Prepared for: GR (CAN) Investment Co., Ltd

Thundering Waters Secondary Plan

Characterization and Environmental Impact Study

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1. INTRODUCTION

1.1. TERMS OF REFERENCE SUMMARY AND OBJECTIVES

Dougan & Associates Ecological Consulting and Design (D&A) and C. Portt and Associates (CPA) were retained in early 2015 by GR (CAN) Investment Co., Ltd to provide natural heritage support for the Secondary Plan process that has been initiated for the lands colloquially known as Thundering Waters.

Throughout spring and summer 2015, D&A and CPA worked with the Secondary Plan team, the client, and the approval agencies to develop a terms of reference (ToR) to outline the scope for the natural heritage studies required to support, and inform, the Secondary Plan process of important environmental features that will require protection and management.

The ToR for the natural heritage studies used the Niagara Region's Environmental Impact Study (EIS) guidelines as a framework for the proposed scope, as well as input from the Niagara Peninsula Conservation Authority (NPCA). The ToR is provided in Appendix A, and in summary includes the following study objectives for the natural heritage characterization report:

Fieldwork and reporting to identify the following terrestrial and aquatic natural heritage elements was required:

- Provincially Significant Wetland (PSW) areas
- Habitat of Endangered and Threatened Species
- Significant Woodlands
- Habitat of Species of Concern
- Location of NPCA regulated wetlands
- Critical Fish Habitat (Type 1)
- Critical Fish Habitat (Type 2 and 3)

The work plans to address these objectives are outlined in the ToR (Appendix A). Comments on the proposed ToR from NPCA highlighted that, in addition to the proposed work plan, crepuscular bird habitat characterization should be considered (primarily to assess habitat suitability and occurrence of Eastern Whip-poor-will (*Antrostomus vociferus*), as well as inventory for Bat Maternity Roost trees.

1.2. STUDY AREA SUMMARY

The study area is located within the eastern-most extent of the Niagara Peninsula (Map 1), and is bounded by Oldfield Road to the north, Dorchester Road to the west, Chippawa Parkway to the south, and west of Kister Road (Map 1).

In this area, the bedrock geology consists of sandstone, shale, dolostone, and siltstone of the Guelph Formation, which overlays Precambrian basement rock (Ontario Geological Survey, 2011). The study area is also within the Haldimand Clay Plain, and the surficial geology consists predominantly of fine-textured glaciolacustrine deposits of silt and clay with minor sand and gravel components (Chapman and Putnam 1983; Ontario Geological Survey, 2010). In the south-western corner of the study area the soils consist of man-made deposits of fill (Ontario Geological Survey, 2010), which are likely from the excavation of the adjacent Power Canal and/or the Conrail Drain that bisects the study area.

Topographic relief across the site is minimal and generally slopes in a south and south-west direction towards the Welland River and the Power Canal. Fine-scale topographic variation across the site is due to a combination of small moraine ridges in undisturbed areas, and man-made deposits and drainage ditches. The small moraines, or sloughs, underlie most of the Niagara Falls Slough Forest Wetland Complex (NFSFWC), and are characterized by a network of shallow depressions and connecting channels which create complex drainage patterns. Slough topography such as that present on the property was likely formed at the margin of the retreating Laurentide Ice Sheet during the Late Wisconsinan glacial period (Menzies et al. 2001); land use practices during recent times, however have undoubtedly modified these systems. Along Dorchester Road and Chippawa Parkway, most of the slough topography has been eliminated due to filling and piling.

Review of historical imagery for the subject property available on Google Earth™ suggested that approximately half of the subject property was devoid of vegetation in 1934. This included large areas of the property south of the Canadian National rail line, directly east of Dorchester Road, and south of the western extent of Oldfield Road. The remaining areas that were visible in the mapping indicated that the property supported mature deciduous trees, associated with what is now identified as the Niagara Falls Slough Forest Wetland Complex Provincially Significant Wetland. Aerial imagery taken in 1954 confirmed these patterns, and indicated that some areas of the site have been heavily disturbed in the past 80 years, while other areas (consistent with the wetland complex) have been intact for in excess of 80 years.

2. DATA COLLECTION METHODS

2.1. BACKGROUND REVIEW

2.1.1. MNRF DATA

A spatial query for records of natural heritage areas (e.g. Woodlands, Wetlands, Areas of Natural and Scientific Interest (ANSI)) and Species at Risk) was conducted for the study area and the adjacent 1 km grid squares using data provided by the Natural Heritage Information Centre (NHIC) and their online mapping tool (NHIC, 2015) on May 6th, 2015. Species at Risk records were also requested from local MNRF staff (personal communication with Guelph District MNRF), along with any specific information regarding their occurrence in the area.

2.1.2. NPCA DATA

The Niagara Peninsula Conservation Authority's online mapping tool was used to review existing mapping for Ecological Land Classification (ELC), Environmental Conservation Areas, Wetlands, and associated regulated area layers on April 9th, 2015. Additionally, meetings with the NPCA ecology staff identified potential species of conservation concern and wildlife habitat that would require consideration for field inventory, including: Whip-poor-will and Bat Maternity Roost habitat.

2.2. SITE VISITS

2.2.1. ECOLOGICAL LAND CLASSIFICATION

Vegetation communities were classified and mapped using the Ecological Land Classification (ELC) System for Southern Ontario (Lee et al. 1998). Interpretation of aerial photo/satellite imagery, MNRF wetland boundaries, and a digital elevation model from LiDAR points were used to determine differences in land cover across the study area and to establish potential ELC boundaries. Subsequent site visits were conducted to confirm/refine boundaries and classify the vegetation communities present. The Niagara Natural Area Inventory (NAI) (NPCA 2010) was also reviewed to determine which ELC communities were likely to occur within the study area.

D&A staff completed site visits to classify vegetation communities during the spring, summer, and fall 2015; specific dates and staff present are summarized in Table 1. During each site visit, staff walked transects through each pre-defined polygon to inventory the flora and determine the composition of the dominant canopy species. Soil texture and soil moisture regime were determined using Denholm and Schut (2009) by extracting soil cores within representative areas of each ELC vegetation type.

2.2.2. PLANT INVENTORY

Spring, summer, and fall vegetation inventories were conducted simultaneously with site visits for ELC and wetland boundary delineation, as outlined in Table 1. The habitat requirements for all Species at Risk (SAR) identified during the review of background material were noted and used in the field to improve the potential for detecting these species. When SAR and/ or provincially rare species were

observed, a GPS point and notes regarding the habitat were taken. Vascular plants species that could not be positively identified in the field were collected, pressed, and confirmed at a later date. The nomenclature reported for all vascular plants is consistent with the Natural Heritage Information Centre (NHIC 2014). Federal rankings for identified Species at Risk are from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2015), provincial rankings for Species at Risk are from the Natural Heritage Information Centre (NHIC, 2014), and regional rankings are from Oldham (2010). The native status of identified plants is based on the NHIC (2014).

2.2.3. WETLAND BOUNDARY DELINEATION

As per the request of the Ontario Ministry of Natural Resources and Forestry (Anne Yagi, Pers. Comm.), the boundary of the Niagara Falls Slough Forest Wetland Complex PSW required delineation. D&A staff delineated the boundary using the Ontario Wetland Evaluation System (OWES) protocols; a Trimble GeoExplorer 6000 Series GeoXH high-accuracy GPS unit was used to georeference the boundary. This boundary was reviewed in the field with MNRF and NPCA staff. A summary of the dates and surveyors present for the wetland boundary delineation is provided in Table 1. Adjustments to the PSW were approved in writing by MNRF on May 16th , 2016 (Joad Durst, personal communication).

2.2.4. SALAMANDER INVENTORY

Dougan & Associates undertook a salamander trapping program within the study area. This program was employed to determine the extent of pond-breeding salamander diversity and activity, and to screen for the Endangered Jefferson Salamander (*Ambystoma jeffersonianum*) (Species-at-Risk; COSEWIC 2015; OMNR 2015).

The study involved the capture of pond-breeding salamanders in natural populations at select locations shown in Appendix B. Tissue samples (i.e. tail tips) were required from individual Ambystoma salamanders in order to perform DNA analysis to determine which species or polyploids are present. Tissue samples were obtained in the field and specimens were released at the capture site.

Prior to fieldwork, Wildlife Animal Care Committee Research Protocol (WACCRP), Wildlife Scientific Collectors Authorization (WSCA) and Endangered Species Act (ESA) permits were required. Applications for these permits were submitted on March 27, 2015. OMNRF staff accompanied field staff during the first trapping round to observe protocols and ensure that WACCRP, WSCA and ESA standards were upheld. The following permits numbers were issued for the 2015 trapping program: WACCRP: 15-143, WSCA: 1079399, ESA: GU-B-004-15.

In order to ensure that all individuals are treated with the highest care, standard operating procedures were followed. In particular, the following sets of documents were reviewed prior to fieldwork and recommendations followed wherever applicable:

- Canadian Council on Animal Care Species-specific Recommendations on: Amphibians & Reptiles
- Canadian Council on Animal Care Guidelines on: The Care and Use of Wildlife
- USGS National Wildlife Health Center "Restraint & Handling of Live Amphibians"
- In addition, although toe-clipping was not performed, the USGS National Wildlife Health Centre "Toe-Clipping of Frogs and Toads" (also covers salamanders) was reviewed for general insights

The protocol for trapping in the 2015 season was undertaken to minimize the length of time that captured specimens spent in traps. This lessened the potential of salamanders becoming fatigued and/or oxygen deprived. Salamanders were handled for the shortest amount of time possible, but long enough to collect a tail tip sample. The smallest sample necessary to obtain a successful genetic analysis was taken, approximately 5 mm, which can take up to about a minute of handling time.

The trapping survey period was selected to coincide with adult Ambystomid seasonal migrations to breeding ponds, during early spring associated with the spring thaw. An initial site reconnaissance before trapping was conducted on April 1st, 2015 to confirm pond location; during the visit, target ponds had ice cover between 75 and 100%. Trapping was undertaken one week later, following a warm spring rain. Survey dates and conditions are outlined in Table 2.

Based on site reconnaissance and screening of habitat suitability as well as correspondence with OMNRF (personal communication with Guelph District OMNRF) and results from previous salamander trapping studies on site (unpublished 2009 OMNRF salamander trapping program within the study area), eight ponds were selected for trapping in 2015 (Appendix B). Potentially suitable breeding ponds are present throughout the slough forest habitat on site, and although they vary in size (aerial photo interpretation of ponds suggested ponds range from approximately 26m^2 to 4032m^2), the larger ponds were generally similar in structure and vegetation characteristics. Larger pools were targeted to ensure that the trapping effort was focused on habitat with adequate depth and sufficient vegetation to support egg-laying sites, and thus would increase the chance that salamanders would be captured.

Five traps were deployed in each of the eight ponds surveyed (40 traps total) during the five evenings outlined in Table 2. Within the study ponds, specific trap locations were chosen in the field based on pond shape, depth and the presence of egg-laying sites (e.g. submerged vegetation, logs, shrubs), as these areas are thought to be more attractive to breeding adult salamanders.

Adult salamanders were collected using standard 6mm square, silver wire mesh minnow traps in suitable breeding ponds. On sample nights, the traps were set out before dark and checked early the following morning to minimize the amount of time salamanders spent in the traps. Each trap was flagged, numbered, georeferenced, and attached with rope to a fixed feature on land (i.e. tree, deadfall, rock). Traps were placed in the water with at least 85% of the trap submerged and it was ensured that the trap was lying horizontally on the pond bottom.

When salamanders were caught, specimens handled for analysis were limited to individuals belonging to the "Jefferson Salamander complex" (i.e. *Ambystoma laterale – A. jeffersonianum complex*); other amphibian species and wildlife (e.g. invertebrates and fish) were documented and released. When a specimen from the "Jefferson Salamander Complex" was captured, a small amount of tail tip was removed (~ 5 mm) using a sterile scalpel blade. The tail tip was then placed into a labelled tube of 70% ethanol. After each sample, the scalpel and cutting surface were sterilized using rubbing alcohol and an open flame; scalpel blades were also replaced frequently. After processing, specimens were held for several minutes in a container to monitor for any signs of adverse health effects. After this monitoring period, specimens were released at the point of capture.

On May 7, 2015 tail-tip samples collected during the trapping study were delivered to the lab of Dr. James Bogart, at the University of Guelph. These samples were processed in Dr. Bogart's lab to determine specimen polyploid identification. Results of this DNA analysis were delivered to Dougan &

Associates on June 23, 2015.

2.2.5. NOCTURNAL AMPHIBIAN CALL SURVEYS

Nocturnal Amphibian Call Surveys were conducted in accordance with Bird Studies Canada's Marsh Monitoring Program (MMP). Survey dates were selected to ensure weather conditions were well within the acceptable ranges described by the MMP (Table 3). During site reconnaissance visits throughout the first half of April, 2015, active amphibian breeding habitat and potentially suitable breeding habitat were detected in several parts of the study area. Informed by this site reconnaissance, 10 stations were established around the perimeter of the study area on April 19th, 2015 (Table 3; Appendix B). Three additional stations were added on May 28th, 2015, for a total of 13 surveyed during May and June, 2015 (Table 3; Appendix B). Two of these additional locations, NACS 11 and NACS 12, were established along the Conrail Drain that bisects the study area (Appendix B). NACS 13 was established on the north eastern edge of the study area near salamander Trapping Pond 6 (Appendix B).

2.2.6. BREEDING BIRD SURVEYS

Two breeding bird surveys were conducted on May 28 and May 29 (first survey) and June 4 and June 5 (second survey), 2015, following the protocols outlined by the Ontario Breeding Bird Atlas (OBBA) (Cadman et al., 2007). The survey locations are shown in Appendix B. The OBBA protocol stipulates that the surveys be conducted between sunrise and 10:00 a.m., between May 24 and July 12, during appropriate weather conditions (i.e., light winds, no heavy rains, and good visibility). Given the size of the study area, a total of 32 Point Count Stations (PCS) were surveyed for 10 minutes each (Appendix B), with additional species noted in areas between and outside of the PCS locations. Additionally, nocturnal surveys conducted on May 28th, 2015 were within the preferred window for detecting Whip-poor-will (*Caprimulgus vociferus*).

2.2.7. BAT ROOST SURVEYS

Methods for determining presence of bat roosting habitat followed steps 1 and 2 of the OMNRF recommended approaches for bat and bat habitat surveys of treed habitats (OMNRF, 2014). The approach involved screening areas on the property for vegetation communities that include deciduous forests, mixedwood forests, coniferous forests, deciduous swamp, mixedwood swamp, and coniferous swamp. It was determined that deciduous forest and deciduous swamp are both present on the subject property. This was followed up by conducting surveys for cavity trees at 34 locations on the subject property that included woodlands, deciduous forest, and deciduous swamp areas during the leaf-off season (Appendix B). Survey plots followed the OMNRF 2014 guidelines, and used a 0.05 ha circular plot to determine the number of highly suitable snags (> 25 cm diameter at breast height). Since completing the surveys, an updated version of the survey guidelines released, May 2016 (OMNRF, 2016); changes to the guideline recommend that acoustic surveys be conducted prior to snag density survey to determine if SAR bats are present in the area; acoustic surveys were not completed for this EIS.

2.2.8. AQUATIC SURVEYS

Field investigations were conducted by C. Portt and Associates staff, on April 11th, 12th, 21st, June 11th, and October 6th, 2015. The initial field investigations were conducted to characterize the aquatic habitats within the subject properties, and assess their importance under early spring conditions with regard to potential spawning habitat and accessibility for fish. In particular, wetland areas within the subject properties and along the edge of the Welland River were evaluated for their suitability and utilization as spawning areas for Northern Pike (*Esox lucius*), and watercourses were examined for riffle-spawning fishes such as White Sucker (*Catostomus commersonii*). Locations that were identified as having potential for spawning and/or more permanent habitats were examined again on April 21st, 2015. Additional observations of flow and general habitat were conducted on June 11th and October 6th. Electrofishing was undertaken on June 11th and October 6th, 2013, using a Halltech 2000 backpack electrofisher. After field identification and enumeration, all fish were released alive at the point of capture. A Garmin GPS 76CSx Global Positioning System (GPS) unit was used to record the locations of all observations and digital photographs, as well as electrofishing locations. Selected photographs of site conditions are provided in Appendix H. Common aquatic plants were identified at a basic level to be included, where appropriate, in habitat descriptions, but no attempt was made to characterize the full aquatic macrophyte community.

The Ministry of Natural Resources and Forestry (MNRF) and the Niagara Peninsula Conservation Authority (NPCA) were also contacted to obtain any relevant existing fish collection information.

3. NATURAL HERITAGE CHARACTERIZATION

3.1. BACKGROUND STUDIES

3.1.1. TERRESTRIAL

The spatial query for NHIC data revealed a total of sixty-three (63) records for species of conservation concern known to occur presently or historically within approximately 1km of the study area. The records include forty-nine (49) species of vascular plants, four (4) birds, two (2) fish, four (4) invertebrates, including three (3) mollusks and one (1) odonate, three (3) reptiles, and one (1) restricted record. The provincial rankings (S Rank; NHIC, 2014) ranged from Presumed Extirpated (SX) to Apparently Secure (S4), though most records are for species that are considered Critically Imperiled (S1), Imperiled (S2), or Vulnerable (S3), or some combination of those rankings. According to COSEWIC (2015), twelve (12) species are Endangered (END), four (4) species are Special Concern (SC), seven (7) species are Threatened (THR), and one (1) species is Extirpated (EXP). Species at Risk in Ontario include twelve (12) Endangered (END), three (3) Special Concern (SC), eight (8) Threatened (THR), and one (1) extirpated species (MNRF; NHIC, 2014).

In addition to the NHIC Query, Guelph District MNRF staff provided the following list of species that may occur in the areas:

- Round-leaved Greenbrier (*Smilax rotundifolia*); Present in Warren Creek PSW- possibly in Niagara Falls Slough Wetland PSW (NFSW)
- Snapping Turtle (*Chelydra serpentina*); Highly likely using site
- Eastern Flowering Dogwood (*Cornus florida*); Not likely- upland species
- White Wood Aster (*Eurybia divaricate*); Not likely-upland species
- Swamp Rose-mallow (*Hibiscus moscheutos*); Yes. Present along Chippawa Channel (formerly Welland River)
- Butternut (*Juglans cinerea*); Possibly present
- American Water-willow (*Justicia americana*); No. Present in Lyon's Creek and Dufferin Island Only
- Peregrine Falcon (*Falco peregrinus*); Nesting active in cliff and old OPG building at base of falls in Lower Niagara River
- Eastern Meadowlark (*Sturnella magna*); Good potential in open areas

A review of natural heritage mapping by the NHIC (2014) identified both woodlands and a Provincially Significant Wetland (PSW), the Niagara Falls Slough Forest Wetland Complex (NFSFWC), occurring within the study area (Figure 2). The NFSFWC consists of multiple wetland units both within and outside of the study area. Based on NHIC mapping, seven (7) wetland units occur within the study area, including two relatively large, contiguous units. Aside from the NFSFWC, additional woodlands are shown throughout the study area with the exception of several large areas within the southern half of the study area and along the rail corridor and large drainage feature that bisect the study area (Map 2).

3.1.2. AQUATICS

The MNRF (personal communication with Guelph District MNRF) stated that the MNRF does not have any fish information for this site. The MNRF biologist also suggested that the mouth of the Conrail Drain should be investigated with regard to fish access from the Power Canal, and that spawning Northern Pike (*Esox lucius*) may access the wetlands along the edge of the Welland River.

Correspondence with NPCA biologist indicated that they do not have fish information for this site.

3.2. SITE INVESTIGATIONS

3.2.1. ECOLOGICAL LAND CLASSIFICATION

A total of 13 ELC dominant vegetation communities from Anthopogenic, Cultural, Forest, and Swamp ELC Ecosites were identified among 45 polygons during the site investigations conducted in 2015 (Table 5). Within the some of the ELC communities, an additional seven (7) vegetation types were identified as complexes and/or inclusions with the dominant vegetation types. A summary of the dominant ELC communities is provided in Table 5, and a list of all ELC vegetation types observed including their provincial rankings are provided in Table 6. Oak Mineral Deciduous Swamp (SWD1) accounts for the largest proportion of the study area at 78 ha (40%) followed by Mineral Cultural Woodland (CUW1; 23%), Green Ash Mineral Deciduous Swamp (SWD4-1; 12%) (Table 5). The remaining vegetation communities each amount to approximately 25% of the total study area.

Each of the dominant ELC Ecosites and Vegetation Types is summarized below. For species associated with the ELC polygons see Table 6.

3.2.1.1. ANTHROPOGENIC LANDS

Anthropogenic (ANTH): Polygon 41

Lands classified as ANTH include areas that have been cleared of natural vegetation and are in use for human activities such as parking lots, lawns, residential dwellings, commercial outlets, and industrial structures. Due to the removal of natural habitats, features, and functions from these areas, all lands categorized as ANTH are considered to be low quality.

Anthropogenic lands account for only 3.37ha (1.74%) of the study area, and are found only in the easternmost portion of the study area (Polygon 41; Figure 2). This area is a former industrial site with several buildings, aggregate storage areas, and a driveway from Progress Street. Vegetation within this polygon was sparse and primarily early successional with scattered shrubs and trees. Industrial waste was also present throughout, including piles of garbage and concrete bordering the adjacent vegetation communities.

3.2.1.2. CULTURAL PLANT COMMUNITIES

Dry-Moist Old Field Meadow (CUM1-1): Polygons 7, 25, 42, 43, 44

Cultural meadows represent a very early stage of natural succession. They contain a low abundance of woody species (<25% cover) and are dominated primarily by opportunistic forbs and grasses. Cultural meadows account for 9.76ha (5.0%) of the study area, and are present along and within the Conrail Drain that bisects the study area (Polygon 7), a large open area used informally for all-terrain vehicles along Dorchester Road (Polygon 25), and areas adjacent to the industrial facility (Polygons 42, 43, 44) at the eastern edge of the study area. Polygon 7 is a long, linear, drainage feature, polygon 25 is a large open filled area, and polygons 42 – 44 are old-fields that may have a history of agricultural use based on historic imagery (Google Earth™, 2015).

Dominant species included exotic forbs (e.g. *Trifolium pretense*, *Vicia cracca*) and grasses (e.g. *Phragmites australis ssp australis*, *Schedonorus pratensis*), though some native species such as Hemp Dogbane (*Apocynum cannabinum*), Strict Blue-eyed-grass (*Sisyrinchium montanum var. montanum*), and Goldenrod (*Solidago altissima*, *S. juncea*) were present. Relative cover of trees and shrubs was less than 25%, and included scattered Eastern Cottonwood (*Populus deltoides ssp deltoides*), and patches of Common Buckthorn (*Rhamnus cathartica*), Heart-leaved Willow (*Salix eriocephala*), Gray Dogwood (*Cornus racemosa*), and Dotted Hawthorn (*Crataegus punctata*). Regionally rare species includes Wooly Sedge (*Carex pellita*), which was observed in a moist pocket within polygon 25.

Cultural Thicket (CUT1-1): Polygon 16

These communities are characteristic of lands that have been cleared in the past, left to regenerate, and succeed towards a naturally-vegetated community. Cultural thickets include areas in a somewhat later stage of succession than cultural meadow, where shrub cover is greater than 25% but tree cover remains below 25%. Cultural thicket communities are dominated by woody shrubs and often have an understory of forbs and grasses.

Overall, mineral cultural thicket accounts for approximately 15.7 ha (8.1%) of the land cover within the study area, and is only present as a dominant Ecosite within polygon 16. This area is dominated by Dotted Hawthorn with occasional Gray Dogwood, and scattered trees including American Elm (*Ulmus Americana*) and Eastern Cotton Wood. The herbaceous groundcover community is abundant with Smooth Aster (*Symphyotrichum laeve var. laeve*), Old Field Aster (*Symphyotrichum pilosum var. pilosum*), New England Aster (*Symphyotrichum novae-angliae*), and Wild Strawberry (*Fragaria virginiana*) in moist areas; drier areas contained Gray-stemmed Goldenrod (*Solidago nemoralis*), Early Goldenrod, Canada Pussytoes (*Antennaria howelii ssp. canadensis*), Oxeye Daisy (*Leucathemum vulgare*), and Common St. John's-wort (*Hypericum perforatum*). Notable species include Canada Pussytoes and Yellow Sedge (*Carex flava*), which are both rare within Niagara Region. The substrates within this feature are primarily derived from man-made fill, and consist of unstratified Clay Loam to a depth of 60cm with no mottling.

Gray Dogwood Cultural Thicket (CUT1-4): Polygons 9, 11, 28, 45

Gray Dogwood Cultural Thicket accounts for 7.9ha (4.1%) of the total study area among 4 polygons (Figure 2; polygons 9, 11, 28, 45). These features occur between the Conrail Drain and the rail line

(polygon 9, 11), within the northwest corner of the study area (polygon 45), and in polygon 28 east of polygon 27 (Figure 2). Overall, the species composition within these features was similar to that of polygon 16, but suggestive of slightly more moist soil conditions. Gray Dogwood was the most abundant shrub species rather than Dotted Hawthorn, and tree cover was slightly higher than polygon 16. The occurrence of taller tree species was infrequent and below 25%, and included Green Ash (*Fraxinus pennsylvanica*), Red Maple (*Acer rubrum*), Northern Pin Oak (*Quercus palustris*), Black Cherry (*Prunus serotina*), and American Elm. In moist areas shrub species included White Meadowsweet (*Spirea alba*), Bebb's Willow (*Salix bebbiana)*, and Briar Rose (*Rosa rubiginosa var. rubiginosa*), while dominant ground cover species included various Aster species (*Symphyotrichum* spp), Blue Vervain (*Verbena hastata*), Begger's Ticks (*Bidens sp*), sedges (*Carex sp*), Common Boneset (*Eupatoreum perfoliatum*), Purple Loosestrife (*Lythrum salicaria*), Reed Canary Grass (*Phalaris arundinacea*), and Sensitive Fern (*Onoclea sensibilis*); drier areas had Canada Goldenrod (*Solidago canadensis*), Queen Anne's Lace (*Daucus carota)*, Common Plantain (*Plantago major*), and Black Knapweed (*Centaurea nigra*). The substrate within these communities was moist Clay Loam, though mottling was generally below 20cm.

Cultural Woodland (CUW1): Polygons 1, 15, 19, 22, 34, 35, 37

Cultural woodlands are treed areas characterized by canopy coverage between 35 – 60%. These communities often represent the stage of natural succession between cultural thicket and forest, but may also represent a disturbed or fragmented forest.

Cultural woodlands were prevalent throughout the study area, and accounted for 44.8ha (23.1%) of the total area among 7 polygons. These areas were complexed with Cultural Thicket (CUT1) due to the open canopy and dense shrub/understory layer of Hawthorn (e.g. *Crataegus punctata*, *Crataegus succulenta*), Gray Dogwood, Common Apple (*Malus pumila*), and Common Buckthorn (*Rhamnus cathartica*) in many areas. The relative cover of canopy species was below 60% in most areas, and generally consisted of Green Ash and Eastern Cottonwood, with lower abundance of American Elm, White Willow (*Salix alba*), and occasional Northern Pin Oak. Green Ash was the dominant understory species and was present as regenerating stems and as groundcover. Climbing Poison Ivy (*Toxicodendron radicans*) was abundant throughout. Herbaceous groundcover species included Broad-leaved Enchanter's Nightshade (*Circaea Canadensis*), Fowl Mannagrass (*Glyceria striata*), Field Horsetail (*Equisetum arvense*), Woodland Sedge (*Carex blanda*), Common Nipplewort (*Lapsana communis*), and Kidney-leaved Buttercup (*Ranunculus arbotivus*). The soil in these features was Clay or Silty Clay with mottling at or well below 20cm.

White Pine Coniferous Plantation (CUP3-2): Polygon 33

Coniferous plantations include vegetation communities where canopy cover is greater than 60% and the dominating canopy trees are conifers, typically planted in rows.

The small White Pine plantation (0.3 ha) was dominated by planted White Pine (*Pinus strobus*) with few other tree species aside from Green Ash. The understory and shrub layer were abundant with Climbing Poison Ivy, Thicket Creeper, and Choke Cherry, while Wild Red Raspberry (*Rubus idaeus ssp strigosus*), Avens species (*Geum* sp), Wild Strawberry, and Virginia Knotweed (*Persicaria virginiana*) were abundant in the ground layer.

3.2.1.3. TERRESTRIAL PLANT COMMUNITIES

Fresh-Moist Ash Lowland Deciduous Forest (FOD7-2): Polygon 13

This small (1.8 ha) vegetation community (polygon 13) borders the north side of one of the large slough forest blocks (polygon 27). The canopy and understory of this feature consist of a mix of Green Ash and Eastern Cottonwood, while the shrub layers is abundant with young Green Ash, Gray Dogwood, Common Buckthorn, and Wild Red Raspberry. The groundcover was abundant with Garlic Mustard, Avens species (*Geum* sp), and Wild Strawberry. The soils within this polygon are moist and of similar texture (Silty Clay) to upland areas within adjacent polygon 27.

Fresh-Moist Poplar Deciduous Forest (FOD8-1): Polygon 14

This small vegetation community (polygon 14; 0.9 ha) included a young Eastern Cottonwood canopy with American Elm, and an understory of Common Buckthorn, Gray Dogwood, and Highbush Cranberry (*Viburnum opulus ssp trilobum*). The groundcover was indicative of relatively moist soils, and included sedges (*Carex gracillima, C. leptonervia*), Rushes (*Juncus dudlyei, Juncus tenuis*), Red-tinged Bulrush (*Scirpus microcarpus*), and Purple Loosestrife. Creeping Spike-rush (*Eleocharis palustris*), a rare species in Niagara Region, was also found within this polygon.

Fresh-Moist Oak – Maple – Hickory Deciduous Forest (FOD9): Polygons 30, 36, 38, 40, 46

Polygons 30, 36, 38, 40 are narrow, fragmented upland and valley slope forests that border the floodplain swamp forest within polygon 31. Due to the narrow shape of these features, the canopy was relatively sparse resulting a denser shrub layer, along with encroachment from the adjacent cultural thickets. The species composition is similar to polygon 31, with a mix of Oak (*Q. rubra, Q macrocarpa*), Shagbark Hickory, and Maple (*A. saccharum*), but contained more upland species such as White Ash (*Fraxinus americana*), Black Cherry (*Prunus serotina*), and White Oak. Understory tree and shrub species included Ash, Eastern Hop Hornbeam (*Ostrya virginiana*), Choke Cherry, Common Buckthorn, and Hawthorns (*Crataegus* sp). Abundant ground cover species included Wild Strawberry, Asters, Enchanter's Nightshade, and Thicket Creeper. The soils in this polygon were Silty Clay with no evident mottling.

Polygon 46 borders the western edge of the large slough forest complex, and was similar in species composition to this polygon and polygons 30, 36, 38, and 40, but contained less of the slough-topography and their associated species (e.g. Pin Oak, Freeman Maple). Relative to these polygons, polygon 46 contained a higher abundance of Shagbark Hickory and White Oak. This polygon is notable for the size distribution of mature trees, and is likely the largest and most contiguous portion of mature deciduous forest within the study area.

