in scheduling the post-construction monitoring. Prepared project binders for staff involved in the projects.

Biologist, Erieau Wind Farms, GDF Suez Energy
Assisted in obtaining both provincial and federal permits for post-construction mortality monitoring at two wind farms in southern Ontario. Prepared the health and safety plans and assisted in scheduling the post-construction monitoring. Prepared project binders for staff involved in the projects.

Biologist, Windsor Phase III Solar, Samsung Renewable Energy Inc., Location
Completed the renewable energy approval and a system impact assessment as they related to 50 MW transmission connected solar projects. The project included substation design, transmission line design review and energy studies.

Biologist, Southgate Phase III Solar, Samsung Renewable Energy Inc., Location
Completed the renewable energy approval and a system impact assessment as they related to 50 MW transmission connected solar projects. The project included substation design, transmission line design review and energy studies.

EMPLOYMENT HISTORY

DILLON CONSULTING LIMITED

2013 - Present Biologist

ONTARIO MINISTRY OF NATURAL RESOURCES

2013 Renewable Energy Planning Ecologist

2012 A/Integrated Resource Management Technical Specialist

2010 - 2012 Renewable Energy Planning Ecologist

2010 Lands Technician

FISHERIES AND OCEANS CANADA

2009 - 2010 Fish Habitat Biologist

QUINTE CONSERVATION AUTHORITY

2009 Watershed Technician

MINISTRY OF THE ENVIRONMENT

2008 Abatement Summer Student

PROFESSIONAL DEVELOPMENT

Headwater and Barrier Attrition Workshop, Rideau Valley Conservation Authority, April 2015

Post-Construction Bird and Bat Mortality Monitoring Training, MNR, 2014

Bat Maternity Colony Habitat Training, MNR, 2014

Advanced Open Water with Coral Reef Research Specialty, PADI, Seychelles, 2014

Ecological Flow Requirements Workshop, WWF Canada and Grand River Conservation Authority, 2011

Small Non-Pleasure Vessel Basic Safety (MED A3) Certified, MNR, 2011

Ontario Wetland Evaluation System Course, MNR, 2011

Fish Identification Course (Level 1), MNR, 2011

Clear Writing, MNR, 2011

Environmental Review Tribunal Training, MNR, 2011

Project Management 101 Training, MNR, 2011

Introduction to ArcGIS training, ERSI, 2010

Data Sensitivity Training (Natural Heritage Information Centre), MNR, 2010

Pleasure Craft Operators Card, Government of Canada, 2010

ATIP Training, Department of Fisheries and Oceans Canada, 2010

Habitat Referral Protocol Training, Department of Fisheries and Oceans Canada, 2010

Ontario Benthos Biomonitoring Network Training, Quinte Conservation Authority, 2009

PADI Open Water, Southwest Sulawesi, Indonesia, 2007

Coral Reef Population Researcher, Cap Ternay, Seychelles

Check Your Watershed Day, Lower Trent Conservation Authority, Brighton, Ontario

Coral Reef Research Assistant, Hoga Island, Indonesia

Kevin Robinson, B.Sc.

BIOLOGIST
krobinson@dillon.ca

PERSONAL PROFILE

Kevin is a biologist and field crew leader with experience in aquatic and terrestrial habitat assessment, wildlife sampling and monitoring, water quality sampling and monitoring, maintenance of electrical systems and HVAC systems.

EDUCATION

B.Sc. (Hons), Environmental Resource Sciences, Trent University, 2011

Diploma, Environmental Technologist, Sir Sandford Fleming College, 2009

Diploma, Environmental Technician, Sir Sandford Fleming College, 2008

RELEVANT EXPERIENCE

ROADWAY PROJECTS

Field Biologist, Terry Fox Drive Extended Services 2012-2017, City of Ottawa, Ontario

Completed multi-year, follow-up monitoring of species at risk related to Terry Fox Drive road development which included completing four separate scientific investigations; collaboration on advanced propagation of 100 American Ginseng plants; implementation and long-term recovery of species at risk over a five-year period; a three-year study of Blanding's Turtle; and design and implementation of a Wildlife Guide System to direct animals through special-built culverts. Specific works included coordinating field staff for the three year mark and recapture Blanding's Turtle study. Collected field measurements of turtles caught and Passive Integrated Transponder (PIT) tags were implanted into turtles for further identification. Radio telemetry transponders were placed on several turtles to learn the habitat and movement patterns of these turtles. Installed motion sensing wildlife cameras into culverts to determine wildlife passage through culverts. Interpreted field data and assisted in preparing summary reports. *2017 (completed).*

ENVIRONMENTAL MONITORING

Field Biologist, Riverside South Phase 12 Environmental Impact Statement, Urbandale Corporation, Ottawa, Ontario

Completed a planning rationale, environmental impact statement, tree conservation report, and headwater stream assessment for a new development in Riverside South. Project work included field surveys, reporting, agency consultation and approval applications. Specific works included completing field surveys and coordinating with project team. Assisted with data interpretation and preparation of summary report. *(ongoing).*

Field Biologist, Henderson Lands, Urbandale Corporation, Kemptville, Ontario

Completed a planning rationale, environmental impact statement, tree conservation report, and headwater stream assessment for a new development in Kemptville. Project work included field surveys, reporting, agency consultation and approval applications. Specific works included completing field surveys and coordinating with project team. Assisted with data interpretation and preparation of summary report. *(ongoing).*

Field Biologist, Huntmar Lands Environmental Impact Statement, Urbandale Corporation , Ottawa, Ontario
Completed a traffic impact study, environmental impact statement, and tree conservation report for a new development in the Kanata West Lands. Project work included field surveys, reporting, agency consultation and approval applications.Specific works included completing field surveys and coordinating with project team. Assisted with data interpretation and preparation of summary report. *(ongoing).*

Field Biologist, Riverside South Phase 15 Environmental Impact Statement, Urbandale Corporation, Ottawa, Ontario
Completed a planning rationale, environmental impact statement, tree conservation report, and headwater stream assessment for a new development in Riverside South. Project work included field surveys, reporting, agency consultation and approval applications. Specific works included completing field surveys and coordinating with project team. Assisted with data interpretation and preparation of summary report. *(ongoing).*

Field Biologist, Riverside South Phase 14 Environmental Impact Statement, Urbandale Corporation, Ottawa, Ontario
Completed a planning rationale, environmental impact statement, tree conservation report, and headwater stream assessment for a new development in Riverside South. Project work included field surveys, reporting, agency consultation and approval applications. Specific works included completing field surveys and coordinating with project team. Assisted with data interpretation and preparation of summary report. *(ongoing).*

Field Biologist, Riverside South Phase 16 Environmental Impact Statement, Urbandale Corporation, Ottawa, Ontario
Completed an environmental impact statement and headwater stream assessment for a new development in Riverside South. Project work included field surveys, reporting, agency consultation and approval applications. Specific works included completing field surveys and coordinating with project team. Assisted with data interpretation and preparation of summary report. *(ongoing).*

Field Biologist, Jackson Trails Environmental Impact Study, Minto Communities Inc., Ottawa, Ontario
Completed an Environmental Impact Statement and Tree Conservation Study for a development in Stittsville. The study was completed as part of an application for residential development. The project included species at risk surveys and permitting, mitigation development, a restoration plan and agency consultation. Specific works include coordinating with project team and client representatives to conduct construction environmental monitoring and field surveys *(ongoing).*

Field Biologist, Integrity Dig Program, Enbridge Pipelines Inc., Southern Ontario and Quebec
Conducted multiple environmental screenings of pipeline right-of-way maintenance locations in advance of planned vegetation clearing, to identify potential sensitive environments and species. Assisted in preparation of associated regulatory permitting. Specific works included on-site assessments and completion of associated reporting, including recommendations for mitigation measures. *2014 (completed).*

Field Biologist, Innes Road Replacement, Enbridge Gas, Ottawa, Ontario
Provided environmental monitoring and environmental awareness training for the pipeline installation along Innes Road. The project developed a bespoke environmental awareness training program to ensure the on staff contractors were aware of the environmental constraints and mitigation measures expected on site. The project also included ongoing construction environmental monitoring to ensure construction complied with mitigation requirements and all potential impacts were minimized. Specific works included project also included ongoing construction environmental monitoring to ensure construction staff complied with mitigation requirements and all potential impacts were minimized. Coordinated with project team and staff contractors to complete soil sampling program. *2014 (completed).*

Field Technician, Proposed Kingston Solar Farms, Samsung Solar, Kingston, Ontario
Conducted extensive water well survey and sampling program associated with proposed solar farm installations in the area. Liaised with property owners and produced a summary report. *2012 (completed).*

Field Biologist, CityLights LP, SkyPower Limited, Chesterville, Ontario
Prepared REA and produced Project Description, Construction Plan, Design and Operations and Decommissioning Plan report. Conducted environmental impact study on the natural environment, wildlife, and water bodies to complete two additional required reports: a Natural Heritage Assessment and a Water Report. Identified all environmental and socio-economic impacts and outlined the necessary mitigation and monitoring measures. Consulted with stakeholders throughout the entire REA process. Specific works included completing field surveys and coordinating with project team. *2012 (completed).*

Field Biologist, Country Hills Estate, City of Ottawa, Ontario
Completed a Scoped Environmental Impact Statement to specifically address concern for the impact of a rural residential development in south Ottawa on species at risk. Specific works included coordinating with project team and conducting field surveys. *2012 (completed)*.

FILL SAMPLING PROGRAMS

Field Technician, Trail Road Landfill Stage 1, City of Ottawa, Ontario
Supported the finalization of the detailed design drawings, specifications and provided tender assistance for the Trail Road Landfill Stage 1 final cover system. The cover system is focused around a final low permeability system. *(ongoing).*

Field Technician, Fill Material Sampling Program, City of Ottawa, Ontario
Collected topsoil and fill samples at various locations throughout Ottawa, analyzing for metals, hydrocarbons, volatile organic compounds, polycyclic aromatic hydrocarbons, pesticides, dioxins and furans and general inorganic chemistry. Specific works included completing fill sampling program and coordinating with project team. *2015 (completed).*

ENVIRONMENTAL SITE ASSESSMENTS

Environmental Scientist, Prince of Wales Environmental Site Assessment, City of Ottawa, Ontario Completed a Phase 1 Environmental Site Assessment for the project property in accordance with standards produced by the Canadian Standards Association (CSA Z768). The site included a multi-story community centre that previously operated as a municipal firehall. Adjacent properties included both active and former retail gas stations and drycleaning operations. Specific works included coordinating with project team and client representatives. Conducted the site visit and background review, and assisted in preparing a summary report. *2016 (completed).*

Environmental Scientist, Arrowsmith Drive Environmental Site Assessments, City of Ottawa, Ontario
Completed Phase I and II Environmental Site Assessments at 2040 Arrowsmith Drive in accordance with O.Reg. 153/04 requirements. Specific works included coordination with project team and subcontractors (drillers and geotechnical). Conducted soil sampling program during drilling, and collected groundwater samples from the monitoring wells installed. Assisted with the data interpretation and preparing a summary report. *2016 (completed).*

Environmental Phase One ESA Bel-Air Park on Berwick, City of Ottawa, Ontario
Completed a Phase One Environmental Site Assessment at a municipal park in accordance with standards produced by the Canadian Standards Association (CSA Z768). The site included an onsite building and various other park features. Specific works included coordinating with project team and client representatives. Conducted the site visit and background review, and assisted in the preparation of a Phase 1 ESA summary report. *2017 (completed).*

Environmental Scientist, Belfast Road Environmental Site Assessment, City of Ottawa, Ontario
Conducted a Phase One/Two Environmental Site Assessment of the property in accordance with standards produced by the Canadian Standards Association (CSA Z768 and CSA Z769), and Ontario Regulation 153/04 (O.Reg. 153/04), including the designation of Potentially Contaminating Activities (PCAs) and Areas of Potential Environmental Concern (APECs). Specific works included coordinating with project team and subcontractors to complete a drilling and soil sampling program, followed by conducting a groundwater monitoring program. Assisted in interpreting the analytical data and preparing a summary report. *2013 (completed).*

Environmental Scientist, Phase One/Two ESAs of 411 Dovercourt, City of Ottawa, Ontario
Completed Phase One and Two Environmental Site Assessments (ESA) at a property in accordance with standards produced by the Canadian Standards Association (CSA Z768 and CSA Z769). The property included a large municipal park and a multistory community centre. Specific works included coordinating with project team and drilling subcontractors and conducted a drilling and soil sampling program across the site. Collected groundwater samples from the newly installed monitoring wells. Interpreted soil and groundwater analytical data and assisted in the preparation of Phase One and Two ESA summary reports *2017 (completed).*

Environmental Scientist, Phase One ESA Marlborough Forest, City of Ottawa, Ontario
Conducted a Phase 1 Environmental Site Assessment for a forested rural property with a utility corridor crossing it, and an adjacent active railway. The site was being considered for purchase by the City for future use as a natural environmental area. Specific works included coordinating with project team and conducted site visit and background review. Assisted in the preparation of a Phase 1 ESA summary report. *(ongoing).*

Environmental Scientist, Smiths Falls Yard Groundwater Monitoring, Canadian Pacific, Smiths Falls, Ontario

Conducted groundwater monitoring and sampling at the CP Smiths Falls Yard at Mile 123.85 of the Winchester Subdivision, to assess potential changes in groundwater and light non-aqueous phase liquid (LNAPL) levels, and groundwater quality at the Yard. A limited remedial program consisting of the installation of Oxygen Releasing Material (ORM) socks in select wells was also completed. Specific works included coordinating with project team and subcontractors. Conducted groundwater monitoring and sampling program. Assisted in interpreting the resulting analytical data and completing a summary report *(ongoing).*

Environmental Scientist, Pineglen Groundwater Study, City of Ottawa, Ontario

Completed monitoring well installation and a groundwater monitoring program for the Pineglen community in Nepean. Included monitoring well drilling, groundwater sampling, reporting and project management and coordination. Specific works included coordinating with project team and drilling subcontractors and conducted a drilling program. Collected groundwater samples from the newly installed wells. Interpreted groundwater analytical data and assisted in preparation of a summary report. *(ongoing).*

Environmental Scientist, Reids Lane Phase One Environmental Site Assessments, City of Ottawa, Ontario

Completed two due diligence Phase One ESA in accordance with CSA P1ESA Standard Z768-01 for the properties located on Reids Lane. The scope of work included historical records review, site reconnaissance and interviews, and evaluation and reporting. Specific works included assisting in data interpretation and the preparation of a Phase 1 ESA summary report*(ongoing).*

Environmental Scientist, Cardinal Creek Stormwater Sediment Assessment, City of Ottawa, Ontario

Completing a sediment sampling program to assess the quality of the accumulated sediment in the stormwater management system. The assessment includes a field program to collect samples, interpretation of the analytical results, and possible options for disposal of the sediment. Specific works included coordinating with the project team and conducted soil and sediment sampling program. Interpreted soil and sediment analytical data and assisted in the preparation of a summary report. *(ongoing).*

Environmental Scientist, Former Woodward Dump Investigations and Risk Management Plan, City of Ottawa, Ontario

Completed an assessment of a former dump currently used as a municipal park. Investigations included additional assessment of soil quality, potential landfill gas generation, and cover thickness. A closure/risk management plan was developed to establish long-term risk management and monitoring requirements. Specific works included coordinating with project team and drilling subcontractors and conducted a drilling and soil sampling program across the site. Assisted in the collection of landfill gas sampling from the newly installed landfill gas probes. Conducted data interpretation and assisted in the preparation of a summary report. *(ongoing).*

Environmental Scientist, Phase Three Environmental Site Assessment and Environmental Sampling Program, Defence Construction Canada, CFB Borden, Ontario

Developed and implemented a Phase Three ESA work program at a federal firefighter training school. Upon document review and hydrogeological characterization, the project included

evaluation of the fate and transport mechanisms for metals, hydrocarbons and perfluorinated compounds (PFCs) at the site. Specific works included the coordination of field staff and subcontractors, supervision of drilling activities, and collection of soil, groundwater, surface water, and sediment samples during difficult winter conditions. *2014 (completed).2014 (completed).*

Environmental Scientist, Westport Severance Phase One ESA and Environmental Impact Statement, Rideau Valley Conservation Authority, Ottawa Area, Ontario
Completed a Phase One Environmental Site Assessment and Environmental Impact Statement for a proposed 45.2 ha parcel of land to be severed from the existing Lions Club property. The RVCA is purchasing this land to fulfill goals made by the MNR to support Blunt-lobed woodsia, a species protected under the federal Species at Risk Act (SARA). Specific works included coordinating with project team and conducted an environmental investigation of the natural features within the property. Assisted conducting Phase 1 site visit and background review. Preparation of a Phase 1 ESA summary report and Environmental Impact Statement. *2014 (completed).*

Assisted in interpreting the resulting analytical data and completing a Phase Two ESA summary report*Environmental Scientist, Hawthorne Phase Two Environmental Site Assessment, City of Ottawa, Ontario*
Conducted a Phase Two ESA in accordance with CSA Standard Z769 in order to characterize the potential contamination of the site, from activities such as storage of coal and roofing materials, automotive repair and railway workshops. Included construction of overburden boreholes/monitoring wells and a test pit investigation. The ESA also assessed the potential buried metallic objects previously identified in a geophysical investigation. Specific works included coordinating with project team and subcontractors and conducted soil test pitting and sampling program across site. Interpreted analytical results and assisted in the preparation of a summary report. *2014 (completed).*

Environmental Scientist, Heron Park Phase Two Environmental Site Assessment, City of Ottawa, Ontario
Conducted a Phase Two ESA in accordance with CSA Standard Z769, with the objective of characterizing potential contamination at the site. *2014 (completed).*

Field Technician, CSC Frontenac Institution, Public Works and Government Services Canada, Kingston, Ontario
Completed Phase II and III Environmental Site Assessments of five contaminated sites at the institution. The contamination was determined to be associated with metal impacts from material storage areas, agricultural lands, and petroleum fuel impacts near former fuel storage and maintenance areas. *2012 (completed)*.

HYDROGEOLOGICAL INVESTIGATIONS/SOURCE PROTECTION

Environmental Scientist, Water Well Survey and Pipeline Reinforcement, Enbridge Pipeline Inc., Ottawa, Ontario
Completed a pre- and post-construction assessment at approximately 70 residential properties. Specific works included contacting residents, collecting water samples, completing well surveys and contacting residents with analytical results. Completed data interpretation and prepared summary report. *(ongoing).*

Environmental Scientist, Groundwater Monitoring Program, Kingston Solar LP, Kingston, Ontario

Conducted the pre-construction and post-construction groundwater monitoring program associated with this solar project. Per the conditions of the REA, the groundwater monitoring program is required during both construction and operation of the facility. The program includes finalization of the monitoring program, pre-construction monitoring and post-construction monitoring for the first two years of the facility operation. Specific works included coordinating with project team, client representatives and contacting residents. Collected water samples and completed well surveys. Interpreted groundwater analytical data to produce a summary report and contacted residents with analytical results. *(ongoing).*

Field Technician, 2013 Environmental Consulting Services, Confidential Food Industry Client, Ontario

Conducted groundwater sampling and installed several monitoring wells across the sites in relation to wastewater treatment ponds. Performed data interpretation using trend graphs and piper plots, and summarized results in numerous annual reports. Specific works included coordinating with field staff and conducting the groundwater and sampling program at the site. Interpreted groundwater analytical results and prepared summary reports. *2010-2017 (ongoing).*

Field Technician, Groundwater Investigation Fire Training Facility, Public Works and Government Services Canada, Sault Ste. Marie, Ontario

Completed Phase II/III ESA at the Sault Ste. Marie Airport firefighter training area. Completed report summarizing field methodologies and findings.). Specific works included coordination with project team and drilling subcontractors and completed a drilling program. Collected groundwater samples from the newly installed monitoring wells. Interpreted groundwater analytical data and assisted in the preparation of a Phase 2 ESA summary report. *2014 (completed).*

Environmental Scientist, Rural Infrastructure Management Plan, City of Ottawa, Ontario

Conducted background research for the rural infrastructure master plan which comprises a comprehensive analysis of all the municipalities' 22 rural settlements to determine which specific settlements would be the focus for growth through updated official plan policy. *2013 (completed).*

LANDFILL MONITORING/ASSESSMENT

Environmental Scientist, Trail Road and Nepean Landfill Monitoring Program, City of Ottawa, Ontario

Completed the annual monitoring and operating program at the Trail Road and Nepean landfill sites. The project included field sampling/data collection, lab analysis coordination, data interpretation, report preparation and liaison with the Ontario Ministry of the Environment and other key stakeholders. Specific works included water level and leachate level measurements and collection of groundwater, surface water and leachate samples. Advanced boreholes and installed monitoring wells through landfill material and the surrounding area. Compiled data into a database, interpreted analytical results and assisted in preparing reports. *(ongoing).*

SITE REMEDIATION

Environmental Scientist, Material Sampling Program. Cogeco Connexion Inc, Belleville, Ontario
Assessed and sampled the stained soil identified during the recent building inspection at a Cogeco Connexion (Cogeco) property. Specific works included coordinating with project team, contractors, and client representatives. Coordinated a remedial excavation and collected confirmatory soil samples from the excavation limits. Interpreted analytical data and assisted in preparing a summary report. *(ongoing).*

Environmental Scientist, Spill Response Investigation and Monitoring, Confidential Oil and Gas Client, Ontario
Provided sampling for glycol release response project. Specific works included coordinating with project team, subcontractors, and client representatives for completing initial assessment, potable well and groundwater sampling and reporting. *2015 (completed).*

WATER/WASTEWATER PROJECTS

Environmental Monitoring Assistant, Water Quality Sampling, City of Ottawa, Ontario
Collected water samples from rivers, creeks and streams within the City of Ottawa. Collected runoff water samples from snow disposal areas and stormwater management ponds and calibrated and used testing equipment, such as Dissolved Oxygen meters, Gas level meters, pH meters and Conductivity meters. Collected samples from sanitary and storm sewers and entered sample results into databases. *2010 (completed*).

MAINTENANCE PROJECTS

Maintenance Helper II, Maintenance of HVAC systems, City of Ottawa, Ontario
Assisted in maintaining Ottawa City Hall's HVAC system by changing air filters and cleaning air ducts. Assisted maintenance technicians in preparing for various outside events. Involved in many maintenance projects in and around Ottawa City Hall. *2007 (completed*).

EMPLOYMENT HISTORY

DILLON CONSULTING LIMITED

2011 - Present Biologist, Field Crew Leader

CITY OF OTTAWA

2008 - 2010 Environmental Monitoring Assistant (summer)

2006 - 2007 Maintenance Helper II

PROFESSIONAL DEVELOPMENT

e-Railsafe, June 2017

Standard First Aid, CPR Level C, February 2017

WHMIS Training, March 2017

Confined Space Awareness Training , January 2015

Ontario Stream Assessment Protocol – Headwater and Barrier Attribution Workshop – Rideau Valley Conservation Authority , 2015

Water/Wastewater Operator Certificate – Drinking Wastewater Collection Facility Operator-In-Training – Ministry of the Environment

Water/Wastewater Operator Certificate – Drinking Wastewater Treatment Facility Operator-In-Training – Ministry of the Environment

Certificate of Achievement – Walkerton Clean Water Centre –Entry Level Drinking Water Operator Course

Certificate of Completion – Ontario Wetland Evaluation System – Sir Sandford Fleming College

Jonathan W.A. Harris, ISA Certified Arborist

BIOLOGIST

jharris2@dillon.ca

PERSONAL PROFILE

Jonathan is a field biologist with experience in natural environment management projects and as a skilled field biologist brings a broad level of understanding various environmental disciplines to every project. His area of expertise is in terrestrial ecosystem field studies with a focus on ecological land classification, wildlife surveys, wetland evaluations, species at risk surveys and most recently, invasive plant species control. Jonathan is also a certified arborist, proficient in tree identification and has completed a number of inventories and/or health assessments.

RELEVANT EXPERIENCE

PROJECT MANAGEMENT

Arborist/Project Manager, Arborist Services, University of Toronto Mississauga, Mississauga, Ontario

Providing ongoing arborist services for several campus projects including expansion of buildings. These services maintenance of the campus master tree inventory and development of Arborist Report and Protection Plans, as required. *(ongoing)*

Arborist/Project Manager, Varcon Property Development, Mainline Planning Services Inc., Hamilton, Ontario

Completed arborist services in support of a proposed mixed use medium density residential and commercial development. These services included an inventory of 160 trees within 6 metres of an anticipated construction footprint and development of an Arborist Report and Protection Plan outlining the results and recommendations. *2016 (completed)*

Arborist/Project Manager, Tree Inventory and Arborist Report, Enbridge Gas New Brunswick Inc., Toronto, Ontario

Completed a tree inventory and arborist report for a gas header replacement within Queen's Park, Toronto. On-site arborist services were also provided during excavation of test pits. *2016 (completed).*

EDUCATION

Ontario Advanced Diploma, Fish and Wildlife Technology, Sir Sandford Fleming College, 2009

Ontario Diploma, Fish and Wildlife Technician, Sir Sandford Fleming College, 2008

CERTIFICATIONS

International Society of Arboriculture (Certified Arborist)

AFFILIATIONS/ASSOCIATIONS

Ontario Invasive Plant Council (Member)

Ontario Nature (Member)

Ontario Field Botanists (Member)

Toronto Field Naturalists (Member)

Ontario Field Ornithologists (Member)

Arborist/Project Manager, Tree Inventory and Arborist Report, Enbridge Gas New Brunswick Inc., Toronto, Ontario
Completed a tree inventory and arborist report for a gas header replacement within a community housing complex. *2016 (completed).*

Project Manager, Outline of Services for Little Creek, Canadian Solar Solutions Inc., Napanee, Ontario
Project manager for preconstruction surveys to be completed prior to development of the Little Creek Solar Farm. Activities included nest searches and rare species searches. Project required a major scope change when species at risk (Butternut) were discovered and required additional assessments and registration with the Ministry of Natural Resources. The scope change was dealt with promptly and did not result in any delays to the client's schedule. *2014 (completed).*

ECOLOGICAL LAND CLASSIFICATION

Biologist, Commercial Vehicle Inspection Facilities, GWPs 4045-10-01 and 4046-10-01, Lancaster and Gananoque South, Ministry of Transportation, Ontario
Completed the preliminary design and environmental assessment (EA) for the relocation of two existing truck inspection stations (TIS). The project included development and evaluation of site location alternatives for each TIS, development of a modified CVIF site layout to meet specific regional needs and public and agency consultation. The project was completed as a Group B Class EA and included preparing a preliminary design report and transportation Environmental study report for each site. *(ongoing).*

Biologist, Mega 3, Eastern Region, Ministry of Transportation, Ontario
Completed the preliminary design, environmental assessment and 30% detailed design of 10 structures in eastern Ontario, identified as design-build ready. This project also included the preliminary design, environmental assessment and detailed design of the rehabilitation of 14 structures. The project involved a replacement/rehabilitation approach and traffic staging alternatives. *(ongoing).*

Biologist, Mega EA, Ministry of Transportation, Ontario
Completed the preliminary design and environmental assessment to determine the strategy for the replacement of 10 bridges and two culverts, and improvements of five interchanges on Highways 4, 21 and 401. *(ongoing).*

Biologist/Technical Support, Update of Trail Standards, City of London, Ontario
Undertook an update and revision to the City's guidelines for establishing management zones and trails in environmentally significant areas. Work included extensive consultation with a focus group and a federal and provincial review for conformity of the previous guidelines. Specific works included technical support to senior staff during preparation of the new Guidelines document and during facilitation of the five Trail Focus Group meetings. *2016 (completed).*

Biologist, Mega 2, Ministry of Transportation, Ontario
Completed the inspection and detailed design of the rehabilitation of 33 bridges and 1 culvert on Highways 3, 401, 402, 403 and one culvert replacement on Highway 4. Structure types included slab on steel box girder, slab on steel plate girder, slab on AASHTO/CPCI girder, slab

on trapezoidal girder, reinforced concrete deck slab (rectangular voids), post-tensioned deck slab (round voids) and an open footing culvert. *2014 (completed)*.

Biologist, Beeton Management Plan, Walton Developments and Management, Beeton, Ontario
Prepared environmental overview and land management plans (EOLMPs) for three master plan areas including ~40 properties. The EOLMPs compiled preliminary inventories and an understanding of the natural heritage features on each property such as woodlands, valleys, wetlands, watercourses, etc., as well as to identify the potential areas of opportunity and constraints to development in the future. *2014 (completed).*

Biologist, Gore Road Bridge Replacement, City of London, Ontario
Completed the Municipal Class Environmental Assessment, preliminary design and detailed design for the replacement of the bridge. This included changes to municipal utilities and the extension of the Kiwanis Park Pathway under the bridge. *2014 (completed).*

Biologist, Line 10 Replacement and Decommissioning Project, Enbridge Gas New Brunswick Inc., Westover to Nanticoke, Ontario
Completed an environmental and socio-economic impact assessment for the replacement of a pipeline. The project included permitting and approvals coordination, desktop and field studies of aquatic, soil, air, physical and acoustic characteristics along the pipeline route. Specific works included surveys using the Ecological Land Classification for Southern Ontario to map the various vegetation communities found along the proposed stretch of pipeline replacement. *2014 (completed).*

Biologist, Line 11 Replacement Project, Enbridge Gas New Brunswick Inc., Westover to Nanticoke, Ontario
Completed an environmental and socio-economic impact assessment for the replacement of a pipeline. The project included permitting and approvals coordination, desktop and field studies of aquatic, soil, air, physical and acoustic characteristics along the pipeline route. Specific works included surveys using the Ecological Land Classification for Southern Ontario to map the various vegetation communities found along the proposed stretch of pipeline replacement. *2014 (completed).*

Biologist, Species at Risk Survey, Department of National Defence, Canadian Forces Base Shilo, Manitoba
Completed a survey of 24 possible species at risk in Range Area 9, modelled habitat use by 18 species and completed an internal environmental assessment to plan for digbox training. *2014 (completed).*

Biologist, Gotham Wind Farm, Invenergy Wind Canada ULC, Perth, Ontario
Provided support for the renewable energy approvals for a proposed wind farm comprising 20 wind turbines with a capacity of up to 69 MW. Specific works included completing surveys using the Ecological Land Classification for Southern Ontario to map the various vegetation communities found within the project area. *2013 (completed)*.

Biologist, Wellington North Wind Farm, Renewable Energy Systems Canada Inc., Wellington North, Ontario
Completed a natural heritage risk assessment study for a proposed wind energy development. The study assessed the development risks and probable effects to wildlife species and habitat.

Field studies involved ecological land classification, bat maternity colony surveys, winter raptor surveys, and bird species at risk surveys. *2013 (completed).*

Biologist, Gateway Employment Zone, Walton Development and Management, New Tecumseth, Ontario
Completed a report which documents natural features through background review of secondary sources and field studies to determine potential constraints to development that may exist as a result of the natural environment. Also identify stewardship and enhancement opportunities on three properties. *2013 (completed).*

Biologist, Solar Natural Heritage Assessment, Samsung Renewable Energy Inc., Port Hope, Ontario
Completed natural heritage work and winter raptor surveys for a large solar power project. *2013 (completed).*

Biologist, 1756 St. John's Sideroad Environmental Impact Study, Team Greensborough JV Inc., Aurora, Ontario
Completed an Environmental Impact Study of the natural heritage features within and surrounding a site in Aurora, Ontario as part of an application for employment and residential development. *2013 (completed).*

Biologist, Medway Valley Heritage Forest ESA, City of London, Ontario
Completed surveys using the Ecological Land Classification (ELC) for Southern Ontario to verify whether existing ELC data was accurate and refined where required. *2013 (completed).*

Biologist, Southwest Georgetown Peer Review, Southwest Georgetown Landowners Group, Halton Hills, Ontario
Assessed previously completed natural environmental works on the property. The project has included natural environmental work and field studies, and expert witness at the Ontario Municipal Board for the appeal of the regional official plan update. *2013 (completed).*

Biologist, Watermain Twinning, Lambton Area Water Supply System, Ontario
Completed the twinning of a transmission main and designed grid reinforcement of the existing trunk main in the southern part of Sarnia, to ensure water supply security to all LAWSS users. The project comprised of two 900 mm watermains and one 600 mm watermain for a distance of more than 20 km. *2013 (completed).*

Biologist, Dufferin Wind Farm, Dufferin Wind Power Inc., Melancthon, Ontario
Coordinated the Ontario Renewable Energy Approvals (REA) process a 49 turbine (100 MW) wind farm and assessed two transmission options - a 30 km 69 kV option and a 40 km 230 kV option. The project included a wind resource assessment, turbine siting, nose assessment, transmission routing, natural heritage assessment, visual assessment, public and agency consultation, and aboriginal consultation. *2012 (completed).*

Biologist, Highbury Avenue Interchange, London, Ministry of Transportation, Ontario
Completed the preliminary and detailed design of the improvements to the interchange. Replaced the Highbury Avenue underpass (a three-span cast-in-place voided slab bridge), as well as ramp realignments, staging, illumination, traffic signals and an environmental assessment (TESR Addendum). *2012 (completed).*

Biologist, Land-based Solar PV Farm, Solera Sustainable Energies Company, Tottenham, Ontario
Completed a pre-feasibility assessment for land-based solar photovoltaic development with a 7,845 kW capacity. The project included identifying natural environmental issues in the project area. Specific works included broad level surveys using the Ecological Land Classification for Southern Ontario to map the various vegetation communities found within the property. *2012 (completed)*.