3.2.1.4. WETLAND PLANT COMMUNITIES

Oak Mineral Deciduous Swamp (SWD1): Polygons 5, 12, 27, 29, 31, 32)

Oak Mineral Deciduous Swamp occupied the largest proportion of the study area with a total of 76.3ha (39.4%) across six (6) polygons (Figure 2); polygons 5, 27, and 32 make up the core areas of the Niagara Falls Slough Forest Wetland Complex. This feature is characterized by a complex of Oak

(*Quercus palustris, Q. macrocarpa, Q bicolor*) and Freeman Maple (*Acer x freemanii*) - dominant bottomland swamp (i.e. sloughs) with intervening Fresh-Moist Oak - Maple Deciduous Forest (FOD9-2) uplands composed of Red Oak, Sugar Maple, American Beech, American Basswood, Shagbark Hickory (*Carya ovata*), Bitternut Hickory (*Carya cordiformis*) Green Ash, American Elm, and White Oak. The subcanopy composition was similar, with the addition of Blue-beech (*Carpinus caroliniana*), Hawthorns, and a higher abundance of Maple, American Beech, and Green Ash than the canopy. The understory was abundant throughout with Spicebush (*Lindera benzoin*), Gray Dogwood, Chokecherry (*Prunus virginiana*), and Hawthorns. The groundcover vegetation was relatively diverse and included species such as Fowl Mannagrass, Sensitive Fern, various sedges, Climbing Poison Ivy, Wild Strawberry, Yellow Trout Lily, Wild Geranium (*Geranium maculatum*), White Trillium, Virginia Knotweed, Garlic Mustard (*Alliaria petiolata*), Dewberry (*Rubus pubescences* and *R. hispidus*), Northeastern Lady Fern (*Athyrium felix-femina var. angustum*), and Spinulose Wood Fern (*Dryopteris carthusiana*).

In deeper slough vernal pools, several additional wetland vegetation types occur, including Buttonbush Mineral Thicket Swamp (SWT2-4) which is a provincially important vegetation community type, and Bulrush Mineral Shallow Marshes (MAS2-2). The Buttonbush Thicket Swamps are dominated by Buttonbush shrubs (*Cephalanthus occidentalis*), and include other abundant species such as Gray Dogwood and Silky Dogwood (*Cornus amomum*); surrounding canopy species include Northern Pin Oak, Black Willow (*Salix nigra*), and American Elm. Less common shrubs included Black Chokeberry (*Aronia melanocarpa*), Black Holly (*Ilex verticillata*), and Mountain Holly (*Ilex mucronata*). The groundcover was rich in graminoid species (e.g. *Eleocharis obtusa, C. lupulina, C. retrorsa, C. tenera, C. tribuloides, C. tuckermanii, Glyceria striata, G. septentrionalis, Juncus effusus, Scirpus pendulus*), as well as forbs such as Ditch Stonecrop (*Penthorum sedoides*), Spotted Water-Hemlock (*Cicuta maculata*), Hemlock Water-parsnip, and Northern Water-horehound (*Lycopus uniflorus*). The Bulrush Mineral Marshes were similar in species composition, though with much less canopy and shrub cover and had a larger percentage of open water with species such as Rufous Bulrush (*Scirpus pendulus*). Soils within this polygon consisted of Clay, Silty Clay, and Clay Loam with mottling at depths ranging from 12cm – 20cm.

Overall, the NFSFWC is an exceptional example of Carolinian slough forest, containing high diversity of native species and a variety of wetland habitats.

Pin Oak Mineral Deciduous Swamp (SWD1-3): Polygons 3, 4

This vegetation type was identified in two small slough polygons along the western edge of the study area, and included 1.3 ha (0.7%) of the total landcover of the study area. The species composition was largely similar to the sloughs within polygons 5 and 7 with a Pin Oak-dominant canopy, and contained similar marsh and thicket swamp inclusions but at a lower abundance.

Green Ash Mineral Deciduous Swamp (SWD2-2): Polygons 6, 8, 18, 26

Green Ash Mineral Deciduous Swamp made up 22.7 ha (11.7%) of the study area across 5 polygons. These features are younger swamp forest than the NFSFWC, with some history of human disturbance such as drainage or filling. Much of the Green Ash-dominant canopy had died back, likely due to Emerald Ash Borer. Some areas of the canopy had a similar species composition to polygons 5 and 27, being Oak-dominant, but were generally younger and lacked the slough topography that defined those communities. Areas with less canopy contained Gray Dogwood Mineral Thicket Swamp (SWT2-9) inclusions, similar to polygons 9, 11, and 28, but with a slightly higher percentage of canopy cover.

The subcanopy and understory layers were abundant with Green Ash, Freeman Maple, Pin Oak, and American Elm, as well as Smooth Arrowwood (*Viburnum recognitum*), Downy Service Berry (*Amelanchier arborea*), Spîcebush, and Tatarian Honeysuckle (*Lonicera tatarica*). Abundant species in the groundcover included Broad-leaved Enchanter`s Nightshade, Fowl Mannagrass, Northern Rough-leaved Goldenrod, Sensitive Fern, Climbing Poison Ivy, Panicled Aster (*Symphyotrichum lanceolatum ssp. lanceolatum*), and Dark-green Bulrush (*Scirpus atrovirens*). The soils in these features consisted of Clay Loam with mottles from 15cm -25cm.

Willow Mineral Deciduous Swamp (SWD4-1): Polygons 2, 10, 17, 20, 21, 23, 24

Willow Mineral Deciduous Swamp (SWD4-1) made up approximately 4.9 ha (2.5%) of the study area and was found in seven (7) polygons. These features are dominated by White Willow and Eastern Cottonwood with Black Walnut (*Juglans nigra*) and American Elm, in both the canopy and subcanopy. The understory consists of Silky Dogwood (*Cornus amomum*) and Gray Dogwood, Highbush Cranberry, Hawthorns, Chokecherry and Bebb`s Willow. The groundcover composition includes Wild Strawberry in upland areas, and in wetter areas Field Horsetail, Panicled Aster, Coltsfoot (*Tussilago farfara*), Northern Water-horehound, and Pin Oak seedlings. The soils within polygons 17, 21, 23, and 24 are similar to those of the CUW1-1 and SWD2-2 polygons. However, unlike the rest of the study area, the soils underlying polygon 17 consist of fine sandy loam with to a depth of 75cm with the water table at a depth of 22cm. No mottles were evident within 20cm.

3.2.2. PLANT INVENTORY

A total of 333 vascular plants were observed during the field investigations, and 307 of these were identified to the species level (Table 6). Of the identified species, approximately 75% are considered native within Ontario (NHIC 2014). A summary of the rankings for vascular plant species is provided in Table 6; no federal or provincial Species at Risk were observed. The Floristic Quality Index (FQI) for the study area was 20.29 including native and exotic species, and was 65.51 for native species only. The relatively high FQI for native species indicates a high richness of species with specific habitat requirements, and is driven primarily by species observed within the NFSFWC polygons. The mean wetness index for the study area was -0.31.

Notable plant species findings included: Schreber's Aster (*Eurybia schreberi*), an Imperiled (S2) species within Ontario; and Honey-Locust (*Gleditsia triacanthus),* an Imperiled to Vulnerable (S2S3) species within Ontario. Both are rare within Niagara Region. The identification of Schreber's Aster was confirmed by John Semple (personal communication) of the University of Waterloo; he is an expert in Asteraceae taxonomy and identification. This species was detected in the upland areas of the Oak Mineral Deciduous Swamp (polygon 27; Map 2). The two Honey-Locust observations (one subcanopy tree approximately 20cm dbh, and 1 seedling) are likely naturally established trees based on them having large thorns (thorns are lacking in the commonly planted cultivars) (Farrar, 1995). Furthermore, the two trees were observed growing within an Oak Mineral Deciduous Swamp (polygon 31; Figure 2), which is consistent with the rich bottomland deciduous forests that native cultivars of this species are typically associated with (Farrar, 1995).

Based on communication with MNRF and NPCA staff, Black Gum (*Nyssa sylvatica*) and Round-leaved Greenbrier are also present in some areas within the NFSFWC; though they were not observed by D&A staff in the study area, they do have potential to be present on the property. For example, Round-

leaved Greenbrier is documented on the adjacent property north of Oldfield Road. A further 51 species that were detected are considered Rare or Uncommon in Niagara Region (Table 6).

Overall, the study area contains a rich assemblage of rare to uncommon native species with an affinity for high-quality wetland habitats.

3.2.3. SALAMANDER TRAPPING

The 2015 trapping program was successfully implemented within the seasonal migration of *Ambystoma* spp. to breeding ponds. During reconnaissance to the study area on April 1, 2015, all of the target pond surfaces were variously frozen between approximately 75 and 95%. One week later, after a warm rain, the first trap session was undertaken (April 7 and 8, 2015) followed by four additional trap sessions over the following twelve days (Table 7). *Ambystoma sp.* (later determined to be *Ambystoma laterale* and various unisexual polyploids) were captured in all but one of the target ponds (Table 7). No other salamander species were captured during the 2015 trapping program.

The number of captured salamanders was generally related to pond size and vegetation cover. Pond 1 and Pond 8 (Appendix B) had the highest number of captured salamanders; both exhibit considerable cover from Buttonbush (*Cephalanthus occidentalis*) and other emergent shrubs, which serve as egg-laying sites for Blue-spotted salamanders. These ponds were also relatively large and deep, providing more vernal pool habitat and ensuring that these habitat sites did not dry out too quickly for sufficient salamander development (JSRT, 2009). Pond 7 is a large pond, however it is not as deep as Pond 8 and has little cover for potential egg-laying sites. Pond 5 appeared to have sufficient emergent shrub cover for egg-laying sites, however it is directly adjacent to Oldfield Road; no salamanders were captured in this pond suggesting there may be road mortality, water quality issues, or other forms of encroachment, which reduce the suitability of Pond 5 as breeding habitat for Blue-spotted Salamanders. Despite having substantial vegetation cover, numerous canisters, fuel drums and other debris were dumped in Pond 4, which may have inhibited the suitability of this pond for breeding Blue-spotted Salamanders.

Incidental species captured during trapping included Spring Peeper (*Pseudacris crucifer*), Stickleback (*Gasterosteidae sp*), and Predaceous Diving Beetle (*Dytiscidae sp*).

Salamander tail-tip samples analyzed by Dr. Bogart (University of Guelph) identified the captured individuals as *Ambystoma laterale* (Blue-spotted Salamanders) and unisexuals (Blue-Spotted Genome dominant) present within the study area (Appendix E). The unisexuals were both female Ambystoma polyploids with a predominance of *A. laterale* chromosomes, which require the presence of male *Ambystoma laterale* to stimulate reproduction (JSRT, 2009). The specific unisexuals present were the triploid *Ambystoma* (2) *laterale – jeffersonianum* or 'LLJ' as well as the tetraploid *Ambystoma* (3) laterale – *jeffersonianum* or 'LLLJ'. No endangered Jefferson Salamander (*Ambystoma jeffersonianum*) or Jefferson dominant polyploids were detected.

These results are consistent with the findings from previous salamander studies conducted at other areas on the site, including: OMNRF surveys conducted within the study area, which captured 37 salamanders within the *Ambysoma laterale* (LL) and *Ambystoma* (2) *laterale – jeffersonianum* (LLJ) genotypes (personal communication, Guelph District MNRF), and results presented in a report by L. Campbell and Associates (2005). The 2015 findings indicate that all salamanders present are Blue-

spotted (*A. laterale*) and Blue-spotted dominant polyploids and there is no evidence of Jefferson Salamander or Jefferson dominant polyploids within the study area.

3.2.4. NOCTURNAL AMPHIBIAN CALL SURVEYS

During the amphibian call survey, six anuran species were heard calling within the study area including Spring Peeper (*Pseudacris crucifer*), American Toad (*Anaxyrus americanus*), Western Chorus Frog (*Pseudacris triseriata*), Northern Leopard Frog (*Lithobates pipiens*), Gray Treefrog (*Hyla versicolor*), and Wood Frog (*Lithobates sylvaticus*). Survey locations are shown in Appendix B and survey results are summarized in the table below as well as in further detail in Appendix F.

Four species of anurans with moderate levels of calling activity were detected in the slough forest ponds along the north section of the property (NACS 1, 2, 13; Appendix B). Western Chorus Frog was most abundant; at least 11 individuals were detected in ponds close to Oldfield Road. Spring Peepers were heard calling throughout this area, but only a few individuals were recorded. American Toad was recorded deeper into the slough forest greater than 100m from the roadside survey stations. Only a couple of calling Gray Treefrogs were detected.

The west section of the property, north of the Conrail Drain (NACS 3, 4, 5; Appendix B) had a relatively low species richness (three species) of anurans and lower number of calling individuals. Spring Peepers were heard calling from southeast of NACS3 and east of NACS4; they were also heard calling just south and east of NACS5. Three Western Chorus Frogs were heard calling from within 100m east of NASC3 and NASC5. They were also heard calling from within 100m southeast of NASC 5. Gray Treefrogs were heard calling from all three stations at low abundances, one to three individuals.

Surveys along the south side of the Conrail Drain (NACS6 and 11; Appendix B) documented five (5) anuran species: Spring Peeper, American Toad, Western Chorus Frog, Northern Leopard Frog, and Gray Treefrog. Breeding habitat just southeast of NACS6 supported only small populations of Spring Peeper, Western Chorus Frog, Northern Leopard Frog, Gray Treefrog, and American Toad. Two Western Chorus Frogs were heard calling from greater than 100m to the east. Only Gray Tree Frog was detected from the survey location in the central area of the property south of the Conrail Drain (NACS11). Other species such as Western Chorus Frog and Spring Peeper would likely have been detected if the location was included in the first round of surveys in April.

In central areas of the property south of the Conrail Drain (NACS12; Appendix B), only Gray Tree Frog was detected; in part because this location was included only after the first round of surveys. Despite being the only species detected, ponds in this area supported a high abundance of Gray Tree Frog. It is assumed that ponds in the slough forest east of NACS 12 also support other early breeding amphibians such as Spring Peeper and Western Chorus Frog.

Surveys within the south section of the property along Dorchester Road (NACS7, 8, 9, 10; Appendix B) documented five species: Spring Peeper, American Toad, Western Chorus Frog, Gray Treefrog, and Wood Frog. Spring Peepers were heard calling from NACS 7, 8, and 9; abundance ranged from a few individuals to a full chorus (north of NACS9). Many American toads were documented at NACS 8. Western Chorus Frog was very abundant just north of NACS9, but was recorded in low abundance across the other survey locations in this area of the property. Gray Treefrog were present along the southern border of the study area in low abundances. One Wood frog was heard calling north of NACS 9 at a distance greater than 100m.

3.2.5. BREEDING BIRD SURVEYS

A total of 67 species of birds was detected during the breeding bird surveys; 56 of these species were considered at least possibly breeding on the site. Nine (9) species were observed flying over the site only, and not considered breeding (Code 'X' – see Table 9), while two (2) species were categorized as migrants only: Blackpoll Warbler (*Setophaga striata)* and Wilson's Warbler (*Cardellina pusilla).* Of the 56 species of breeding birds, three of them are considered introduced (non-native): Rock Pigeon (*Patagioena livia*), European Starling (*Sturnus vulgaris*), and House Sparrow (*Passer domesticus*).

Of the remaining 53 species, four (4) are designated as Species at Risk (SAR): Eastern Wood-Pewee (*Contopus virens*), Acadian Flycatcher (*Empidonax virescens*), Barn Swallow (*Hirundo rustica*), and Wood Thrush (*Hylocichla mustelina*). Acadian Flycatcher is designated as "Endangered" at both a federal level and a provincial level, while Barn Swallow is considered "Threatened" at both levels (COSEWIC 2014, COSEWIC 2015, OMNRF 2015). Eastern Wood-Pewee is categorized as Special Concern at both federal and provincial levels and Wood Thrush is ranked as Threatened federally and Special Concern provincially (COSEWIC 2014, COSEWIC 2015, OMNRF 2015). An additional SAR – Chimney Swift (*Chaetura pelagica;* Threatened federally and provincially) – was observed foraging over the site, but not expected to be nesting on the property as no nesting habitat is present.

At a provincial level, 52 of the 53 native breeding species have been assigned an Srank of either S4 or S5 by the Natural Heritage Information Centre (NatureServe Explorer, 2015), indicating that their provincial populations are "apparently secure" or "secure", respectively (NHIC, 2015). The one exception is Acadian Flycatcher, which is ranked as S2S3, indicating that its provincial populations are considered Vulnerable.

At a regional level, 12 species – Northern Flicker (*Colaptes auratus*), Eastern Wood-Pewee (C*ontopus virens*), Acadian Flycatcher (*Empidonax virescens*), Willow Flycatcher (*Empidonax traillii*), Wood Thrush (*Hylocichla mustelina*), Brown Thrasher (*Toxostoma rufum*), Blue-winged Warbler (*Vermivora cyanoptera*), Eastern Towhee (*Pipilo erythrophthalmus*), Field Sparrow (Spizella pusilla), Savannah Sparrow (*Passerculus sandwichensis*), Rose-breasted Grosbeak (*Pheucticus ludovicianus*), and Baltimore Oriole (*Icterus galbula*) – have been designated by Ontario Partners in Flight as priority landbird species in Bird Conservation Region (BCR) 13 (Lower Great Lakes - St. Lawrence Plain) (OPIF, 2008); in Ontario, BCR 13 corresponds roughly with the area south of the Canadian Shield. The Ontario Landbird Conservation Plan, from which the list of priority landbird species was obtained, is a coalition of government agencies and organizations led by Environment Canada Ontario Region (EC) and the Ontario Ministry of Natural Resources and Forestry (OMNRF), in partnership with Bird Studies Canada (BSC).

At a local level, 36 of the 56 potentially native and non-native breeding species are considered common to very common within the Region of Niagara (Black and Roy 2010). The 20 exceptions are as follows:

- Uncommon – Wood Duck (*Aix sponsa*), Wild Turkey (*Meleagris gallopavo*), Sharp-shinned Hawk (Accipiter striatus), Cuckoo sp. (*Coccyzus sp.*), Great Horned Owl (*Bubo virginianus*), Red-bellied Woodpecker (*Melanerpes carolinus*), Hairy Woodpecker (*Picoides villosus*), Willow Flycatcher (*Empidonax traillii)*, White-breasted Nuthatch (*Sitta carolinensis*), Wood Thrush (*Hylocichla mustelina*), Brown Thrasher (*Toxostoma rufum*), Blue-winged Warbler (*Vermivora cyanoptera*),

Eastern Towhee (*Pipilo erythrophthalmus*), Field Sparrow (*Spizella pusilla*), Swamp Sparrow (*Melospiza georgiana*), and Scarlet Tanager (*Piranga olivacea*)

- Uncommon to rare – Orchard Oriole (*Icterus spurius*)
- Rare – Tufted Titmouse (*Baeolophus bicolor*)
- Rare and local – Yellow-throated Vireo (*Vireo flavifrons*)
- Extremely rare – Acadian Flycatcher (*Empidonax virescens*)

The Ontario Ministry of Natural Resources (OMNR, 2000) considers eight (8) of the species recorded as being area sensitive: Sharp-shinned Hawk, Hairy Woodpecker, Acadian Flycatcher, Yellow-throated Vireo, Tufted Titmouse, White-breasted Nuthatch, Savannah Sparrow, and Scarlet Tanager. This indicates that the species requires large areas of suitable habitat for its long-term survival and is therefore more sensitive to development.

For application of the Migratory Birds Convention Act (Government of Canada,1994a,b), 45 of the 56 species recorded as at least possibly breeding are protected by the Act. As such, it means that it is illegal to harm or kill these species, or to harm or destroy their nests and nesting habitat. The 11 species that are afforded no protection from the Act are Wild Turkey, Sharp-shinned Hawk, Rock Pigeon, Great Horned Owl, Blue Jay, American Crow, European Starling, Red-winged Blackbird, Common Grackle, Brown-headed Cowbird, and House Sparrow.

For application of the Endangered Species Act (ESA) (Government of Ontario, 2007) and the Species at Risk Act (SARA) (Government of Canada, 2002), five bird Species-at-Risk were detected on the site: Chimney Swift, Eastern Wood-Pewee, Acadian Flycatcher, Barn Swallow, and Wood Thrush. These five species are discussed below:

- Chimney Swift – Designated "Threatened" in Ontario and Canada; one bird was recorded foraging overhead at PCS 29; this species was not considered to be breeding on the site as no suitable nesting habitat (e.g. chimneys) is present within it. There are likely suitable chimneys for breeding in nearby areas, accounting for the presence of this foraging bird.
- Eastern Wood-Pewee – Designated "Special Concern" in Ontario and Canada; at least single birds were heard at 13 PCS's during the surveys; two of these stations had multiple birds singing and three additional birds were detected between stations.
- Acadian Flycatcher – Designated "Endangered" in Ontario and Canada; one bird was heard singing at PCS 28 on May 29; it was not subsequently observed so this bird would not be considered territorial.
- Barn Swallow – Designated "Threatened" in Ontario and Canada; one bird was seen foraging west of PCS 7 on May 28. There is no suitable breeding habitat (e.g. barns, bridges) and limited foraging habitat available on the site. There are suitable structures for breeding in the general vicinity so this species may occasionally be present foraging in any open habitats.
- Wood Thrush – Designated "Threatened" in Canada and "Special Concern" in Ontario; this species was recorded at 18 PCS's, with three of the PCS having multiple birds. Three additional birds were detected between or beyond the point count stations.

Additionally, Whip-poor-will was not detected during nocturnal surveys that took place on the night of May 28th, 2015, despite being conducted during the peak calling window for 2015; the peak window for detecting Whip-poor-will in 2015 was May 25th to June 2nd.

For full details on the breeding bird surveys for this site, please see Table 9.

3.2.6. BAT ROOST HABITAT

The calculated standing snag density at 19 of 34 plots was found to exceed the Significant Wildlife Habitat guideline criteria for Bat Maternity Roost habitat (10x25cm dbh snags/hectare) (OMNRF, 2000). Densities ranged from 0 snags/ha to 60 snags/ha. The majority of plots (19 of 35) contained 20/ha or more snags of 25cm dbh (or greater) (Appendix I).

Density averages for all plots within each polygon were calculated, which identified 6 of 12 polygons as having a sufficient number of snags to be consistent with SWH Bat Maternity Roost habitat (OMNR, 2000). Furthermore, the density of snags that are present within the woodlands on the subject property based on the survey results suggest that potentially suitable species-at-risk (SAR) bat habitat is present. Acoustic monitoring to determine presence of SAR bats on the subject property was not within the scope of work for the secondary plan EIS; next steps are discussed further in the section dealing with environmental impacts, and environmental management recommendations for Bat Roost Habitat.

3.2.7. INCIDENTAL SPECIES

Two additional bird species were detected during other field surveys that are likely breeding. American Woodcock (*Scolopax minor*) was heard calling during nocturnal amphibian surveys on April 19, 2015; it was near nocturnal amphibian station 6. A Wilson's Snipe (*Gallinago delicata*) was observed near pond 6 during salamander surveys on April 10, 2015. Neither of these species are considered SAR; both are common and widespread in southern Ontario. American Woodcock is considered common locally, while Wilson's Snipe is considered uncommon (Black and Roy 2010).

An unidentified owl (possibly Barred Owl, *Strix varia*) was observed on April 10, 2015; this species has no breeding status in Niagara Region (Black and Roy, 2010). No owl calls were heard during subsequent evening site visits for amphibian surveys (April 19th, May 28th, June 24th, 2015). Given the relatively early spring date, it could have represented a spring migrant.

An unidentified turtle (likely Snapping Turtle, *Chelydra serpentina*, based on size) was observed by George Coker in the large pond in polygon 24 (Map 2) on June 11th, 2015 while conducting aquatic surveys of the site.

Other species and/or signs of species (e.g. tracks) that were observed while conducting site visits included:

- Coyote (*Canis latrans*)
- White-tailed Deer (*Odocoileus virginianus*)
- Eastern Chipmunk (*Tamias striatus*)
- Grey Squirrel (*Sciurus carolinensis*)
- Raccoon (*Procyon lotor*)
- Eastern Gartersnake (*Thamnophis sirtalis sirtalis*)

3.2.8. AQUATICS

3.2.8.1. SHORELINE

While not part of the subject property, the flattest and lowest areas along the shore of the Welland River, between the river shoreline and Dorchester Road, were examined in detail for Northern Pike spawning areas on April 11th, 2015 (Appendix B). While there were shallow wet locations in this area, the shoreline was not overtopped by the adjacent river to provide access for Northern Pike, nor was there any evidence that overtopping had occurred recently (Photographs 1 and 2). This area was examined briefly during all subsequent site visits, and on no occasion was the bank overtopped or was there evidence of recent overtopping. Therefore it appears that this area did not provide Northern Pike spawning habitat in 2015, though there may be some potential spawning locations in shallow nearshore areas with dense rooted aquatic macrophytes in the Welland River.

3.2.8.2. WATERCOURSES

There are three main watercourses that provide potential access routes for fish from the Welland River and the Power Canal into the interior of the subject property. Watercourse 1 is approximately 212 m long and begins at an old concrete culvert outfall, which is believed to convey flows from a network of legacy pipes that drain surface water, via inlets and broken sections, from the elevated south-central portion of the subject property. The outfall, at the base of an embankment, feeds a small marsh pocket about 30 m long and 13 m wide, which drains through a shallow, 4 to 5 m wide, mud-bottomed watercourse (Photograph 3) to the Welland River. This watercourse appears to be a dug drainage ditch. It has a gentle gradient and in early April it had approximately 10 cm of water depth, which had dwindled to a few centimetres by June 11th, 2015 and was dry when examined on October 6th, 2015. Near its downstream end at its culvert beneath Dorchester Road, it has emergent and submergent aquatic macrophytes (Photographs 4 and 5). Due to the low flow velocity and abundant aquatic plants in its lower section near the Welland River, as well the low gradient connection to the marsh at its upstream end, it is thought that this watercourse represents the best potential Northern Pike spawning habitat within or immediately adjacent to the subject property. Therefore, it was targeted twice for spawning observations (April 11th and 21st, 2015), and electrofished twice (June 11th and October 6 th, 2015) in search of young-of-the-year (YOY) Northern Pike (Table 10). No spawning Northern Pike, or young-of-the-year, were observed.

Watercourse 2 appears to originate within the Thundering Waters Golf Club grounds, northeast of the subject property. On all field investigations in 2015 there was flowing water in Watercourse 2: estimated at 15 L/s on April 12. When Watercourse 2 first enters the subject property it is a straight mud channel, approximately 140 m long, that has been historically channelized (Photograph 6). It then passes through a 70 m long culvert beneath the entrance of a derelict industrial site, but it is not perched at the downstream end and may not be a barrier to the upstream movement of fish. For 104 m downstream of the culvert the watercourse appears to be straightened with rip-rap along much of the banks. For the remaining 816 m to its confluence with the Welland River, Watercourse 2 appears to be a natural meandering channel set within a small valley feature. The upper 634 m of this 816 m long section has a fairly uniform, shallow, clay/mud channel (Photograph 7). Coarse material mixed into the clay/mud substrate occurs where the watercourse passes the end of Don Murie Street, which may be the source of this material, and continues to occur in the channel for approximately 100 m downstream (Photograph 8). Downstream of this coarse material, the remaining 94 m of Watercourse 2, to its confluence with the Welland River is dominated by soft clay mud.

Northern Pike, nor any other fish, were not observed when Watercourse 2 was walked along its entire length in April 2015. There were no accessible wetlands along Watercourse 2, or any aquatic vegetation within the channel, that could be used for Northern Pike spawning. The general lack of instream cover within the largely featureless channel of Watercourse 2 likely contributes to the lack of fish observed. The clay/mud substrates through most of the watercourse would not provide spawning habitat for White Suckers or any of the other common fishes that spawn in flowing waters over coarse substrate. The only exception to this is the short section of channel with coarse material near the downstream end of Watercourse 2, but no spawning fishes were observed here even though the water temperature was 12.2°C on April 21, which is within the range for White Sucker spawning (Scott and Crossman, 1973), and the White Sucker spawning run was well underway at locations in the Hamilton area. No fish were captured by electrofishing on June 21, even though a significant length of stream was fished. However, low numbers of six species, including YOY White Sucker, were captured in the same watercourse section on October 6, 2015 (Table 10). It is not known if the YOY suckers were spawned in this watercourse, or were spawned at some off-site location and have come to occupy this watercourse as a way of avoiding predatory fishes in the Welland River.

The Conrail Drain (Watercourse 3; WC3, Map 2), is a deep, straight, artificial channel, lined with rip-rap along its entire length (Photograph 9). There was some flow observed here during every field investigation in 2015, with, as expected, the highest flow in April and the lowest in October. Some sections of the watercourse had only interstitial flow through the rip-rap channel liner, which would severely inhibit the movement of large fish if they were to occur here. However, it is not expected that larger fish can move into this watercourse from its mouth at the Power Canal, because the steeper-sloped channel in this location, combined with failing and thick gabion rock baskets and the rooted vegetation through which all but the highest flows likely pass, will block upstream movement of large fish (Photograph 10). It was not expected that a diverse fish community could exist under the observed condition of Watercourse 3, and electrofishing only captured Brook Stickleback (Table 10).

Watercourses 4 and 5 are short and have ephemeral flow, and do not appear to have a surface connection to the Power Canal.

Large areas of shallow surface water were observed within the subject property during April. These areas were inaccessible to fish, in particular Northern Pike which can utilize such habitats for spawning, and most were dry by June. One isolated pond was observed to remain permanently wet through 2015 and to support a community of aquatic plants, but no fish were captured (Table 10).

In summary, watercourse features that provide fish habitat are largely restricted to Watercourse 2 (WC2, Map 2). The fish captured during this investigation are considered common and not at risk in southern Ontario. Most of Watercourse 1 (WC1, Map 2) upstream of Dorchester Road provides seasonal, relatively unproductive, non-spawning habitat for fish. Watercourse 2 (WC2, Map 2) is a largely natural watercourse with permanent flow within a small valley feature. While habitat is generally simple and unproductive, it is presently unclear if it provides limited spawning habitat for off-site fishes; retention will likely be required. Watercourse 3 (WC 3, Map 3) is a constructed drainage ditch that provides no spawning habitat for off-site fishes, nor can it be accessed by large off-site fishes. It is relatively unproductive and only supports a sparse population of Brook Stickleback. Watercourses 4 and 5 (WC4 and WC5, Map 2) are not considered fish habitat at this time. The numerous shallow upland wet areas observed in April appeared to all be isolated from fish-occupied waters, and therefore are not expected to contribute to fish habitat on the subject property.

4. ECOLOGICAL CONSTRAINTS AND ENVIRONMENTAL MANAGEMENT PRINCIPLES

The findings from the Natural Heritage Characterization Assessment provided the context for the environmental management strategy for the Secondary Plan area. The strategy considered the use of the mitigation hierarchy (i.e. avoidance, minimization, mitigation/rehabilitation, and compensation) to outline anticipated impacts that may result from the proposed land use, servicing, and transportation scenarios.