Biologist, East Marsh Dyke Rehabilitation, Essex Region Conservation Authority, Leamington, Ontario
Designed the upgrade and expansion of an earthen dyke and channelization under the Drainage Act. The project included the use of armour stone revetment system to preserve and protect agricultural and residential lands from high lake levels. Extensive terrestrial and aquatic assessments were also conducted including correspondence with regulatory bodies (MNR, DFO, etc.). *2012 (completed).*

Biologist, Pelee Drive Sanitary Sewage System, Municipality of Leamington, Ontario
Conducted the Class Environmental Assessment and provided public consultation, planning and engineering services. The primary objective included the resolution of potential impacts to the environment and the community of aging, failed or substandard septic treatment systems. *2012 (completed).*

Biologist, Red Hill Business Park, City of Hamilton, Ontario
Prepared functional and detailed design of road, sanitary sewers and watermains for Nebo Road, Twenty Road and Glover Road, as well as an intersection improvement at Rymal/Glover. Provided technical support during construction, coordinated utilities and relocation work, subconsultants, geotechnical and approval applications to Ministry of the Environment and Hamilton Conservation Authority. *2012 (completed).*

Biologist, Cherry Beach Shoreline Protection Environmental Assessment, City of Hamilton, Ontario
Completed the shoreline protection infrastructure conceptual design and municipal Class Environmental Assessment. Signs of high erosion rates were observed at the site and included a very steep bank with no vegetation established on the bank. One of the proposed options for reducing the erosion included a groyne on the west side of the beach's shoreline. *2012 (completed).*

Biologist, Maple Lakes Estates, Metrus Properties Limited, Georgina, Ontario
Completed an environmental impact study of the natural heritage features within and surrounding the site as part of an application for residential development. The project included an edge management plan. *2011 (completed)*.

Biologist, Laurier Parkway, Detailed Design, Town of LaSalle, Ontario
Completed the detailed design and construction of 6 km of a two-lane arterial road, extending from Malden Road to Howard Avenue. The project included dedicated auxiliary lanes at major intersections, a roundabout at Mike Raymond Drive, a 2.5 m wide asphalt trail, storm drainage via roadside swales and storm sewers, watermains, streetlighting and signalized intersections. *2011 (completed).*

Biologist, Greater Toronto Area Reinforcement Project, Enbridge Gas New Brunswick Inc., Ontario

Completed aquatic assessments for the reinforcement of an existing natural gas distribution network in the Greater Toronto Area. Recommendations for watercourse crossing methodology were provided in a report along with general findings and recommended mitigation measures. Specific works included surveys surveys using the Ecological Land Classification for Southern Ontario to map the various vegetation communities found along a proposed stretch of right-of-way within Mississauga and Toronto. *2011 (completed).*

RENEWABLE ENERGY

Biologist, Environmental Management Compliance Programs, Ontario

Collected field data for over 20 comprehensive environmental compliance programs from project initiation through to commercial operation for solar and wind projects. Clients include Canadian Solar Solutions Inc., Dufferin Wind Energy, TransCanada Energy, and Invenergy Canada. *(ongoing).*

Biologist, Solar Farm Facilities, SkyPower Limited and Canadian Solar Solutions Inc., Southern Ontario

Completed amphibian surveys, species at risk surveys (Bobolink/Eastern Meadowlark) and Monarch butterfly surveys for several solar farm projects as part of the REA process throughout Southern Ontario. *(ongoing).*

Biologist, Dufferin Wind Farm, Dufferin Wind Power Inc., Melancthon, Ontario

Coordinated the Ontario Renewable Energy Approvals (REA) process for a 49 turbine (99.1 MW) wind farm and assessed two transmission options - a 30 km 69 kV option and a 40 km 230 kV option. The project included a wind resource assessment, turbine siting, noise assessment, transmission routing, natural heritage assessment, visual assessment, public and agency consultation, and Indigenous consultation. *2015 (completed).*

Biologist, Alfred Solar Energy Park REA, Canadian Solar Solutions Inc., Township of Alfred, and Plantagenet, Ontario

Conducted REA work for the 10 MW AC solar energy park project. Included: constraints analysis and project description report; consultation activities; technical study reports; natural heritage assessment studies; MNR approvals and permitting requirements document; water assessment report; water body report; species at risk; project management and coordination. *Specific works included c*omplet*ing* the reporting for the Natural Heritage Assessment as part of the REA for *the* proposed solar energy development. *2014 (completed).*

Biologist, Southgate Solar Farm, Samsung Renewable Energy Inc., Southgate, Ontario

Completed a natural heritage risk assessment study for a proposed solar energy development. The study assessed the development risks and probable effects to wildlife species and habitat. Field studies involved ecological land classification, bat maternity colony surveys, species at risk surveys (Bobolink/Eastern Meadowlark), and wildlife surveys to assess candidate significant wildlife habitat. *2014 (completed).*

Biologist, NHA Amendment, Kingston Solar LP, Kingston, Ontario

Provided a natural heritage assessment amendment for the solar PV energy project. The project included consultation with the Ministry of Natural Resources, field work to identify new natural heritage features, and an amendment report. *Specific works included f*ield studies

which involved confirmation of wetland boundaries, species at risk surveys (Eastern Whip-poor-will), pre-construction wildlife surveys to confirm significance of candidate wildlife habitat. *2013 (completed).*

Biologist, Wellington North Wind Farm, Renewable Energy Systems Canada Inc., Wellington North, Ontario
Completed a natural heritage risk assessment study for a proposed wind energy development. The study assessed the development risks and probable effects to wildlife species and habitat. Field studies involved ecological land classification, bat maternity colony surveys, winter raptor surveys, and species at risk surveys (Bobolink/Eastern Meadowlark). *2013 (completed).*

Biologist, Solar Natural Heritage Assessment, Samsung Renewable Energy Inc., Port Hope, Ontario
Completed a natural heritage risk assessment study for a proposed solar energy development. The study assessed the development risks and probable effects to wildlife species and habitat. Field studies involved ecological land classification and winter raptor surveys. *2013 (completed).*

Biologist, Dufferin Wind Farm, Dufferin Wind Power Inc., Melancthon, Ontario
Completed a natural heritage risk assessment study for a proposed wind energy development. The study assessed the development risks and probable effects to wildlife species and habitat. Field studies involved ecological land classification, wetland delineation/evaluation, and amphibian/marsh breeding bird surveys. *2012 (completed).*

Biologist, Conestogo Wind Energy Centre, Invenergy Solar Canada ULC, Perth, Ontario
Completed a natural heritage risk assessment study for a proposed wind energy development. The study assessed the development risks and probable effects to wildlife species and habitat. Field studies involved ecological land classification, wetland delineation/evaluation, and amphibian/marsh breeding bird surveys. *2012 (completed).*

Biologist, McLean's Mountain Wind Farm, Northland Power Inc., Manitoulin Island, Ontario
Completed the assessment of a 10 km 115 kV line to connect the 60 MW MMWF to the provincial grid. This facility requires a marine cable crossing section of the north channel. Permitting work for this facility is ongoing including the MNR work permit, Navigable Water Protection Act clearance and federal Fisheries Act clearance. *2009 (completed).*

WETLAND DELINEATION/EVALUATION

Biologist/Wetland Evaluator, South Cameron Planning Area, South Windsor Development, Ontario
Provided consulting assistance for the provincially significant wetland in the area. Specific works included completing a re-evaluation of an 82 ha provincially designated wetland complex located in Windsor. *(ongoing).*

Biologist, Jackson Trails Environmental Impact Study, Minto Communities Inc. Kanata, Ontario
Completed an Environmental Impact Statement and Tree Conservation Study for a development in Stittsville. The study was completed as part of an application for residential development. The project included Species at Risk surveys and permitting, mitigation development, a restoration plan, and agency consultation. Specific works included designating the boundaries of wetland communities within the study area following the Ontario Wetland Evaluation System protocols. *(ongoing).*

Biologist/Wetland Evaluator, Goulbourn Wetland Complex, City of Ottawa, Ontario
Completed a re-evaluation of a large provincially designated wetland complex which included GIS wetland mapping, field data collection (SAR data/photos), peer review, public consultation, and a summary report to the City and MNRF. *2016 (completed).*

Biologist/Wetland Evaluator, Roseland Estates, City of Windsor, Ontario
Prepared applications for Draft Plan of Subdivision Approval, Zoning By-Law Amendment and Official Plan Amendment to permit the development of a 30 ha property as detached, semi-detached and townhome units in conjunction with commercial-retail uses. Specific works included completing an evaluation of the provincially designated wetland complex located in Windsor. *2015 (completed).*

Biologist, Harper Road Landfill, City of Peterborough, Ontario
Completed the assessment and development of a long-term mitigation plan for the former landfill. Environmental issues addressed included off-site migration of polychlorinated biphenyls in surface water and sediments, off-site chlorinated solvent groundwater plume, waste of unknown composition and quality, undefined landfill area and sensitive land use within the area. *2014 (completed).*

Biologist, Proposed Community Centre, City of Markham, Ontario
Completed an environmental impact study for a proposed community centre at Middlefield Road and 14th Avenue to support a development application for the property. Specific works included designating the boundaries of a wetland within the study area following the Ontario Wetland Evaluation System protocols. *2013 (completed).*

Biologist, Natural Heritage Assessment Amendment, Kingston Solar LP, Kingston, Ontario
Provided a natural heritage assessment amendment for the solar PV energy project. The project included consultation with the Ministry of Natural Resources, field work to identify new natural heritage features, and an amendment report. Specific works included confirming the boundaries of wetland communities within the study area following the Ontario Wetland Evaluation System protocols and completing a peer review of an Ontario Wetland Evaluation System evaluation for one wetland. *2013 (completed).*

Biologist/Wetland Evaluator, Dufferin Wind Farm, Dufferin Wind Power Inc., Melancthon, Ontario
Completed a natural heritage risk assessment study for a proposed wind energy development. The study assessed the development risks and probable effects to wildlife species and habitat. Field studies involved ecological land classification, wetland delineation/evaluation, and amphibian/marsh breeding bird surveys. *2012 (completed).*

Biologist, Maple Lakes Estates, Metrus Properties Limited, Georgina, Ontario
Completed an environmental impact study of the natural heritage features within and surrounding the site as part of an application for residential development. The project included an edge management plan. *2011 (completed)*.

TREE INVENTORIES/HEALTH ASSESSMENTS

Biologist, Capital Works Projects, City of Hamilton, Ontario
Completed an inventory of public and private trees within the City of Hamilton municipal boundary. The inventory involves identification of the common name, botanical name,

diameter (cm) and the condition of trees within the area of influence of municipal capital works projects. *2015 (completed).*

Biologist, Jasper Drive and Bland Avenue, City of Hamilton, Ontario
Design of drainage and stormwater improvements consisting of new driveway culvert ditch works, new outfall, new connection to existing sewer and sealing of sanitary manholes in Stoney Creek. Prepared permit application to Hamilton Conservation Authority and Ministry of the Environment. *2014 (completed).*

Biologist, Robb Avenue Storm Outfall, City of Hamilton, Ontario
Designed a new naturalized storm sewer outfall channel discharging to Battlefield Creek in Stoney Creek, including step pools, tree inventory, re-vegetation strategy, retaining walls and application of permits for construction. *2014 (completed).*

Biologist, Waterfront Development Engineering, City of Hamilton, Ontario
Completed a high-level analysis of issues, opportunities and constraints for West Harbour Piers 5 to 8 lands, to develop a series of potential development options and complete a preliminary servicing review. This project also included data and plan management associated with this review*. 2013 (completed).*

Biologist, McGregor Environmental Impact Study, Bazil Developments Inc., Newmarket, Ontario
Completed an Environmental Impact Study of the natural heritage features within and surrounding a site in Newmarket as part of an application for residential development. Also, as part of this project we are involved with Showcasing Water Innovation to illustrate how greener and more sustainable communities may be fast-tracked through approvals process. *2013 (completed).*

Biologist, Nebo Road Sanitary Sewer/Watermain Upgrades, City of Hamilton, Ontario
Completed detailed design of road and sanitary sewer, from Twenty Road to ~600 m southerly, as well as new watermain from Twenty Road to ~960 m southerly, including street light design, utility coordination, pavement marking drawings and contract documents. Assignment included a tree inventory and tree management plan. Coordinated approvals from Ministry of the Environment and Hamilton Conservation Authority*. 2012 (completed).*

Biologist, Port Credit Harbour West Parks, City of Mississauga, Ontario
Prepared the Municipal Class Environmental Assessment (EA) for the infrastructure needs at the waterfront. The EA included detailed technical assessments of the shoreline, servicing infrastructure and natural heritage features ahead of implementation of the parks renewal projects. The project also included revised master plan drawings that incorporate opportunities and constraints identified in the EA. *2012 (completed).*

Biologist, Dartnall Road Extension, City of Hamilton, Ontario
Provided project management and engineering design to widen the existing two-lane Dartnall Road to four to five lanes and also extend the road beyond Red Hill business park. Street lighting and watermain design were included in the design. This multi-phased project included the realignment of the Hannon Creek to facilitate the extension of the road. Contract administration and construction field services were provided for the construction phase of the creek realignment. *2012 (completed)*

Biologist, Mountain Park Bridge Environmental Assessment, City of Hamilton, Ontario
Prepared the Schedule B Class Environmental Assessment to replace Mountain Park Avenue. The bridge was classified as having moderate heritage potential. *2012 (completed).*

Biologist, Reinforcement Pipeline Environmental Assessment, Enbridge Gas New Brunswick Inc., Alliston, Ontario
Completed a route selection and environmental/cumulative effects assessment for a new pipeline preferred route identifying associated environmental/socio-economic. The proposed project included a total of 9 km of NPS 8 extra-high-pressure pipeline originating from Enbridge's Cookstown Gate Station and terminating at Highway 89/Sideroad 10, New Tecumseh. The project was designed to Class 4 standards, suitable for densely populated urban environments with a maximum operating pressure of 3,450 kPa. Specific works included completing a tree inventory and health assessment for trees along the project footprint; tagging and measuring diameter-at-breast-height; and drafting an arborist report outlining the results and a tree management plan. *2011 (completed).*

Biologist, Ottawa Reinforcement Pipeline, Enbridge Gas New Brunswick Inc., Ottawa, Ontario
Completed a pre- and post-construction assessment and survey of the pipeline. This also included groundwater well and water quality assessments. *2011 (completed).*

Biologist, Environmental Evaluation, Furfari Paving Company Limited, Toronto, Ontario
Completed an environmental evaluation for an agricultural property at Tapscott Road and Passmore Avenue for proposed development of a 1914 m^2 with associated parking and stormwater management facilities. The evaluation included a headwater features and tree assessments. Specific works included a tree inventory and health assessment; tagging and measuring diameter-at-breast-height; and an arborist report outlining the results and a tree management plan. *2011 (completed).*

Biologist, Sanatorium Road Sanitary Sewer Upgrades, City of Hamilton, Ontario
Completed a Class Environmental Assessment, Phases 1 - 4, for Sanatorium Road and stormwater improvements, as well as a flood and erosion control impact study associated with the Class EA for the preferred stormwater management alternative. Completed preliminary road design of the EA preferred road alternative, watermain design, functional design, sanitary servicing strategy, street lighting and underground infrastructure design, prepared tender documents, technical support during construction. *2009 (completed).*

WILDLIFE SURVEYS

Biologist, Solar Farms, Canadian Solar Solutions Inc. and SkyPower Global, Ontario
Prepared REAs for over 60 solar farms in Ontario. Background research and detailed reports were completed for the planning, construction and decommissioning of the farms. Environmental impacts were assessed including natural environment, wildlife, water bodies. Environmental site assessments and socio-economic impacts were identified, with future mitigation and monitoring measures. Stakeholder and public consultation was provided throughout each project. Specific works included amphibian monitoring surveys; Bobolink/Eastern Meadowlark surveys; targeted surveys for Barn Swallow nests in structures to be removed from project locations; surveys along hedgerows and forest edges for the presence/absence of Butternut and surveys of Milkweed plants to assess the abundance of Monarch Butterfly. *2014 (completed).*

Biologist, McGregor Environmental Impact Study, Bazil Developments Inc., Newmarket, Ontario
Completed an Environmental Impact Study of the natural heritage features within and surrounding a site in Newmarket as part of an application for residential development. Also, as part of this project we are involved with Showcasing Water Innovation to illustrate how greener and more sustainable communities may be fast-tracked through approvals process. *2013 (completed).*

Biologist, Mountain Park Bridge Environmental Assessment, City of Hamilton, Ontario
Prepared the Schedule B Class Environmental Assessment to replace Mountain Park Avenue. The bridge was classified as having moderate heritage potential. *2012 (completed).*

Biologist, Sault Ste. Marie Annual Program, City of Sault Ste. Marie, Ontario
Undertook the Sault Ste. Marie Municipal Landfill Work Programs for several years, providing assistance with groundwater, surface water and leachate monitoring programs. The phases included sampling coordination and lab analysis, biological testing, environmental monitoring, committee resource and 2008 NPRI & O. Reg. 127 Report for Landfill. *2011 (completed).*

Biologist, Bush Street and Mississauga Road Class Environmental Assessment, Regional Municipality of Peel, Ontario
Completed the Class EA for Bush Street and Mississauga Road improvements near Belfountain. The project included natural heritage, water resources and archaeology components. *2010 (completed).*

Biologist, McLean's Mountain Wind Farm, Northland Power Inc., Manitoulin Island, Ontario
Completed the assessment of a 10 km 115 kV line to connect the 60 MW MMWF to the provincial grid. This facility requires a marine cable crossing section of the north channel. Permitting work for this facility is ongoing including the MNR work permit, Navigable Water Protection Act clearance and federal Fisheries Act clearance. *2009 (completed).*

Biologist, Environmental Impact Study, Private Developer, London, Ontario
Completed an EIS as part of a development application adjacent to fish habitat, significant woodland and significant wetland. *2008 (completed).*

FIELD SCREENING

Environmental Inspector, Operations, Enbridge Pipelines Inc., Oshawa, Ontario
Environmental inspector for casing extension along Line 9. Documented whether contractor was in compliance with the environmental clearance and landowner agreements. Provided recommendations to the contractor and Enbridge inspectors to address any environmental issues. *2016 (completed).*

Lead Environmental Screener, Integrity Dig Program, Enbridge Pipelines Inc., Ontario
Completed environmental inspections and reporting for integrity dig sites across southern Ontario. Specific works included documenting existing conditions at each dig location and definiung where work spaces, access route, were to be placed during construction. *2015 (ongoing).*

Biologist, Governor's Road Canadian National Railway Overhead, City of Hamilton, Ontario
Completed the detailed design of this three-span bridge rehabilitation. The bridge spans two railway tracks. The project included traffic staging, local site drainage and improved embankment slope protection. It also recommended concrete patching repairs, replacement of

waterproofing and paving, replacement of expansion joints, and replacement of bridge barriers. *2012 (completed).*

SPECIES AT RISK SURVEYS

Biologist, Mega 1, Ministry of Transportation, Ontario
Completed the inspection and detailed design for the rehabilitation of 16 bridges and one culvert along Highways 401 and 402. Structure types included structural steel box girders and prestressed concrete girders. Rehabilitation included repairs to the deck, deck soffit, piers, pier caps and barrier walls. *2011 (completed)*

Biologist, County Road 22 Reconstruction, Phase 5, County of Essex, Ontario
Completed the detailed design of the reconstruction of County Road 22 from Old Tecumseh Road to County Road 25 and several intersection designs and the twinning of the existing bridge over the Puce River. The project structural, municipal, environmental and transportation design. *2011 (completed).*

ENVIRONMENTAL MONITORING

Environmental Inspector, Construction Work Plan, Enbridge Pipelines Inc., Colborne, Ontario
Provided environmental monitoring and observation during construction and reclamation of the excavation dig site to assist with compliance with environmental permits' constraints and recommendations. Specific works included documenting compliance with the environmental clearance and landowner agreements; providing recommendations for addressing environmental issues. *2014 (completed).*

Biologist, Highland Sanitary Trunk Sewer, City of London, Ontario
Completed a multidisciplinary project which included the assessment of hydrogeological, groundwater and ecological conditions of a proposed trunk sewer alignment adjacent to a provincially significant wetland and other important wildlife habitat features and functions. Using baseline condition information, impacts were defined, mitigation recommended and restoration plans developed. Specific works included monitoring health of vegetation planted along a wetland buffer and monitoring sample plots within a Buttonbush swamp for any impacts caused by construction activities. *2013 (completed).*

Biologist, Rt. Hon. Herb Gray Parkway, Species at Risk Field Monitoring, Windsor Essex Mobility Group, Ontario
Provided environmental monitoring and oversight of botanical species at risk (SAR) transplants for this new six-land below-grade freeway. In addition to botanical SAR, target and salvage of Bulter's Gartersnake and Eastern Foxsnake was completed. Specific works included transplanting and participating in the target and salvage of the Butler's Garter Snake. *2011 (completed).*

EMPLOYMENT HISTORY

DILLON CONSULTING LIMITED

2011 - Present Field Biologist

UNIVERSITY OF CHICAGO

2010 Songbird Research Assistant

DUCKS UNLIMITED CANADA

2009 Muskrat/Wetland Research Technician

NORTHERN TILAPIA INC.

2008 - 2009 Fisheries Technician

FLEMING COLLEGE ATLANTIC SALMON HATCHERY

2007 - 2008 Hatchery Assistant

PROFESSIONAL DEVELOPMENT

Ontario Amphibian and Reptile Survey and Handling Course, Scales Nature Centre. 2016
MNR Data Sensitivity Training, December 2013
Ecological Land Classification Training, September 2011
Ontario Wetland Evaluation System Certification, June 2012
WHMIS, 2011
Standard First Aid, CPR and AED training 2013
Wilderness First Aid, 2012
Radio and Ultrasonic Telemetry, 2008
Pleasure Craft Operator Card, 2004

VOLUNTEER ACTIVITIES

Marsh Monitoring Program, Bird Studies Canada, 2014-Present
Christmas Bird Count (Kleinberg), Bird Studies Canada, 2013-Present
Weekend Explorers Program, Rouge Valley Conservation Centre, 2013-Present
Christmas Bird Count (Pickering), Bird Studies Canada, 2011-Present
Rouge Park Road Ecology Monitoring, Toronto Zoo, 2011

Appendix C

Headwater Drainage Features Assessment

DILLON CONSULTING

RIVERSIDE SOUTH DEVELOPMENT CORPORATION

Headwater Drainage Features Assessment Report

Phase 15B

November 2017

October 2017 – 14-9916

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Figures

Tables

Appendices

1.0 Purpose

Dillon Consulting Limited (Dillon) was retained by Riverside South Development Corporation (RSDC) to undertake a Headwater Drainage Feature (HDF) Assessment at the proposed RSDC Phase 15B Development located on one contiguous parcel of land with frontage on both Spratt Road and River Road, in the City of Ottawa, Ontario (the "Study Area") (Figure 1). This report was prepared to support the development application by RSDC and supplements the required Environmental Impact Study (EIS).

1.1 Scope

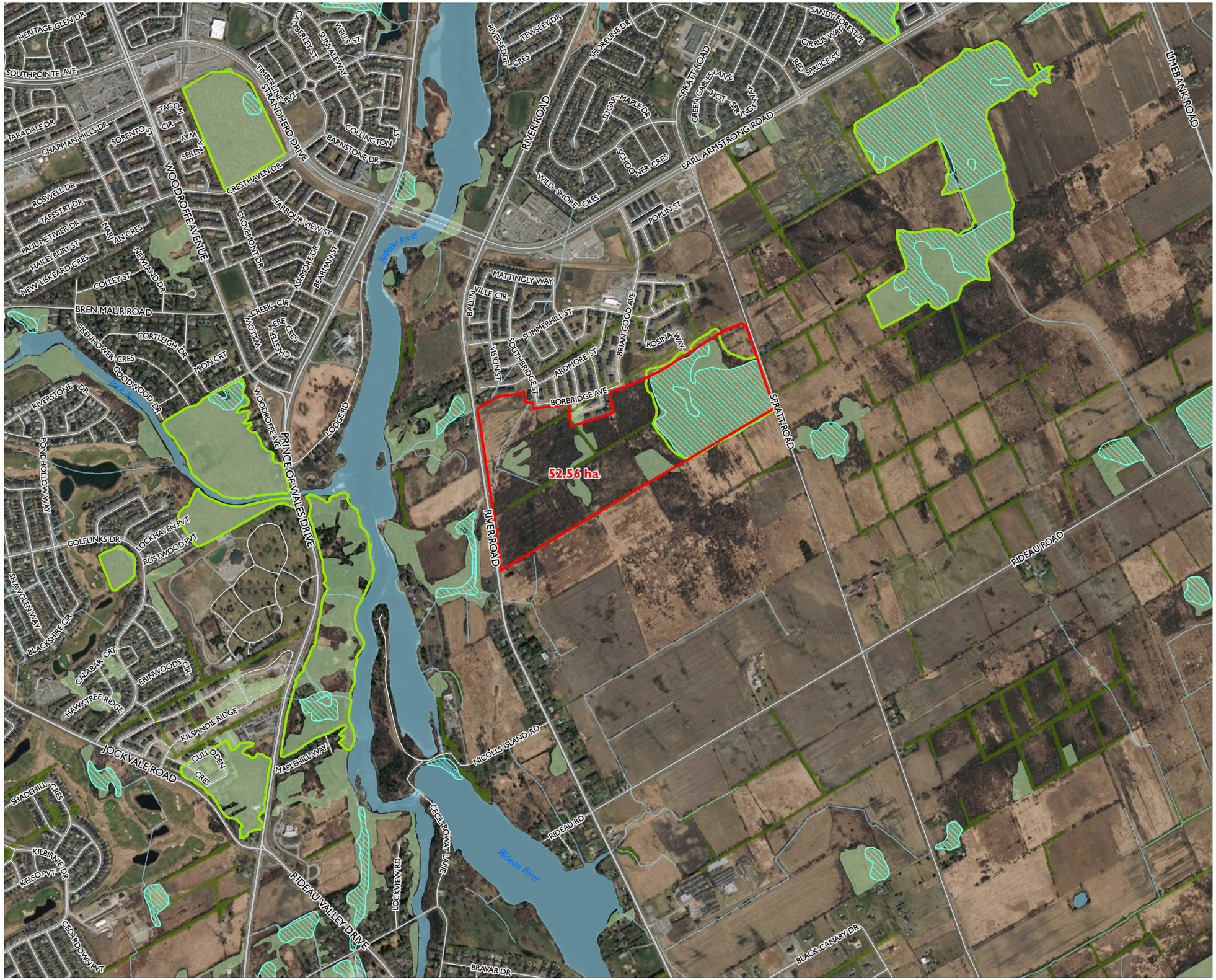
This report evaluates and classifies potential on-site HDF's following the *Evaluation, Classification, and Management of Headwater Drainage Features Guidelines* developed by the Toronto Region Conservation Authority (TRCA) and Credit Valley Conservation (CVC) in 2014, hereafter referred to as the "Guidance Document". This Guidance Document is provided in *Appendix A*. These guidelines were adopted in spring 2015 by the Rideau Valley Conservation Authority (RVCA) for application to projects within RVCA jurisdiction. The evaluation also recommends a number of post-development management strategies which are consistent with the Guidance Document for each of the classified HDF's.

1.2 General Description of Site

The Study Area is located in the City of Ottawa, Ontario at 4650 Spratt Road. It is legally described as Part Lot 22 and 23 Concession 1, in the City of Ottawa. The area is comprised of agricultural (row crop) with large woodlands and areas of meadow and scrubland.

1.3 Development Concept

The City of Ottawa has designated this land as Development Reserve Zone (DR) and Environmental Protection Zone (EP) in the Official Plan (OP). RSDC is proposing to develop this site for residential use featuring single family homes and residential townhomes.



RIVERSIDE SOUTH DEVELOPMENT CORPORATION

PHASE 15B
PART OF 4650 SPRATT ROAD
AND 750 RIVER ROAD

FIGURE 1
STUDY AREA

- Study Area Boundary
- City of Ottawa Natural Heritage Area
- Unevaluated Wetland
- Water Body
- Woodland
- Hedgerow

1:15,000

0 100 200 400 m

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: LK
MAP CHECKED BY: AZ
MAP PROJECTION: NAD 1983 UTM Zone 18N

DILLON CONSULTING

PROJECT: 149916
STATUS: DRAFT
DATE: 2017-10-26

FILE LOCATION: \\dillon.ca\DILLON_DFS\Ottawa\Ottawa CAD\CAD\2014\149916\FROM TORONTO SERVER\mxd\Headwaters Report\2017_B\Figure 1 Study Area.mxd

2.0 Methodology

This Study Area was reviewed using a combination of desktop methods and field studies to confirm potential HDF's to help determine potential impacts resulting from future development activities. The HDF Assessment was conducted using the methods outlined in the Guidance Document. Dillon biologists who completed the HDF assessment component of the field work received training by a Conservation Authority, prior to the start of field studies.

2.1 Secondary Source Background Review

Background information was examined to help determine what features are present and where sampling should occur. Documents were also reviewed for fisheries information and other information relating to this catchment area relevant to the HDF Assessment.

Background resources searched are provided in *Appendix B* and included the following:

- Ministry of Natural Resources and Forestry (MNRF)
  - Land Information Ontario (LIO)
- City of Ottawa
  - Google Earth layers
  - Official Plan mapping (GeoOttawa)
- Rideau Valley Conservation Authority (RVCA)
  - *Lower Rideau Subwatershed Report* (2012)
    - *Rideau River-Hogs Back Catchment*
- Niblett Environmental Associates Inc. (NEA)
  - *Riverside South Community Design Plan Fisheries Compensation Plan (2007)*
- Fisheries and Oceans Canada
  - Aquatic Species at Risk Mapping
- ArcGIS
- Google Earth satellite/ aerial photo interpretation

Based on this information, sample locations were determined and are presented in Figure 2.

RIVERSIDE SOUTH DEVELOPMENT CORPORATION

PHASE 15B
PART OF 4650 SPRATT ROAD
AND 750 RIVER ROAD

FIGURE 2
SAMPLING LOCATIONS

- Property Boundary
- Headwater Stream
- Intermittent Headwater Stream

1:4,000

0 20 40 80 120 m

N
W E
S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: LK
MAP CHECKED BY: AZ
MAP PROJECTION: NAD 1983 UTM Zone 18N

DILLON CONSULTING

PROJECT: 149916
STATUS: DRAFT
DATE: 2017-10-26

FILE LOCATION: \\dillon.ca\DILLON_DFS\Ottawa\Ottawa CAD\CAD\2014\149916\FROM TORONTO SERVER\mxd\Headwaters Report\2017_B\Figure 2 Sampling Locations.mxd

2.2 Field Sampling

The assessment was conducted following the 'Standard Methods' as defined by the Guidance Document. This included various site visits throughout the spring and summer of 2015 as detailed in Table 1. Ecological Land Classification (ELC) was also completed by Dillon in 2014. Survey dates and weather conditions for each site visit are listed in Table 1.