Four core strategies were proposed as a means to guide the process of developing an effective environmental management plan to address the sensitivities and functions of the identified natural features and species within the Secondary Plan area:

i) Consolidate and complement the existing protected areas where important natural features are adjacent to and contiguous with the PSW/EPA boundaries (e.g. mature woodlands/trees and/or habitat for species of conservation concern).

ii) Promote opportunities/functional linkages of protected areas using a combination of natural and anthropogenic corridors.

iii) Identify areas on-site that provide practical opportunities for enhancement and/or compensation for natural areas that will be impacted in the context of future urban uses.

iv) Outline appropriate inventory and monitoring methods to assess the environmental management strategy objectives and targets and establish adaptive measures.

To address the natural heritage features and species that are likely to trigger provincial and municipal policy, direction on the first three principles outlined in the foregoing is summarized in Table 11. Mitigation recommendations are provided, as well as key considerations in developing the environmental management strategy. Environmental management areas are identified on Map 3. The three categories presented include primary, secondary, and tertiary management areas. Primary management areas included features of the highest constraint (i.e. PSW wetlands). Secondary areas included non-PSW wetlands, deciduous forest, and cultural woodlands. Tertiary areas included early successional habitats, cultural plantations, and proposed buffer areas.

Natural features that are identified as avoidance areas include the slough forest wetlands designated as Provincially Significant Wetland (PSW) and Environmental Protection Areas (EPA) in the City's Official Plan (OPA 96, Schedule A). In addition to the protected PSW/EPA areas, buffers are recommended based on NPCA requirements, addressing factors such as feature sensitivities, functional linkages (e.g. hydrology and wildlife corridors) to adjacent lands, and proposed land uses. Additional lands and/or natural heritage elements outside of the PSW/EPA that complement the natural features that occur within the PSW/EPA, provide significant wildlife habitat, and/or provide important ecological linkage functions, are recommended for protection and/or management.

The natural heritage elements and preliminary policy triggers that have been documented on the property and are present in Table 11, include the following:

- Provincially Significant Wetland Slough Forest
- Watercourse 1 and 2 and associated floodplain (WC1 and WC2, Map 2)
- Endangered/Threatened Species at Risk and their associated habitat
- Old growth/Mature Forest Habitat
- Shrub/Early Successional Bird Habitat
- Bat Maternity Roost Habitat
- Mast Tree Habitat
- Amphibian Breeding Habitat (Woodland Type)
- Habitat for Provincially Rare and/or Species of Special Concern (Schreber's Aster, Honey Locust, Eastern Wood-Pewee, Wood Thrush, and Snapping Turtle)
- Reptile Hibernacula
- Deer Winter Congregation Areas
- Rare Vegetation Communities
- NPCA regulated wetlands
- ECA woodlands

To document the proposed approach to managing the identified natural heritage features and elements present on the property, a series of Environmental Management Principles were developed to help guide the process (Appendix J). The environmental management principles were reviewed by the Secondary Plan Steering Committee and provide direction on recommended methods for rationalizing a natural heritage system on the property that protects EPA areas and, to the extent possible, provides for representation of the natural heritage features, habitats, and elements outlined above.

The environmental management principles are also used as method to evaluate potential impacts arising from the proposed land use plan, recommendations for enhancement, and recommendations for compensation.

These environmental management concepts were also incorporated into five overall principles that were presented to Niagara Falls City Council on April 26th, 2016. Council supported the preparation of a Secondary Plan based on the five principles as well as input from received from the public and agencies. The principles are outlined in more detail in the next section.

5. ENVIRONMENTAL MANAGEMENT PRINCIPLES AND IMPACT ASSESSMENT

Impacts to natural features that are present on the subject property are addressed in light of the Environmental Management Principles that were reviewed by the Thundering Waters Secondary Plan Steering Committee, and incorporated into the overall principles supported by Niagara Falls City Council as the basis for preparation of the Secondary Plan. The Environmental Management Principles provide guidance on natural heritage features and elements that should be considered for protection and/or representation within a proposed Natural Heritage System (NHS) on the subject property. The key directions were provided under five sections:

1. Recommendations for protection
2. Opportunities for enhancement
3. Special consideration areas
4. Integration with built form
5. Implementation and permitting considerations

Potential impacts and recommendations for environmental management are addressed explicitly under recommendations for protection. Additional NHS elements considered under this section included opportunities for linkages to onsite and offsite natural heritage features. Impacts to the natural heritage features and elements are identified. Opportunities for mitigation are recommended. Where mitigation recommendations cannot fully address impacts, and residual impacts are anticipated, recommendations for follow-up study and compensation planning are proposed that they be addressed during future stages of planning, in conjunction with submission of draft plans of subdivision.

The subsequent sections relating to opportunities for enhancement, special consideration areas, integration with built form, and implementation and permitting considerations, are presented from the Environmental Management Principles report and are intended to provide direction when preparing draft block plans.

5.1. RECOMMENDATIONS FOR PROTECTION

The impacts to natural heritage resources summarized below are based on the land use plan provided to D&A on May 20th, 2016. The impacted areas were calculated in GIS by overlaying the block plan onto vegetation community mapping in the D&A ELC layer. Where development blocks overlap with natural heritage features, it is expected that complete removal of the features would occur (i.e. direct impact).

Table 12 provides a summary of the existing land cover (ELC Community Series) that is anticipated to be impacted by the proposed land use plan (Map 3). Impacted areas include those directly lost for the proposed change in land use. Under the proposed land use plan, the total area to be directly impacted would be approximately 96 ha (Table 12). These losses are primarily within cultural vegetation community types (meadows, plantation, thickets, and woodlands) and existing anthropogenic lands (68 ha). In terms of total area removed, the vegetation communities most heavily impacted include

Cultural Woodlands (33 ha; 75% reduction), non-PSW Deciduous Swamp (24 ha; 82% reduction), and Cultural Thickets (23 ha; 96% reduction). This is followed by impacts to Cultural Meadow (8 ha, 87% reduction), Deciduous Forest (2 ha; 35% reduction), PSW Deciduous Swamp (1.3 ha, 2% reduction), and Coniferous Plantation (0.3 ha; 100% reduction).

The following sections outline impacts that are anticipated given the removal of the various vegetation types. Potential impacts are identified, along with proposed mitigation and/or compensation measures to address impacts.

5.1.1. PROVINCIALLY SIGNIFICANT WETLAND SLOUGH FOREST

Potential Impacts

Much of the study area contains the Niagara Falls Slough Forest Wetland Complex Provincially Significant Wetland (NFSFWC) which consists of series of wetland patches within and outside of the study area. The PSW boundary within the study area was investigated based on NPCA mapping, and delineated by D&A during 2015; a site visit was also conducted with MNRF and NPCA biologists to verify the delineated wetland boundary. MNRF provided confirmation of the proposed updates to the PSW boundaries for the study area on May 16, 2016 (Joad Durst, personal communication).

The largest wetland unit (polygon 5, Map 2) is located northwest of the of the rail line and is an Oak Mineral Deciduous Swamp (SWD1) with prominent slough features; the second largest (polygon 27) is located south of the rain line and contains the same vegetation community and similar slough features. Six other wetland units are located south of the rail line; four (polygon 20, 21, 23, and 24) are Oak Mineral Deciduous Swamp (SWD1) and two (polygon 31 and 32) are Willow Mineral Deciduous Swamp (SWD4-1). Two wetland units (polygon 3 and 4) are located along the western edge of the study area and are Pin Oak Mineral Deciduous Swamp (SWD1-3). PSWs are defined as Environmental Protection Areas (EPA) under Niagara Region's environmental policies.

Based on the proposed land use plan, the majority of the PSW features will be protected. Encroachment of the PSW boundary would occur in two polygons (27 and 32) where areas along their northern edges are proposed for removal to accommodate an arterial road that will connect with Ramsey Road to the east. The result is approximately 0.7 ha of removal in polygon 27, and approximately 0.6 ha in polygon 32.

Development and associated activities that occur on lands adjacent to the PSW areas may result in indirect impacts that result from changes to underlying functions, and proximity effects such as disturbance along edges and encroachment by humans. These may include:

- Alterations to water balance;
- Introduction of non-native invasive species;
- Avoidance behaviour of wildlife;
- Reduction of interior forest habitat;
- Increased sedimentation and erosion;
- Reduction in water quality;
- Noise, light, and chemical pollution;
- Loss of habitat;

- Loss of significant wildlife habitat (SWH);
- Loss of provincially, regionally and/or locally rare species; and
- Anthropogenic disturbances and encroachment

Environmental Management Recommendations

Potential impacts to the PSW features can largely be mitigated through developing outside of the PSW and implementation of a sufficient buffer between the PSW and all development activities. The volume and quality of water entering the wetland units should remain the same as pre-development conditions, and/or be improved. Use of Low Impact Development (LID) best management practices such as permeable pavement, bioswales in addition to stormwater management facilities, can aid in achieving no impact to water balance, and/or water quality (and will be addressed through the Storm Water Management Report being prepared by Amec Foster Wheeler). Best management practices for sediment and erosion control should also be implemented to reduce the potential for sediment and erosion impacts to the PSW features. Revegetation of any cleared area with appropriate native species will help to reduce erosion and limit the introduction of non-native invasive species.

Buffers between the PSW and residential/commercial development areas are generally recommended to be 30m; the spatial separation between protected features and built environment will help to reduce the risk of impacts related to encroachment, and disturbance to hydrological functions. This distance is also the recommended setback to preserve the vernal pool envelope that is the most critical wildlife foraging habitat, as well as the area that supports the hydrologic functions for maintaining water balance (Calhoun and Klemens, 2002). Reduced buffers of 15m are recommended for locations where the proposed office business blocks (Blocks 12 and 13, Map 3) have been sited; the built form of these areas is expected to provide a lower coverage of impermeable surface and allow for open design elements (e.g. horticultural plantings) that can be placed adjacent to buffer areas. To further mitigate the potential for impacts to PSW/EPA features adjacent to these blocks, a 15m interface zone between the proposed development and the buffer area is proposed.

Water balance and water quality for protected wetlands will be maintained to pre-development conditions. This may be achieved through LID best management practices including, but not limited to, limiting impermeable surfaces in developed areas, implementing sediment and erosion control measures, and revegetation of cleared area with native species (CVC, 2012). The recommended buffer areas may also provide opportunities for managing potential disturbances to water balance and water quality. For example, swale systems within the buffers could be designed to ensure that surface flows are managed to address water balance concerns. Additionally, vegetated buffers can reduce the risk of contaminants such as heavy metals, salt, and pesticides reaching vernal pools (Boone and Pauli, 2008).

Ensuring that the quality of vernal ponds in the protected slough forest is maintained is critical to the long-term sustainability of the protected system. Many plants and wildlife that are present within the slough forest are entirely dependent on the vernal pool features (e.g. plants and wildlife that are only found in the vernal ponds) or seasonally dependent on the pools for critical life stages (e.g. breeding habitat for frogs, toads, and salamanders). Three zones of management are suggested as a BMP to improve the potential for maintaining high quality vernal pool systems in urbanizing environments (Calhoun and Klemens, 2002; Windmiller and Calhoun 2008): the pond depression, the vernal pool envelope (adjacent 30m), and the critical terrestrial habitat zone (30m to 230m). The first and second zones are the most critical for protecting key aspects of vernal pool ecology and are thus

recommended as zones with no development. The third zone has more flexibility, suggesting that when development is less than 25% of the area, impacts to vernal pools will be low. Where this is not feasible, additional design considerations are recommended that would reduce the risk to wildlife such as amphibians, can be applied to the development block to mitigate impacts. For the proposed project, the 30m buffers, and the 15m buffers with additional 15m interface design requirements will help to ensure that vernal pools and their adjacent 30m envelopes are protected. The 230m critical terrestrial habitat zone will be protected for vernal pools that are located in the interior areas of the PSW/EPA. For other ponds located near the edge of the protected wetlands, the 230m management zone extends onto the adjacent development blocks. Where this is the case, best management practices for storm water management should be implemented to ensure runoff from urban areas does not flow directly into pond habitats. Additional considerations should be incorporated into block designs within the 230m area that facilitate wildlife movement (e.g. use of culverts, eco-passages, and/or curb designs that allow small wildlife to negotiate road crossings and other barriers).

Indirect mitigation approaches that will help to minimize impacts includes education of residents on the types of vegetation and wildlife present within the protected wetlands areas, its ecology and sensitivities; approaches that involves information brochures and nature interpretation boards could be used to reduce encroachment and other indirect impacts that often occur when natural areas become more accessible to humans.

5.1.2. WATERCOURSES AND ASSOCIATED VALLEY AND FLOODPLAIN

Potential Impacts

Watercourse 1 (Map 2) is a 4 to 5 m wide low gradient channel that is likely a dug ditch that has since partially naturalized. In 2015 it contained shallow water along its length in the spring, but was dry when examined on October 6, except at its downstream end where it is backwatered from the Welland River, and at the culvert mouth which is its upstream source. Instream aquatic habitat is generally poor due to the complete lack of coarse substrates and lack of water. The lack of coarse substrates limit the extent to which fish from the Welland River will utilize this watercourse for spawning or feeding, however, 4 Emerald Shiners were captured at its upstream end, and some unidentified small-bodied fish species were observed at about the channel mid-point during one site visit. Five common species of fish were captured downstream of the subject property near the Welland River. No large-bodied fish species were observed, though there seemed to be some potential for Northern Pike spawning in the extreme downstream end of the watercourse. Watercourse 1 is not expected to be affected by the proposed land use plan.

Watercourse 2 (Map 2) represents the most natural permanently flowing watercourse within the subject property. However, instream habitat is generally poor due to the almost complete lack of coarse substrates. The lack of coarse substrates also limit the extent to which fish from the Welland River will utilize this watercourse for spawning or feeding. No large-bodied fish species were observed, including during the Northern Pike and White Sucker spawning period. Six species of common fish have been captured here, including young-of-the-year White Sucker. It is unknown if the White Sucker were produced in this watercourses, or have moved into the watercourses from the Welland River.

Watercourse 2 is located in the eastern most portion of the study area, where it flows south to the Welland River through an industrial area and valleyland (Map 2). The valleylands, including the

watercourse and floodplain, are policy triggers in the Provincial Policy Statement and Conservation Authorities Act (Government of Ontario, 2013), while the watercourse is also protected under the Fisheries Act (1985).

The industrial area and a northern portion of the valley, including Watercourse 2 and PSW, fall within block B12 (Map 3). A road bordering Blocks B08, B09, and B13 also encroaches on the western edge of the valleylands, and may result in indirect impacts to several small portions of the PSW and adjacent valleylands that support the watercourse function (Map 3).

Watercourse 3 (i.e. the Contrail Drain) is a completely artificial trapezoidal armoured drainage feature that bisects, but is not part of, the subject property. Large-bodied fishes cannot access this channel due to the interstitial flow through the rip-rap substrate and dense beds of invasive Common Reed, plus the debris barriers near its downstream end. Brook Stickleback, in low numbers, has been the only fish species captured here. Based upon the above, this watercourse is an artificial drainage feature and should be classed as MNRF Type 3 fish habitat.

Watercourses 4 and 5 (Map 2) have ephemeral flow, and do not appear to have a direct surface connection to the power canal. Watercourse 4 is seasonally wet on the subject property, and since it is within the retained wetland area (polygon 5) it will not be impacted by the proposed development. Based upon the above, this watercourse is classed as MNRF Type 2 fish habitat, requiring a minimum buffer of 15 m (Map 2).

Watercourse 5 (Map 2) is poorly defined on the subject property, is dry most of the time, and is isolated from downstream habitats, and is therefore not considered fish habitat. Watercourse 5 will be eliminated by the proposed development, and its drainage function will be incorporated into the general future site drainage.

With no apparent fish communities in either Watercourse 4 or 5, and no potential for fish to move into these watercourses from downstream habitat, they would not be considered fish habitat under the Fisheries Act.

Environmental Management Recommendations

Based upon the characterization of Watercourse 1, it is classed as MNRF Type 2 fish habitat, requiring a minimum buffer of 15 m.

Based upon the characteristics of Watercourse 2, it is classed as MNRF Type 2 fish habitat, requiring a minimum buffer of 15 m. As the watercourse is surrounded by adjacent wetland features with a 15m buffer, the watercourse buffer requirements have been met.

Where watercourse crossings are necessary, the location(s) that minimize potential impacts should be assessed based on existing habitat condition, associated floodplain, and associated vegetation communities in the adjacent valley land. Where impacts are unavoidable, mitigation and/or compensation strategies could be developed in consultation with the NPCA, and submitted to the Department of Fisheries and Oceans for permitting if fish or fish habitat are impacted.

Opportunities for improvements exist for Watercourses 1 and 2 (WC1 and WC2, Map 2). For Watercourse 1, reconstruction of the channel to be narrower (and thus deeper), as well as the addition of coarse substrate, may encourage utilization by spring spawning fishes. For Watercourse 2, the upper portion of the watercourse has a 74 m long section of buried channel, plus a 162 m section of straightened channel. Both could be rehabilitated to a natural channel form, thus increasing the quality and quantity of fish habitat. Additionally, coarse substrate could be added to portions of the watercourse to diversify general instream habitat and provide spawning substrate for potential resident and migratory fishes.

5.1.3. ENDANGERED/THREATENED SPECIES AT RISK AND ASSOCIATED HABITAT

Potential Impacts

Three species that are designated as endangered or threatened were observed within the study area: Acadian Flycatcher (*Empidonax virescens*) (Endangered), Barn Swallow (*Hirundo rustica*) (Threatened), and Chimney Swift (*Chaetura pelagica*). Acadian Flycatcher was observed during the initial breeding bird survey, but not detected on subsequent visits. Chimney Swift was observed foraging over the property; no nesting structures are present.

One Barn Swallow (*Hirundo rustica*) was observed foraging over the Conrail Drain during breeding bird surveys in 2015. Habitat suitability for Barn Swallow breeding within the study is considered to be low and no evidence of breeding activity was detected during field surveys. Potential nesting habitat exists within and adjacent to the secondary plan area, particularly in culverts that are present along the Conrail Drain and other old bridge structures that are present in the area.

Breeding habitat for Barn Swallow is not expected to be lost during site development. Although nesting was not observed during surveys in 2015, prior to any development nest surveys should be conducted to determine if nesting is occurring in or near culverts and bridges that are located on the property. Some foraging habitat for Barn Swallows may be lost and local insect populations may be reduced as a result of the proposed development; this may reduce foraging habitat occupancy by Barn Swallows within the study area. The nearby Welland and Niagara rivers, along with adjacent riparian wetlands are expected to continue to serve as the primary local foraging habitat for Barn Swallows.

Environmental Management Recommendations

As habitat for endangered or threatened SAR was not observed in the study area, mitigation or compensation measures are not currently required. Should active nests for Barn Swallow be found near the time of development and be impacted, the regulations for Barn Swallow under the Endangered Species Act allow for nest habitat compensation that achieves overall benefit through constructing nesting structures that can be placed in nearby suitable habitat (e.g. near the Welland River). The Welland Power Canal, Welland River and adjacent riparian wetlands are expected to provide the majority of local insect production for open country insectivores such as Barn Swallow. The impact to highly enclosed swamp habitat within the study area is not expected to contribute to the loss of breeding or foraging habitat for Barn Swallow.

5.1.4. HABITAT FOR PROVINCIALLY RARE SPECIES AND/OR SPECIES OF SPECIAL CONCERN

Potential Impacts

Two provincially rare plant species were identified within the study area during field site surveys in 2015; Schreber's Aster (*Eurybia schreberi*) and Honey Locust (*Gleditsia triacanthos*). These species both occur within the Provincially Significant Wetlands (PSW); Schreber's Aster within the mature central deciduous swamp and Honey Locust along the floodplain of Watercourse 2 (Map 2). Based on the proposed site plan, no development is to occur in or near the known locations of these species. However, Schreber's Aster is likely to occur in upland pockets throughout the PSW, and therefore may be impacted where intrusions into the PSW and adjacent mature forests are proposed. Two additional rare species are known from the study area or nearby similar habitats; Black Gum (*Nyssa sylvatica*) and Round-leaved Greenbrier (*Smilax rotundifolia*). These species are also most likely to occur within the PSW areas and mature deciduous forest and swamps.

Additionally, Black Gum is known from historical records to occur within the secondary plan study area. Targeted surveys for Black Gum were conducted during 2015 in areas where this species was putatively documented during previous studies of the site (i.e. associated with ELC polygons 3, 4, and 5); no individuals were observed. Although D&A have not yet confirmed the presence of this species in the study area, it is likely present, albeit in low numbers. Habitat for Black Gum in Ontario is typically associated with low wet areas (Government of Ontario, 2014; Burns and Honkala, 1990). Areas outside of the PSW/EPA wetlands that that have appropriate habitat for this species include polygons 12, 29, and 46.

Two bird species designated as Special Concern in Ontario were identified within the study area during 2015: Eastern Wood-Pewee and Wood Thrush. Both of these species utilize wooded habitats including upland forests and wetland swamps. Both species occur readily within the study area.

Wood Thrush typically prefers moist, mature deciduous and mixed forests that have tall trees and well-developed understory layers (Government of Ontario, 2015b; COSEWIC, 2012). These birds have an estimated territory of 2ha in Ontario (Freemark and Merriam, 1986), and prefer to nest in Sugar Maple or American Beech stands of moderate density where soils are mesic or xeric (Ouellet, 1974). Nesting sites tend to be in lowland areas with trees greater than 16m tall with a closed canopy of various deciduous tree species, a moderate subcanopy and a relatively open forest floor with moist soil and decaying leaf litter for foraging (Robbins et al., 1989; Evans et al., 2011). While these birds prefer to nest within large forests, they can also thrive in highly fragmented woodlands, but are less successful in landscapes fragmented by agriculture and wide linear corridors (Rich et al., 1994; Weinberg and Roth, 1998; Evans et al., 2011). In southern Ontario, the effect of the size of forested areas, ranging in size from 3-50ha, seems to be independent of the amount of adjacent housing surrounding the forest patches on the number of Wood Thrush (Friesen et al., 1995). For example, Wood Thrush breeding populations in a landscape only 14% forested by patches 3-140ha in size were found to be self-sustaining (Friesen et al., 1999). In addition, studies have confirmed that breeding densities of Wood Thrush are lower in forest patches within residential areas than in rural forests with no adjacent housing (Friesen et al 1995).

Eastern Wood-Pewee typically resides along forest edges and clearings within deciduous and mixed forests, often dominated by sugar maple, elm, and oak (COSEWIC 2013; Government of Ontario 2015a; Graber et al. 1974). These birds prefer intermediate and mature-aged stands with little understory vegetation, and generally occupy the mid-canopy layer (Government of Ontario 2015a). A study by Falconer (2010) in southern Ontario found that Eastern Wood-Pewee selected habitats with lower tree species diversity, less pines, and lower basal area, demonstrating that they prefer open habitats with less trees to provide them with optimal foraging ability. However, Falconer (2010) found that low-density mature trees greater than 40cm at breast height were found to be important for nesting selection in deciduous woodlands. In addition, many studies have established that Eastern Wood-Pewees may benefit from forest management practices such as selective harvest, as it creates open areas in the canopy which may provide for increased foraging ability (Clark et al. 1983; Wilson et al. 1995; Artman et al. 2001; Campbell et al. 2007; Greenberg et al. 2007; Burke et al. 2011). These birds have also been found to use dead branches as foraging perches, which may be considered another habitat requirement (Via 1970).

In southern Ontario, typical Eastern Wood-Pewee territory is approximately 1.8 ha in size, with no significant difference between deciduous forest and pine plantation habitats (Falconer 2010). Many investigations have determined that while the size of forest patches does not seem to impact habitat selection, forest stands adjacent to residential development including houses and roads tend to be less often used by these birds (Stauffer and Best, 1980; Blake and Karr, 1987; Robbins et al., 1989; Freemark and Collins, 1992; Desrochers et al. 2010; Friesen et al. 1995; Keller and Yahner 2007). For example, Friesen et al. (1995) found that 4ha woodlots without nearby housing supported more Neotropical songbirds on average than did 25ha lots located in urban areas.

Over 95 ha of wooded area will be retained, with polygon 5 being the largest (43 ha) (Map 2). The large area of protected woodland is expected to continue to provide suitable habitat for both bird species, and will maintain viable populations during post-development conditions. Where cultural woodland areas are developed, individual Wood Thrush and Eastern Wood-Pewee that are currently using these areas for nesting and foraging will be displaced. Of the two species, Wood Thrush is more likely to be impacted as the species tends to be susceptible to edge effects (i.e. at the boundary between forest and open areas) and it also prefers understory conditions with a higher density of shrubs and small trees. Therefore, the increase in edge habitat that is expected as a result of development is anticipated to result in a reduced local abundance of these species, but the local populations are expected to persist given the amount of wooded habitat that will be preserved.

Environmental Management Recommendations

Where disturbances to provincially rare plants, such as Schreber's Aster, are expected to occur, impacts can be mitigated through appropriate compensation actions such as salvaging and transplanting individual plants and seed collection. It is recommended that the detailed aspects of such a compensation plan be developed and submitted during the subdivision plan application process. Locations where compensation plants may be likely for Schreber's Aster are identified on Map 4.

Salvaging and transplanting mature tree species such as Honey Locust and Black Gum is not feasible. Therefore, where individuals of these species are present, it is recommended that they be protected

and incorporated into the subdivision block design where feasible. Tree savings plans should be developed and submitted during the subdivision plan application process for these species if they are found in areas that are proposed for development.

Compensation and/or enhancement plans to address impacts related to proposed development where Wood Thrush and/or Eastern Wood-Pewee habitat is present can be prepared. Enhancement of the understory communities in the protected PSW/ESA areas could be achieved through forest woodland management that emphasizes establishment of understory shrub habitats (for nesting), where the existing understory is either too open, or too dense. Addressing loss to Eastern Wood-Pewee habitat will require a longer-term solution, and should be considered along with tree compensation that is required under the Region's Tree and Forest Conservation Bylaw (By-law 30-2008). For both species, however, the proposed land-use plan is not expected to result in their loss from the site. The proposed compensation/enhancement recommendations will help address anticipated reductions in abundance.

In addition to species of Special Concern and provincially rare species, where regionally rare species are present outside of the protected wetland areas, compensation plans should be prepared in a similar manner. Similar to other rare plants, rare regional species can be salvaged and replanted in appropriate habitat that will be protected on-site.

5.1.5. OLD GROWTH/MATURE FOREST AND MAST TREE HABITAT

Potential Impacts

The bulk of old growth/mature forest and mast tree habitat will be protected within the PSW lands. Excellent specimens of large mature mast trees on the property include, but are not limited to, Red Oak, Pin Oak, Bur Oak, and Shagbark Hickory; many individual trees being over 50cm in diameter at breast height, and some over 100cm. Old-growth forest areas and mature trees are also present outside of the PSW, including individual and small stands of trees in ELC polygons 12, 13, 29, 30, and 46 (Map 2).

The proposed land use plan includes development areas that overlap with locations where individual and/or patches of old growth and/or mature mast trees are present. Removal of these trees would result in loss of important functional elements of the natural heritage system including but not limited to wildlife habitat such as nesting habitat, roosting habitat, cavity habitat, seed crops for food, and seed for re-colonization of young trees.

Environmental Management Recommendations

To identify old-growth habitat, mature trees, and mast trees that should be considered for protection, a tree saving plan should be conducted for the proposed development blocks that overlap with the ELC polygons where old-growth, mature trees, and/or mast trees are present; blocks where scoped tree savings plans are recommended for these areas and trees are identified on Map 4.

Recommendations for tree protection and compensation should follow the Niagara Region's Tree and Forest Conservation By-law.

5.1.6. SHRUB AND EARLY SUCCESSIONAL BIRD HABITAT

Potential Impacts

The presence of various bird species in the early succession vegetation communities on the property are consistent with indicators of shrub and early successional habitat defined as 'Significant Wildlife Habitat' (SWH) in Ecoregion 7E in Ontario. Several early successional indicator bird species are present (Brown Thrasher, Black-billed Cuckoo, and Field Sparrow) within a 15.7 ha block of cultural thicket (Polygon 16). The removal of this area will result in displacement of the various bird species and other wildlife that utilize this habitat type.

Vegetation present in this type of habitat is typically quite resilient to impacts, and can become re-established in disturbed areas (i.e. the vegetation present tend to be the first to colonize disturbed areas, and are therefore early successional). The characteristics of plants that are considered early successional makes them good candidates for re-establishment in buffers, and other restoration or enhancement areas where lands are currently disturbed, and/or will be disturbed during development.

Environmental Management Recommendations

To mitigate impacts associated with loss of this habitat, early succession shrubs, grasses, and wildflowers that are present in this habitat type can be incorporated into planting plans for buffers, interface areas (for example on blocks B12 and B13), and other open areas where planting plans are warranted. Additional opportunities are present along non-developed portions of the Conrail Drain, where planting early successional vegetation along the slopes will also reduce erosion risks, and help increase the linkage function of the Conrail Drain for wildlife. Details regarding the loss of early successional habitat and plant species can be addressed as part of a compensation plan to be submitted with plans of subdivision. Blocks where compensation for early successional habitat are recommended are identified in Map 4.

5.1.7. BAT MATERNITY ROOST HABITAT

Potential Impacts

Bat maternity colonies are poorly understood in Ontario and difficult to locate. They are typically associated with mature and over-mature forests containing suitable dead tree cavities, rock crevices and/or abandoned structures. As such, bat maternity colonies may be present in the mature woodland, swamp and forest habitat of the study area. In particular, as indicated by snag density surveys, potentially high suitability habitat occurs north of the Conrail Drain adjacent to the large northern PSW block (i.e. Polygons 1, 6 and 46).

These maternity colonies, if present, may be negatively impacted by development through direct habitat removal (woodland clearing), decreased insect availability (vegetation clearing and site filling) and increased anthropogenic encroachment into suitable habitat (i.e. PSW blocks).

Results from the cavity tree density surveys across the property indicate that most of the wooded areas are likely to contain standing dead trees that may provide suitable roosting habitat. As all of the proposed development blocks contain woodland areas, additional follow-up is required to determine whether or not cavity trees are being used by bats, and in particular bats that are designated as SAR.

Environmental Management Recommendations

Direction on recommended follow-up surveys for bat roost habitat was provided by the Guelph District MNRF (personal communication, Michelle Martin). Following adoption of the secondary plan, acoustic surveys for bats should be targeted in wooded areas to determine if SAR bats are present. Currently, the recommendations provided in this EIS are that acoustic surveys should be conducted in the vicinity of the best cavity trees within each proposed land use block; the scope of this recommendation may be updated in discussion with MNRF upon their review of the proposed secondary plan land use, and the results from the cavity tree density surveys. In cases where the land use plan does impact cavity trees that provide roost habitat for SAR bats, options regarding an overall benefit permit will need to be discussed and approved by the MNRF. Screening for SAR bats and development of overall benefit plans (if required) should be prepared and submitted prior to submission of plans of subdivision.