TABLE 1: SITE VISIT DATES AND WEATHER CONDITIONS

DATE (2015)	TIME	PERSONNEL	WEATHER CONDITIONS	AIR TEMP (ºC)*	PURPOSE
APRIL 29	08:00	W. MOORE K. MCLEAN	SUNNY, CLEAR	12.8	HDF SITE VISIT #1 A
APRIL 30	08:00	W. MOORE K. MCLEAN	SUNNY, CLEAR	12.3	HDF SITE VISIT #1 B
MAY 7	20:45	K. ROBINSON	MOSTLY CLEAR	18.3	AMPHIBIAN SURVEY #1
MAY 27	21:00	K. ROBINSON	MOSTLY CLEAR WITH LIGHT CLOUD COVER	23.1	AMPHIBIAN SURVEY #2
JUNE 24	21:30	K. ROBINSON W. MOORE	MOSTLY CLEAR WITH LIGHT CLOUD COVER	18.8	AMPHIBIAN SURVEY #3
JULY 3	14:00	W. MOORE B. GOTTFRIED	SUNNY	16.9	ELECTROFISHING
JULY 29	09:00	W. MOORE K. ROBINSON	SUNNY, HOT	27.1	HDF SITE VISIT #2

*Mean daily temperatures as reported from Ottawa Macdonald-Cartier International Airport (Environment Canada)

The first headwaters site visits occurred between April 29th and April 30th of 2015, and the second headwaters site visits occurred on 29th of 2015. Three amphibian surveys were also conducted following the Marsh Monitoring Protocol. No precipitation occurred on any of the survey dates.

The sites were accessed by foot to inventory and assess any watercourses present within the property boundaries during the first site visits. The purpose of the second site visits was to confirm features surveyed during the first assessments and evaluate if surface flow was present in order to determine the hydroperiod. Field data was collected regarding the flow, channel form, aquatic habitat, and vegetation of potential HDFs within the Study Area.

These assessments were completed within defined channel segments, based on modifiers within the reach (i.e., culverts, changes in flow type or vegetation). Photos of each HDF segment are included in *Appendix C.*

2.3 Classification

Using the information collected in the Evaluation phase (both desktop and field observations) the following attributes of the HDFs were classified:

1. Hydrology
2. Riparian Habitat
3. Fish and Fish Habitat
4. Terrestrial Habitat

3.0 Evaluation

The following sections detail the results of the background review and site assessments for the Study Area.

3.1 Secondary Sources

General Conditions

The Study Area lies within the Lower Rideau Subwatershed (see *Appendix B*), which is part of the larger Rideau River Watershed. There are six catchment areas that form the Lower Rideau Subwatershed and the Study Area lies within the Rideau River-Hogs Back catchment area. The site drains directly into the Rideau River.

The Rideau River-Hogs Back catchment drains an area of 38 km^2 which makes up 4.9% of the Lower Rideau Subwatershed and 0.9% of the Rideau Valley Watershed (RVCA). A summary of information from the *Lower Rideau Subwatershed Report* (RVCA 2012) is included below:

- *The catchment contains many tributaries, including Nepean, Hunt Club, Black Rapids, Barrhaven, Mosquito and Mud Creeks, as well as the Jock River;*
- *This reach is under shoreline development pressure and is intensively used for boating;*
- *Dominant land cover is settlement (44%), followed by crop and pastureland (23%), woodland (13%), transportation (11%), water (6%), grassland (2%) and wetland (1%);*
- *Contains a warm/cool water recreational and baitfish fishery with 40 fish species;*
- *Riparian buffer is comprised of woodland (33%), settlement (30%), crop and pastureland (29%), transportation (6%), wetland (2%) and grassland (1%);*
- *Water quality rating along the Rideau River is fair at the Strandherd Bridge, directly north of the Study Area; and,*
- *Woodland cover has increased by 2.4% over a 6 year period.*

Fisheries Resources

As mentioned above, the overall characterization of the Rideau River-Hogs Back catchment in the subwatershed study is cool/warm water recreational and baitfish fishery with over 40 species observed. These species are listed in Table 2.

TABLE 2: FISH SPECIES RECORDED WITHIN THE RIDEAU RIVER-HOGS BACK CATCHMENT

SCIENTIFIC NAME	COMMON NAME	SRANK[1]	SARA[2]	ESA[3]
FUNDULUS DIAPHANUS	BANDED KILLIFISH	S5	---	---
POMOXIS NIGROMACULATUS	BLACK CRAPPIE	S4	---	---
NOTROPIS HETERODON	BLACKCHIN SHINER	S4	---	---
NOTROPIS HETEROLEPIS	BLACKNOSE SHINER	S5	---	---

SCIENTIFIC NAME	COMMON NAME	SRANK[1]	SARA[2]	ESA[3]
LEPOMIS MACROCHIRUS	BLUEGILL	S5	---	---
PIMEPHALES NOTATUS	BLUNTNOSE MINNOW	S5	---	---
LABIDESTHES SICCULUS	BROOK SILVERSIDE	S4	---	---
CULAEA INCONSTANS	BROOK STICKLEBACK	S5	---	---
AMEIURUS NEBULOSUS	BROWN BULLHEAD	S5	---	---
UMBRA LIMI	CENTRAL MUDMINNOW	S5	---	---
ICTALURUS PUNCTATUS	CHANNEL CATFISH	S4	---	---
CYPRINUS CARPIO	COMMON CARP	SNA	---	---
LUXILUS CORNUTUS	COMMON SHINER	S5	---	---
HYBOGNATHUS REGIUS	EASTERN SILVERY MINNOW	S2	---	---
NOTROPIS ATHERINOIDES	EMERALD SHINER	S5	---	---
SEMOTILUS CORPORALIS	FALLFISH	S4	---	---
NOTEMIGONUS CRYSOLEUCAS	GOLDEN SHINER	S5	---	---
ETHEOSTOMA NIGRUM	JOHNNY DARTER	S5	---	---
MICROPTERUS SALMOIDES	LARGEMOUTH BASS	S5	---	---
PERCINA CAPRODES	LOGPERCH	S5	---	---
NOTROPIS VOLUCELLUS	MIMIC SHINER	S5	---	---
COTTUS BAIRDI	MOTTLED SCULPIN	S5	---	---
ESOX MASQUINONGY	MUSKELLUNGE	S4	---	---
ESOX LUCIUS	NORTHERN PIKE	S5	---	---
LEPOMIS GIBBOSUS	PUMPKINSEED	S5	---	---
AMBLOPLITES RUPESTRIS	ROCK BASS	S5	---	---
MOXOSTOMA MACROLEPIDOTUM	SHORTHEAD REDHORSE SUCKER	S5	---	---
MOXOSTOMA ANISURUM	SILVER REDHORSE SUCKER	S4	---	---
MICROPTERUS DOLOMIEU	SMALLMOUTH BASS	S5	---	---
NOTROPIS HUDSONIUS	SPOTTAIL SHINER	S5	---	---
NOTURUS GYRINUS	TADPOLE MADTOM	S4	---	---
ETHEOSTOMA OLMSTEDI	TESSELLATED DARTER	S4	---	---
ESOX MASQUINONGY X ESOX LUCIUS	TIGER MUSKELLUNGE	---	---	---
SANDER VITREUS VITREUS	WALLEYE	S5	---	---
CATOSTOMUS COMMERSONI	WHITE SUCKER	S5	---	---
AMEIURUS NATALIS	YELLOW BULLHEAD	S4	---	---
PERCA FLAVESCENS	YELLOW PERCH	S5	---	---

[1] Provincial (Subnational) Rank; [2]Federal *Species at Risk Act*; [3]Ontario *Endangered Species Act* (2007).

The *Lower Rideau Subwatershed Report* (2012) classifies the Rideau River as fair on the water quality scale within this section of the river. This suggests this reach of the river as well as its tributaries may provide suitable habitat for a wide variety of fish species. No aquatic Species at Risk (fish or mussels) have been identified within the Rideau River-Hogs Back catchment in the *Lower Rideau Subwatershed Report* (2012), although three Species of Conservation Concern

were identified to potential occur in the area during a cross-reference NHIC database exercise; Greater Redhorse (S3), Northern Brook Lamprey (S3) and River Redhorse. (S2). No Species at Risk were identified within the Rideau River-Hogs Back catchment or in the general vicinity of the Study Area from available DFO mapping.

Previous Studies

NEA conducted a study of the tributaries in Riverside South as part of the Riverside South Community Design Plan Fisheries Compensation Plan (2007). The results of the study indicated that tributaries that were to be 'filled' or left in a 'natural state'. Based on this, and correspondence from the RVCA (Jennifer Lamoureux personal communication, June 18, 2016), any tributaries within Riverside South mapped as "filled" can be assessed as either "Mitigation" or "No Management Required". Other tributaries shown as being left in a natural state can be assessed based on the results of the HDF assessment.

3.2 Field Observations

Several tributaries to the Rideau River are present within the Study Area. Note that tributaries were assessed in segments based on modifiers within the channels but have been grouped for evaluation purposes. Photo documentation taken during surveys has been included in *Appendix C*.

The naming of the tributaries is consistent with nomenclature used in mapping created by Niblett Environmental Associates Inc. (NEA) in 2007, and used in the *Riverside South Community Design Plan Fisheries Compensation Plan* (NEA 2010). For those that were not included in NEA mapping, tributary names were created to follow a similar format, or to make them distinguishable from other tributaries within Riverside South.

3.2.1 Study Area Tributaries

Tributary S5-R2

Tributary S5-R2 is located within the northwest corner of the Study Area and flows in a westerly direction through an area of wet meadow towards a culvert at River Road. The tributary flows through old agricultural ditches which have naturalized over time and are now overgrown with meadow grasses. The feature has no defined channel at the far upstream end and comprises pooled water within meadow and scrubland area. There is also evidence of disturbance and tire rutting within the channel due to recreational uses. Within this site, there is an abundance of trails used for walking and all-terrain vehicles. There is tire rutting and debris within Tributary S5-R2 where trails cross the channel, and empty gas cans were observed within the tributary and meadow area. There was also a gasoline odour and visible sheen on top of the water within the tributary. Due to recent development to the north of the site, upstream portions of this tributary are no longer functioning and are dry.

During the first site visit, the tributary was observed conveying water through the wet meadow area toward a roadside ditch at River Road and ultimately toward a culvert just south of the tributary. During subsequent site visits this tributary was completely dry and overgrown with meadow grasses and cattails, and therefore no electrofishing was completed.

Tributary S5-A

Tributary S5-A originates within the western portion of the Study Area, and appears to be a channelized feature created to convey flows from historic agricultural fields (see historical photos in Section 2.0 of the *EIS Report*), and now conveys flows from within the wet woodland area. It appears as though this area was once a low-lying area of meadow within the property which was channelized and used for site drainage. This tributary does not connect to Tributary S5-R2/1a or any other features upstream.

During the site visit this tributary had flows similar to that of Tributary S5-R2, conveying flows through the wet meadow area towards a culvert at River Road (where it meets Tributary S5-R2). No electrofishing was completed as this tributary was completely dry and overgrown with meadow grasses during subsequent site visits.

Tributary S5-R2/1

Tributary S5-R2/1 travels down the center of the Study Area within a ditch alongside an old laneway. Water flows north and west through the tributary conveying water from spring thaw within the Study Area. There is a culvert located at RIDE008, where water flows both north through the culvert, and west toward River Road.

During the first site visit it was discovered that parallel furrows were present throughout the woodlands surrounding Tributary S5-R2/1. This suggests that this site was once used for agriculture but was likely too wet and was left to naturalize. This is further evidenced by rows of old apple trees present within the south central portion of the Study Area. A review of historic aerial photos confirms this determination as photos from 1976 show most of the site in active agriculture (refer to Section 2.0 of the *EIS Report*).

Tributary S5-R2/1a

Tributary S5-R2/1a is the main branch of the tributary flowing west toward a culvert at River Road. The channel is located within an old fencerow and contains both culverts and disturbance where recreational trails cross the watercourse.

During the first site visit the upstream segments of the tributary (RIDE011, RIDE012) contained substantial flow entering the site from a meadow south of the Study Area. The downstream segments of the tributary had minimal flow and a channel was difficult to detect at the far

downstream end where the culvert is located. During subsequent site visits, this tributary was damp but contained no water, and therefore no electrofishing was completed. The upstream segments were dry but likely convey water during heavy rain events as evidenced by the damp substrates and lack of vegetative growth within the channel. The downstream segments were dry and grown in with scrub species.

Tributary S5-R2/1b

Tributary S5-R2/1b flows north through the culvert at RIDE008 and outlets at the northern boundary of the Study Area. There is on-going development in this area, and at the time of the first site visit that area had been graded, leaving a slight drop along the northern Study Area boundary (see Photos 44-46 in *Appendix C*). At this time water was observed flowing over the edge of the cut in to the new development area and draining into a newly installed stormwater drain. There was substantial flow into this area, from both Tributary S5-R2/1b and from other furrows carrying water from spring thaw into the cut.

During the electrofishing survey on July 3rd, the development to the north was excavated further leaving a straight cut approximately 4 feet in depth along the northern Study Area boundary. Channels were evident where water had been flowing off the edge of the cut and into the stormwater drain. During the second site visit Tributary S5-R2/1b was dry and very difficult to detect. Further, the tributary no longer had an outlet as silt fencing was installed along the boundary of the Study Area preventing water from entering the construction area.

Tributary S5-R2/2

Tributary S5-R2/2 originates within old fencerows in the northeast portion of the Study Area. There is no upstream connection to Tributary S5-R2/2 and flows are present during spring thaw only. At the northern boundary of the Study Area flows enter a meadow and terminate in stagnant pools within the meadow area. A review of historic aerial photos (see Section 2.0 of the *EIS Report*) suggests that this tributary used to connect with other agricultural ditches in the area, flowing north and west towards the Rideau River. Recent development north of the site has removed these watercourses and connections to the Study Area.

During the first site visit this tributary was observed conveying minimal flow north into the adjacent property. During subsequent site visits this tributary was dry and virtually undetectable due to vegetative growth within the Study Area, and therefore no electrofishing was completed.

Results of the HDF Assessment within the Study Area are detailed in Table 3.

TABLE 3: DETAILS OF SITE ASSESSMENT FOR STUDY AREA

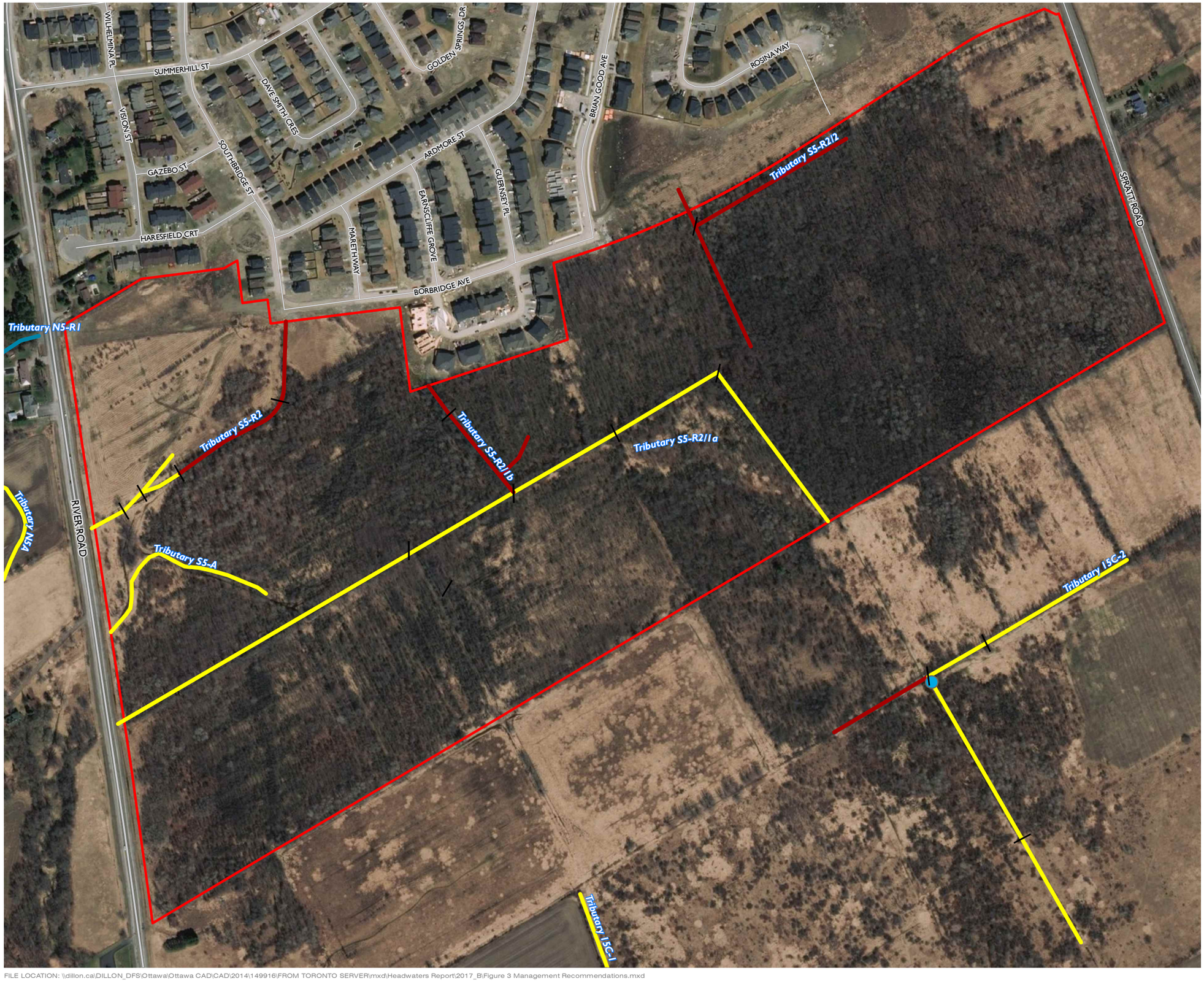
DRAINAGE FEATURE	SITE VISIT	DATE OF FIELD WORK	FLOW ASSESSMENT	VEGETATION ASSESSMENT		CHANNEL FORM			SEDIMENT TRANSPORT			COMMENTS	PHOTO REFERENCES
			FLOW INFLUENCE (FI) / CONDITION (FC)/ TYPE (FT)	RIPARIAN	TERRESTRIAL	AVERAGE WETTED WIDTH (m)	AVERAGE DEPTH (m)	AVERAGE BANKFULL WIDTH (m)	SUBSTRATES	SEDIMENT TRANS.	SEDIMENT DEP.		
TRIBUTARY S5-R2													
RIDE001	1	29-Apr-15	Flow observed FI: Baseflow (3) FC: Min. Flow (4) FT: Channelized (2)	Meadow (4)	Meadow (4)	1.2	0.17	1.8	Si, Sa	None	Minimal	- Nutrient Input – Floating algae observed on water surface - Dead/decaying plant material also observed within channel - Downstream flows into roadside ditch and culvert crossing River Road	1, 3
	2	30-Jul-15	No flow observed during 2nd site assessment.									- Grown in with meadow grasses and some cattails	2, 4
RIDE002	1	29-Apr-15	Flow observed FI: Base flow (3) FC: Min. Flow (4) FT: Channelized (2)	Meadow (4)	Meadow (4)	1.50	0.25	1.84	Si, Sa	Instream Bank Erosion	Substantial	- Sheen on water and empty gas cans found in stream and in adjacent meadow - Strong gas smell - Gray Treefrogs heard during amphibian breeding surveys in woodland adjacent	5, 7
	2	30-Jul-15	No flow observed during 2nd site assessment.									N/A	6
RIDE003	1	29-Apr-15	Flow observed FI: Base flow (3) FC: Standing Water (2) FT: No Defined Feat. (4)	Scrubland (5)	Meadow (4)	0.47	0.05	0.55	Si, Sa	None	Moderate	- No defined features observed at upstream end (wet meadow) - Pooling water observed within scrubland area with dense vegetation growing within feature	8, 10
	2	30-Jul-15	No flow observed during 2nd site assessment.									N/A	9, 11
RIDE004	1	29-Apr-15	Flow observed FI: Base flow (3) FC: Standing Water (2) FT: Channelized (2)	Meadow (4)	Meadow (4)	0.70	0.06	0.85	Si, Sa	Instream bank erosion	Moderate	- Very little flow, channel consists of a rill between RIDE005 and RIDE002	12, 13
	2	30-Jul-15	No flow observed during 2nd site assessment.									N/A	Not available
RIDE005	1	29-Apr-15	Flow observed FI: Base flow (3) FC: Standing Water (2) FT: Channelized (2)	Forest (6)	Forest (6)	1.15	0.06	1.58	Si, Sa	Instream bank erosion	Moderate	- Channel disturbed where trail crosses (tire rutting) causing back up of water in that area - Palette in channel for crossing Channel dry with moist soils - Leaf litter and overhanging logs and branches observed - Sections of stagnant water smelled of gas	Not available
	2	30-Jul-15	No flow observed during 2nd site assessment.									- Channel dry, palette and tire rutting still present	14, 15
TRIBUTARY S5A													
RIDE006	1	29-Apr-15	Flow observed FI: Base flow (3) FC: Standing Water (2) FT: Channelized (2)	Forest (6)	Forest (6)	1.15	0.06	1.58	Si, Sa	Instream bank erosion	Moderate	- Generally the same measurements and characteristics as RIDE002 (decided to split into separate segment)	Not available
	2	30-Jul-15	No flow observed during 2nd site assessment.									N/A	Not available
TRIBUTARY S5-R2/1a													
RIDE007	1	29-Apr-15	Flow observed FI: Base flow (3) FC: Min. Flow (4) FT: Channelized (2)	Forest (6)	Forest (6)	1.72	0.10	2.22	Si	Instream Bank Erosion	Moderate	- Upstream segment breaks at culvert - Downstream flows into two separate channels- a main channel flowing northwest towards the culvert at River Road (shown in background water layers), and the fencerow straight towards river road. Where the spilt is the channel is disturbed as trails cross the channel in this location. - Little flow was found flowing within the fencerow west of the split. This area is a very wet scrubby forest with no distinctive channels. Water in this area is draining west toward River Road. Where the tributary approaches river River Road the channel is less defined and flows through a wet meadow area and ultimately into the culvert crossing River Road.	16, 18
	2	30-Jul-15	No flow observed during 2nd site assessment.									- Recreational path was very muddy with wet pockets. And crosses the fencerow at the spilt. - May be using the northwest flowing channel for ATV's as well as the pathway continues in that direction. - The fencerow was dry and vegetated past the split.	17, 19

DRAINAGE FEATURE	SITE VISIT	DATE OF FIELD WORK	FLOW ASSESSMENT	VEGETATION ASSESSMENT		CHANNEL FORM			SEDIMENT TRANSPORT			COMMENTS	PHOTO REFERENCES
			FLOW INFLUENCE (FI) / CONDITION (FC)/ TYPE (FT)	RIPARIAN	TERRESTRIAL	AVERAGE WETTED WIDTH (m)	AVERAGE DEPTH (m)	AVERAGE BANKFULL WIDTH (m)	SUBSTRATES	SEDIMENT TRANS.	SEDIMENT DEP.		
RIDE008	1	29-Apr-15	Flow observed FI: Base flow (3) FC: Min. Flow (4) FT: Channelized (2)	Forest (6)	Forest (6)	0.92	0.11	1.10	Si, Sa	None	Minimal	- Decrease in flow moving downstream towards culvert and becomes stagnant and algae observed throughout - Sheen on water surface	20, 22
	2	30-Jul-15	No flow observed during 2nd site assessment.									N/A	21, 23, 24
RIDE011	1	29-Apr-15	Flow observed FI: Base flow (3) FC: Sub. Flow (5) FT: Channelized (2)	Forest (6)	Forest (6)	1.75	0.12	2.27	Cl, Si	None	Moderate	- Similar characteristics of RIDE011	27, 28
	2	30-Jul-15	No flow observed during 2nd site assessment.									N/A	Not available
RIDE012	1	29-Apr-15	Flow observed FI: Base flow (3) FC: Sub. Flow (5) FT: Channelized (2)	Forest (6)	Forest (6)	1.75	0.12	2.27	Cl, Si	None	Moderate	- Upstream channel flowing from adjacent property to the south. Adjacent property is composed of low-lying wet meadows and scrubland - Algae observed within channel	29, 30, 32, 34
	2	30-Jul-15	No flow observed during 2nd site assessment.									N/A	31, 33
TRIBUTARY S5-R2/1b													
RIDE009a	1	29-Apr-15	Flow observed FI: Base flow (3) FC: Subs. Flow (5) FT: Channelized (2)	Forest (6)	Forest (6)	1.26	0.04	1.48	Si	Instream Bank Erosion	Minimal	- Leaf litter observed throughout channel - Conveys water into RIDE008 from eastern portions of the woodland	39, 40
	2	30-Jul-15	No flow observed during 2nd site assessment.									N/A	Not available
RIDE009	1	30-Apr-15	Flow observed FI: Base flow (3) FC: Min. Flow (4) FT: Channelized (2)	Forest (6)	Forest (6)	1.05	0.19	1.15	Cl, Si	Instream bank erosion	Moderate	- Upstream is concrete culvert that connects to RIDE006/RIDE007 segments	35, 38
	2	30-Jul-15	No flow observed during 2nd site assessment.									- This channel was searched for during the second assessment and not detected due to heavy vegetative growth within the laneway (trees, shrubs)	36, 37
RIDE0010	1	29-Apr-15	Flow observed FI: Base flow (3) FC: Min. Flow (4) FT: Channelized (2)	Forest (6)	Forest (6)	N/A	N/A	N/A	N/A	None	N/A	- Wet forested area- no channel detected during the first site visit - Multiple rows/ pockets of water within the forest flowing to the north	41, 43, 44, 45, 46
	2	30-Jul-15	No flow observed during 2nd site assessment.									- Channel identified during the second site assessment (old agricultural ditch similar to that of channels upstream)	42
TRIBUTARY S5-R2/2													
RIDE013	1	30-Apr-15	Flow observed FI: Base flow (3) FC: Standing Water (2) FT: Channelized (2)	Forest (6)	Forest (6)	1.88	0.12	2.10	Si, Sa	None	Minimal	- Flooded grassy area along property boundary with vernal pools along boundary	47, 48
	2	30-Jul-15	No flow observed during 2nd site assessment.									N/A	Not available
RIDE014	1	30-Apr-15	Flow observed FI: Base flow (3) FC: Subs. Flow (5) FT: Channelized (2)	Forest (6)	Forest (6)	1.21	0.08	1.43	Si, Sa	None	Minimal	- Channel flows north of property into wet meadow within adjacent property and then slows and pools further west	49, 50
	2	30-Jul-15	No flow observed during 2nd site assessment.									N/A	51

*Clay= Cl, Silt= Si, Sand= Sa; **Minimal= <5mm, Moderate= 5-30 mm, Substantial= 31-80 mm, Extensive= >80 mm

4.0 Classification

The condition of the tributaries is described above in Section 3.2. Based on the observations made during site visits, the features have been classified and subsequently management recommendations have been made for each branch according to the Guidance Document, as well as the previous study completed by NEA (2007) and personal communication with the RVCA (June 2016). The management recommendations listed on the following pages are depicted on Figure 3.



RIVERSIDE SOUTH DEVELOPMENT CORPORATION

PHASE 15B
PART OF 4650 SPRATT ROAD
AND 750 RIVER ROAD

FIGURE 3
MANAGEMENT RECOMMENDATIONS

- Study Area Boundary
- Vernal Pool

Management Recommendation

- No Management Required
- Mitigation
- Not Assessed - Outside of Staked Property Boundary

1:4,000

0 20 40 80 120 m

N
W E
S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: LK
MAP CHECKED BY: AZ
MAP PROJECTION: NAD 1983 UTM Zone 18N

DILLON CONSULTING

PROJECT: 149916
STATUS: DRAFT
DATE: 2017-10-26

FILE LOCATION: \\dillon.ca\DILLON_DFS\Ottawa\Ottawa CAD\CAD\2014\149916\FROM TORONTO SERVER\mxd\Headwaters Report\2017_B\Figure 3 Management Recommendations.mxd

The tributaries within the Study Area have been classified and management recommendations have been proposed (Table 4).

Tributary S5-R2:

Contributing Function (Mitigation) (RIDE001, RIDE002)

The first two segments of this tributary (RIDE001, RIDE002) have been classified as having Contributing Function with a management recommendation of Mitigation as this downstream portion of the tributary collects flows from within the northwestern portion of the Study Area during spring thaw and heavy rain events. The feature was dry during the second assessment and does not contain valued fish habitat. Further, Gray Tree frogs were heard near this area during amphibian breeding surveys, but no significant amphibian breeding habitat exists within the site.

Limited Functions (No Management Required) (RIDE003, RIDE004, RIDE005)

This upstream section of Tributary S5-R2 has been disturbed by recent development to the north removing the most upstream connections and by trails though the channels creating barriers to flowing water. This section was dry with some standing water during the first site visit, and contains no fish or amphibian habitat. Due to the lack of contribution to the downstream segments, this section has been classified as having Limited Function with a recommendation of No Management Required.

Tributary S5A: Contributing Function (Mitigation)

Tributary S5A has been classified as having Contributing Function with a management recommendation of Mitigation as this tributary coveys flow from wet meadow and forest area within land west of the Study Area, towards a culvert at River Road, where it meets with Tributary S5-R2. A review of historic aerial photos suggests that this tributary was once a low-lying area of meadow (swale) through was used to be agricultural fields; but is now a dug channel with no connection upstream. There is no important fish habitat, and no amphibians were heard calling here during amphibian breeding surveys. Further, there are no important riparian or terrestrial functions.

Tributary S5-R2/1a: Contributing Function (Mitigation)

Following the Guidance Document, Tributary S5-R2/1a would have been classified as having Valued Function with a management recommendation of Conservation as the tributary conveys flows from south of The Study Area, and from wet forest within The Study Area, west towards a culvert crossing River Road. The feature was dry during July site visits and barriers exist along the channel (trail crossings, culverts). There is no important fish habitat present, but the tributary does have important riparian functions as it is surrounded by forest. However, based on results of previous studies (NEA 2007) and communication with the RVCA, this tributary has be classified as having Contributing Function with a management

recommendation of Mitigation, as it was not shown in NEA mapping and connecting tributaries were planned to be “filled”.

Tributary S5-R2/1b: Limited Functions (No Management Required)
Tributary S5-R2/1b has been classified as having Limited Function with a management recommendation of No Management Required as this branch of the tributary no longer contributes to downstream fish or terrestrial habitat. Recent development north of The Study Area has severed the tributary and directed all flows into a stormwater drain. The area has been re-graded with a slight berm along the northern border of the Study Area and silt fencing has been installed which is preventing water from entering the new development. Therefore, water flowing north within this tributary now either disperses throughout the woodland, or percolates into the ground. Due to the lack of a defined channel within the downstream reach and the removal of a downstream connection for this tributary, there is no important fish habitat or terrestrial functions present.

Tributary S5-R2/2: Limited Functions (No Management Required)
Tributary S5-R2/2 has been classified as having Limited Function with a management recommendation of No Management Required as this tributary has no connections upstream or downstream. Water flowing north enters a meadow within a development area, where is pools and remains. There is no fish or amphibian habitat within this tributary and no terrestrial functions.