5.1.8. WOODLAND BREEDING AMPHIBIAN HABITAT

Potential Impacts

The vernal pool habitats within the slough forest complex provide excellent breeding habitat for woodland amphibians. Almost all of the pools within the PSW/EPA areas will be protected; there are some pools in the PSW/EPA areas that will be impacted by the arterial alignment that is proposed along the north edge of polygons 27 and 32 (Map 2).

Woodland breeding habitat is also present in the non-PSW wetlands areas on the property, and supports species such as Spring Peeper, Western Chorus Frog, Northern Leopard Frog, Gray Treefrog, Wood Frog, and American Toad. The extent of non-PSW wetland area proposed for development has been quantified (Table 12), but not the specific area of pool habitat that is present within these wetland areas. Where compensation plans are recommended to address impacts to amphibian habitat, site specific investigations should document the extent of pool areas that will be lost.

Environmental Management Recommendations

Disturbances to existing ponds in the PSW/EPA where roads are proposed should be minimized. Pools should be avoided where possible; where pools cannot be avoided, the foot print of disturbance should be kept to minimum. Timing of pre-grading and other construction activities can also minimize impacts if activities are done outside of key breeding periods (e.g. March to July). Standard best management practices for reducing the potential for erosion and sedimentation should be implemented.

Where amphibian habitat is present in areas of non-PSWs that are proposed for development, it is recommended that compensation plans be developed to address impacts. An amphibian habitat compensation plan should be prepared for the proposed blocks where impacts to amphibian habitat are anticipated (e.g. see C2 designations on Map 4). Details regarding the loss of amphibian habitat can be developed and submitted as part of a compensation plan to be submitted with plans of subdivision.

Whether wetland creation is a viable approach to compensate for impacts to amphibian habitat resulting from urban development is largely dictated by the surrounding landscape context. Many studies note that because of the limited dispersal ability of amphibians, larger wetlands located within suitable landscapes (i.e. with surrounding forest cover) tend to attract more dispersers than smaller ones in less suitable landscapes (Lehtinen and Galatowisch, 2001; Holzer, 2014).

Some studies of restored wetlands have shown that certain amphibians will begin to successfully use created wetlands rather quickly, often within several months of creation (Lehtinen and Galatowisch 2001). In a study of 12 created wetlands, Lehtinen and Galatowisch (2001) found that of 12 species found throughout reference sites and created wetlands, 8 were present in the latter within the first few months and many of these sites contained successful breeding populations. Another study by Brown et al. (2011) found that the large majority of created wetlands were rapidly colonized by American Toad, Bull Frog, Wood Frog and Spotted Salamanders. Additionally, Pechmann et al (2001) found that Spring Peepers colonized created ponds within a year, and Mole salamanders and Eastern Newts colonized within three years and persisted through the following four years of the study. In another example, Petranka et al. (2003) confirmed that seven amphibian species bred in 10 newly constructed wetlands within the first year (wetlands were created in autumn-winter and amphibians began breeding in February) and species richness reached equilibrium within two years. These authors also found that the annual turnover rate was approximately 25%, and that the created wetlands in their study supported more species than the reference ponds (Petranka et al. 2003). Their data also suggest that faunal monitoring for a period of 2-3 years is sufficient to classify species that will use the ponds for approximately the first decade post-construction (Petranka et al. 2003).

Compensation plans that are developed for the loss of amphibian breeding habitat should identify opportunities to create new vernal pools within the PSW/EPA areas, buffers, and/or other locations within the study area that are amenable. Although explicit areas within these features have not been identified in this EIS for restoration, enhancement, and/or compensation, opportunities may exist in the following locations:

- The northwest areas of polygon 5 (Map 2) where historical disturbances have altered the characteristics of the vernal pool system, and the mineral oak swamp is younger than in adjacent areas
- The south and central areas of polygon 27, where bermed areas and trails have impacted the characteristics of the vernal pool system
- Areas surrounding polygon 20 (including recommended buffers) that will also facilitate linkage, and can be linked to storm water management
- Areas adjacent to polygons 21, 23, and 24, including the recommended buffers and areas that are not practical for development

The proposed areas for compensation are only recommendations at this point; specific plans should be developed as part of the compensation plans that are recommended for blocks where the proposed development is anticipated to result in losses to amphibian breeding habitat.

5.1.9. REPTILE HIBERNACULA

Potential Impacts

Targeted surveys for reptile hibernacula were not required as part of the Terms of Reference. The number of incidental observations of snakes (Eastern Gartersnake) suggests that hibernacula are present within the study area. Where these features are present within the PSW/EPA areas they will be protected. However, there are likely other areas outside of the PSW/EPA that support reptile hibernacula. Given the difficulty in detecting such features, it is recommended that screening occur prior to pre-grading and other site preparation activities, and that construction crews be educated on impact avoidance to these species. Management should focus on rescuing and relocating snakes, should they be found during this period.

Environmental Management Recommendations

Management for potential impacts to snakes and snake hibernacula should focus on developing contingency plans that allow screening for, salvaging, and translocating snakes prior to, and during pre-grading and site preparation activities. Prior to pre-grading and site preparation activities, it is recommended that a qualified ecologist screen the proposed construction areas for reptile hibernacula, and individual snakes and turtles. Should hibernacula be observed, a management strategy should be developed to compensate for the loss of the features. Should individual snakes or turtles be observed, they should be collected and translocated to the protected PSW/EPA areas. The ability to salvage and translocate snakes and other reptiles will require securing various wildlife handling permits; this should be done well in advance of commencing pre-grading and other site preparation activities.

5.1.10. DEER WINTER CONGREGATION AREAS

Potential Impacts

Stratum II deer wintering area is identified across much of the study area. The removal of cultural woodlands across the property will reduced the extent of this habitat. Large areas however, will be preserved in the PSW/EPA areas and respective buffers. Additionally, linkage opportunities that facilitate deer movement will continue to be present on the property (see linkage areas on Map 4).

Environmental Management Recommendations

Environmental management recommendations are not required for addressing impacts to deer winter congregation areas for this site.

5.1.11. RARE VEGETATION COMMUNITIES

Potential Impacts

Three provincially rare vegetation community types were observed within the study area during field surveys in 2015:

- Pin Oak Mineral Deciduous Swamp (SWD1-3)
- Buttonbush Mineral Thicket Swamp (SWT2-4)
- Gray Dogwood Mineral Thicket Swamp (SWT2-9)

The Pin Oak Mineral Deciduous Swamp occurs primarily within the PSW/EPA areas, and will be protected. Approximately 3.9 ha of this community occurs outside the PSW within blocks A06 and B13 (Map 3), and will be directly impacted as a result. The majority of Buttonbush Mineral Thicket Swamps occurred as inclusions within the PSW, and will therefore be protected. The Gray Dogwood Mineral Thicket Swamps occurred as inclusions within both PSW and non-PSW wetlands. Where this community occurs within the PSW, they will be protected. Outside of the PSW, approximately 0.16 ha of this community type will be impacted based on the proposed development in block A06 (Map 3).

Environmental Management Recommendations

The Pin Oak Mineral Deciduous Swamp and Buttonbush Mineral Thicket Swamp communities are primarily associated with the PSW and will therefore be protected. Where these communities occur outside of protected areas (e.g. polygon 12, Map 2), a salvaging and relocation plan should be developed in collaboration with NPCA for provincially or regionally rare plant species associated with this. Relocation should target areas that will be protected, either within the PSW as enhancement and/or in other areas that are targeted for on-site compensation/restoration.

The Gray Dogwood Mineral Thicket Swamp communities are associated with non-PSW wetlands areas (example as inclusions in polygon 6, Map 2). Where this type of habitat is impacted, the extent of loss can be documented; the extent of loss will be incorporated into the buffer planting plans and on-site enhancement/compensation plans, with attempts to balance impacts. Additionally, shrub species such as Gray Dogwood and Button Bush can be incorporated into planting plans associated with SWM ponds, and revegetating enhancement areas within the Conrail Drain.

5.1.12. WETLANDS (NON-PSW)

Potential Impacts

The proposed land use plan identifies 14 development blocks and parts of the proposed road network that will encroach on nine non-PSW wetland features (Map 3). Wetland types that are proposed for development include Oak Mineral Deciduous Swamp (SWD1), Willow Mineral Deciduous Swamp (SWD4-1), and Green Ash Mineral Deciduous Swamp (SWD2-2). The total area proposed for development is approximately 24 ha. Loss of the various wetland features and functions are documented in other sections (e.g. amphibian habitat, bat roost habitat, habitat for Wood Thrush,

habitat for Eastern Wood-Pewee, etc). Although the loss of wetland area will reduce the availability of habitat for the various plants and wildlife that are present, negative impacts can be avoided and/or minimized through the various mitigation recommendations, and requirements to develop compensation plans.

Environmental Management Recommendations

The Niagara Peninsula Conservation Authority (NPCA) is authorized under Section 28 of the Conservation Authorities Act to implement and enforce the Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario Regulation 155/06). Relating to wetlands, permission to develop in wetlands can be granted under section 3 of Ontario Regulation 155/06; additionally, permission to develop in wetlands can be given with or without conditions.

As outlined in the various Environmental Management Recommendation sections above, where features and functions of wetlands are anticipated to be impacted, direction has been provided to complete additional site specific inventories (example for old-growth, mature, and/or mast trees), and compensation plans that outline specific strategies that will allow impacts to be avoided and/or mitigated. These plans have not been provided in this EIS, as the level of detail required is not within the scope for the secondary plan EIS. Instead, the detailed compensation plans can be scoped as a condition of approval when draft plans of subdivision are submitted. Compensation plans could take the form of various approaches, including but not limited to enhancement of existing on-site PSW areas and buffers, off-site compensation and enhancement (e.g. within the adjacent patches of the Niagara Slough Forest Wetland Complex Provincially Significant Wetland),

5.1.13. LINKAGES

Potential Impacts

Under existing conditions, natural features in the study area are well connected; the only intervening anthropogenic lands that may cause some barriers to wildlife movement are the Dorchester Road, Oldfield Road, Chippawa Parkway, the Conrail Drain, the existing rail line, the Thundering Waters golf course, and existing industrial lands. The proposed land-use plan will reduce the overall connectivity of the system, but will maintain linkage areas that facilitate connections between the core wetland areas (polygons 3, 4, 5, 27, 31, and 32).

Environmental Management Recommendations

To ensure core wetland areas are connected to onsite and offsite natural features, four linkage areas have been identified (Map 4). The first linkage area (L1) is located between the two largest PSW features (polygons 5 and 27). The proposed location connects the two wetland blocks with a 50m wide corridor in the vicinity of where the spur line to the Chemtrade property crosses the Conrail Drain; following the spur line would result in a shared 50m corridor between GR (CAN) Investment Co., Ltd lands and the adjacent golf course lands. The remaining linkage areas (L2 – L6) are provided primarily as locations where eco-passages should be incorporated into road designs. The second and third linkage areas (L2 and L3) are intended to maintain connectivity between polygon 31 (along the watercourse corridor), polygon 27, and polygon 35. The fourth linkage area (L4) recommendation is

located where a 30m buffer for polygon 3 and a proposed Storm Water Management block interface with Dorchester Road. The resulting linkage interface with Dorchester Road is approximately 80m, and is intended to provide connectivity to the wooded features along the banks of the Power Canal. The fifth and sixth linkage areas (L5 and L6) are intended to provide connectivity for small wildlife through the centre of the residential development. The linkage areas connect the cluster of polygons 21, 23, and 26 with polygon 25 to the north (L5), and to the Welland River to the south (L6). Specific design recommendations for the linkage corridors and eco-passages can be determined during a more advanced stage of planning.

5.2. OPPORTUNITIES FOR ENHANCEMENT AND COMPENSATION

Opportunities exist on the property to improve degraded areas that exist within protected areas, and to improve and/or establish new naturalized areas. This will help to offset reductions in green space that will occur within the developed areas of the property. The main objective will be consolidating the key areas, and maintaining/creating linkages among them. Opportunities include:

- Enhancement of degraded provincially significant wetland areas through recreating vernal pond habitats, removal of invasive species, and establishment of native understory species (in both wetland upland areas).
- Revegetation of areas that are currently anthropogenic/cultural that will not be incorporated into the developed area.
- Wetland creation in identified compensation areas to offset any loss of pond and wetland habitats and functions that are removed as part of the development lands.
- Revegetation of Stormwater Management Facilities and the Conrail Drain with a focus on early successional shrub habitats.
- Use of native plant species to revegetate of natural and anthropogenic corridors (created linkages).

5.3. SPECIAL CONSIDERATION AREAS

A number of existing human-made and natural elements on the subject property provide opportunities for maintaining and/or enhancing the ecological features and functions following development. These include, but are not limited to the rail corridor, the Conrail Drain, and individual trees.

- Rail Corridor – identify opportunities for natural heritage enhancements along the rail corridor setbacks; identify opportunities for eco-passages under the rail to facilitate long-term linkage opportunities for amphibians and other small wildlife
- Conrail Drain – identify opportunities for natural heritage enhancement within and along the Conrail Drain
- Individual Trees - large mature trees scattered across the site; where grading permits they should be identified during detailed site planning, and preserved if possible.

5.4. INTEGRATION WITH BUILT FORM

The built form of the proposed secondary plan area will include land-uses that support and/or complement feature and functions of the core and linkage areas. For example, Storm Water Management facilities, parks, and trail areas can provide opportunities for restoring native plant communities, creating habitat for wildlife, and other ecological functions. Recommendations include, but are not limited to:

- Buffers – use of buffers to ensure hydrological function of key features is protected and/or enhanced; allowance for trails within buffer areas to direct pedestrian movement and avoid encroachment into key features; allowance for variable width buffers depending on adjacent land uses and trail alignments
- Grading – identify opportunities to direct clean runoff into and/or away from the protected NHS to ensure local hydrologic conditions of vernal pools and ponds are not impacted; and identify opportunities to redirect clean runoff into vernal pool and other pond restoration areas
- Encroachment Management – ensure edge of NHS is demarcated using interpretative signs and fencing where necessary; manage to prevent hazards and strengthen edge characteristics
- Storm Water Management – identify opportunities for natural heritage enhancements within SWM blocks
- Trails – to the extent feasible, identify trail opportunities outside of the NHS; where entering the NHS, avoid core areas within the core features (i.e. existing vernal pools, most interior areas, mature old-growth areas); make use of dead-end trails; use boardwalks where feasible to avoid impacts to wetlands and compaction of forest floor
- Park Blocks – identify natural heritage enhancement opportunities within park blocks;
- Road Crossing Designs – where road crossings bi-sect corridor areas between core features, identify location and type of eco-passages that will facilitate movement of amphibians and other small wildlife
- Watercourse Crossing Designs – where watercourse crossings are proposed, ensure ecological linkage for wildlife is incorporated into design considerations

5.5. IMPLEMENTATION AND PERMITTING CONSIDERATIONS

Consideration of factors that reduce impacts during pre-development, construction, and post development phases will help with the successful implementation and long-term sustainability of the proposed NHS. Recommendations that are provided below outline considerations related to timing of disturbances, use of an adaptive management framework, and use of on-site plant materials for rehabilitation and restoration of degraded core areas, where compensation areas are identified, and within enhancement areas on built form land-uses:

- Avoid and/or minimize disturbance in and adjacent to defined NHS areas (particularly core features)
- Time development to avoid key life-history periods for wildlife (e.g. spring breeding of amphibians and nesting for migratory birds) and when soils on the site are saturated (e.g. following the spring melt)

- Initiate natural heritage enhancement and compensation works prior to development, and/or in-step with development phasing to ensure proposed enhancement and compensation projects are successful
- Adaptive management and adjustments during detailed design to avoid significant species and/or habitats that have not currently been identified (e.g. snake hibernacula, Species at Risk)
- Use of native plant species to minimize establishment of non-native invasive species
- Salvaging and Relocation: Rescue and relocation of wildlife such as amphibians and turtles, and significant native plants. Many opportunities exist for collecting and using plant and animal species on the property for relocation into existing habitats and/or restored areas on the property. This will ensure that representative plant and wildlife species that exist in the proposed development areas will be retained for use as part of the overall restoration and enhancement strategy. Measures could include:
    - Seed collection to ensure a supply of locally adapted native plants are archived for future restoration/enhancement initiatives
    - Removal, storage, and re-use of soil propagule banks (e.g. top soil from areas with a high concentration of native seeds, rhizomes, bulbs, and other plant reproductive material)
    - Salvaging of other ecosystem elements that can provide habitat structure (e.g. logs, tree stumps, boulders, and large rocks)

6. RECOMMENDATIONS AND CONLCUSIONS

The proposed land use plan results in an approximately even split of lands that will be protected as natural heritage system, and lands that will be developed as residential, commercial, mixed use, and for institutional purposes. The reduction in green space is associated with proposed development on lands that are currently early successional habitat, cultural woodlands, or non-PSW wetlands. Although reductions in area of these different green space types will result in a loss of habitat for some species, the large areas of high quality wetland and buffer areas that will be protected are expected to provide sufficient space and habitat for many species that are currently present, and will allow them to persist under post-development conditions. This, however, is contingent on the recommendation for different types of environmental management plans being followed, and compensation/enhancement plans being prepared to address impacts that are anticipated based on the proposed development blocks.

The follow-up studies and/or compensation/enhancement plans that will require more information about site-specific characteristics and block plan concepts include:

- Acoustic monitoring of bat roost habitats to determine presence of SAR bats; if present, permitting and overall benefit plans will need to be addressed through the MNRF
- Compensation/enhancement plans for impacts to non-PSW wetlands
- Compensation/enhancement plans for impacts amphibian breeding habitat
- Compensation/enhancement plans for impacts to provincially rare species and/or species of special concern (e.g. Schreber's Aster, Eastern Wood-Pewee, or Wood Thrush)
- Compensation/enhancement plans for impacts to rare vegetation habitats
- Compensation/enhancement plans for impacts to early successional breeding bird habitat
- Reptile hibernacula screening and salvaging/translocation plans for early stage of construction such as site preparation and pre-grading activities

The recommendations for these studies are outlined in Map 4 for each specific development block. Where it is more efficient to deal with the recommended studies in a comprehensive manner (e.g. completing and submitting a Tree Savings Plan) for multiple blocks, this should be encouraged.

In summary, the EIS recommends that the secondary plan be accepted with the conditions that are outlined in the environmental management recommendations presented in the impact assessment section (Section 5.1). Upon fulfillment of the conditions, it is expected that the proposed development will have no ecological impact on the populations of plants and wildlife that are currently present on the subject property and subject to Provincial, Regional, and City natural heritage policies.

7. REFERENCES

Artman, V.L., E.K. Sutherland, and **J.F. Downhower. 2001.** Prescribed burning to restore mixed-oak communities in southern Ohio: Effects on breeding-bird populations. Conservation Biology 15:1423-1434.

Black, J.E. and **K.J. Roy (eds). 2010.** Niagara Birds: a compendium of articles and species accounts of the birds of the Niagara Region in Ontario. 703 pages.

Blake, J.G. and **J.R. Karr. 1987.** Breeding birds in isolated woodlots: area and habitat relationships. Ecology 68:1724-1734.

Boone, M.D. and **Pauli. B.D.** Chemical contamination of vernal pools. In Calhoun, A.J.K, and deMaynadier, P.G. (Eds.) Science and conservation of vernal pools in North America. CRC Press, New York

Brown D.J., Street, G.M., Nairn, R.W., and Forestner, M.R.J. (2011). A Place to Call Home: Amphibian Use of Created and Restored Wetlands. International Journal of Ecology, 1-11. doi: 0.1155/2012/989872

Burke, D., K. Elliott, K. Falk, and **T. Piraino. 2011**. A Land Manager's Guide to Conserving Habitat for Forest Birds in Southern Ontario. Queen's Printer for Ontario. 134 pp. Retrieved from: http://www.ont-woodlot-assoc.org/pdf/August%202011%20- %20Land_Manager's_Guide _2011.pdf.

Burns, R.M. and **Honkala, B.H. 1990**. *Silvics of North America: Volume 2, Hardwoods*. Washington, D.C.: Forest Service, United States Department of Agriculture.

Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and **A.R. Couturier (eds.) 2007**. Atlas of the Breeding Birds of Ontario, 2001 – 2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto. xxii + 706 pp.

Calhoun, A. J. K. and **M. W. Klemens. 2002.** Best development practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York.

Campbell, S.P., J.W. Witham, and **M.L. Hunter Jr. 2007.** Long-term effects of group selection timber harvesting on abundance of forest birds. Conservation Biology 21:1218–1229.

Clark, K., D. Euler, and **E. Armstrong. 1983.** Habitat associations of breeding birds in cottage and natural areas of central Ontario. Wilson Bulletin 95:77-96.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2012. COSEWIC Species Assessments (detailed version), October 2012. Accessed at: http://www.cosewic.gc.ca/eng/sct0/rpt/ csar_e.html

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2013. Assessment and Status Report on the Eastern Wood-pewee (*Contopus virens)* in Canada. Her Majesty the Queen in Right of Canada. Retrieved from: https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/cosewic/sr_Eastern%20Wood-pewee_2013_e.pdf

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2014. Canadian Wildlife Species at Risk. October 2014. Committee on the Status of Endangered Wildlife in Canada. Web site: http://www.cosewic.gc.ca/eng/sct0/rpt/rpt_csar_e.cfm [accessed 5 October 2015]

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2015. COSEWIC Wildlife Species Assessments (detailed version), May 2015. Available at: http://www.cosewic.gc.ca/rpts/Detailed_species_assessments_e.pdf

Credit Valley Conservation. 2012. Low impact development discussion paper. Available online at URL: http://www.creditvalleyca.ca/wp-content/uploads/2013/01/LID_DISCUSSION_PAPER_NOV_2012.pdf.

Desrochers, A., C. Renaud, W.M. Hochachka and **M. Cadman. 2010.** Area-sensitivity by forest songbirds: theoretical and practical implications of scale-dependency. Ecography 33:921-931.

Evans, M., E. Gow, R. R. Roth, M. S. Johnson and **T. J. Underwood. 2011.** Wood Thrush (Hylocichla mustelina), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/246

Falconer C.M. 2010. Eastern Wood-pewee (Contopus virens) nest survival and habitat selection in deciduous forest and pine plantations. MSc thesis,Trent University, Peterborough, ON. 64 pp.

Farrar, J.L.. 1995. Trees in Canada. Fitzhenry & Whiteside Ltd. Toronto. ON. 504 pp.

Freemark, K. E. and **Merriam, H. G. 1986.** Importance of area and habitat heterogeneity to bird assemblages intemperate forest fragments. Biological Conservation 36: 115– 141

Freemark, K. and **B. Collins. 1992.** Landscape ecology of birds breeding in temperate forest fragments. Pp. 443-454 in J. M. Hagen III and D. W. Johnston (eds.). Ecology and Conservation of Neotropical Migrant Landbirds. Smithsonian Institution Press, Washington, DC

Friesen, L.E., P.F.J. Eagles, and **R.J. MacKay. 1995.** Effects of residential development on forest dwelling neotropical migrant songbirds. Conservation Biology 9:1408-1414

Friesen, L., M.D. Cadman and R.J. MacKay. 1999. Nesting success of neotropical migrant songbirds in a highly fragmented landscape. Conserv. Biol. 13(2):338-346.

Government of Canada. 1994a. Migratory Birds Convention Act, Statutes of Canada (1994, c. 22). Retrieved from the Department of Justice Laws Website: http://laws-lois.justice.gc.ca/eng/acts/M-7.01/FullText.html

Government of Canada. 1994b. Migratory Birds Regulations, Consolidated Regulations of Canada (1994, c. 1035). Retrieved from the Department of Justice Laws Website: http://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._1035/FullText.html

Government of Canada. 2002. Species at Risk Act, Statutes of Canada (2002, c. 29). Retrieved from the Department of Justice Laws Website: http://laws-lois.justice.gc.ca/eng/acts/S-15.3/index.html

Government of Ontario. 2007. Endangered Species Act, Statutes of Ontario (2007, c. 6). Retrieved from the ServiceOntario e-Laws website: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_07e06_e.htm

Government of Ontario. 2013. Conservation Authorities Act (O. Reg. 57/13). Available at: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_060150_e.htm

Government of Ontario. 2014. Black Gum. Queen's Printer for Ontario. Retrieved from: https://www.ontario.ca/page/black-gum

Government of Ontario. 2015. Eastern wood-pewee. Queen's Printer for Ontario. Retrieved from: https://www.ontario.ca/page/eastern-wood-pewee

Government of Ontario. 2015. Wood thrush. Queen's Printer for Ontario. Retrieved from: https://www.ontario.ca/page/wood-thrush

Graber, R.R., J.W. Graber, and **E.L. Kirk. 1974.** Illinois Birds: Tyrannidae. Illinois Natural History Survey, Biological Notes No. 86.

Greenberg, C.H., A.L. Tomcho, J.D. Lanham, T.A. Waldrop, J. Tomcho, R.J. Phillips, and **D. Simon. 2007.** Short-term effects of fire and other fuel reduction treatments on breeding birds in a southern Appalachian upland hardwood forest. Journal of Wildlife Management 71:1906-1916.

Holzer, K.A. 2014. Amphibian use of constructed and remnant wetlands in an urban landscape. Urban Ecosystems, 17, 955-968. doi: 10.1007/s11252-014-0373-0

Keller, G.S. and **R.H. Yahner. 2007.** Seasonal forest-patch use by birds in fragmented landscapes of south-central Pennsylvania. Wilson Journal of Ornithology 119:410- 418.

L. Campbell and Associates. 2005. Salamander study preliminary report, Dorchester Road, Niagara Falls (Draft Report). Prepared by AMEC Earth and Environmental.

Lee, H., W. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southcentral Sciences Section, Science Development and Transfer Branch, SCSS Field Guide FG-02.

Lehtinen, R.M. and **S.M. Galatowitsch. 2001.** Colonization of Restored Wetlands by Amphibians in Minnesota. The American Midland Naturalist Journal, 145, 388-396.

NatureServe Explorer. 2015. National and Subnational Conservation Status Definitions web page. Available at: http://explorer.natureserve.org/nsranks.htm

NHIC (Natural Heritage Information Centre). 2014. NHIC Srank definitions. Accessed at: http://nhic.mnr.gov.on.ca/MNR/nhic/glossary/srank.cfm

NHIC (Natural Heritage Information Centre). 2015. Ontario Vascular Plant Species List. Biodiversity Explorer Online Database. Ontario Ministry of Natural Resources.

NHIC (Natural Heritage Information Centre). 2015. NHIC Species Lists. Available at: http://www.ontario.ca/page/get-natural-heritage-information

OMNRF (Ontario Ministry of Natural Resources and Forestry), 2000. Significant Wildlife Habitat Technical Guide. 151pp

OMNRF (Ontario Ministry of Natural Resources and Forestry). 2014. Bat and Bat Habitat Surveys of Treed Habitats, August 2014 [Draft]. Guelph District MNRF draft survey protocols. 4pp

OMNRF (Ontario Ministry of Natural Resources and Forestry). 2015. Species at Risk in Ontario (SARO) List. Updated October 1, 2015. Available at: http://www.ontario.ca/environment-and-energy/species-risk-ontario-list

OMNRF (Ontario Ministry of Natural Resources and Forestry). 2016. Bat and Bat Habitat Surveys of Treed Habitats, May 2016 [Draft]. Guelph District MNRF draft survey protocols. 5pp

OMMAH (Ontario Ministry of Municipal Affairs and Housing). 2005. Provincial Policy Statement. 37 pp. Available at: http://www.mah.gov.on.ca/Asset1421.aspx

OPIF (Ontario Partners in Flight). 2008. Ontario Landbird Conservation Plan: Lower Great Lakes/St. Lawrence Plain, North American Bird Conservation Region 13. Ontario Ministry of Natural Resources, Bird Studies Canada, Environment Canada. Draft version 2.0. Available at: http://www.bsc-eoc.org/PIF/PIFOBCR13Plan.pdf

Ouellet, H. 1974. Les oiseaux des collines montérégiennes et de la région de Montréal, Québec, Canada. Publication de Zoologie no. 5. Musée nationaux du Canada. Ottawa. 168 pp

Pechmann, J.H.K., Estes, R.A., Scott, D.E., and **J. Whitefield Gibbons. 2001.** Amphibian colonization and use of ponds created for trial mitigation of wetland loss. Wetlands, 21(1), 93-111.

Petranka, J.W., Kennedy, C.A., and **S.S. Murray. 2003.** Response of amphibians to restoration of a southern Appalachian wetland: A long-term analysis of community dynamics. Wetlands, 23(4), 1030-1042.

Rich, T.D., C.J. Beardmore, H. Berlanga, P.J. Blancher, M.S.W. Bradstreet, G.S. Butcher, D.W. Demarest, E.H. Dunn, W.C. Hunter, E.E. Iñigo-Elias, J.A. Kennedy, A.M. Martell, A.O. Panjabi, D.N. Pashley, K.V. Rosenberg, C.M. Rustay, J.S. Wendt, and **T.C. Will. 2004.** Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, NY. Partners in Flight website. http://www.partnersinflight.org/cont_plan/ (Version: March 2005)

Robbins, C.S., D.D. Dawson, and **B. A. Dowell. 1989.** Habitat area requirements of breeding forest birds of the Middle Atlantic States. Wildlife Monograph 103:1-34.

Scott, W.B., and E. J. Crossman. 1973. Freshwater fishes of Canada. Bulletin 184 – Fisheries Research Board of Canada. 966 pp

Stauffer, D.L. and **L.B. Best. 1980.** Habitat selection by birds of riparian communities: evaluating effects of habitat alterations. Journal of Wildlife Management. 44:1-15.

Via, J.W. 1979. Foraging tactics of flycatchers in southwestern Virginia. Pp. 191-201 in J.G. Dickson, R.N. Conner, R.R. Fleet, J.C. Kroll, and J.A. Jackson, editors. The Role of Insectivorous Birds in Forest Ecosystems. Academic Press, NY.

Weinberg, H.J. and R.R. Roth. 1998. Forest area and habitat quality for nesting wood thrushes. The Auk 115(4):879-889.

Wilson, C., R.E. Masters, and **G.A. Bukenhofer. 1995.** Breeding bird response to pinegrassland community restoration for Red-cockaded Woodpeckers. Journal of Wildlife Management 59:56-67.

Windmiller, B., and **A.J.K. Calhoun. 2008**. Conserving vernal pool wildlife in urbanizing landscapes. In Calhoun, A.J.K, and deMaynadier, P.G. (Eds.) Science and conservation of vernal pools in North America. CRC Press, New York.