TABLE 4: CLASSIFICATION TABLE FOR THE STUDY AREA

Feature and Segment	STEP 1		STEP 2	STEP 3	STEP 4	Results per Segment	Management Recommendation Based on Guidance Document	Overall Management Recommendation Based on NEA, 2007
	Hydrology	Modifiers	Riparian	Fish Habitat	Terrestrial Habitat			
TRIBUTARY S5-R2								
RIDE001	Contributing Function: Ephemeral	Tire rutting in channel, garbage (gas cans)	Valued: Meadow/ Scrubland	Contributing Function: Mainly for transport of allochthonous materials to downstream fish bearing reaches	Limited Function: No terrestrial habitat present	Mitigation: Contributing Functions	MITIGATION	MITIGATION
RIDE002	Contributing Function: Ephemeral	Tire rutting in channel, garbage (gas cans)	Valued: Meadow/ Scrubland	Contributing Function: Mainly for transport of allochthonous materials to downstream fish bearing reaches	Limited Function: No terrestrial habitat present	Mitigation: Contributing Functions		
RIDE003	Recharge Function: Standing Water	N/A	Valued: Meadow/ Scrubland	Contributing Function: Mainly for transport of allochthonous materials to downstream fish bearing reaches	Limited Function: No terrestrial habitat present	No Management Required: Limited Functions Wet Meadow - altered by disturbance to the north	NO MANAGEMENT REQUIRED (features disturbed and segments no longer functioning properly)	NO MANAGEMENT REQUIRED (features disturbed and segments no longer functioning properly)
RIDE004	Recharge Function: Standing Water	N/A	Valued: Meadow/ Scrubland	Contributing Function: Mainly for transport of allochthonous materials to downstream fish bearing reaches	Limited Function: No terrestrial habitat present	No Management Required: Limited Functions Dry fencerow- altered by disturbance to the north and trails within		
RIDE005	Recharge Function: Standing Water	Recent development to the north	Valued: Scrubland	Contributing Function: Mainly for transport of allochthonous materials to downstream fish	Limited Function: No terrestrial habitat present	No Management Required: Limited Functions		

Feature and Segment	STEP 1		STEP 2	STEP 3	STEP 4	Results per Segment	Management Recommendation Based on Guidance Document	Overall Management Recommendation Based on NEA, 2007
	Hydrology	Modifiers	Riparian	Fish Habitat	Terrestrial Habitat			
TRIBUTARY S5-R2								
				bearing reaches		Dry fencerow-altered by disturbance to the north		
TRIBUTARY S5A								
RIDE006	Contributing Function: Ephemeral	Tire rutting in channel, garbage (gas cans)	Valued: Meadow/ Scrubland	Contributing Function: Mainly for transport of allochthonous materials to downstream fish bearing reaches	Limited Function: No terrestrial habitat present	Mitigation: Contributing Functions	MITGATION	MITGATION
TRIBUTARY S5-R2/1a								
RIDE007	Contributing Function: Ephemeral	Culvert	Important: Forest	Contributing Function: Mainly for transport of allochthonous materials to downstream fish bearing reaches	Contributing Functions: Movement corridors	Conservation: Valued Functions	CONSERVATION	MITIGATION
RIDE008	Contributing Function: Ephemeral	Culvert	Important: Forest	Contributing Function: Mainly for transport of allochthonous materials to downstream fish bearing reaches	Contributing Functions: Movement corridors	Conservation: Valued Functions		
RIDE011	Contributing Function: Ephemeral	Culvert	Important: Forest	Contributing Function: Mainly for transport of allochthonous materials to downstream fish bearing reaches	Contributing Functions: Movement corridors	Conservation: Valued Functions		
RIDE012	Contributing Function: Ephemeral	Culvert	Important: Forest	Contributing Function: Mainly for transport of allochthonous materials to downstream fish bearing reaches	Contributing Functions: Movement corridors	Conservation: Valued Functions		

Feature and Segment	STEP 1		STEP 2	STEP 3	STEP 4	Results per Segment	Management Recommendation Based on Guidance Document	Overall Management Recommendation Based on NEA, 2007
	Hydrology	Modifiers	Riparian	Fish Habitat	Terrestrial Habitat			
TRIBUTARY S5-R2								
TRIBUTARY S5-R2/1b								
RIDE009	Contributing Function: Ephemeral	N/A	Important: Forest	Limited Function: No transport to downstream reaches (stormwater drain)	Limited Functions: No connection to downstream habitat	Mitigation: Contributing Functions	NO MANAGEMENT REQUIRED (functions removed- drains into stormwater drain)	NO MANAGEMENT REQUIRED (functions removed- drains into stormwater drain)
RIDE0010	Contributing Function: Ephemeral	N/A	Important: Forest	Limited Function: No transport to downstream reaches (stormwater drain)	Limited Functions: No connection to downstream habitat, severed channel with new residential development	Mitigation: Contributing Functions		
TRIBUTARY S5-R2/2								
RIDE013	Recharge Function: Standing Water	Excavation and stormwater drain downstream	Important: Forest	Contributing Function: Mainly for transport of allochthonous materials to downstream fish bearing reaches	Limited No connection to downstream habitat	Mitigation: Contributing Functions	NO MANAGEMENT REQUIRED (no connection downstream- drains into meadow in construction zone)	NO MANAGEMENT REQUIRED (no connection downstream- drains into meadow in construction zone)
RIDE014	Contributing Function: Ephemeral	Culvert	Important: Forest	Contributing Function: Mainly for transport of allochthonous materials to downstream fish bearing reaches	Limited Functions: No connection to downstream habitat	Mitigation: Contributing Functions		

5.0 Management Recommendations

In accordance with the Guidance Document, the following management recommendations are available for HDFs:

Mitigation (Contributing Functions)

The Guidance Document lists the following recommended management options for HDF's with Contributing Functions:

- *Replicate or enhance functions through enhanced lot level conveyance measures, such as well-vegetated swales to mimic online wet vegetation pockets, or replicate through constructed wetland features connected downstream;*
- *Replicate on-site flow and outlet flows at the top end of system to maintain feature functions with vegetated swales, etc.*
- *If catchment area has been previously removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls;*
- *Replicate functions by lot level conveyance measures connected to the natural heritage system, as feasible and / or Low Impact Development stormwater options.*

Tributary S5-R2 (downstream); S5A; S5-R2/1a

Tributaries with Contributing Functions within The Study Area were created as channelized ditches when the site was used for agricultural purposes. Since that time, the site has naturalized and these features function to convey flows from spring freshet and heavy rain events downstream toward the Rideau River. The stormwater management design for this site will replicate the conveyance features within the site. These features do not contain important fish or terrestrial functions.

Tributary S5-R2 (upstream); S5-R2/1b; S5-R2/2

No management is required for these features as they no longer function properly due to development activities to the north of the site. These features have been severed and no longer have connections downstream and contained standing water during the first site visit.

6.0 Next Steps

As a result of the HDF Assessment completed at the property located on 4650 Spratt Road management recommendations were determined based on classification of HDFs within the Study Area. The results are detailed in Table 3 and Table 4, and Figure 3. In order to facilitate development of this property, a plan must be produced detailing how these features will be managed for review by the RVCA.

This plan will be developed collectively by biologists and project engineers (stormwater designer, etc.) and will be submitted to the RVCA for confirmation at a later phase. In addition, review by Fisheries and Oceans Canada may be required for future channel modifications, as per the Federal Fisheries Act.

Appendix A
Site Photos

TRIBUTARY PHOTOS OF THE STUDY AREA	
TRIBUTARY S5-R2	
Photo 1 April 29, 2015 Notes: Site Visit #1 RIDE001 Upstream looking east	
Photo 2 July 30, 2015 Notes: Site Visit #2 RIDE001 Upstream looking east (dry)	

Photo 3 April 29, 2015 Notes: Site Visit #1 RIDE001 Downstream looking west (at River Road)	
Photo 4 July 30, 2015 Notes: Site Visit #2 RIDE001 Downstream looking west (dry)	

Photo 5 April 29, 2015 Notes: Site Visit #1 RIDE002 Upstream looking east	
Photo 6 July 30, 2015 Notes: Site Visit #2 RIDE002 (dry)	

Photo 7 April 29, 2015 Notes: Site Visit #1 RIDE002 Downstream looking west	
Photo 8 April 29, 2015 Notes: Site Visit #1 RIDE003 Upstream looking northeast	

Photo 9 July 30, 2015 Notes: Site Visit #2 RIDE003 Upstream looking northeast (dry)	
Photo 10 April 29, 2015 Notes: Site Visit #1 RIDE003 Downstream looking west	

Photo 11 July 30, 2015 Notes: Site Visit #2 RIDE003 Downstream looking west (dry)	
Photo 12 April 29, 2015 Notes: Site Visit #1 RIDE004 Upstream looking east (no flow)	

Photo 13 April 29, 2015 Notes: Site Visit #1 RIDE004 Downstream looking west toward corner of RIDE002 and RIDE003	
Photo 14 June 30, 2015 Notes: Site Visit #2 RIDE005 Looking south where trail crosses (dry)	

Photo 15 June 30, 2015 Notes: Site Visit #2 RIDE005 Upstream looking east (dry)	
TRIBUTARY S5-R2/1a	
Photo 16 April 29, 2015 Notes: Site Visit #1 RIDE007 Upstream looking east	

Photo 17 July 30, 2015 Notes: Site Visit #2 RIDE007 Upstream looking east (dry)	
Photo 18 April 29, 2015 Notes: Site Visit #1 RIDE007 Downstream looking west	

Photo 19 July 30, 2015 Notes: Site Visit #2 RIDE007 Downstream looking west (dry)	
Photo 20 April 29, 2015 Notes: Site Visit #1 RIDE008 Upstream at culvert looking east	

Photo 21 July 30, 2015 Notes: Site Visit #2 RIDE008 Upstream at culvert looking east (dry)	
Photo 22 April 29, 2015 Notes: Site Visit #1 Culvert conveying flow from wet areas to the south into RIDE008 downstream (looking north).	

Photo 23 July 30, 2015 Notes: Site Visit #2 RIDE008 Upstream looking east (dry)	
Photo 24 July 30, 2015 Notes: Site Visit #2 RIDE008 Downstream looking west (dry)	

Photo 25 April 29, 2015 Notes: Site Visit #1 Wetland area south of RIDE007/008 draining into tributary, looking south	
Photo 26 July 30, 2015 Notes: Site Visit #2 Wetland area south of RIDE007/008 draining into tributary, looking south (dry)	

Photo 27 April 29, 2015 Notes: Site Visit #1 RIDE011 Downstream	
Photo 28 April 29, 2015 Notes: Site Visit #1 RIDE011 Upstream looking east	

Photo 29 April 29, 2015 Notes: Site Visit #1 RIDE012 Downstream looking west	
Photo 30 April 29, 2015 Notes: Site Visit #1 RIDE012 Upstream looking south at property boundary	

Photo 31 July 30, 2015 Notes: Site Visit #2 RIDE012 Downstream looking north from property boundary (dry)	
Photo 32 April 29, 2015 Notes: Site Visit #1 RIDE012 Upstream looking south	

Photo 33 July 30, 2015 Notes: Site Visit #2 RIDE012 Upstream looking south (dry)	
Photo 34 April 29, 2015 Notes: Site Visit #1 RIDE012 Downstream	

TRIBUTARY S5-R2/1b	
Photo 35 April 29, 2015 Notes: Site Visit #1 RIDE009 Upstream looking south	
Photo 36 July 30, 2015 Notes: Site Visit #2 RIDE009 Upstream looking south (dry)	

Photo 37 July 30, 2015 Notes: Site Visit #2 RIDE009 Downstream-South side of culvert looking north (dry)	
Photo 38 April 29, 2015 Notes: Site Visit #1 RIDE009 Downstream looking north at culvert	

Photo 39 April 30, 2015 Notes: Site Visit #1 RIDE009a Downstream flowing into RIDE009 from the east	
Photo 40 April 30, 2015 Notes: Site Visit #1 RIDE009a Downstream flowing into RIDE009 from the east	

Photo 41 April 30, 2015 Notes: Site Visit #1 RIDE010 Upstream-wet forest area	
Photo 42 July 30, 2015 Notes: Site Visit #2 RIDE010 Downstream towards adjacent excavated property (dry)	

Photo 43 April 30, 2015 Notes: Site Visit #1 RIDE010 Upstream-wet forest area	
Photo 44 April 30, 2015 Notes: Site Visit #1 Study Area boundary looking south at RIDE010 flowing into development area to the north.	

Photo 45 April 30, 2015 Notes: Site Visit #1 Study Area boundary looking south at RIDE010 flowing into development area to the north.	
Photo 46 April 30, 2015 Notes: Site Visit #1 Flows from Tributary S5-R2/1b (RIDE010) flowing into stormwater drain north of the Study Area boundary.	

TRIBUTARY S5-R2/2	
Photo 47 April 30, 2015 Notes: Site Visit #1 RIDE013 Upstream looking east	
Photo 48 April 30, 2015 Notes: Site Visit #1 RIDE013 Downstream at culvert, looking west	

Photo 49 April 30, 2015 Notes: Site Visit #1 RIDE014 Downstream looking north	
Photo 50 April 29, 2015 Notes: Site Visit #1 RIDE014 Downstream at adjacent property looking north	

Photo 51 July 30, 2015 Notes: Site Visit #2 RIDE014 Downstream at adjacent property looking west (dry)	
Photo C26 April 22, 2015 Notes: Site Visit #1 SPR009 Downstream looking west	

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Lower Rideau Subwatershed Report. Rideau Valley Conservation Authority, 2012.

Appendix D

Site Photos

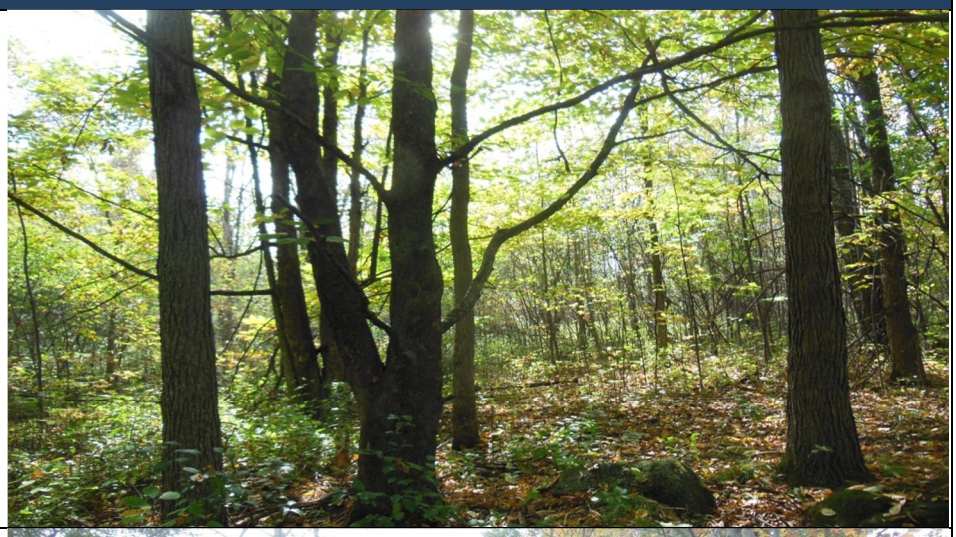
Study Area	
Photo 1 September 29, 2014 Notes: Fresh-Dry Upland Deciduous Forest (FODM4)	
Photo 2 September 29, 2014 Notes: Fresh-Moist Green Ash-Hardwood Lowland Deciduous Forest (FODM7-2)	
Photo 3 September 30, 2014 Notes: Fresh-Moist Poplar Deciduous Forest (FODM8-1)	

Photo 4 September 29, 2014 Notes: Fresh-Moist Graminoid Meadow (MEGM4)	
Photo 5 September 29, 2014 Notes: Fresh-Dry Mixed Meadow (MEMM3)	
Photo 6 April 29, 2015 Notes: Green Ash Mineral Deciduous Swamp Type (SWDM2-2)	

Photo 7 September 29, 2014 Notes: Fresh-Moist Sugar Maple-Lowland Ash Deciduous Forest (FODM6-1)	
Photo 8 September 29, 2014 Notes: Thicket Swamp (SWT)	
Photo 9 October 21, 2014 Notes: Fencerow (TAGM5)	

Photo 10 September 30, 2014 Notes: Fresh-Moist Deciduous Thicket (THDM5)	
Photo 11 October 19, 2017 Notes: Cut Field	
Photo 12 2017 Notes: Cut Field (Google aerial photo 2017) providing clear validation of cutting activities.	