8. TABLES

Table 1: ELC, Plant inventory, and PSW delineation site visit summary

Purpose	Date	Surveyors
Spring ELC and Plant Inventory	May 6th, 2015	Dylan White, Zack Harris
Spring ELC and Plant Inventory	May 8th, 2015	Dylan White, Kristen Beauchamp
Spring ELC and Plant Inventory	May 15th, 2015	Kristen Beauchamp, Zack Harris
Summer ELC and Plant Inventory	June 3rd, 2015	Steve Hill, Zack Harris
Summer ELC, Wetland Delineation, Summer Plant Inventory	August 17th, 2015	Dylan White, Zack Harris
Summer ELC and Wetland Delineation, Summer Plant Inventory	August 21, 2015	Dylan White, Zack Harris
Summer ELC and Wetland Delineation, Summer Plant Inventory	August 26th, 2015	Dylan White, Kristen Beauchamp
Summer ELC and Wetland Delineation, Summer Plant Inventory	August 27th, 2015	Dylan White, Kristen Beauchamp
Summer ELC and Wetland Delineation, Summer Plant Inventory	August 28th, 2015	Dylan White, Kristen Beauchamp
Summer ELC, Wetland Delineation, and Summer Plant Inventory	September 1st, 2015	Dylan White, Zack Harris, Steve Hill
Wetland Verification	September 2nd 2015	Dylan White, Zack Harris, Steve Hill, GR (CAN) Investments Co. Ltd representatives, Anne Yagi (MNRF), Lee-Ann Hamilton (NPCA)
Fall ELC and Plant Inventory	September 28th, 2015	Dylan White, Zack Harris
Fall ELC and Plant Inventory	October 5th, 2015	Dylan White, Zack Harris
Cavity tree and mast tree surveys	November 11th, 2015	Dylan White, Zack Harris

Table 2: Salamander trapping summary

Date	Survey	Time	Weather	Surveyors
April 1, 2015	Site Recon.	15:00-18:30	5°C, clear	Dylan White
April 7, 2015	Trap Set 1	17:00-20:00	3°C, overcast, light breeze	Dylan White
April 8, 2015	Trap Check 1	06:30-11:00	5°C, overcast	Kristen Beauchamp, Dylan White, Helen Hemansen (OMNRF)
April 9, 2015	Trap Set 2	17:30-20:30	11°C, rain, calm	Dylan White
April 10, 205	Trap Check 2	06:15-11:15	10°C, partly cloudy, light breeze	Kristen Beauchamp, Karl Konze, Dylan White
April 12, 2015	Trap Set 3	18:00-20:00	9°C, clear	Dylan White
April 13, 2015	Trap Check 3	05:45-8:45	8°C, clear, sunny	Kristen Beauchamp, Dylan White
April 16, 2015	Trap Set 4	18:00-20:00	12°C, partly cloudy, breeze	Dylan White
April 17, 2015	Trap Check 4	06:00-9:30	10°C, partly cloudy	Kristen Beauchamp, Dylan White
April 19, 2015	Trap Set 5	18:00-20:00	12°C, partly cloudy	Dylan White
April 20, 2015	Trap Check 5 and Trap removal	06:00-09:30	13°C, partly cloudy	Kristen Beauchamp, Dylan White

Table 3: Nocturnal amphibian survey summary

Date (2015)	Surveyors	Station ID	Start Time (p.m.)	Noise Index (as per NAAMP)	Wind (Beaufort Scale)	Temperature (°C)	Precipitation
April 19	Dylan White	1	10:15	2	1-2	8-10	None
		2	10:25	2	1 - 2	8 - 10	None
		3	10:38	2	1 - 2	8 - 10	Light rain
		4	10:43	2	1 - 2	8 - 10	Light rain
		5	10:52	2	1 - 2	8 - 10	Light rain
		6	11:00	2	1 - 2	8 - 10	Light rain
		7	11:10	2	1 - 2	8 - 10	Light rain
		8	11:20	2	1 - 2	8 - 10	Light rain
		9	11:30	2	1 - 2	8 - 10	Light rain
		10	11:37	2	1 - 2	8 - 10	Light rain
May 28	Zack Harris Kristen Beauchamp	1	12:15	2-3	0	16.0	Humid
		2	12:05	2-3	0	14.0	Humid
		3	11:55	2-3	0	14.0	Humid
		4	11:45	2-3	0	14.0	Humid
		5	11:37	2-3	0	15.8	Humid
		6	10:28	2-3	1	15.0	Humid
		7	11:28	2-3	0	15.8	Humid
		8	11:20	2	1	15.0	Humid
		9	11:10	2	1	15.0	Humid
		10	11:00	2	1	15.0	Humid
		11	9:23	2	0	19.5	None
		12	9:59	2	0	19.5	None
		13	12:21	2	1	16.0	Humid
June 24	Zack Harris Kristen Beauchamp	1	12:04	3	0	17.8	Humid
		2	11:55	3	0	17.8	Humid
		3	11:46	3	0	17.8	Humid
		4	11:36	3	0	17.8	Humid
		5	11:28	3	0	17.8	Humid
		6	10:36	3	0	16.5	Humid
		7	11:18	3	0	16.5	Humid
		8	11:11	2-3	0	16.5	Humid
		9	11:00	2	0	16.5	Humid
		10	10:49	2-3	0	16.5	Humid

		11	9:48	2	0	16.5	Humid
		12	10:16	2	0	16.5	Humid
		13	12:12	2	0	17.5	Humid

Noise Index as per North American Amphibian Monitoring Program (NAAMP) Frog call survey instructions http://www.massnaamp.org/online_docs/NAAMP%20MA%20Datasheet%202012.pdf)	
Code	**Indicator**
0	No appreciable effect (e.g. owl calling)
1	Slightly affecting sampling (e.g. distant traffic, dog barking, 1 car passing)
2	Moderately affecting sampling (e.g. nearby traffic, 2 – 5 cars passing)
3	Seriously affecting sampling (e.g. continuous traffic nearby, 6 – 10 cars passing)
4	Profoundly affecting sampling (e.g. continuous traffic passing, construction noise)

Beaufort Wind Scale as described according to the MMP (BSC, 2009)		
Code	**Wind Speed (kph)**	**Indicator**
0	0 – 2	Calm; smoke rises vertically
1	3 – 5	Light air movement; smoke drifts
2	6 – 11	Slight breeze; wind felt on face, leaves rustle
3	12 – 19	Gentle breeze; leaves and small twigs in constant motion
4	20 – 30	Moderate breeze; small branches are moved, raises dust & loose paper
5	31 – 39	Fresh breeze; small trees in leaf begin to sway; crested wavelets form
6	40 – 50	Strong breeze; large branches in motion.

Table 4: Breeding bird survey summary

Date	Observer	Time	Weather Conditions	Purpose
May 28, 2015	Karl Konze	05:23 – 08:59	Partly cloudy, light west-northwest winds, 16 – 20°C	Breeding bird survey #1 (PCS 1 – 16)
May 29, 2015	Karl Konze	05:19 – 09:28	Partly cloudy, light south winds, 15 – 20°C	Breeding bird survey #1 (PCS 17 – 32)
June 4, 2015	Karl Konze	05:15 – 09:03	Clear, calm, 11 – 19°C	Breeding bird survey #2 (PCS 1 – 16)
June 5, 2015	Karl Konze	05:20 – 09:32	Partly cloudy, calm, 17 – 21°C	Breeding bird survey #2 (PCS 17 – 32)

Table 5: Summary of ELC Ecosite and Vegetation Types observed within study area.

ELC Community Code (Dominant)	ELC Community Description	Number of Polygons	Total Area (ha)	Percent
ANTH	Anthropogenic	1	3.37	1.74
CUM1-1	Cultural Meadow	5	9.76	5.04
CUP3-2	White Pine Coniferous Plantation	1	0.33	0.17
CUT1	Mineral Cultural Thicket	1	15.68	8.1
CUT1-4	Gray Dogwood Cultural Thicket	4	7.86	4.06
CUW1	Mineral Cultural Woodland	8	44.78	23.12
FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest	1	1.76	0.91
FOD8-1	Fresh – Moist Poplar Deciduous Forest	1	0.92	0.48
FOD9	Fresh – Moist Oak – Maple – Hickory Deciduous Forest	4	3.95	2.04
SWD1	Oak Mineral Deciduous Swamp	6	76.33	39.41
SWD1-3	Pin Oak Mineral Deciduous Swamp	2	1.33	0.69
SWD2-2	Green Ash Mineral Deciduous Swamp	4	22.69	11.72
SWD4-1	Willow Mineral Deciduous Swamp	7	4.92	2.54
		45	193.67	100.00

Table 6: Summary of plant species observed within ELC polygons. Grey highlighting identifies species that are uncommon or rare in Niagara; those with asterisk (*) represent those that are provincially rare (S2 or S2S3).

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22 (35, 37)	23	24	25	26 (39)	27	28 (34, 47)	29	30 (36, 38, 40)	31	32	33	41	42	44	45	46
Acer negundo	Manitoba Maple	x												x		x																			x	x	x	x	
Acer rubrum	Red Maple				x								x	x					x									x	x										
Acer saccharinum	Silver Maple					x							x															x											x
Acer saccharum	Sugar Maple				x	x						x	x															x					x						x
Acer x freemanii	Hybrid Maple (Acer rubrum X Acer saccharinum)			x	x	x	x	x						x					x								x					x						x
Achillea millefolium	Common Yarrow									x						x													x									
Agrimonia gryposepala	Hooked Agrimony	x	x		x	x	x	x	x			x	x				x											x			x	x							x
Agrostis gigantea	Redtop			x													x																						
Agrostis stolonifera	Creeping Bentgrass																											x											
Alisma subcordatum	Southern water-plantain					x																																	x
Alisma triviale	Northern Water-plantain			x	x	x															x																		x
Alliaria petiolata	Garlic Mustard	x		x	x	x			x			x	x	x		x			x									x			x	x							x
Allium cernuum	Nodding onion			x																																			
Allium tricoccum var. tricoccum	Wild Leek					x	x																																x
Ambrosia trifida	Great Ragweed					x																																	x
Amelanchier arborea	Downy Serviceberry	x				x	x		x			x	x																					x					x
Antennaria howellii ssp. canadensis	Canada Pussytoes																x																						
Apocynum androsaemifolium	Spreading Dogbane																												x										
Apocynum cannabinum	Hemp Dogbane																									x													
Arisaema triphyllum	Jack-in-the-pulpit				x	x	x					x	x			x			x	x			x																	x
Aronia melanocarpa	Black Chokeberry																											x											
Asclepias incarnata	Swamp Milkweed			x	x	x												x			x							x											x
Asclepias syriaca	Common Milkweed									x																			x										
Asparagus officinalis	Garden Asparagus									x																														
Athyrium filix-femina var. angustum	Northeastern Lady Fern					x																						x											x
Atriplex prostrata	Creeping Saltbush																														x	x							
Berberis thunbergii	Japanese Barberry				x	x																						x					x						x
Bidens cernua	Nodding Beggarticks																											x	x		x	x							
Bidens comosa	Three-parted Beggarticks					x																																		x
Bidens connata	Purple-stemmed Beggarticks			x	x																																		
Bidens frondosa	Devil's Beggarticks				x																								x										
Blephilia ciliata	Downy wood mint					x																																		x
Boehmeria cylindrica	False Nettle			x	x											x												x											
Brassica nigra	Black Mustard								x							x																								
Caltha palustris	Yellow Marsh Marigold					x																																		x
Calystegia sepium	Hedge False Bindweed																x																							

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22 (35, 37)	23	24	25	26 (39)	27	28 (34, 47)	29	30 (36, 38, 40)	31	32	33	41	42	44	45	46
Cardamine concatenata	Cut-leaved Toothwort					x																																x
Cardamine douglassii	Limestone Bittercress					x	x																																x
Cardamine pensylvanica	Pennsylvania Bittercress																											x										
Carduus nutans ssp. nutans	Nodding Thistle																									x												
Carex arcta	Northern Clustered Sedge																			x																		
Carex bebbii	Bebb's Sedge																		x																			
Carex blanda	Woodland Sedge					x	x									x				x								x										x
Carex canescens	Hoary Sedge																		x																			
Carex comosa	Bristly Sedge																											x										
Carex crinita	Fringed Sedge			x	x	x																						x										x
Carex echinata	Star sedge					x																																	x
Carex flava	Yellow Sedge																x	x																				
Carex garberi	Elk Sedge																	x																				
Carex gracillima	Graceful Sedge	x				x									x	x			x									x			x	x						x
Carex grayi	Asa Gray Sedge																											x										
Carex hystericina	Porcupine Sedge																											x										
Carex intumescens	Bladder Sedge					x																						x						x				x
Carex lacustris	Lake-bank Sedge																				x							x										
Carex leptonervia	Finely-nerved Sedge														x			x																				
Carex lupulina	Hop Sedge		x			x													x									x					x					x
Carex pallescens	Pale Sedge																											x										
Carex pellita	Woolly Sedge																									x												
Carex prasina	Drooping Sedge																		x																			
Carex projecta	Necklace Sedge					x																						x										x
Carex pseudocyperus	Cyperus-like Sedge																											x										
Carex radiata	Stellate Sedge				x				x																			x										
Carex retrorsa	Retrorse Sedge																											x										
Carex rosea	Rosy sedge								x																														
Carex stipata	Awl-fruited Sedge	x																x	x																			
Carex stricta	Tussock Sedge					x															x																	x
Carex tenera	Slender Sedge				x	x																						x										x
Carex tribuloides	Blunt Broom Sedge																				x							x										
Carex tuckermanii	Tuckerman's Sedge			x	x																													x				
Carex vulpinoidea	Fox Sedge					x													x		x																	x
Carpinus caroliniana	Blue-beech				x	x	x						x															x					X					x
Carya cordiformis	Bitternut Hickory			x	x															x								x					X					
Carya ovata	Shagbark Hickory				x	x	x						x	x						x	x			x					x					x					x
Celtis occidentalis	Common hackberry												x																										

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22 (35, 37)	23	24	25	26 (39)	27	28 (34, 47)	29	30 (36, 38, 40)	31	32	33	41	42	44	45	46
Centaurea nigra	Black Knapweed																												x										
Cephalanthus occidentalis	Common Buttonbush			x	x	x																						x					x						x
Cerastium fontanum	Common Mouse-ear Chickweed																											x										
Chelidonium majus	Greater Celadine																											x										
Chelone glabra	White Turtlehead					x																																	x
Cichorium intybus	Chicory							x																															
Cicuta maculata var. maculata	Spotted Water-hemlock				x	x	x									x					x							x					x						x
Cinna latifolia	Drooping Woodreed				x	x													x									x					x						x
Circaea canadensis	Broad-leaved Enchanter's Nightshade	x					x		x			x	x			x			x	x								x			x	x	x					
Cirsium vulgare	Bull Thistle					x													x																				x
Claytonia caroliniana	Carolina Spring Beauty						x						x																										
Claytonia virginica	Narrow-leaved Spring Beauty					x							x																										x
Convallaria majalis	European Lily-of-the-valley					x																																	x
Convolvulus arvensis	Field Bindweed																									x													
Cornus amomum	Silky Dogwood	x	x	x	x														x									x											
Cornus racemosa	Gray Dogwood	x		x	x	x	x	x	x	x		x	x	x	x	x		x	x	x	x		x			x	x	x	x				x						x
Cornus stolonifera	Red-osier Dogwood		x	x	x	x	x	x	x	x	x	x		x		x	x	x	x		x						x	x	x		x	x							x
Crataegus grandis	Grand hawthorn												x																										
Crataegus monogyna	English Hawthorn																				x																		
Crataegus punctata	Dotted Hawthorn	x					x		x							x	x	x		x						x		x			x	x							x
Crataegus succulenta	Fleshy Hawthorn	x																		x																			
Dactylis glomerata	Orchard Grass															x																							
Daucus carota	Wild Carrot							x		x						x	x									x			x						x				
Doellingeria umbellata	Flat-top White Aster																																x						
Dryopteris carthusiana	Spinulose Wood Fern			x		x																																	x
Elaeagnus angustifolia	Russian Olive								x								x																						
Eleocharis erythropoda	Red-stemmed Spike-rush																	x																					
Eleocharis obtusa	Blunt Spike-rush			x	x																							x										
Eleocharis ovata	Ovate Spike-rush															x												x										
Eleocharis palustris	Creeping Spike-rush														x																								
Elymus canadensis	Canada Wildrye																												x										
Elymus hystrix	Bottlebrush Grass					x																																	x
Elymus virginicus var. virginicus	Virginia Wildrye				x																							x										
Epifagus virginiana	Beechdrops					x																																	x
Epilobium ciliatum	Hairy Willowherb	x																																					
Equisetum arvense	Field Horsetail					x			x	x						x	x	x	x	x			x																x
Erigeron annuus	Annual Fleabane															x																							
Erigeron philadelphicus	Philadelphia Fleabane																			x																			

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22 (35, 37)	23	24	25	26 (39)	27	28 (34, 47)	29	30 (36, 38, 40)	31	32	33	41	42	44	45	46
Erythronium americanum	Yellow Trout-lily					x	x		x				x																				x						x
Eupatorium perfoliatum	Common Boneset					x																						x	x		x	x	x					x
Eurybia divaricate	White wood aster				x																																	
Eurybia macrophylla	Large-leaved Aster				x	x																						x			x	x	x					x
*Eurybia schreberi**	Schreber's Aster*																											x										
Euthamia graminifolia	Grass-leaved Goldenrod																	x								x			x									
Eutrochium maculatum var. maculatum	Spotted Joe Pye Weed																		x		x		x															
Fagus grandifolia	American Beech				x	x	x						x						x									x					x	x				x
Fragaria virginiana	Wild Strawberry	x		x	x	x	x	x	x	x		x	x	x		x	x	x	x				x			x		x			x	x	x	x				x
Frangula alnus	Glossy Buckthorn															x		x	x			x	x	x	x													
Fraxinus americana	White Ash					x																									x	x	x					x
Fraxinus pennsylvanica	Green Ash	x		x	x	x	x	x	x	x		x	x	x		x		x	x	x	x	x	x	x	x		x	x	x		x	x	x					x
Galium obtusum	Blunt-leaved Bedstraw																											x										
Galium palustre	Marsh Bedstraw			x	x	x															x																	x
Geranium maculatum	Spotted Geranium					x	x					x	x						x									x					x					x
Geum fragarioides	Barren Strawberry					x																																x
Geum laciniatum	Rough Avens				x																																	
*Gleditsia triacanthos**	Honey-locust*																															x						
Glyceria septentrionalis	Eastern Mannagrass																											x										
Glyceria striata	Fowl Mannagrass	x		x	x	x													x	x	x	x		x	x			x			x	x	x					x
Gymnocladus dioicus	Kentucky Coffeetree	x																																				
hyHamamelis virginiana	American Witch-hazel																											x										
Hemerocallis fulva	Orange Daylily															x																						
Hydrophyllum virginianum	Virginia Waterleaf												x																									
Hypericum perforatum	Common St. John's-wort	x				x										x	x																					x
Hypericum punctatum	Common St. John's-wort					x																																x
Ilex mucronata	Mountain Holly																											x										
Ilex verticillata	Black Holly																											x										
Impatiens capensis	Spotted Jewelweed					x										x												x			x	x	x					x
Iris versicolor	Harlequin Blue Flag			x	x	x																																x
Juglans nigra	Black Walnut	x	x																x										x									
Juncus dudleyi	Dudley's Rush														x														x									
Juncus effusus	Soft Rush	x		x	x																							x										
Juncus tenuis	Path Rush														x																							
Juniperus virginiana	Eastern Red Cedar							x									x																					
Lamium amplexicaule	Common Deadnettle																	x																				
Laportea canadensis	Wood Nettle																															x	x	x				

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22 (35, 37)	23	24	25	26 (39)	27	28 (34, 47)	29	30 (36, 38, 40)	31	32	33	41	42	44	45	46
Lapsana communis	Common Nipplewort	x												x		x			x	x			x					x			x	x		x					
Leersia oryzoides	Rice Cutgrass			x	x	x																											x						x
Leersia virginica	Virginia Cutgrass																											x											
Leucanthemum vulgare	Oxeye Daisy															x	x									x													
Ligustrum vulgare	European Privet	x																	x	x																			
Linaria vulgaris	Butter-and-eggs															x																							
Lindera benzoin	Spicebush	x		x	x	x	x						x						x	x			x					x					x						x
Lonicera tatarica	Tartarian Honeysuckle	x	x	x	x	x	x		x		x	x	x			x			x	x							x	x	x										x
Lycopus americanus	American Water-horehound					x															x								x				x						x
Lycopus uniflorus	Northern Water-horehound			x	x	x										x		x										x											x
Lysimachia nummularia	Creeping Jennie				x	x										x													x		x	x	x					x
Lythrum salicaria	Purple Loosestrife			x	x	x		x							x				x									x	x										x
Maianthemum canadense	Wild Lily-of-the-valley					x	x																																x
Maianthemum racemosum	False Solomon's-seal																											x											
Maianthemum stellatum	Star-flowered False Solomon's-seal					x																						x											x
Maclura pomifera	Osage-orange	x																																					
Malus coronaria	Sweet Crabapple																									x													
Malus pumila	Common Apple	x				x			x					x						x																			x
Medicago lupulina	Black Medic																											x											
Melilotus albus	White Sweet-clover																									x													
Melilotus officinalis	Yellow Sweet-clover																x																						
Mentha arvensis	Field Mint																	x	x																				
Narcissus pseudonarcissus	Commom Daffodil										x																												
Onoclea sensibilis	Sensitive Fern			x	x	x	x				x	x				x			x	x		x		x	x			x	x					x					x
Osmunda regalis	Royal Fern					x																																	x
Osmundastrum cinnamomeum	Cinnamon Fern					x																																	x
Ostrya virginiana	Eastern Hop-hornbeam																											x				x	x						
Oxalis montana	Common Wood-sorrell					x										x																		x					x
Parthenocissus inserta	Thicket Creeper	x			x	x	x		x	x			x			x		x	x	x			x					x	x		x	x		x				x
Penstemon digitalis	Foxglove Beardtongue			x	x																									x								
Penstemon hirsutus	Hairy beardtongue			x																																		
Penthorum sedoides	Ditch-stonecrop			x	x												x						x						x									
Persicaria hydropiper	Marshpepper Smartweed			x	x																								x									
Persicaria sagittata	Arrow-leaved Smartweed					x																																	x
Persicaria virginiana	Virginia Smartweed	x		x	x	x	x						x			x			x									x			x	x						x
Phalaris arundinacea	Reed Canary Grass		x	x	x	x																						x	x		x	x						x
Phragmites australis ssp. americanus	American Reed							x		x	x		x															x											

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22 (35, 37)	23	24	25	26 (39)	27	28 (34, 47)	29	30 (36, 38, 40)	31	32	33	41	42	44	45	46
Phragmites australis ssp. australis	European Reed							x		x	x	x	x													x										x	x	x	x	
Pilea pumila	Canada Clearweed					x																																	x
Pilosella caespitosa	Meadow Hawkweed																											x											
Pinus sylvestris	Scotch Pine	x		x	x																																		
Plantago aristata	Large-bracted plantain															x																							
Plantago lanceolata	English Plantain																x	x								x													
Plantago major	Common Plantain									x																		x	x										
Poa compressa	Canada Bluegrass															x																							
Poa nemoralis	Woods Bluegrass				x																																		
Poa pratensis ssp. pratensis	Kentucky Bluegrass															x										x										x	x	x	
Podophyllum peltatum	May-apple					x	x						x							x																			x
Polygonum achoreum	Leathery Knotweed					x																																	x
Polygonum aviculare ssp. aviculare	Prostrate Knotweed																									x													
Polygonum virginianum	Virginia Knotweed																																	x					
Populus deltoides ssp. deltoides	Eastern Cottonwood	x	x			x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x						x					x
Populus tremuloides	Trembling Aspen					x	x		x			x		x																									x
Potentilla recta	Sulphur Cinquefoil	x																																					
Potentilla simplex	Old-field Cinquefoil					x										x												x											x
Prunella vulgaris ssp. vulgaris	Self-heal					x																							x										x
Prunus americana	American Plum																			x																			
Prunus avium	Sweet Cherry					x	x							x														x											x
Prunus pensylvanica	Pin Cherry				x																																		
Prunus serotina	Wild Black Cherry	x				x	x						x															x	x		x	x							x
Prunus virginiana	Choke Cherry	x		x	x	x	x	x	x	x		x	x			x	x	x	x	x			x					x			x	x	x	x					x
Quercus alba	White Oak					x																						x			x	x							x
Quercus bicolor	Swamp White Oak			x	x											x			x									x		x	x	x		x					
Quercus ellipsoidalis	Northern Pin Oak					x						x																												x
Quercus macrocarpa	Bur Oak	x		x	x	x	x					x	x			x			x								x	x	x	x	x	x	x						x
Quercus palustris	Pin Oak	x	x	x	x	x	x		x			x	x	x				x	x	x	x	x		x	x			x	x	x	x	x	x	x					x
Quercus rubra	Northern Red Oak				x	x	x		x				x	x					x									x			x	x	X	x					x
Ranunculus abortivus	Kidney-leaved Buttercup					x	x									x				x								x					x						x
Ranunculus acris	Tall Buttercup															x																							
Ranunculus hispidus var. hispidus	Bristly buttercup					x																																	x
Rhamnus alnifolia	Alderleaf Buckthorn																				x																		
Rhus typhina	Staghorn Sumac																																	x					
Rhamnus cathartica	Common Buckthorn	x		x	x	x	x		x		x	x	x	x	x	x			x	x	x	x	x	x	x	x		x	x		x	x		x	x				x
Ribes americanum	Wild Black Currant								x																															
Ribes cynosbati	Prickly Gooseberry					x																	x																	x

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22 (35, 37)	23	24	25	26 (39)	27	28 (34, 47)	29	30 (36, 38, 40)	31	32	33	41	42	44	45	46
Ribes glandulosum	Skunk Currant	x				x	x									x			x	x											x	x							x
Ribes hirtellum	Smooth Gooseberry			x	x																																		
Ribes lacustre	Bristly Black Currant		x			x																																	x
Ribes triste	Swamp Red Currant						x																																
Rosa multiflora	Multiflora Rose															x											x	x			x	x							
Rosa palustris	Swamp Rose																											x											
Rosa rubingosa var. rubingosa	Briar Rose					x																	x						x										x
Rubus allegheniensis	Alleghany Blackberry						x						x						x									x	x		x	x						
Rubus hispidus	Bristly Dewberry					x																						x										x
Rubus idaeaus ssp. idaeus	European red raspberry													x																			x						
Rubus idaeus ssp. strigosus	Wild Red Raspberry	x				x	x		x	x		x	x			x			x		x		x				x	x					x					x
Rubus occidentalis	Black Raspberry	x																													x	x						
Rubus pubescens	Dewberry				x	x																																	x
Rudbeckia hirta var. hirta	Black-eyed Susan								x																														
Salix alba	White Willow		x													x				x																			
Salix amygdaloides	Peach-leaved Willow																											x											
Salix bebbiana	Bebb's Willow					x												x	x									x	x				x						x
Salix discolor	Pussy Willow																	x																					
Salix eriocephala	Heart-leaved Willow																									x													
Salix interior	Sandbar Willow																x	x																					
Salix nigra	Black Willow																											x											
Salix x fragilis	(Salix alba X Salix euxina)							x																															
Sambucus canadensis	Common Elderberry				x																																		
Sambucus nigra	European Elder																											x											
Sanguinaria canadensis	Bloodroot																			x																			
Poa us pratensis	Meadow Fescue															x										x													
Schoenoplectus tabernaemontani	Soft-stemmed Bulrush																				x																		
Scirpus atrovirens	Dark-green Bulrush																		x																				
Scirpus microcarpus	Red-tinge Bulrush														x																								
Scirpus pendulus	Rufous Bulrush		x	x	x	x																																	x
Scutellaria lateriflora	Mad Dog Skullcap					x																							x										x
Securigera varia	Common Crown-vetch																									x													
Sisyrinchium montanum var. montanum	Strict Blue-eyed-grass																x									x													
Sium suave	Hemlock Water-parsnip			x	x																x							x											
Solanum dulcamara	Climbing Nightshade		x	x	x											x												x	x					x					
Solidago altissima ssp. altissima	Eastern Late Goldenrod															x			x							x		x						x					

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22 (35, 37)	23	24	25	26 (39)	27	28 (34, 47)	29	30 (36, 38, 40)	31	32	33	41	42	44	45	46
Solidago canadensis var. canadensis	Canada Goldenrod					x	x										x	x	x										x				x						x
Solidago flexicaulis	Zigzag Goldenrod				x	x																																	x
Solidago juncea	Early Goldenrod															x	x									x													
Solidago nemoralis ssp. nemoralis	Gray-stemmed Goldenrod							x									x																						
Solidago patula	Spreading Goldenrod	x																																					
Solidago rugosa var. rugosa	Northern Rough-leaved Goldenrod	x		x	x	x													x				x				x	x			x	x						x
Sphenopholis intermedia	Slender Wedge Grass																											x										
Spiraea alba	White Meadowsweet			x	x	x	x																					x	x									x
Streptopus lanceolatus var. lanceolatus	Eastern rose-twisted stalk					x																																x
Symphoricarpos occidentalis	Western snowberry			x																																		
Symphyotrichum ericoides var. ericoides	White Heath Aster							x							x		x												x									
Symphyotrichum laeve var. laeve	Smooth Aster																x																					
Symphyotrichum lanceolatum ssp. lanceolatum	Panicled Aster	x	x	x	x	x		x							x	x		x	x		x		x				x	x	x		x	x		x				x
Symphyotrichum lateriflorum	Starved Aster	x	x			x																						x	x		x	x	x	x				x
Symphyotrichum novae-angliae	New England Aster					x			x						x	x	x		x									x	x									x
Symphyotrichum pilosum var. pilosum	Old Field Aster							x							x		x																					
Symphyotrichum urophyllum	Arrow-leaved Aster					x																																x
Taraxacum officinale	Common Dandelion	x				x	x		x	x		x	x			x		x	x							x												x
Thalictrum dioicum	Early Meadow-rue					x							x																									x
Thelypteris palustris	Eastern Marsh Fern					x																											x					x
Tilia americana	American Basswood					x							x						x									x			x	x	x					x
Toxicodendron radicans	Climbing Poison Ivy	x	x		x	x	x	x	x			x	x			x		x	x	x	x		x					x	x		x	x		x				x
Trifolium pratense	Red Clover									x						x										x												
Trifolium repens	White Clover																											x										
Trillium grandiflorum	White Trillium					x																																x
Tussilago farfara	Colt's-foot							x										x																				
Typha angustifolia	Narrow-leaved Cattail					x																																x
Typha latifolia	Broad-leaved Cattail			x	x																					x		x										
Ulmus americana	American Elm	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x	x	x	x							x	x		x	x	x					x
Ulmus rubra	Slippery Elm														x																							
Urtica dioica ssp. dioica	European Stinging Nettle			x	x																																	
Uvularia grandiflora	Large-flowered Bellwort					x																																x
Vaccinium corymbosum	Highbush Blueberry					x																																x
Verbena hastata	Blue Vervain		x																x									x	x		x	x						
Verbena urticifolia	White Vervain	x																																				

Scientific Name	Common Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22 (35, 37)	23	24	25	26 (39)	27	28 (34, 47)	29	30 (36, 38, 40)	31	32	33	41	42	44	45	46
Veronica officinalis	Common Speedwell	x							x																			x											
Viburnum acerifolium	Maple-leaf Viburnum													x														x											
Viburnum lentago	Nannyberry					x	x												x									x										x
Viburnum opulus ssp. trilobum	Highbush Cranberry														x	x		x		x																		
Viburnum recognitum	Smooth Arrowwood								x								x		x																			
Vicia cracca	Tufted Vetch							x	x	x						x										x			x										
Vinca minor	Periwinkle								x							x																							
Viola affinis	Le Conte's Violet																		x																			
Viola cucullata	Marsh Blue Violet			x	x	x																																x
Viola palmata	Palmate-leaved violet			x																																		
Viola sororia	Wooly blue violet						x																															
Vitis riparia	Riverbank Grape				x				x	x						x		x	x	x								x	x									
Arctium sp	Burdock Species																																	x		x	x	x	
Artemisia sp	Worm wood Species																																		x				
Aster sp	Aster species								x	x		x	x																										
Carya sp	Hickory Species															x																x	x					
Crataegus sp	Hawthorn Species	x		x	x	x	x		x	x		x	x	x					x				x				x		x										x
Dryopteris sp	Wood Fern Species				x	x										x												x										x
Epilobium sp	Willow-herb Species					x	x									x																						x
Galium sp	Bedstraw Species					x																																x
Geum sp	Avens Species	x				x	x		x			x	x	x		x			x	x			x					x			x	x	x	x				x
Hieracium sp	Hawkweed Species																x																					
Juncus sp	Rush Species					x									x	x																						x
Lemna sp	Duckweed Species					x																						x										x
Malus sp	Apple Species	x				x	x	x								x			x																			x
Myosotis sp	Forget-me-not Species			x	x																																	
Oenothera sp	Evening-primrose Species																x																					
Oxalis sp	Wood-Sorrel Species					x	x																											x				x
Polygonum sp	Smartweed Species	x	x	x	x																																	
Potamogeton sp	Pondweed Species					x																																x
Potentilla sp	Cinquefoil Species						x					x																x										
Prenanthes sp	Rattlesnake-root Species				x	x																																x
Rosa sp	Rose Species	x		x	x		x	x	x			x							x																			
Salix sp	Willow Species			x	x				x		x										x	x		x	x													
Scirpus sp	Bulrush Species					x															x																	x
Trifolium sp	Clover Species							x									x																			x	x	x	
Vicia sp	Vetch Species																																						
Viola sp	Violet Species															x				x								x										

Table 7: *Ambystoma laterale* (and unisexual polyploids) capture numbers by date and pond (see Appendix 2).