Photo 13 October 19, 2017 Notes: Dry-Fresh Sugar Maple – Beech Deciduous Forest (FODM5-2)	
Photo 14 October 19, 2017 Notes: Fresh- Moist Sugar Maple – Lowland Ash Deciduous Forest (FODM6-1)	

Photo 15 October 19, 2017 Notes: Fresh-Moist Mixed Meadow (MEMM4)	

Appendix E

Vegetation Inventory

Scientific Name	Common Name	Srank	Coefficient Conservation	Coefficient Wetness
Acer negundo	Manitoba Maple	S5	0	-2
Acer rubrum	Red Maple	S5	4	0
Acer saccharinum	Silver Maple	S5	5	-3
Acer saccharum	Sugar Maple	S5	4	3
Acer x freemanii	Freeman's Maple	SNA	---	---
Achillea millefolium	Common Yarrow	SE	---	3
Ambrosia artemisiifolia	Annual Ragweed	S5	0	3
Arctium sp	Burdock Species	---	---	---
Asarum canadense	Canada Wild-ginger	S5	6	5
Asclepias sp	Milkweed Species	---	---	---
Asclepias syriaca	Common Milkweed	S5	0	5
Betula papyrifera	Paper Birch	S5	2	2
Carex sp	Sedge Species	---	---	---
Cirsium arvense	Canada Thistle	SNA	---	3
Dactylis glomerata	Orchard Grass	SNA	---	3
Daucus carota	Wild Carrot	SNA	---	5
Dryopteris sp	Wood Fern Species	---	---	---
Equisetum sp	Horsetail Species	---	---	---
Fraxinus pennsylvanica	Green Ash	S4	3	-3
Grass sp	Grass Species	---	---	---
Juglans cinerea	Butternut	S3?	6	2
Juglans nigra	Black Walnut	S4	5	3
Juniperus communis	Ground Juniper	S5	4	3
Linaria vulgaris	Butter-and-eggs	SNA	---	5
Lonicera sp	Honeysuckle Species	---	---	---
Lysimachia nummularia	Creeping Jennie	SNA	---	-4
Moss sp	Moss Species	---	---	---
Onoclea sensibilis	Sensitive Fern	S5	4	-3
Parthenocissus quinquefolia	Virginia Creeper	S4?	6	1
Phalaris arundinacea	Reed Canary Grass	S5	0	-4
Phleum pratense	Common Timothy	SNA	---	3
Pinus sylvestris	Scotch Pine	SNA	---	5
Poa pratensis ssp. *pratensis*	Kentucky Bluegrass	S5	0	1
Populus balsamifera	Balsam Poplar	S5	4	-3

Scientific Name	Common Name	Srank	Coefficient Conservation	Coefficient Wetness
Quercus macrocarpa	Bur Oak	S5	5	1
Quercus rubra	Northern Red Oak	S5	6	3
Rhamnus cathartica	Common Buckthorn	SNA	---	3
Rhus hirta	Staghorn Sumac	S5	1	5
Ribes sp	Currant Species	---	---	---
Sagittaria latifolia	Broad-leaved Arrowhead	S5	4	-5
Salix fragilis	Crack Willow	S4?	---	-1
Salix sp	Willow Species	---	---	---
Salix x fragilis	(Salix alba X Salix euxina)	SNA	---	---
Solidago sp	Goldenrod Species	---	---	---
Sparganium sp	Burreed Species	---	---	---
Symphyotrichum novae-angliae	New England Aster	S5	2	-3
Symphyotrichum puniceum var. *puniceum*	Swamp Aster	S5	6	-5
Symphyotrichum sp	Aster Species	---	---	---
Taraxacum officinale	Common Dandelion	SNA	---	3
Thelypteris palustris	Eastern Marsh Fern	S5	5	-4
Thuja occidentalis	Eastern White Cedar	S5	4	-3
Tilia americana	American Basswood	S5	4	3
Trifolium sp	Clover Species	---	---	---
Typha angustifolia	Narrow-leaved Cattail	SNA	3	-5
Ulmus americana	American Elm	S5	3	-2
Urtica sp	Nettle Species	---	---	---
Vicia sp	Vetch Species	---	---	---
Vitis sp	Grape Species	---	---	---

Appendix F

Species Screen Table

TABLE F: SPECIES OF CONSERVATION CONCERN AND SPECIES AT RISK WITH THE POTENTIAL TO OCCUR IN SURVEY AREA

SCIENTFIC NAME	COMMON NAME	GENERAL HABITAT ACCORDING TO THE MNRF SIGNIFICANT WILDLIFE HABITAT TECHNICAL GUIDE	CONSERVATION STATUS			SOURCE	POTENTIAL FOR HABITAT WITHIN STUDY AREA	RATIONALE	DEVELOPMENT IMPLICATIONS & IMPACTS
			Federal (*SARA*)	Provincial (*ESA, 2007*)	S-Rank				
SPECIES OF CONSERVATION CONCERN									
BIRDS									
Chlidonias niger	Black Tern	Wetlands, coastal or inland marshes; large cattail marshes, marshy edges of rivers, lakes or ponds, wet open fens, wet meadows; returns to the same area to nest each year in loose colonies. Must have shallow water and areas of open water near nests and required marshes >20 ha in size.	---	SC	S3B	MNRF	No	There are no wetlands within or adjacent to the Study Area large enough to support this habitat.	No- species and/ or habitat not affected
Contopus virens	Eastern Wood-pewee	Open, deciduous, mixed or coniferous forest; predominated by oak with little understory; forest clearings, edges; farm woodlots, parks.	---	SC	S4B	MNRF, OBBA	No	Although there are woodlands located within the Study Area, they are predominated by aspen, ash, and maple; not oak. Although this species was observed during field surveys, the woodland habitat would not be large enough to support significant wildlife habitat for forest breeding birds which require more expansive tracts of forest (>100 ha).	No- species and/ or habitat not affected
Ammodramus savannarum	Grasshopper Sparrow	Well-drained grassland or prairie with low cover of grasses, taller weeds on sandy soil; hayfields or weedy fallow fields; uplands with ground vegetation of various densities; perches for singing; requires tracts of grassland > 10 ha.	---	SC	S4B	OBBA	No	There are no tracts of grassland >10 ha in size present within the Study Area, no Grasshopper Sparrows were observed during field surveys within the Study Area.	No- species and/ or habitat not affected
Falco peregrinus	Peregrine Falcon	Rock cliffs, crags, especially situated near water; tall buildings in urban centres; threatened by chemical contamination; reintroduction efforts have been attempted in numerous locations throughout Ontario.	SC	SC	S3B	MNRF	No	There are no rock cliffs, or tall buildings located within the Study Area. Further, this area is currently a rural agricultural area whereas this species prefers urban centres.	No- species and/ or habitat not affected
Asio flammeus	Short-eared Owl	Grasslands, open areas or meadows that are grassy or bushy; marshes, bogs or tundra; both diurnal and nocturnal habits; ground nester; home range 25 -125 ha; requires 75-100 ha of contiguous open habitat.	SC	SC	S2N,S4B	MNRF, OBBA	No	The Study Area does not contain any tracts of meadow or grassland large enough to support habitat for this species.	No- species and/ or habitat not affected
Hylocichla mustelina	Wood Thrush	Carolinian and Great Lakes-St. Lawrence forest zones; undisturbed moist mature deciduous or mixed forest with deciduous sapling growth; near pond or swamp; hardwood forest edges; must have some trees higher than 12 m.	---	SC	S4B	MNRF, OBBA	No	This species requires large undisturbed tracts of forest. Woodlands of size to support significant wildlife habitat for forest breeding birds (>100 ha) is not present within the Study Area.	No- species and/ or habitat not affected
Coturnicops noveboracensis	Yellow Rail	Large, freshwater or brackish grass and sedge marshes with dense vegetation including bulrushes, horsetails, and grasses.	SC	SC	S4B	MNRF	No	No large areas of marsh habitat are present within the Study Area.	No- species and/ or habitat not affected

SCIENTFIC NAME	COMMON NAME	GENERAL HABITAT ACCORDING TO THE	CONSERVATION STATUS			SOURCE	POTENTIAL FOR	RATIONALE	DEVELOPMENT
HERPETOZOA									
Lampropeltis triangulum	Eastern Milksnake	Farmlands, meadows, hardwood or aspen stands; pine forest with brushy or woody cover; river bottoms or bog woods; hides under logs, stones or boards in outbuildings; often uses communal nest sites.	SC	SC	S3	MNRF, ON	Yes	No potential snake hibernacula were identified through ELC surveys or other field work in 2015. Although this species may occur within the area, there are no specific features to support significant wildlife habitat for this species within the Study Area.	No- species and/ or habitat not affected
Sternotherus odoratus	Eastern Musk Turtle	Aquatic; except for when laying eggs; shallow slow moving water of lakes, streams, marshes and ponds; hibernate in underwater mud, in banks or in muskrat lodges; eggs are laid in debris or under stumps or fallen logs at water's edge; often share nest sites; sometimes congregate at hibernation sites.	THR	SC	S3	MNRF, ON	No	There are no large waterbodies within the Study Area to support habitat for this species.	No- species and/ or habitat not affected
Thamnophis sauritus septentrionalis	Eastern Ribbonsnake	Sunny grassy areas with low dense vegetation near bodies of shallow permanent quiet water; wet meadows, grassy marshes or sphagnum bogs; borders of ponds, lakes or streams; hibernates in groups.	SC	SC	S3	MNRF	No	There are no areas of permanent water within the Study Area. Further, there are no marshes, or bogs located within the Study Area.	No- species and/ or habitat not affected
Graptemys geographica	Northern Map Turtle	Large bodies of water with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges, will bask in groups; uses soft soil or clean dry sand for nest sites; may nest at some distance from water; home ranges 30 -70 ha and require aquatic corridors for movement.	SC	SC	S3	MNRF, ON	No	There are no large bodies of water within the Study Area to provide suitable habitat for this species. This species would typically be found within lakes or large rivers.	No- species and/ or habitat not affected
Chelydra serpentina	Snapping Turtle	Permanent, semi-permanent freshwater; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water; home range size ~28 ha.	SC	SC	S3	MNRF, ON	No	There are no large bodies of water within the Study Area to provide suitable habitat for this species.	No- species and/ or habitat not affected
Pseudacris triseriata pop. 1	Western Chorus Frog (Great Lakes / St. Lawrence - Canadian Shield Population)	Roadside ditches or temporary ponds in fields; swamps or wet meadows; woodland or open country with cover and moisture; small ponds and temporary pools.	THR	---	S3	ON	Yes	There are drainage ditches with meadow located within the Study Area, however, this species was not observed during amphibian breeding surveys in 2015.	No- species and/ or habitat not affected
LEPIDOPTERA									
Danaus plexippus	Monarch	The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest. Caterpillars eat exclusively milkweed. And adults require the nectar of wildflowers to feed.	SC	SC	S2N,S4B	MNRF, TEA	No	This species may be observed passing through the Study Area, however since there are no undisturbed fields with abundant meadow and milkweed, suitable habitat for this species is not present. Further, since this site is not within 5 km of Lake Ontario, it cannot be considered as significant wildlife habitat for migratory butterflies.	No- species and/ or habitat not affected

SCIENTFIC NAME	COMMON NAME	GENERAL HABITAT ACCORDING TO THE	CONSERVATION STATUS			SOURCE	POTENTIAL FOR	RATIONALE	DEVELOPMENT
FISH									
Moxostoma valenciennesi	Greater Redhorse	Moderate to swift current riffles, run and pools of medium to large rivers with clear water and gravel substrate.	---	---	S3	NHIC	No	No large rivers or lakes are present within the Study Area. Further, watercourses within the Study Area do not contain gravel substrates or riffle, pool habitat.	No- species and/ or habitat not affected
Ichthyomyzon fossor	Northern Brook Lamprey (Great Lakes - Upper St. Lawrence populations)	Clear, coolwater streams. The larval stage requires soft substrates such as silt and sand for burrowing which are often found in the slow-moving portions of a stream. Adults are found in areas associated with spawning, including fast flowing riffles comprised of rock or gravel.	SC	SC	S3	MNRF	No	No fast flowing riffles comprised of rock or gravel occur within the Study Area.	No- species and/ or habitat not affected
Moxostoma carinatum	River Redhorse	Medium to large-size rivers that have substantial flows with clear water and gravel substrate.	SC	SC	S2	MNRF	No	No medium to large rivers or lakes are present within the Study Area	No- species and/ or habitat not affected
SPECIES AT RISK									
VASCULAR PLANTS									
Juglans cinerea	Butternut	Mixed deciduous forests.	END	END	S3?	MNRF	Yes	Butternut trees were identified within the Study Area.	Yes- consultation with MNRF required.
LICHENS									
Leptogium rivulare	Flooded Jellyskin	Mainly found growing on the bark at the base of trees that are periodically flooded, typically during the spring. Trees species include Black Ash, Red Maple, American Elm, and Balsam Poplar.	THR	THR	S3	MNRF	Yes	Suitable habitat for this species may be present within the Study Area, however this species was not observed during vegetation surveys within the Study Area.	No- species and/ or habitat not affected
BIRDS									
Riparia riparia	Bank Swallow	Sand, clay or gravel river banks or steep riverbank cliffs; lakeshore bluffs of easily crumbled sand or gravel; gravel pits, road-cuts, grassland or cultivated fields that are close to water; nesting sites are limiting factor for species presence.	---	THR	S4B	MNRF, OBBA	No	There are no valleylands located within the Study Area.This species was not observed during breeding bird surveys in 2015.	No- species and/ or habitat not affected
Hirundo rustica	Barn Swallow	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water.	---	THR	S4B	MNRF, OBBA	No	A Barn Swallow was observed within the Study Area during surveys in 2015. No barns of structures were identified within 200m of the Study Area that would provide habitat for this species.	No- species and/ or habitat not affected

SCIENTFIC NAME	COMMON NAME	GENERAL HABITAT ACCORDING TO THE	CONSERVATION STATUS			SOURCE	POTENTIAL FOR	RATIONALE	DEVELOPMENT
Dolichonyx oryzivorus	Bobolink	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha.	---	THR	S4B	MNRF, NHIC, OBBA	Yes	There are no expansive grasslands >30 ha within the Study Area.	No- species and/ or habitat not affected
Chaetura pelagica	Chimney Swift	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water.	THR	THR	S4B,S4N	MNRF	No	As the Study Area is located within agricultural lands with no anthropogenic structures or cliffs, suitable habitat for Chimney Swift would not be present as they prefer urban areas with buildings for nesting.	No- species and/ or habitat not affected
Sturnella magna	Eastern Meadowlark	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size.	---	THR	S4B	MNRF, OBBA	Yes	There are no expansive grasslands >30 ha within the Study Area. This species was not observed during field surveys within grassland areas.	No- species and/ or habitat not affected
Ixobrychus exilis	Least Bittern	Deep marshes, swamps, bogs; marshy borders of lakes, ponds, streams, ditches; dense emergent vegetation of cattail, bulrush, sedge; nests in cattails; intolerant of loss of habitat and human disturbance.	THR	THR	S4B	MNRF	No	There are no areas of marsh, or marshy borders around any water features within the Study Area that would provide habitat for this species. The only areas within the site containing cattails are the agricultural ditches, and these would not provide suitable habitat for this species.	No- species and/ or habitat not affected
Lanius ludovicianus	Loggerhead Shrike	Grazed pasture, marginal farmland with scattered hawthorn shrubs, hedgerows; fence posts, wires and associated low-lying wetland; located on core areas of limestone plain adjacent to the Canadian Shield. Requires at least 25 ha of suitable habitat.	END	END	S2B	MNRF	No	There are no areas of grazed pasture, or low-lying wetland to provide suitable habitat for this species. The Study Area is primarily agricultural (row crop) with deciduous woodlands. Further, this species was not identified during field surveys.	No- species and/ or habitat not affected
Caprimulgus vociferus	Whip-poor-will	Dry, open deciduous woodlands of small to medium trees; oak or beech with lots of clearings and shaded leaf litter; wooded edges, forest clearing with little herbaceous growth; pine plantations; associated with >100 ha forests.	---	THR	S4B	MNRF	No	As this species is associated with large deciduous woodlands >100 ha in size, suitable habitat for this species would not be found within the Study Area. Further, no Whip-poor-wills were observed during crepuscular breeding bird surveys in 2015.	No- species and/ or habitat not affected
MAMMALS									
Myotis lucifugus	Little Brown Myotis	Uses caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in dark warm areas such as attics and barns; feeds primarily in wetlands, forest edges.	END	END	S4	MNRF	Yes	No structures are present within the Study Area to provide roosting habitat for this species (i.e., barns, attics, etc.). However, there are woodlands located within the Study Area, that may provide habitat for this species.	Unknown
Pipistrellus subflavus	Tri-colored Bat	Older forests hollow trees or buildings for roosting. Winters in caves or underground locations. Forage primarily over water and along streams in the forest.	---	THR	S4B	MNRF	Yes	No structures are present within the Study Area to provide roosting habitat for this species (i.e., barns, attics, etc.). However, there are woodlands located within the Study Area, which may provide habitat for this species.	Unknown
HERPETOZOA									

SCIENTFIC NAME	COMMON NAME	GENERAL HABITAT ACCORDING TO THE	CONSERVATION STATUS			SOURCE	POTENTIAL FOR	RATIONALE	DEVELOPMENT
Emydoidea blandingii	Blanding's Turtle	Shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft muddy bottoms and aquatic vegetation; basks on logs, stumps, or banks; surrounding natural habitat is important in summer as they frequently move from aquatic habitat to terrestrial habitats; hibernates in bogs.	THR	THR	S3	MNRF, ON	Yes	There are no shallow marshes, or large water bodies within the Study Area to provide suitable habitat for this species.	No- species and/ or habitat not affected.