Pond	Number of Ambystoma laterale captured by survey date					TOTAL
	April 8	April 10	April 13	April 17	April 20	
1	3	12	1	0	0	16
2	1	3	0	0	0	4
3	3	4	2	0	1	10
4	1	2	1	0	0	4
5	0	0	0	0	0	0
6	1	3	2	0	0	6
7	2	5	0	0	0	7
8	0	19	0	0	0	19
TOTAL	11	48	6	0	1	66

Table 8: Summary of anuran species found at each Nocturnal Amphibian Call Station.

Property Location	**NACS Station**	**Spring Peeper** *Pseudacris crucifer*	**American Toad** *Anaxyrus americanus*	**Western Chorus Frog** *Pseudacris triseriata*	**Northern Leopard Frog** *Lithobates pipiens*	**Gray Treefrog** *Hyla versicolor*	**Wood Frog** *Lithobates sylvaticus*
North Area (Oldfield Road)	1	Present	Present	Present		Present	
	2	Present	Present	Present		Present	
	13					Present	
East Area (Dorchester Road)	3	Present		Present		Present	
	4	Present				Present	
	5	Present		Present		Present	
Central Area (Near Conrail Drain)	6	Present	Present	Present	Present	Present	
	11	Present				Present	
Central Area (south of Conrail Drain)	12					Present	
South Area (north of Dorchester Road/Chippewa Parkway)	7	Present	Present	Present		Present	
	8	Present	Present	Present		Present	
	9	Present		Present		Present	Present
	10		Present	Present		Present	

Table 9: Breeding Bird Summary. Grey highlights indicate species that were observed, but not breeding on the property. Green highlights indicate species that are either provincially, regionally, or locally rare, and/or area sensitive.

Common Name	Scientific Name	Conservation Status					Covered by MBCA (1994)	Area Sensitivity (OMNR 2000)	Breeding Evidence (OBBA 2001)
		National	Provincial		Regional	Local			
		COSEWIC Designation (2014)	OMNRF Designation (OMNRF 2015)	Srank (2013 Update)	BCR 13 Priority Sp. (Lower Great Lakes / St. Lawrence Plain) (OPIF 2008)	Niagara Region (Black & Roy 2010)			
Canada Goose	*Branta canadensis*	---	---	S5	---	very common	Y	---	X
Wood Duck	*Aix sponsa*	---	---	S5	---	uncommon	Y	---	Possible
Mallard	*Anas platyrhynchos*	---	---	S5	---	common	Y	---	Possible
Wild Turkey	*Meleagris gallopavo*	---	---	S5	---	uncommon	N	---	Possible
Double-crested Cormorant	*Phalacrocorax auritus*	NAR	NAR	S5	---	very common	N	---	X
Great Blue Heron	*Ardea herodias*	---	---	S4	---	uncommon	Y	---	X
Great Egret	*Ardea alba*	---	---	S2	---	rare	Y	---	X
Black-crowned Night-Heron	*Nycticorax*	---	---	S3	---	uncommon	Y	---	X
Sharp-shinned Hawk	*Accipiter striatus*	NAR	NAR	S5	---	uncommon	N	AS	Possible
Killdeer	*Charadrius vociferus*	---	---	S5	---	common	Y	---	Probable
Spotted Sandpiper	*Actitis macularius*	---	---	S5	---	common	Y	---	Possible
Common Tern	*Sterna hirundo*	NAR	NAR	S4	---	uncommon	Y	---	X
Rock Pigeon	*Patagioena livia*	---	---	SNA	---	very common	N	---	Possible
Mourning Dove	*Zenaida macroura*	---	---	S5	---	very common	Y	---	Possible
Cuckoo species	*Coccyzus sp.*	---	---	S4-S5	---	uncommon	Y	---	Possible
Great Horned Owl	*Bubo virginianus*	---	---	S4	---	uncommon	N	---	Possible
Chimney Swift	*Chaetura pelagica*	THR	THR	S4	PLS	uncommon	Y	---	X
Red-bellied Woodpecker	*Melanerpes carolinus*	---	---	S4	---	uncommon	Y	---	Probable
Downy Woodpecker	*Picoides pubescens*	---	---	S5	---	common	Y	---	Probable
Hairy Woodpecker	*Picoides villosus*	---	---	S5	---	uncommon	Y	AS	Possible
Northern Flicker	*Colaptes auratus*	---	---	S4	PLS	common	Y	---	Probable
Eastern Wood-Pewee	*Contopus virens*	SC	SC	S4	PLS	common	Y	---	Probable
Acadian Flycatcher	*Empidonax virescens*	END	END	S2S3	PLS	extremely rare	Y	AS	Possible
Willow Flycatcher	*Empidonax traillii*	---	---	S5	PLS	uncommon	Y	---	Probable
Eastern Phoebe	*Sayornis phoebe*	---	---	S5	---	common	Y	---	Possible
Great Crested Flycatcher	*Myiarchus crinitus*	---	---	S4	---	common	Y	---	Probable

Common Name	Scientific Name	Conservation Status					Covered by MBCA (1994)	Area Sensitivity (OMNR 2000)	Breeding Evidence (OBBA 2001)
		National	Provincial		Regional	Local			
		COSEWIC Designation (2014)	OMNRF Designation (OMNRF 2015)	Srank (2013 Update)	BCR 13 Priority Sp. (Lower Great Lakes / St. Lawrence Plain) (OPIF 2008)	Niagara Region (Black & Roy 2010)			
Yellow-throated Vireo	*Vireo flavifrons*	---	---	S4	---	rare and local	Y	AS	Probable
Warbling Vireo	*Vireo gilvus*	---	---	S5	---	common	Y	---	Probable
Red-eyed Vireo	*Vireo olivaceus*	---	---	S5	---	common	Y	---	Probable
Blue Jay	*Cyanocitta cristata*	---	---	S5	---	very common	N	---	Probable
American Crow	*Corvus brachyrhynchos*	---	---	S5	---	common	N	---	Probable
Purple Martin	*Progne subis*	---	---	S4	---	very common	Y	---	X
Tree Swallow	*Tachycineta bicolor*	---	---	S4	---	very common	Y	---	Probable
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	---	---	S4	---	uncommon	Y	---	X
Barn Swallow	*Hirundo rustica*	THR	THR	S4	---	very common	Y	---	Possible
Black-capped Chickadee	*Poecile atricapillus*	---	---	S5	---	common	Y	---	Probable
Tufted Titmouse	*Baeolophus bicolor*	---	---	S4	---	rare	Y	AS	Probable
White-breasted Nuthatch	*Sitta carolinensis*	---	---	S5	---	uncommon	Y	AS	Probable
House Wren	*Troglodytes aedon*	---	---	S5	---	common	Y	---	Probable
Wood Thrush	*Hylocichla mustelina*	THR	SC	S4	PLS	uncommon	Y	---	Probable
American Robin	*Turdus migratorius*	---	---	S5	---	very common	Y	---	Probable
Gray Catbird	*Dumetella carolinensis*	---	---	S4	---	common	Y	---	Probable
Brown Thrasher	*Toxostoma rufum*	---	---	S4	PLS	uncommon	Y	---	Possible
European Starling	*Sturnus vulgaris*	---	---	SNA	---	very common	N	---	Probable
Cedar Waxwing	*Bombycilla cedrorum*	---	---	S5	---	common	Y	---	Probable
Blue-winged Warbler	*Vermivora cyanoptera*	---	---	S4	PLS	uncommon	Y	---	Probable
Common Yellowthroat	*Geothlypis trichas*	---	---	S5	---	common	Y	---	Probable
Yellow Warbler	*Setophaga petechia*	---	---	S5	---	common	Y	---	Probable
Blackpoll Warbler	*Setophaga striata*	---	---	S4	---	spring/fall transient	Y	---	Migrant
Wilson's Warbler	*Cardellina pusilla*	---	---	S4	---	spring/fall transient	Y	---	Migrant
Eastern Towhee	*Pipilo erythrophthalmus*	---	---	S4	PLS	uncommon	Y	---	Probable

Common Name	Scientific Name	Conservation Status					Covered by MBCA (1994)	Area Sensitivity (OMNR 2000)	Breeding Evidence (OBBA 2001)
		National	Provincial		Regional	Local			
		COSEWIC Designation (2014)	OMNRF Designation (OMNRF 2015)	Srank (2013 Update)	BCR 13 Priority Sp. (Lower Great Lakes / St. Lawrence Plain) (OPIF 2008)	Niagara Region (Black & Roy 2010)			
Chipping Sparrow	*Spizella passerina*	---	---	S5	---	common	Y	---	Probable
Field Sparrow	*Spizella pusilla*	---	---	S4	PLS	uncommon	Y	---	Probable
Savannah Sparrow	*Passerculus sandwichensis*	---	---	S4	PLS	very common	Y	AS	Possible
Song Sparrow	*Melospiza melodia*	---	---	S5	---	very common	Y	---	Probable
Swamp Sparrow	*Melospiza georgiana*	---	---	S5	---	uncommon	Y	---	Probable
Scarlet Tanager	*Piranga olivacea*	---	---	S4	---	uncommon	Y	AS	Probable
Northern Cardinal	*Cardinalis*	---	---	S5	---	common	Y	---	Probable
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	---	---	S4	PLS	common	Y	---	Probable
Indigo Bunting	*Passerina cyanea*	---	---	S4	---	common	Y	---	Probable
Red-winged Blackbird	*Agelaius phoeniceus*	---	---	S4	---	very common	N	---	Probable
Common Grackle	*Quiscalus quiscula*	---	---	S5	---	very common	N	---	Probable
Brown-headed Cowbird	*Molothrus ater*	---	---	S4	---	very common	N	---	Probable
Orchard Oriole	*Icterus spurius*	---	---	S4	---	uncommon to rare	Y	---	Possible
Baltimore Oriole	*Icterus galbula*	---	---	S4	PLS	common	Y	---	Probable
American Goldfinch	*Spinus tristis*	---	---	S5	---	common	Y	---	Probable
House Sparrow	*Passer domesticus*	---	---	SNA	---	very common	N	---	Probable

LEGEND:

COSEWIC: END - Endangered; THR - Threatened; SC - Special Concern; NAR - assessed and deemed to be not at risk; --- = not assessed as population secure

OMNRF: END - Endangered; THR - Threatened; SC - Special Concern; NAR - assessed and deemed to be not at risk; --- = not assessed as population secure

Provincial Sranks: S2/S3 - vulnerable; S4 - apparently secure; S5 - secure; SNA - non-native exotic

OPIF: PLS - Priority Landbird Species

Area Sensitivity: AS = Area Sensitive species

OBBA: X - species observed flying over site only and not considered as potential breeder; M - migrant only

Table 10: Fish species captured during 2015 site investigation

	Watercourse 1				Watercourse 2		Watercourse 3 (Conrail Drain)		Pond
Date	June 11	Oct. 6	June 11	June 11	June 11	Oct. 6	June 11	June 11	June 11
Station	1-1	1-1	1-2	1-3	2-1	2-1	3-1	3-2	P1
Electroseconds Stream length sampled	241 s 22 m	na 22 m	196 s 25 m	115 s 36 m	703 s 155 m	1057 s 168 m	811 s 105 m	109 s 12 m	141 s na
Species									
White Sucker *Catostomus commersonii*	1j	20yoy	0	0	0	18yoy	0	0	0
Largemouth Bass *Micropterus salmoides*	0		0	0	0	7j	0	0	0
Central Mudminnow *Umbra limi*	2a	10a	0	0	0	1a	0	0	0
Yellow Perch *Perca flavescens*	1j		0	0	0	0	0	0	0
Brook Stickleback *Culaea inconstans*	0		0	0	0	0	5	0	0
Brown Bullhead *Ameiurus nebulosus*	3j		0	0	0	1j	0	0	0
Bluntnose Minnow *Pimephales notatus*	1a		0	0	0	1a	0	0	0
Emerald Shiner *Notropis atherinoides*	0		0	4	0	0	0	0	0
Golden Shiner *Notemigonus crysoleucas*	0		0	0	0	2a	0	0	0

Notes: j=juvenile; a=adult; yoy=young of the year

Table 11: Preliminary Environmental Management Strategy Recommendations

Natural Heritage Element and Preliminary Policy Trigger(s)	Mitigation Hierarchy Recommendations	Preliminary Environmental Management Strategy Considerations
Slough Forest/Vernal Pool Complex Floodplain Wetlands along east creek Policy Trigger: PPS: Provincially Significant Wetland) Municipal: EPA Associated polygons in Map 2: 3, 4, 5, 20, 21, 23, 24, 27, 31, 32	Avoid: Required for residential and commercial development; preferable option for servicing and transportation. Minimize: Where servicing and transportation impacts are unavoidable, steps should be taken to minimize the spatial extent and duration of impact. Mitigate/Rehabilitate: Where servicing and transportation impacts are unavoidable, steps should be taken to mitigation/rehabilitate impacted features. Compensate: Not typically an option for PSW features, but compensation for residual impacts resulting from servicing and transportation should be considered.	PSW features have been identified and tentatively confirmed by the MNRF. There may be some room for small adjustments to the tentative boundary; where this is required, adjustments should be as minimal as possible. Buffers to the PSW boundary will range between 15 and 30 meters, and/or that required to ensure vernal pools and their function are not impacted by adjacent development; adjacent lands uses will also be considered during the prescription of buffer dimensions. Enhancement areas within PSW boundaries where features and/or functions have been disturbed in the past (e.g. recreate vernal pools where topography has been altered, clear/control patches of invasive species, identify areas of potential forest decline and establish an understory of native tree species, etc.) Establish linkages (both ecological and anthropogenic) among the PSW units to ensure core features are connected and permeable for small and medium sized wildlife.

Watercourses and Fish Habitat Policy Trigger: Fisheries Act: Fish habitat PPS: Fish habitat, watercourse, valley land Conservation Authorities Act General Regulation Associated Features in Map 2: WC1, WC2	Avoid: Impacts from development should be avoided where possible. Minimize: Where servicing and transportation impacts are unavoidable, steps should be taken to minimize the spatial extent and duration of impact. Mitigate/Rehabilitate: Where servicing and transportation impacts are unavoidable, steps should be taken to mitigation/rehabilitate impacted features. Compensate: Where servicing and transportation impacts are unavoidable, steps should be taken to compensate for impacted habitat.	Watercourses 1 and 2 are largely within the PSW boundaries on the property and will therefore be maintained. Where watercourse crossings are necessary, the location(s) that minimize potential impacts should be assessed based on existing habitat condition, associated floodplain, and associated vegetation communities in the adjacent valley land. Where impacts are unavoidable, mitigation and/or compensation strategies will be developed in consultation with the NPCA, and submitted to the Department of Fisheries and Oceans for permitting if fish or fish habitat are impacted.
Species at Risk/Species at Risk Habitat (Endangered and Threatened Species)	Avoid: Impacts resulting from residential and commercial development should be avoided; preferable option for servicing and transportation. Minimize: Where impacts from development are unavoidable, the spatial extent and duration	Provincially Endangered or Threatened Species at Risk detected during the 2015 surveys include: • Barn Swallow • Chimney Swift • Acadian Flycatcher

Policy Trigger: PPS (Endangered Species Act) Municipal (Environmental Conservation Area)	of impact should be minimized, particularly where it relates to occupied or potential habitat. Mitigate/Rehabilitate: Where servicing and transportation impacts are unavoidable, steps should be taken to mitigation/rehabilitate impacted features. Compensate: Not typically an option for species at risk habitat, but compensation for residual impacts resulting from servicing and transportation should be considered.	Nesting habitat for Barn Swallow and Chimney Swift were not documented on the site. If nesting habitat for these species is found and will be impacted, an ESA permit will be required. The occurrence of Acadian Flycatcher included an individual that was documented in one of the isolated Willow Deciduous Swamp features (polygon 20, Map 2); the individual was not documented on subsequent site visits (either during follow-up breeding bird surveys or ELC site investigation) and therefore the feature was note considered breeding habitat, and a management plan is not required for this species. Other species that were not detected, but have potential to be present include: • White Wood Aster • Round-leaved Greenbrier If these species are documented on the subject property during scoped recommendations for block plan applications, the location will be georeferenced and a contingency plan will be developed in collaboration with the MNRF and NPCA. ESA permits will be required if there is potential impact to the species and/or its habitat.
Old growth/Mature Forest Policy Trigger: PPS (Significant Wildlife Habitat) Municipal (Environmental	Avoid: Where possible impacts from development should be avoided. Minimize: Where impacts are unavoidable, the spatial extent and duration of impact should be minimized.	The bulk of old growth/mature forest will be protected within the PSW. Where other old-growth areas are present on the site they should be protected; this could include individual tree protection. Where development blocks are proposed on and/or adjacent to old-growth trees outside of the PSW, setbacks should be large enough to ensure the trees roots are not impacted. Buffers to old growth/mature forest areas will ensure appropriate spatial separate is provided to reduce impacts to trees.

Conservation Area) Affected polygons: 5, 27, 32 and potentially localized areas within 12, 13, 29, 30, and 46	Mitigate/Rehabilitate: Where impacts are unavoidable, best management practices will be required to ensure the spatial extent of impact is contained, and efforts to restore to pre-disturbance condition are planned. Compensate: Not feasible for old growth/mature forests.	Compensation for old-growth forest is not feasible.
Shrub/Early Successional Bird Habitat Policy Trigger: PPS (Significant Wildlife Habitat) Municipal (Environmental Conservation Area) Affected polygons: 9, 11, 16, 28	Avoid: Where possible, impacts should be avoided. Minimize: Where impacts are unavoidable, the spatial extent and duration of impact should be minimized. Mitigate/Rehabilitate: Where impacts are unavoidable, the best management practices should be undertaken to ensure the spatial extent of impact is contained, and efforts to restore to pre-disturbance conditions are planned. Compensate: High potential for on-site restoration and incorporating into design of	Shrub/Early successional bird habitat is present in areas that will be proposed for development. Therefore, the features and characteristics of this habitat type will be a priority for creation within PSW buffers, parkland blocks, and/or restoration planting along the Con-rail Drain. Specific aspects of the plan will be developed with NPCA later in the Secondary Plan process.

	parks, greenspace, and other open space blocks.	
Bat Maternity Roost Habitat Policy Trigger: PPS (Significant Wildlife Habitat) Municipal (Environmental Conservation Area) Affected polygons: 5, 27, 32 and potentially localized areas within 6,12, 13, 29, 30, and 46	Avoid: Impacts will likely need to be avoided where bat maternity roosts are document, particularly if the roosts are used by Bat SAR. Minimize: Impacts to bat maternity roost trees will be considered on a cases by case basis. Mitigate/Rehabilitate: Where indirect impacts are likely, disturbances can be minimized through individual tree setbacks. Compensate: Compensation for loss of bat maternity roost trees is not feasible, other options that result in the creation of bat roost habitat can be explored.	Surveys for Bat Maternity Roost habitat were undertaken during the leaf off season (November 11th, 2015). Updates will be provided as an addendum to the preliminary characterization report. Individual trees that meet the criteria for bat maternity roosts will be identified and georeferenced. Cavity trees are present in abundance across all wooded features in the study area. Follow up with MNRF will be require to scope acoustic monitoring for Bat Species at Risk, and determination of SAR habitat and required overall benefit permitting where impacts are anticipated.
Mast Tree Habitat Policy Trigger: PPS (Significant Wildlife Habitat) Municipal (Environmental	Avoid: Concentration areas of mast trees (e.g. Oaks and Hickories) should be protected. Minimize: Where impacts are unavoidable, the extent of tree removal should be minimized.	Surveys for Mast Tree habitat outside of the PSW/EPA areas were undertaken on November 11th, 2015. The majority of Mast Tree habitat will be protected in the PSW/EPA areas. Outside of the PSW/EPA areas, mast tree species including various species of Oak and Hickory are most abundant in the features that have been classified as Fresh – Moist Oak – Maple – Hickory Deciduous Forest (polygons 30, 36, 38, 48; Map 2). Where individual and/or groups of these trees are present, they can be incorporated into buffers, linkage areas, and/or preserved as individual trees.

Conservation Area) Affected polygons: 5, 27, 32 and potentially localized areas within 30, 36, 38, 46	Mitigate/Rehabilitate: Where indirect impacts are likely, disturbances can be minimized through appropriate setbacks to protect individual trees and their root systems. Compensate: Where mast trees are removed, an appropriate compensation plan should be developed based on the size/age of each tree.	
Amphibian Breeding Habitat (Woodland type) Policy Trigger: PPS (Significant Wildlife Habitat) Municipal (Environmental Conservation Area) Affected polygons: 3, 4, 5, 20, 21, 23, 24, 27, and 32; potential for	Avoid: Impacts to amphibian breeding habitat are to be avoided within the PSW, and should be avoided where possible outside of the PSW. Minimize: Where unavoidable, the spatial extent and duration of impacts to amphibian breeding habitat should be minimized. Mitigate/Rehabilitate: Where impacts are unavoidable, best management practices should be undertaken to ensure the spatial extent of impact is contained, and efforts to restore to pre-disturbance conditions are planned.	The majority of amphibian woodland breeding habitat will be protected in the PSW. Other small vernal ponds exist across the property outside of the PSW boundary. These areas have been documented as part of the characterization, and where impacts are unavoidable, opportunities for enhancement of existing habitat will be explored; as well, opportunities for habitat recreation on-site will be explored in collaboration with the NPCA.

some areas within polygons 11 and 12	Compensate: Opportunities for vernal pool creation/enhancement can be explored, both as a method to address potential loss of ponds outside the PSW, and to enhance ponds within the PSW.	
Habitat for Provincially Rare Species and/or Species of Special Concern (Schreber's Aster) Policy Trigger: PPS (Significant Wildlife Habitat) Municipal (Environmental Conservation Area) Affected polygons: 27, 32	Avoid: Impacts to Schreber's Aster are to be avoided within the PSW, and should be avoided where possible outside of the PSW. Minimize: Where unavoidable, the spatial extent and duration of impacts the species habitat should be minimized. Mitigate/Rehabilitate: Where impacts are unavoidable, best management practices should be undertaken to ensure the spatial extent of impact is contained, and efforts to restore to pre-disturbance conditions are planned. Additionally, plants should be salvage and relocated to suitable habitat. Compensate: Where required, salvaged plants can be used for	Currently, Schreber's Aster has only been documented in PSW areas and therefore will be protected. If it is found in other locations, the area will be georeferenced. Where the species occurs outside of protected areas, a salvage and relocation plan will be developed in collaboration with the NPCA.

	restoration and enhancement of degraded areas within the PSW, or within restoration areas identified elsewhere on site.	
Habitat for Provincially Rare Species and/or Species of Special Concern (Honey-locust) Policy Trigger: PPS (Significant Wildlife Habitat) Municipal (Environmental Conservation Area) Affected polygons: 31	Avoid: Impacts to Honey-locust are to be avoided within the PSW, and should be avoided where possible outside of the PSW. Minimize: Where unavoidable, the spatial extent and duration of impacts the species habitat should be minimized. Mitigate/Rehabilitate: Where impacts are unavoidable, best management practices should be undertaken to ensure the spatial extent of impact is contained, and efforts to restore to pre-disturbance conditions are planned. Additionally, plants should be salvage and relocated to suitable habitat. Compensate: Where required, salvaged plants can be used for restoration and enhancement of degraded areas within the PSW, or within restoration areas identified elsewhere on site.	Currently, Honey-locust has only been documented in PSW areas and therefore will be protected. If it is found in other locations, the area will be georeferenced. Where the species occurs outside of protected areas, a tree preservation study will be completed to determine the feasibility of avoiding impacts. Where impacts are unavoidable, a compensation plan will be developed in collaboration with the NPCA.

Habitat for Provincially Rare Species and/or Species of Special Concern (Eastern Wood Pewee) Policy Trigger: PPS (Significant Wildlife Habitat) Municipal (Environmental Conservation Area) Affected polygons: 5, 6, 18, 19, 27	Avoid: Impacts to Eastern Wood-Pewee breeding habitat within the PSW are to be avoided, and should be avoided where possible outside of the PSW. Minimize: Where impacts to Eastern Wood-Pewee habitat are unavoidable, the spatial extent and duration of impact should be minimized. Mitigate/Rehabilitate: Where impacts are unavoidable, best management practices should be undertaken to ensure the spatial extent of impact is contained, and efforts to restore forest understory areas to pre-disturbance conditions are planned. Compensate: Compensation for Eastern Wood-Pewee habitat is not feasible in the short-term.	Large areas of Eastern Wood-Pewee habitat will be protected within the PSW areas. Other woodland areas that support this species could also be protected and/or prioritized for compensation/enhancement. Additionally, as this species will use smaller woodland elements, the feasibility of retaining groups of trees as woodland elements will be explored during the Secondary Plan process.
Habitat for Provincially Rare Species and/or Species of Special Concern (Wood Thrush)	Avoid: Impacts to Wood Thrush breeding habitat within the PSW are to be avoided, and should be avoided where possible outside of the PSW.	Large areas of Wood Thrush habitat will be protected within the PSW areas. Other woodland areas that support this species may also be protected and/or prioritized for compensation/enhancement. This species is unlikely to use small woodland patches, and/or wooded areas in proximity to developed land, therefore larger buffers around high

Policy Trigger: PPS (Significant Wildlife Habitat) Municipal (Environmental Conservation Area) Affected polygons: 1, 4, 5, 6, 11, 12, 13, 19, 24, 27	Minimize: Where impacts to Eastern Wood-Pewee habitat are unavoidable, the spatial extent and duration of impact should be minimized. Mitigate/Rehabilitate: Where impacts are unavoidable, best management practices should be undertaken to ensure the spatial extent of impact is contained, and efforts to restore forest understory areas to pre-disturbance conditions are planned. Compensate: Compensation for Wood Thrush habitat is not feasible in the short-term.	quality habitat areas may be required for PSW and other areas that are retained.
Habitat for Provincially Rare Species and/or Species of Special Concern (Snapping Turtle) Policy Trigger: PPS (Significant Wildlife Habitat)	Avoid: Impacts to Snapping Turtle breeding habitat within the PSW are to be avoided, and should be avoided where possible outside of the PSW. Minimize: Where impacts to Snapping Turtle breeding habitat are unavoidable, the spatial extent and duration of impact should be minimized.	Snapping Turtle habitat may be present in larger ponds on the property. One sighting (assumed to be a Snapping Turtle) was observed in polygon 24 located near the Welland River. This feature is part of the PSW, and therefore will be retained. Off-site linkage to the Welland River and Power Canal should be maintained, as should linkage among pond habitats within the proposed development area.

Municipal (Environmental Conservation Area) Affected polygons: 24 (potential)	Mitigate/Rehabilitate: Where impacts are unavoidable, best management practices should be undertaken to ensure the spatial extent of impact is contained, and efforts to restore pre-disturbance conditions are planned. Additionally, linkage among wetland feature and the Welland Canal should be maintained and/or enhanced. Compensate: Where impacts are unavoidable and cannot be mitigated, compensation for impacted Snapping Turtle habitat will be considered and opportunities identified.	
Reptile Hibernacula Policy Trigger: PPS (Significant Wildlife Habitat) Municipal (Environmental Conservation Area) Affected polygons:	Avoid: The location of reptile hibernacula should be avoided if documented. Minimize: Given that reptile hibernacula are very difficult to detect, a contingency plan will be developed to minimize impacts to reptile hibernacula should they be found. Mitigate/Rehabilitate: Where indirect impacts to reptile hibernacula are unavoidable,	Reptile hibernacula were not observed during site visits, in part because they are very difficult to detect. If hibernacula are identified during subsequent site visits, the location will be documented and a contingency plan will be developed in collaboration with the NPCA.

Potentially All	best management practices should be undertaken to ensure the spatial extent of impact is contained, and efforts to restore pre-disturbance conditions are planned. As noted above, a contingency plan will be prepared in the event that reptile hibernacula is encountered. This will include spatial setbacks, and linkage to protected natural areas. Compensate: Where impacts are unavoidable, reptile hibernacula can be recreated on-site.	
Deer Winter Congregation Areas Policy Trigger: PPS (Significant Wildlife Habitat) Municipal (Environmental Conservation Area) Affected polygons:	Avoid: Impacts to deer wintering habitat should be avoided within the PSW, and other woodland areas where possible. Minimize: Where impacts are unavoidable, the extent of impacted forest should be minimized, and avoid core areas within the identified habitat. Mitigate/Rehabilitate: Where impacts are unavoidable, linkage among core areas of deer wintering habitat should be established.	Deer winter congregation habitat will be largely protected within the PSW areas. Protection of these areas, associated buffers, and linkage protection/creation will ensure that core areas of this habitat are protected and connectivity is maintained.

All polygons with wooded habitat	Compensate: On-site compensation for deer wintering habitat is not feasible.	
Rare Vegetation Communities Policy Trigger: PPS (Significant Wildlife Habitat) Municipal (Environmental Conservation Area) Affected polygons: 3, 4, 5, 6, 27, 32	Avoid: Impacts to rare vegetation community types should be avoided. Minimize: Where impacts cannot be avoided, the extent and duration of disturbance should be minimized. Mitigate/Rehabilitate: Where impacts are unavoidable, best management practices adjacent to rare vegetation community types should be undertaken. Additionally, if these areas have a high likelihood of being impacted, ensure representative species are salvaged and use for restoration and enhancement elsewhere. Compensate: Where impacts are unavoidable, some on-site compensation work may be feasible for rare vegetation communities. As above, a salvaging strategy should be developed for such cases.	Rare vegetation types include: Pin Oak Mineral Deciduous Swamp Type (SWD1-3): S2S3 Buttonbush Mineral Thicket Swamp Type (SWT2-4): S3 Gray Dogwood Mineral Thicket Swamp Type (SWT2-9): S3S4 The Pin Oak Mineral Deciduous Swamp Type is primarily associated with the PSW and will therefore be protected. There are other polygons outside of the PSW boundary that have elements of this vegetation type (e.g. polygon 12). Where this feature type will be impacted, a salvaging and relocation plan should be developed for provincially or regionally rare plant species associated with the feature. Relocation should target areas that will be protected, either within the PSW as enhancement and/or in other areas that are targeted for on-site compensation/restoration. The Buttonbush Mineral Thicket Swamp communities are associated with the PSW and will be therefore be protected. If other features are found during additional field investigations (e.g. within polygon 12), they will be identified. As above, where this feature type is impacted, a salvaging and relocation plan will be prepared for any provincially or regionally rare plant species and wildlife that are present. The Gray Dogwood Mineral Thicket Swamp communities are associated with non-PSW wetlands areas (example as inclusions in polygon 6). Where this type of habitat is impacted, the extent of loss can be documented; the extent of loss will be incorporated into the buffer planting plans and on-site enhancement/compensation plans, with attempts to balance impacts.

		Direction for the salvaging and relocation plan will be developed in collaboration with the NPCA.
Other Wetlands (e.g. Green Ash Swamp, Willow Swamp, Oak Swamp) Policy Trigger: Municipal (Environmental Conservation Area) Affected polygons: 2, 6, 8, 10, 12, 17, 18, 26, and 29	Avoid: Where feasible, non-PSW wetland features should be considered for protection. Minimize: Where unavoidable, the spatial extent of impact to non-PSW wetlands should be minimized. Mitigate/Rehabilitate: Where non-PSW areas are protected, appropriate buffers should be implemented to ensure protection of their features and functions. Additionally, where retained, some enhancement/rehabilitation may be required. Compensate: Where impacts result in loss of these features, the potential for compensation through enhancement of on-site PSW features and recreation of similar habitats should be considered.	Areas of Green Ash, Willow, and Oak swamp exist outside of the PSW boundary. These areas are regulated by the Region of Niagara and the NPCA, therefore will require negotiations regarding removal. To address potential impacts associated with removal of these features, opportunities should be explored to enhance the PSW areas, identify potential on-site compensation areas, and identify linkage corridors among features that are retained. On-going collaboration with the NPCA will be required to identify how these features will be managed as part of the Secondary Plan.
Deciduous Forest and Woodlands	Avoid: The highest quality deciduous forest and woodland areas should be protected.	Areas of deciduous woodland and cultural woodland exist outside of the PSW boundary. These areas are regulated by the Region of Niagara and the NPCA, therefore will require negotiations regarding removal. To

outside of PSW boundaries Municipal (Environmental Conservation Area) Affected polygons: 1, 13, 14, 15, 19, 22, 31, 34, 35, 36, 37, 38, 40, 46, and 47	Minimize: Where impacts are unavoidable, steps should be taken to minimize the spatial extent and duration of impact of these features. Mitigate/Rehabilitate: Where forested and woodland areas are protected, appropriate buffers should be implemented to ensure protection of their features and functions. Additionally, where retained, some enhancement/rehabilitation may be required. Compensate: Where impacts result in loss of these features, the potential for compensation through enhancement of on-site PSW features and restoration of similar habitats should be considered.	address potential impacts associated with removal of these features, opportunities should be explored to enhance the PSW areas, identify potential on-site compensation areas, and identify linkage corridors among features that are retained. On-going collaboration with the NPCA will be required to identify how these features will be managed as part of the Secondary Plan.

Regionally Rare Plants.

Avoid: Where regionally rare plant species are present in the PSW, impacts will be avoided.

Minimize: Where regionally rare species are present outside of the PSW, impacts to these species should be minimized through maintaining habitat around locations where these species are abundant.

Mitigate/Rehabilitate: Where impacts are unavoidable, regionally rare species should be salvaged and replanted in appropriate habitat that will be protected on-site. In this regard, attention should be given to regionally rare species that occur outside of the PSW.

Compensate: Where impacts are unavoidable, and plant relocation is required, enhancement and habitat restoration maybe necessary to create the appropriate habitat conditions for the respective regionally rare plants.

The following table identifies regionally rare plant species that were documented on the subject property. Where species are found in features outside of the PSW areas, and/or other features that end up being protected, recommendations for salvaging and relocation can be developed.

Common Name	Scientific Name	Within PSW	Outside PSW
Pin Cherry	*Prunus pensylvanica*	x	
Limestone Bittercress	*Cardamine douglassii*	x	
Leathery Knotweed	*Polygonum achoreum*	x	
Asa Gray Sedge	*Carex grayi*	x	
Pale Sedge	*Carex pallescens*	x	
Schreber's Aster	*Eurybia schreberi*	x	
Blunt-leaved Bedstraw	*Galium obtusum*	x	
Mountain Holly	*Ilex mucronata*	x	
Honey-locust	*Gleditsia triacanthos*	x	
Smooth Gooseberry	*Ribes hirtellum*	x	
Drooping Woodreed	*Cinna latifolia*	x	x
Necklace Sedge	*Carex projecta*	x	x
Swamp Red Currant	*Ribes triste*		x
Carolina Spring Beauty	*Claytonia caroliniana*		x
Creeping Spike-rush	*Eleocharis palustris*		x
Red-tinge Bulrush	*Scirpus microcarpus*		x
Finely-nerved Sedge	*Carex leptonervia*		x
Yellow Sedge	*Carex flava*		x
Canada Pussytoes	*Antennaria howellii ssp. canadensis*		x
Elk Sedge	*Carex garberi*		x
Drooping Sedge	*Carex prasina*		x

		Le Conte's Violet	*Viola affinis*	x
		American Plum	*Prunus americana*	x
		Alderleaf Buckthorn	*Rhamnus alnifolia*	x
		Woolly Sedge	*Carex pellita*	x
Regionally Rare Wildlife Species	Avoid: Where regionally rare wildlife species are present in the PSW, impacts will be avoided. Minimize: Where regionally rare species are present outside of the PSW, impacts to these species should be minimized through maintaining habitat around locations where these species are abundant. Mitigate/Rehabilitate: Appropriate buffers adjacent to protected areas where these species have been documented will help to reduce impacts. Where impacts are unavoidable, the spatial extent of impacts should be restored as soon as	Regionally rare bird species observed on the property included Acadian Flycatcher (Polygon 20), Yellow-throated Vireo (Polygon 11, 14, 15, 27), and Tufted Titmouse (Poly 5, 6, 11, 12, 27). Although Acadian Flycatcher was observed on the property, only an individual on one occasion was observed (Polygon 20). This suggests the species was not breeding on the property and management of this species and habitat is not required. Habitat for Yellow-throated Vireo and Tufted Titmouse will be protected within the PSW areas. Buffers to the PSW and other retained features may also provide appropriate habitat for these species. Some areas that provide habitat outside of the PSW areas may also be retained if features are determined to be old growth and/or have bat maternity roosts.		

	possible for temporary disturbances. Compensate: Compensation for Regionally Rare wildlife species habitat that were documented on site is not feasible.	

Table 12. Summary of Impacted Area (ha) for Existing Landcover/Vegetation Communities within the study area

Community Series	ELC Code (Community Series)	Existing Area (ha)	Developed Area (ha)	Retained Area (ha)
Anthropogenic	ANTH	3.37	2.85	0.52
Cultural Meadow	CUM	9.76	8.45	1.31
Cultural Plantation	CUP	0.33	0.33	0.00
Cultural Thicket	CUT	23.53	22.60	0.93
Cultural Woodland	CUW	44.78	33.39	11.39
Deciduous Forest	FOD	6.62	2.34	4.28
Deciduous Swamp (Non-PSW)	SWD	29.90	24.40	6.41
Deciduous Swamp (PSW)	SWD	75.30	1.30	73.16
Total		193.67	95.66	98.01

Table 13: Summary of impacts to proposed natural heritage system features and elements

Features and Elements Recommended for Protection	Summary from Impact Assessment	Recommended Action
Environmental Protection Areas (EPA), which includes the Niagara Peninsula Slough Forest Provincially Significant Wetland (PSW)	All areas that have been identified as Provincially Significant Wetland EPA have been protected. Additionally, buffers that vary depending on proposed land use have been prescribed: 30m for most residential and commercial areas; 15m plus an additional 15m special policy area adjacent to the limit of the buffer for the education/innovation lands proposed on the east side of the subject area.	The extent of the Environmental Protection Area should be staked and surveyed by an Ontario Land Surveyor, and buffer areas demarcated in the field.
Endangered/Threatened Species at Risk and their associated habitat	Impacts to habitat for endangered and/or threatened species is not anticipated. Some areas on the subject property could provide nesting habitat for Barn Swallow (e.g. culverts).	Prior to submission of plans of subdivision, all culverts should be surveyed following standard protocols to determine if culverts are being used as nesting habitat by Barn Swallow.
The permanent watercourse with natural channel present on the east and south side of the property (Watercourses 1 and 2)	Impacts to aquatic resources in watercourses 1 and 2 are not anticipated.	Improvements to channel design and addition of coarse substrates could help to improve fish habitat.
Non-PSW Wetlands	Approximately 24 ha of non-PSW wetland is proposed for development. The vegetation types impacted include Oak Mineral Deciduous Swamp (SWD1), Green Ash Mineral Deciduous Swamp (SWD2-2), and Willow Mineral Deciduous Swamp (SWD4-1)	The preparation of compensation/enhancement for non-PSW wetlands has been proposed as means to identify opportunities to mitigate impacts associated with these features. Enhancement of wetland areas that are protected (i.e. functional improvements), creation of wetland elements in buffer areas (that aren't currently wetland), and creation of wetland elements on storm water management blocks will help to mitigate impacts associated with loss of these wetlands. Residual impacts (i.e. those not addressed through mitigation, on-site

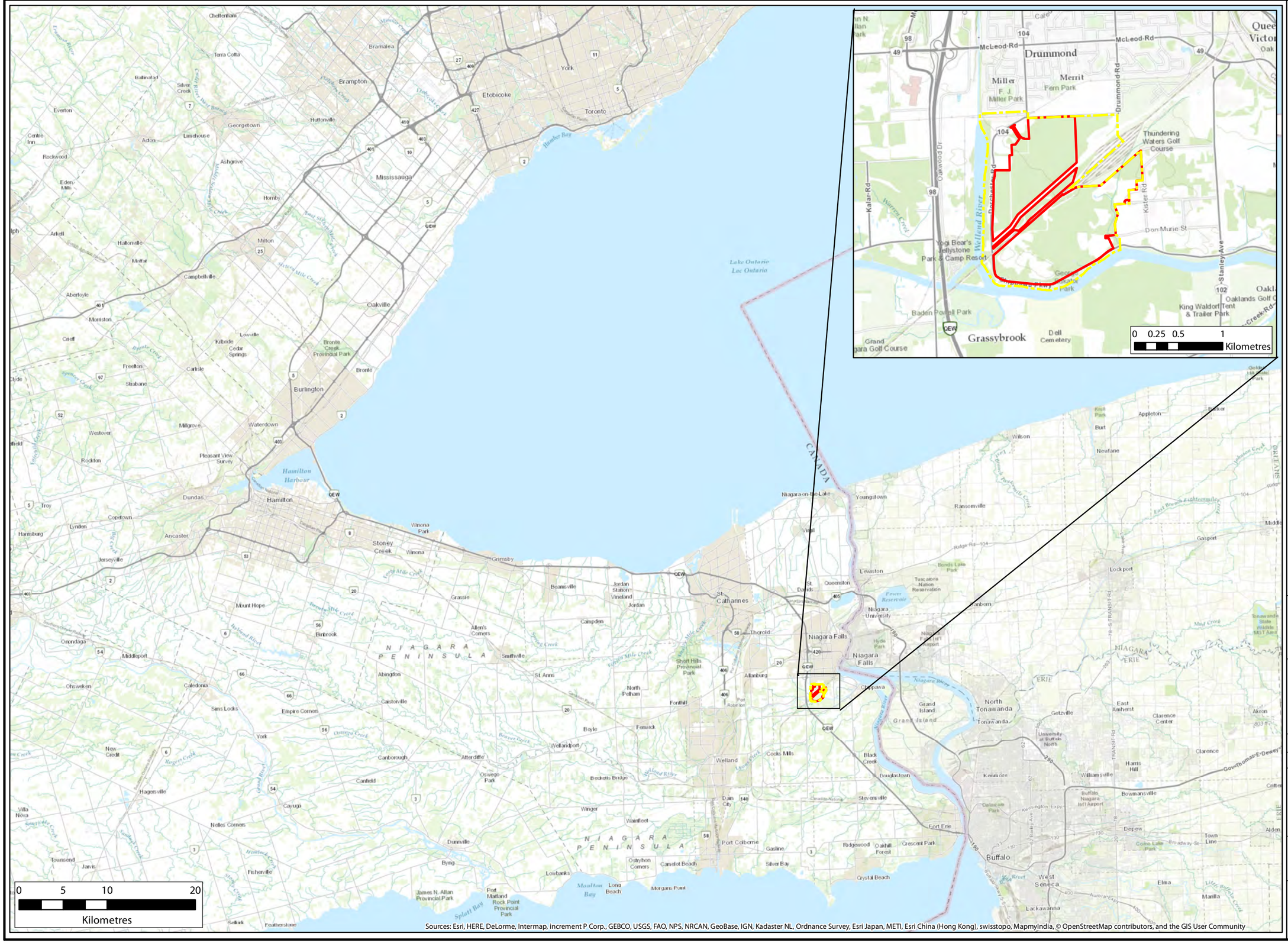
		compensation, and/or restoration/enhancement) could be addressed through offsite compensation. The terms and conditions of such a compensation/enhancement plan should be negotiated with the NPCA. Prior to submission of plans of subdivision, compensation plans should be prepared that address impacts associated with removal of amphibian habitat. Specific details regarding restoration, compensation, and monitoring should be addressed during the preparation of subdivision or site plans. This includes removal of wetland features associated with blocks A02, A04, A09, B01, B02, B06, B08, B09, and B13.
Old growth/Mature Forest Habitat	Much of the old growth and mature forest habitats on the property are protected within the PSW/EPA lands. An area of old growth Oak forest is located in block A11 (ELC polygon 46); this area is partially protected by the 30m PSW/EPA buffer; areas outside of the buffer would not be protected. Individual mature trees are also present in blocks A06 and B13.	Old growth forest elements associated with Blocks A06, A11, and B13 should be protected and/or integrated into the proposed subdivision design using best management practices to avoid impacts to individual trees. As part of the submission of plans of subdivision for these blocks, a tree saving plan should be prepared and submitted to document the specific location of trees that will be protected and those that will be removed. The tree saving plan should follow the requirements outlined in section 1.36 of the Niagara Region Tree and Forest Conservation Bylaw (Bylaw No. 30-2008).
Bat Maternity Roost Habitat	Much of the forested areas that have potential to provide bat maternity roost habitat are within the PSW lands that will be protected. Across the study area, there are a number of wooded areas outside of the protected PSW/EPA blocks that meet criteria for bat roost habitat and may require further field investigation to determine if they are being used by SAR bats.	Cavity trees that provide habitat for SAR bat species are protected under the Endangered Species Act. Given the recent listing and updated protocols for managing SAR bat habitat, it is recommended that the MNRF be consulted prior to development to better understand how potential SAR bat habitat should be managed. The most recent bat habitat survey guidelines released in May 2016 protocols indicate that acoustic monitoring be conducted to determine if SAR species are present, and potentially

	The mean and standard error of cavity trees from a sample of 44 0.5 ha plots was 16.4 stem/ha (+/- 2.95 standard error), with higher cavity tree densities in wooded areas that were in decline.	using cavity trees as roost habitat. Based on the current cavity tree surveys, some of the wooded areas that are proposed for development have a high density of cavity trees. Where cavity trees are proposed for removal, the MNRF should be consulted As part of the submission of plans of subdivision, screening for bat maternity roost trees should be conducted in proposed development blocks A01-A04, A06, A07, A09, A10, B01, B02, B05-B07, B13, and B14; surveys should follow the Guelph District MNRF guidelines for bat and bat habitat surveys of treed habitats (MNRF 2016). Given that snag density thresholds have been met in these areas, the survey methods prescribe acoustic monitoring, and if SAR bats are detected, an Information Gathering Form will need to be submitted to the Guelph District MNRF.
Mast Tree Habitat	Much of the forested areas that have a high occurrence of mast trees (e.g. Oaks, Hickory, and Walnuts) are within the protected PSW/EPA lands and their respective buffers. Areas where mast trees may be impacted include: the deciduous forest feature (Polygon 46) associated with Block A11, and small patches or individual mast trees throughout other wooded areas on the property.	Mast trees presented in Block A11 should be protected. The trees in this particular area have old-growth characteristics, with some individual trees being over a 1 metre in diameter. As part of the submission of plans of subdivision, a tree saving plan, in coordination with the recommendations for old growth areas, should be conducted to ensure important mast trees are protected, and/or appropriate methods for compensation are identified where trees will be removed.
Amphibian Breeding Habitat (Woodland Type)	Much of the forested and swamp areas that have a high occurrence of amphibian breeding habitat occur within the protect PSW/EPA lands.	Where amphibian breeding habitat is proposed for removal, habitat of similar composition and structure could be restored elsewhere on the subject property.

	Amphibian habitat is also present in many of the non-PSW wetland features. This includes areas within blocks A02, A04, A09, B01, B02, B06, B08, B09, B10 and B13.	As part of the submission of plans of subdivision, a habitat compensation plan should be prepared to mitigate impacts associated with removal of amphibian habitat associated with blocks A02, A04, A09, B01, B02, B06, B08, B09, B10 and B13. Specific details regarding restoration, compensation, and monitoring should be addressed during the preparation of subdivision/site plans.
Habitat for Provincially Rare and/or Species of Special Concern (Schreber's Aster, Honey Locust, Black Gum, Eastern Wood-Pewee, Wood Thrush, and Snapping Turtle)	Much of the forested and wetland areas that have occurrence of Schreber's Aster, Honey Locust, Eastern Wood-Pewee Wood Thrush, and Snapping Turtle will be protected within the PSW/EPA lands. Habitat for Wood Thrush and Eastern Wood-Pewee exists outside of the protected PSW/EPA lands and is proposed for removal.	Where Schreber's Aster is present in habitats that are proposed for development, individual plants can be salvaged and transplanted into appropriate habitat within the protected areas. Details regarding a salvage and transplantation plan should be addressed through a compensation plan as part of the submission of plans of subdivision. Where Black Gum is present in habitats that are proposed for development, individual trees should be protected using best management practices. No action is required for the Honey Locust as its location is protected within a PSW block and associated buffers. Addressing habitat loss for Eastern Wood-Pewee and Wood Thrush will be a long-term commitment. An option to address reductions in woodland habitat is through tree compensation, enhancement of existing habitat in protected areas, tree planting in buffers, and other land-use blocks with green spaces. No specific action is required for Snapping Turtle as its habitat is protected within the PSW block and associated buffers.

Reptile Hibernacula	Although no reptile hibernacula were observed during 2015, field investigations, it is highly probably that they are present within the study area. Impacts to hibernacula should be avoided if they are found during site investigations conducted later in the processes. As well, reptile hibernacula can be integrated into plans for buffers and/or other restoration activities.	Reptile hibernacula are difficult to detect, and may not be feasible to protect if they end up being located in development areas. Contingency plans for salvaging and relocating snakes should be developed as part of a detailed environmental management and restoration plan. Additionally, recommendations for site-specific hibernacula creation can be addressed during the development and refinement of site plans.
Deer Winter Congregation Areas	The large areas of swamp that is protected will continue to provide wintering habitat for White Tailed Deer. The total area will be reduced, however interior areas will be maintained in the larger wetland blocks.	No management recommended.
Rare Vegetation Communities	The three provincially rare vegetation community types present in the study area will be largely protected within the PSW wetland areas. Some features that are proposed for removal do contain these vegetation community types. Where this is the case, impacts should be mitigation through salvaging plants and/or their propagules (seeds, rhizomes, and mature plants) and transplanted into existing features and/or restoration areas.	Soils and vegetation can be salvaged and translocated to appropriate existing habitat, enhancement areas, and/or restoration areas. Specific design recommendations can be outlined a part of a compensation plan that is submitted along with plans of subdivision.
Early Succession Breeding Bird Habitat	Early successional breeding bird habitat associated with polygons 16 and 28 are proposed for development associated with blocks B01, B02, B03, B04, and B13.	Early successional vegetation characteristics that are present within the habitats affected can be incorporated into design specifics for parks, storm water management pond areas, buffers, and other open space plantings. Specifics details can be outlined a part of a compensation plan that is submitted along with plans of subdivision.

9. MAPS



Legend

- Property Boundary
- Secondary Plan Area

Thundering Waters Secondary Plan

Study Area

DOUGAN & ASSOCIATES
ECOLOGICAL CONSULTING & DESIGN
77 Wyndham Street South • Guelph ON N1E 5R1
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PROJECT: DA15-014-02

CLIENT: GR (CAN) Investment Co., Ltd.

N W E S

UTM Zone 17 NAD83

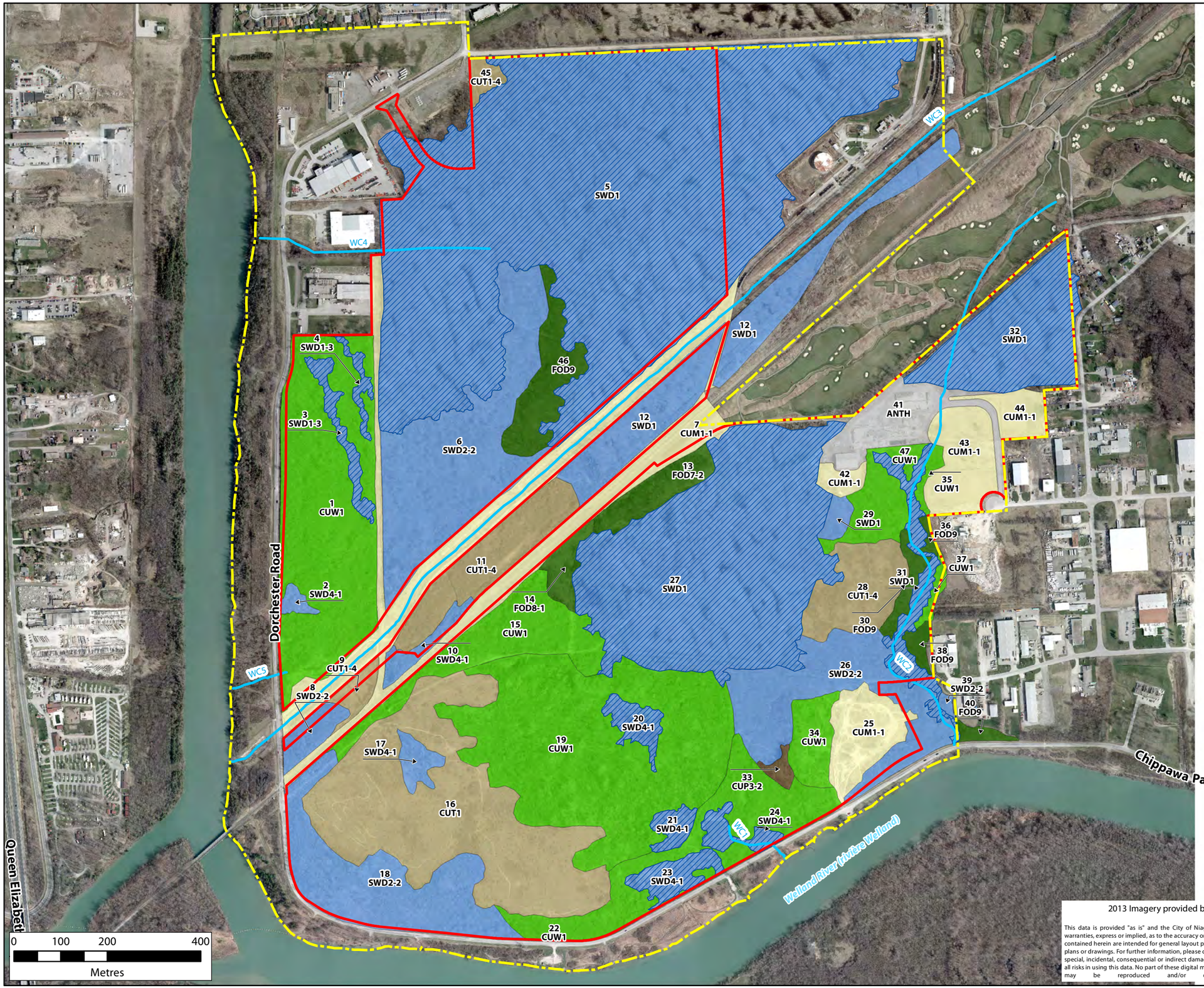
DATE: JUNE 2016

SCALE: 1:400,000

DRAWN BY: LC

CHECKED BY: SH

Map: 1



2013 Imagery provided by the City of Niagara Falls.

Legend

- Property Boundary
- Secondary Plan Area
- Water Courses (2015)
- Provincially Significant Wetland

Vegetation Community Series

- ANTH - Anthropogenic
- CUM - Cultural Meadow
- CUT - Cultural Thicket
- CUP - Plantation
- CUW - Cultural Woodland
- FOD - Deciduous Forest
- SWD - Deciduous Swamp

Thundering Waters Secondary Plan

Vegetation Communities

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PROJECT: DA15-014-03

CLIENT: GR (CAN) Investment Co., Ltd.

N / W / E / S

UTM Zone 17 NAD83

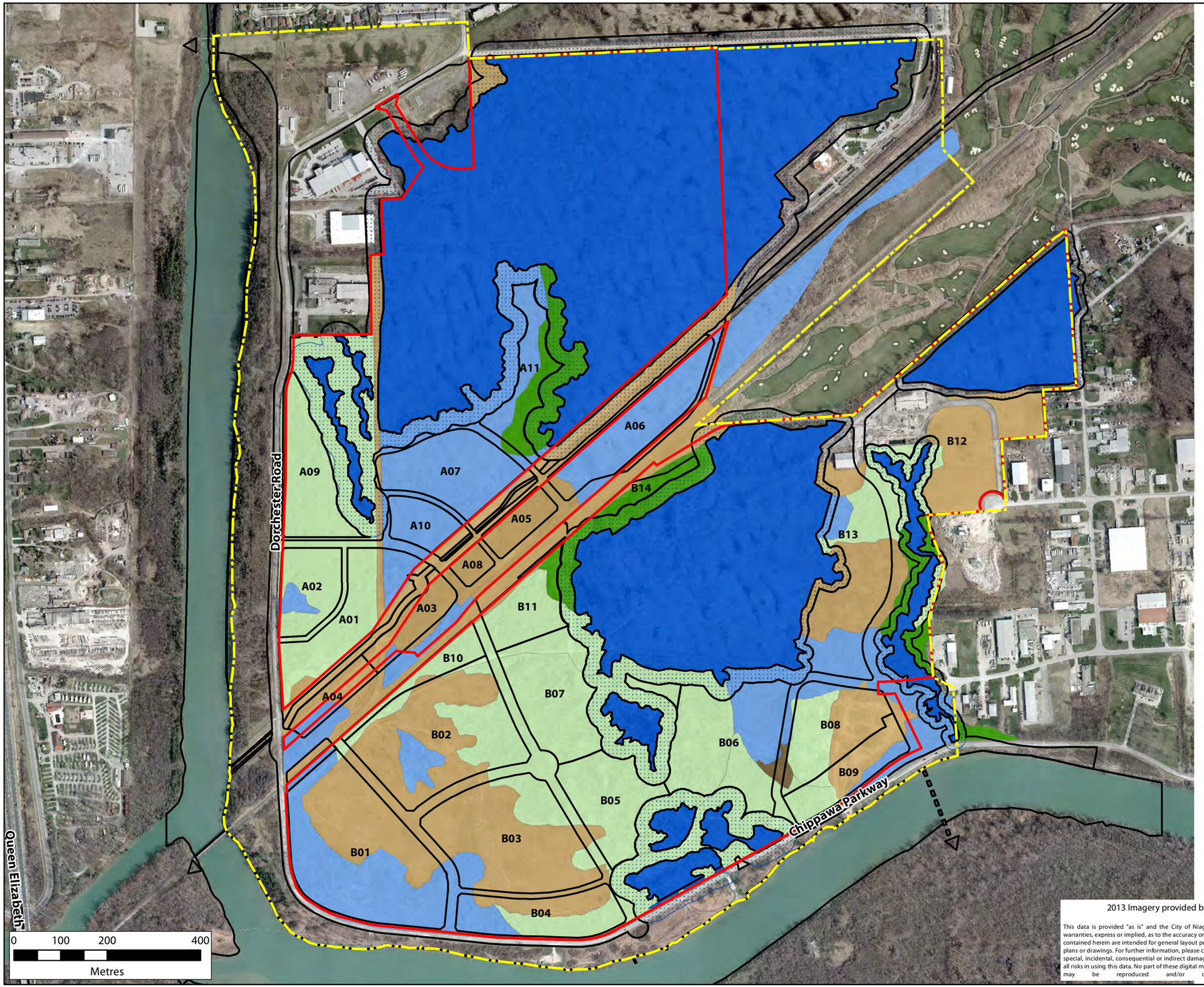
DATE: JUNE 2016

SCALE: 1:8,000

DRAWN BY: LC/LW

CHECKED BY: SH

Map: 2



2013 Imagery provided by the City of Niagara Falls.

Legend

- Property Boundary
- Secondary Plan Area
- Proposed Land Use Plan (May 20, 2016)

Environmental Management

Primary
- Wetland (PSW)

Secondary
- Wetland (non PSW)
- Forest
- Cultural Woodland

Tertiary
- Early Successional Habitat
- Cultural Plantation
- PSW Buffer

Thundering Waters Secondary Plan

Land-use Plan and Management Units

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PROJECT: DA15-014-02

CLIENT: GR (CAN) Investment Co., Ltd.

N W E S
UTM Zone 17 NAD83

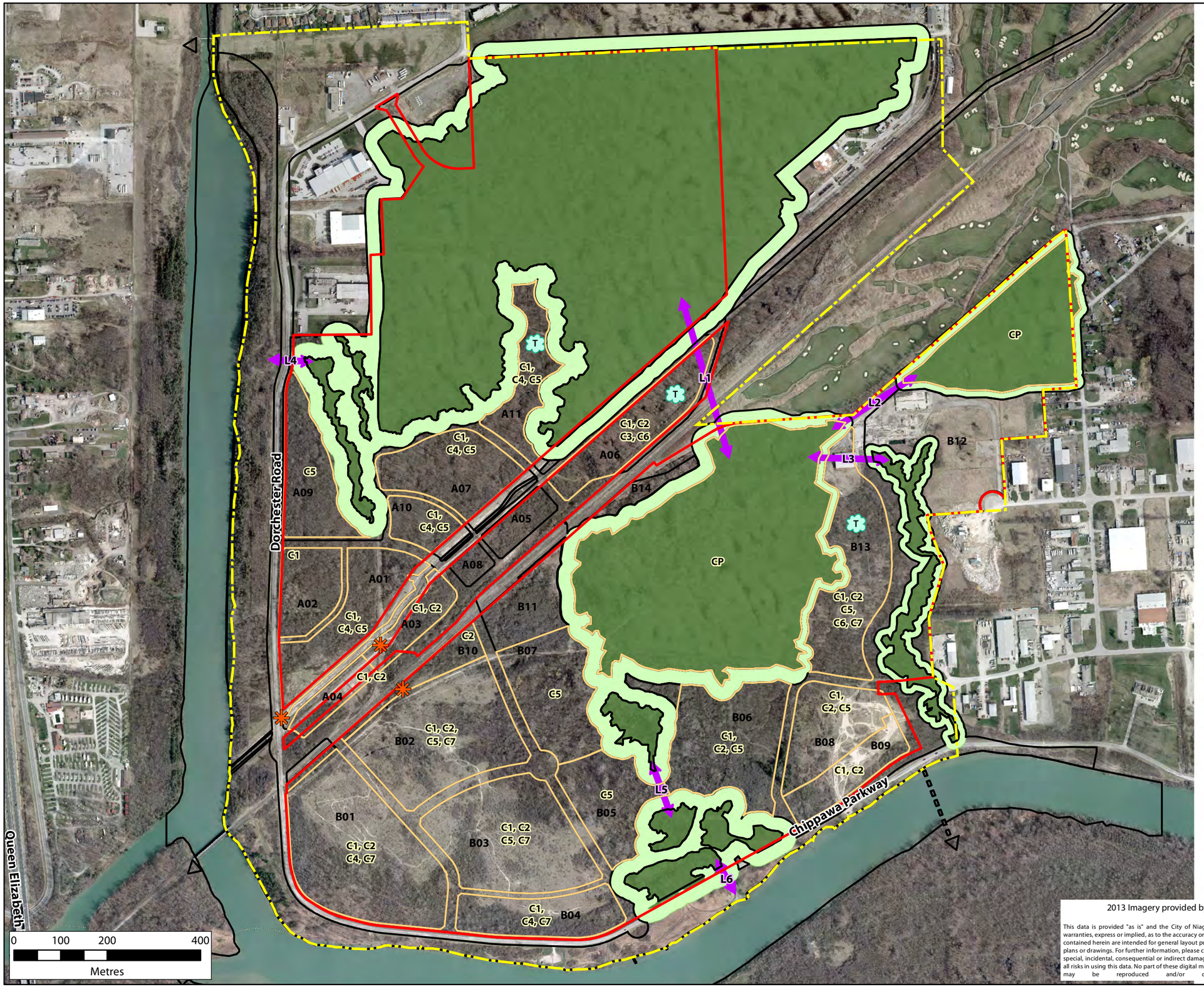
DATE: JUNE 2016

SCALE: 1:8,000

DRAWN BY: LW

CHECKED BY: SH

Figure: 3



2013 Imagery provided by the City of Niagara Falls.

Legend

- Property Boundary
- Secondary Plan Area
- Proposed Land Use Plan (May 20, 2016)
- D&A Wetland Boundary
- Wetland Buffer
- Nest Surveys for Barn Swallow
- Tree Saving Plan (T) required for old growth, mature trees and mast trees
- Linkage Areas
- Compensation Requirements
  - C1 - Non-PSW Wetlands
  - C2 - Amphibian Habitat
  - C3 - Schreber's Aster
  - C4 - Eastern Wood-Peewee Habitat
  - C5 - Wood Thrush Habitat
  - C6 - Rare Vegetation Habitat
  - C7 - Early Successional Breeding Bird Habitat
  - CP - PSW

NOTE:
- bat maternity roost surveys required for all woodlands
- reptile hibernacula surveys required during pre-grading site preparation

Thundering Waters Secondary Plan

Proposed Natural Heritage System & Management Recommendations

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PROJECT: DA15-014-02

CLIENT: GR (CAN) Investment Co., Ltd.

N / W / E / S
UTM Zone 17 NAD83

DATE: JUNE 2016

SCALE: 1:8,000

DRAWN BY: LW

CHECKED BY: SH

Figure: 4

10.APPENDICES

Appendix A: Terms of Reference

Niagara Falls Paradise Development

"Draft" Terms of Reference for Environmental Impact Study

Niagara Falls, Ontario

Prepared for:

GR(CAN) Investment Co., LTD

Prepared by:
Amec Foster Wheeler Environment & Infrastructure
Dougan & Associates
C. Portt and Associates

July 2015

Project No. TP115026

THE PARADISE AT NIAGARA FALLS

"Draft" Terms of Reference Environmental Impact Assessment

Submitted to:

GR(CAN) Investment Co., LTD

Submitted by:

Amec Foster Wheeler Environment & Infrastructure

Dougan & Associates

C. Portt and Associates

July 2015

TP115026

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LIST OF APPENDICES

1.0 PURPOSE/SCOPE OUTLINE

The Environmental Impact Study (EIS) is an important 'building block' for the Secondary Plan. It establishes a clear understanding of the environmental resources including the area features, their function and form. Fundamental components of the EIS include:

- Delineation of the provincially significant wetland boundary;
- Assessment of identified Regional Environmental Conservation Areas;
- Characterization of terrestrial and aquatic natural heritage features and their functions;
- Characterization of sensitivities and constraints related to natural heritage features and functions;
- Identification of ecological linkages;
- Recommendations of appropriate setbacks and buffers;
- Tree preservation;
- Mitigation measures; and
- Rehabilitation, enhancement, and management strategies.

Further details specific to the purpose of the EIS associated with the on-site fisheries and terrestrial systems is offered in the following:

Fish and Aquatic Habitat

The three main watercourses that traverse portions of the study are potentially accessible to fish from the Niagara River and Welland River. Therefore there is the potential for several fish species to use the watercourses on, and adjacent to, the site for spawning. These species include muskellunge (*Esox masquinongy*), northern pike (*Esox lucius*), grass pickerel (*Esox americanus*; a threatened species), and white sucker (*Catostomus commersonii*). There is also the matter of fishes that may permanently inhabit watercourses and waterbodies within the subject property. Based on discussions with the Ontario Ministry of Natural Resources and Forestry (MNRF) and the Niagara Peninsula Conservation Authority (NPCA), fish and fish habitat must be addressed as part of the Environmental Impact Study (EIS). Any development potentially affecting a fishery, either directly or indirectly, will also be subject to the federal Fisheries Act.

Terrestrial Natural Heritage

The Niagara Region EIS Guidelines provide the outline for what is required as part of an EIS to ensure that development meets the requirements of the Greenbelt Plan, the Provincial Policy Statement, Regional Policy Plan, and local Official Plans and By-laws, the Niagara Escarpment Plan, and Niagara Peninsula Conservation Authority (NPCA) Policies and Regulations.

Through consultation with the City, the NPCA, and MNRF, the need for an EIS has been established based on the factors outlined in Table 1 which outlines the natural heritage features that trigger the need for an EIS for the proposed project.

Table 1: EIS Triggers			
	Is an EIS required?		
NATURAL HERITAGE FEATURE	***Development involves lands within the natural heritage feature***	***Development involves adjacent lands***	***To be addressed in EIS for Subject Property***
Areas identified as Environmental Protection Area (EPA)			
Provincially Significant Wetland (PSW)	Development not permitted – no EIS	EIS required for development within 120 metres	Yes
Provincially Significant Life Science Area of Natural and Scientific Interest (ANSI)	Development not permitted – no EIS	EIS required within 50 metres	No
Significant Portions of the Habitat of Threatened and Endangered Species	Where habitat requirements are well defined, development not permitted – no EIS. Where habitat requirements not well defined an EIS is required	EIS required for development within 50 metres. Habitat must be defined in consultation with the MNR	Yes
Significant natural heritage features within the Greenbelt Natural Heritage System	Development not permitted – no EIS	EIS required for development within 120 metres	No
Areas identified as Environmental Conservation Area (ECA)			
Significant Woodlands	EIS required Tree Saving Plan required	EIS required for development within 50 metres	Yes
Significant Wildlife Habitat	EIS required	EIS required for development within 50 metres	Yes
Significant Habitat of Species of Concern	EIS required	EIS required for development within 50 metres	Yes
Critical Fish Habitat(type 1)	EIS required	EIS required for development within 30 metres	Yes
Other Fish Habitat (type 2 and 3)	EIS required	EIS required for development within 15 metres	Yes
Significant Valleylands	EIS required	EIS required for development within 50 metres	No
Other Evaluated Wetland	EIS required	EIS required for development within 50 metres	Yes
Other Features in the Greenbelt Plan			
Greenbelt Natural Heritage System	EIS required	EIS not required.	No
Key hydrologic feature	Development not permitted – no EIS	EIS required for development within 120 metres	No

The EIS that will be prepared for this development area will follow the guidelines and report structure that is outlined in the Region of Niagara EIS Guidelines document. Broadly, this will include the preparation of a constraints analysis and environmental impact study report.

As outlined in the EIS Guidelines, impacts shall be assessed for different phases of the development project (e.g. during site preparation and construction, and following the development); this includes identification of direct impacts, indirect impacts, and cumulative impacts. Opportunities to avoid potential impacts will be considered early in the process through a constraint assessment to determine where land-use/natural heritage conflicts can be resolved through design changes. Following this, mitigation, enhancement, and restoration strategies will be explored. Finally, residual impacts that cannot be addressed through design changes and mitigation/enhancement strategies will be identified, and considered for managing through off-site compensation.

Initial steps to ensure impacts of the proposed land development are minimized will require delineation of natural heritage feature boundaries, identifying appropriate setbacks at a local scale (i.e. buffers may vary across the site depending on sensitivities), and key hydrological linkages that are important for sustaining the function of the system

2.0 BACKGROUND INFORMATION

As part of the process to establish these detailed Terms of Reference, a series of meetings and follow-up consultation were held with the City of Niagara Falls, Region of Niagara, NPCA, and MNRF. Each party was requested to provide access to available relevant information to support the preparation of an EIS; the following provides a summary of specific information related to Fisheries and Terrestrial Resources.

Fish and Aquatic Habitat

The Ministry of Natural Resources and Forestry (MNRF) and the Niagara Peninsula Conservation Authority (NPCA) were contacted regarding existing information on the fish habitat and communities in the watercourses on the site. There are no data available from either agency. The nearby and adjacent, Niagara River and Welland River respectively, support diverse fish communities and support recreational fisheries, hence will require consideration in the assessment.

Terrestrial Natural Heritage

The NPCA and MNRF indicated that various types of information are available for the property, including but not limited to natural heritage reports, element occurrence records, and incidental species occurrence records.

Natural heritage information for previous studies will be used for baseline information. NPCA indicated that this information and other species records for the property can be provided.

The Niagara Region Natural Area Inventory will be used to characterize vegetation characteristics and ecological function of similar systems in the area.

Element occurrence records from the MNRF Guelph District and the Natural Heritage Information Centre will be used to identify species at risk, and provincially rare species that are present in the area, and that may occur on the property.

3.0 CONSULTATION

As noted, various meetings and follow-up consultation has been held with the respective stakeholders and agency partners (ref. Appendix A). The following provides a summary of relevant consultation.

Fish and Aquatic Habitat

As noted, neither the MNRF nor the NPCA have any information regarding fish and fish habitat on the site. It was recommended by MNRF that fish sampling and habitat characterization be undertaken and a Licence to Collect Fish for Scientific Purposes for watercourses on the site was issued to C. Portt and Associates. MNRF (ref. Pers. Comm. A. Yagi) also recommended that aquatic habitat on the site, fish access from adjacent waterbodies, and the potential effects of water management on the golf course be assessed. The MNRF and NPCA have both requested that access to the OPG property be arranged and the potential for fish accessing the Con Rail Drain be determined. It was agreed at the April 21, 2015 meeting (ref. Appendix A) with NPCA that a formal headwater drainage feature assessment would not be necessary, given the ephemeral nature of the watercourses/drainage features.

Terrestrial Natural Heritage

Niagara Peninsula Conservation Authority

The NPCA was consulted and staff provided direction on the following items:

- Mapping that shows the extent and location of wetland boundaries and environmental conservation areas boundaries
- Natural Heritage work previously conducted on the property was reported in a 2009 Environmental Impact Statement. NPCA advised that this could be used as a baseline for information on plant communities and species present; NPCA will provide this report to the team.
- That a number of surveys have not been conducted for the site, including bat habitat surveys, crepuscular bird surveys, and White Wood Aster surveys.
- Wetland boundary delineation on the ground would have to be coordinated with MNRF
- Woodlands are identified as Regional Environmental Conservation Area and will need to be assessed using the appropriate criteria for their significance
- Occurrence and habitat for reptiles (including snakes and turtles) can be determined through incidental observations while on-site for other studies
- Corridors and linkages will need to be characterized to connectivity of natural areas to the surrounding system
- Potential impacts to vernal pools can be addressed through understanding changes to their hydrology using topographic information and micro-catchment characteristics; detailed assessment using feature based water balance and/or ground water monitoring would not be required
- Consideration of trails within wetlands and buffers

Ministry of Natural Resources and Forestry

Consultation with the MNRF confirmed that wetland boundary verification will need to be conducted with the MNRF biologist. This will require visiting the site with the MNRF to confirm and survey wetland boundaries. MNRF also indicated that targeted species at risk surveys may need to be conducted for species that are likely to occur on the property.

4.0 WORK PLAN TASKS

A. Fish and Aquatic Habitat

C. Portt and Associates has conducted initial spring inventories as follows, plus based on agency partners consultation, established follow-on tasks related to fisheries management:

1. Request any background information available from the MNRF and NPCA regarding the fish community in the watercourses and acquire a Licence to Collect Fish for Scientific Purposes.
   Completed. Meeting with NPCA and telephone discussion with MNRF

2. Conduct field investigations to characterize the habitat conditions (presence/absence of flow, wetted channel dimensions, substrate, presence/absence of barriers to migration) and look for spawning fish in all watercourses that occur on the property during the spring spawning period.
   Completed April 11, 12, and 21, 2015.

3. Obtain amphibian trapping information conducted upon vernal pools by Dougan and Associates. Fish are often captured incidentally during this work (minnow traps are used) and therefore may indicate which pools are utilized by fish.

4. Conduct fish sampling by either seining or electrofishing later in the spring or in early summer when individuals spawned this spring will be susceptible to capture.
   Completed June 11, 2015.

5. Arrange for access to OPG property to examine the potential for fish access into the Conrail Drain. This has been required by MNRF and NPCA.
   Contact has been made, but date not scheduled.

6. Investigate the potential for water management/augmentation within the existing golf course, and how this affects flows in the study area watercourses. Must contact golf course maintenance department.

7. Re-examine fish habitat, stream flow, and fish communities (by electrofishing/observation) during the usual late summer low flow period.

8. Prepare a report summarizing the background information and the results and significance of the field investigations.

B. Terrestrial Natural Heritage

Dougan & Associates conducted botanical inventories, ecological land classification surveys, breeding bird surveys, and amphibian surveys during the spring of 2015. To date, this information has confirmed that the existing Ministry of Natural Resources and Forestry wetland mapping provides a good representation of the extent and boundaries of existing wetland features on the ground. Other areas of the site are dominated by young deciduous forest, shrub thickets, and open meadows. The wetland features provide high quality habitat for various amphibian species include frogs, toads, and salamanders. Additionally, a diverse bird and wildlife community is support by the mix of habitat types. The following provides specific details as to the scope completed to-date and that which is proposed.

1. *Nocturnal Amphibian Surveys - **Complete***

   Point counts established across the site to document the frog and toad species and relative abundance. Survey conducted April, May, and June.

2. *Breeding Bird Surveys - **Complete***

   Transects and point counts to document breeding birds present across the site. Surveys conducted May and June.

3. *Early Season Ecological Land Classification and Vegetation Inventory - **Complete***

   Site inventory and boundary delineation of vegetation communities across the site and inventory of early season plants. Surveys conducted during May and June.

4. *Wetland Boundary Delineation*

   Field verify the Provincially Significant Wetland boundary through site investigation and on the ground staking. Follow up visit with MNRF biologist to confirm wetland boundary and capture coordinates using high-accuracy GPS (Trimble Geo XH).

5. *Summer & Fall Vegetation Surveys*

   Summer and fall vegetation surveys to complement the spring inventory work that was completed. In addition to documenting the flora present, targeted surveys will be conducted for SAR species such as White Wood Aster. Inventory will be combined with other field visits such as wetland boundary delineation, and other SAR surveys that are required.

6. *Species at Risk Surveys*

   Meeting with NPCA and MNRF to confirm Species at Risk that are known to be present at the site or have high potential to be present. Targeted field inventory to validate NPCA and MNRF information for the species of interest.

7. *Early Season Summary report – **in progress***

   Technical memorandum documenting findings of early season wildlife and plant inventory work. Preliminary ELC mapping and quantitative summary of vegetation communities.

C. Combined EIS Tasks

1. *Characterization and Evaluation of Significance Report*

   Building on the early season summary, field inventory results will be presented in a overall characterization report. The report will document species observed, vegetation community types present, ecological functions of supporting flora and fauna, status of species present, and important policy boundaries (e.g. wetlands, woodlands, Environmental Conservation Areas), fisheries, and associated habitat. Findings will be used to provide recommendations for appropriate setbacks and fisheries management and will be integrated into the land use planning process throughout the characterization stage of the project.

2. *Integration of Land Use Plan and Constraints Report*

   The draft land use plan will be integrated with the terrestrial natural heritage information and fisheries habitat information to identify consistencies and conflicts with features and proposed protection areas. Preliminary restoration opportunities will be identified. At this stage, impacts that can be avoided through updates to the land use plan will be recommended.

3. *Impact Assessment and Management Recommendations Report*

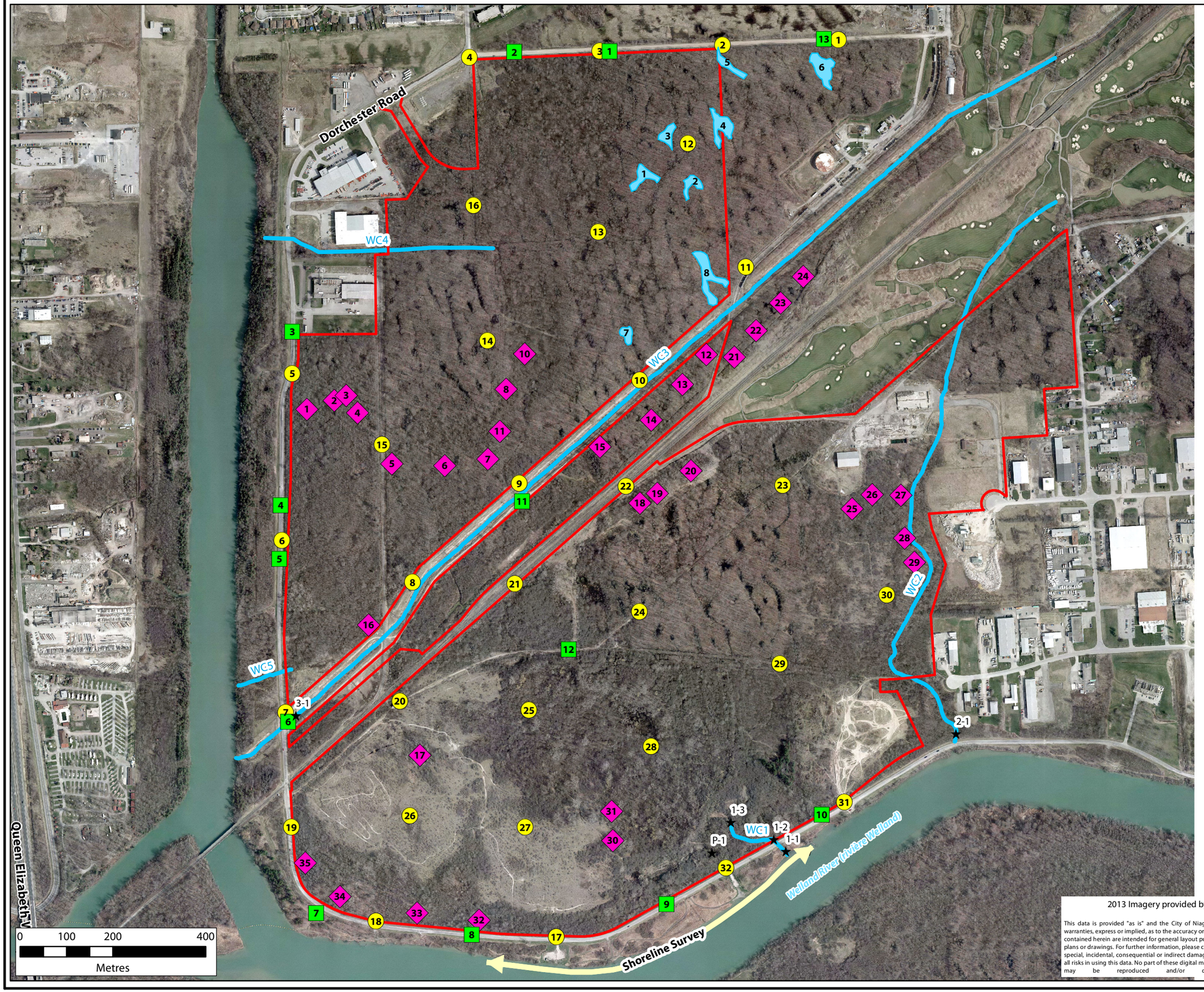
   The impact analysis will summarize the expected direct, indirect, and cumulative impacts that will result from the proposed land use plan. Opportunities for mitigation, restoration, and enhancement will be explored and recommended based on the types and extent of features lost, complementary land use types, and sustainable long-term management strategies. Where necessary to address residual impacts that cannot be addressed on-site, off-site areas will be evaluated through desktop analysis to determine if natural features in the vicinity of the site could be integrated into a broader restoration plan. Based on the proposed restoration and management strategies, monitoring requirements will also be identified.

5.0 SCHEDULE

The EIS will basically involve three (3) primary stages scheduled as follows:

1. *Seasonal Field Data Collection: Spring, Summer, Fall, 2015*
2. *Site Characterization: Fall 2015/Winter 2016*
3. *Impact Assessment/Management Strategies: Winter/Spring 2016*

Appendix B: Wildlife Monitoring Locations



2013 Imagery provided by the City of Niagara Falls.

Legend

- Property Boundary

Wildlife Survey Locations (2015)

- Nocturnal Amphibian Call Station
- Breeding Bird Survey Station
- Bat Maternity Roost Survey Station
- Salamander Trapping
- Water Courses (2015)
- Shoreline Survey Area
- ★ Photos

Thundering Waters Secondary Plan

Wildlife Survey Locations

DOUGAN & ASSOCIATES
ECOLOGICAL CONSULTING & DESIGN
77 Wyndham Street South • Guelph ON N1E 5R3
T 519.822.1609 • F 519.822.5389 • www.dougan.ca

PROJECT: DA15-014-03

CLIENT: GR Canada Investments Ltd.

N W E S
UTM Zone 17 NAD83

DATE: JUNE 2016

SCALE: 1:8,000

DRAWN BY: LC/LW

CHECKED BY: SH

Appendix:

A

Appendix C: NHIC Query Results

Element Occurance ID	Scientific Name	Comman Name	S Rank	COSEWIC	Last Observed	MNRF Status	Extirpated
104195	Acipenser fulvescens pop. 3	Lake Sturgeon (Great Lakes - Upper St. Lawrence River population)	S2	THR	2011-pre	THR	N
104202	Acipenser fulvescens pop. 3	Lake Sturgeon (Great Lakes - Upper St. Lawrence River population)	S2	THR	2011-09-01	THR	N
107809	Sturnella magna	Eastern Meadowlark	S4B	THR	2008-8-3	THR	N
11200	Polygala incarnata	Pink Milkwort	S1	END	1823	END	Y
11351	Morus rubra	Red Mulberry	S2	END	1890-pre	END	N
11378	Justicia americana	American Water-willow	S1	THR	2007-10-04	THR	N
129	Nycticorax nycticorax	Black-crowned Night-heron	S3B,S3N		1991-06-04		N
16487	RESTRICTED	RESTRICTED			1943-PRE		Y
17278	Phegopteris hexagonoptera	Broad Beech Fern	S3	SC	1890's	SC	Y
2042	Ipomoea pandurata	Big-root Morning Glory	S1		1902-08-15		N
2072	Vaccinium stamineum	Deerberry	S1	THR	1896-05-26	THR	Y
21085	Colinus virginianus	Northern Bobwhite	S1	END	1900	END	Y
2119	Lespedeza frutescens	Violet Bush-clover	S1		1891-07-16		Y
22513	Falco peregrinus	Peregrine Falcon	S3B	SC	2008-06-10	THR	N
23025	Nycticorax nycticorax	Black-crowned Night-heron	S3B,S3N		1991		N
23026	Nycticorax nycticorax	Black-crowned Night-heron	S3B,S3N		1991		N
2403	Nuphar advena	Large Yellow Pond-lily	S3		2004		N
2442	Oenothera gaura	Biennial Gaura	S3		2004		N
2484	Polygonum erectum	Erect Knotweed	SH		1895-09-14		Y
2542	Crataegus pruinosa var. dissona	Northern Hawthorn	S3		1905-09-27		N
2543	Crataegus pruinosa var. dissona	Northern Hawthorn	S3		1982-06-11		N
2545	Crataegus pruinosa var. dissona	Northern Hawthorn	S3		1977-05-18		N
2565	Crataegus formosa	Waxy-fruit Hawthorn	S2		1977-09-16		N
2676	Aureolaria virginica	Downy Yellow False Foxglove	S1		1945-08-02		Y
2727	Hybanthus concolor	Eastern Green-violet	S2		1901-05-16		N
2752	Viola rotundifolia	Round-leaved Yellow Violet	SH		1892-06		Y
2899	Carex hirsutella	Hairy Green Sedge	S3		1981		N
3028	Carex appalachica	Appalachian Sedge	S2S3		1882-07-05		N
3079	Schoenoplectiella smithii	Smith's Bulrush	S3		1896-08		Y
3080	Schoenoplectiella smithii	Smith's Bulrush	S3		1896-09-05		Y
3212	Chamaelirium luteum	Fairywand	SX		1897-06-19		Y
3213	Chamaelirium luteum	Fairywand	SX		1891-06-12		Y
3233	Uvularia perfoliata	Perfoliate Bellwort	S1		1904-05-24		N
32468	Emydoidea blandingii	Blanding's Turtle	S3	THR	1985	THR	N
32852	Aristida dichotoma	Churchmouse Threeawn Grass	S1		1995-09-13		N
33028	Gentianella quinquefolia	Stiff Gentian	S2		1894-09-03		Y
3316	Spiranthes lacera var. gracilis	Southern Slender Ladies'-tresses	S1		1896-09-05		Y
3319	Spiranthes lacera var. gracilis	Southern Slender Ladies'-tresses	S1		1908		Y
33691	Oenothera gaura	Biennial Gaura	S3		1995-09-13		N
3397	Dichanthelium praecocius	White-haired Panicgrass	S3		1902-06-17		N
3463	Muhlenbergia tenuiflora	Slim-flowered Muhly	S2		1849-08-02		N
3466	Muhlenbergia tenuiflora	Slim-flowered Muhly	S2		1948-08-20		N
3488	Sphenopholis nitida	Shiny Wedge Grass	S1		1892-06-26		Y
3548	Smilax rotundifolia	Round-leaved Greenbrier	S2	THR	1989-03-14	THR	N
4960	Crotalus horridus	Timber Rattlesnake	SX	EXP	1941-08-22	EXP	Y
5076	Eurybia divaricata	White Wood Aster	S2	THR	1893	THR	Y
5331	Desmodium ciliare	Hairy Small-leaved Tick-trefoil	SX		1887-07		Y
5532	Crataegus beata	Dunbar's Hawthorn	S1				N
5536	Crataegus intricata	Copenhagan Hawthorn	SH		1912-10-07		N
59422	Juncus acuminatus	Sharp-fruited Rush	S3		1901-07-08		N
59831	Desmodium rotundifolium	Prostrate Tick-trefoil	S2		1906-09-03		N
59930	Linum medium var. medium	Stiff Yellow Flax	S3?		1877-07-27		N
59945	Linum virginianum	Woodland Flax	S2		1897-07-16		N
60032	Nyssa sylvatica	Black Gum	S3		1949-06-03		N
60111	Thaspium barbinode	Hairy-jointed Meadow-parsnip	SH		1901-07-04		N
60276	Monarda didyma	Scarlet Beebalm	S3		1904		N
65007	Dichanthelium clandestinum	Deer-tongue Panicgrass	S2		1995-09-13		N
66852	Eurybia divaricata	White Wood Aster	S2	THR	2002-09-12	THR	N
67477	Pleurobema sintoxia	Round Pigtoe	S1	END	1934-06-20	END	N
67880	Arigomphus villosipes	Unicorn Clubtail	S2S3		1934-06-20		N
67990	Ptychobranchus fasciolaris	Kidneyshell	S1	END	1934-06-20	END	N
7479	Clinostomus elongatus	Redside Dace	S2	END	1960-07-01	END	N
84753	Cornus florida	Eastern Flowering Dogwood	S2?	END	2010-05-19	END	N
92206	Castanea dentata	American Chestnut	S2	END	1901	END	N

Element Occurance ID	Scientific Name	Comman Name	S Rank	COSEWIC	Last Observed	MNRF Status	Extirpated
92208	Chimaphila maculata	Spotted Wintergreen	S1	END	1895	END	N
92209	Hibiscus moscheutos	Swamp Rose-mallow	S3	SC	2004	SC	N
92417	Frasera caroliniensis	American Columbo	S2	END	1890's	END	N
93491	Ligumia nasuta	Eastern Pondmussel	S1	END	1988-06-16	END	N
93594	Peltandra virginica	Green Arrow-arum	S2		2004		N
93603	Spiranthes magnicamporum	Great Plains Ladies'-tresses	S3?		2004		N
93604	Carya laciniosa	Shellbark Hickory	S3		2004		N
93605	Persicaria arifolia	Halberd-leaved Tearthumb	S3		2004		N
94937	Cornus florida	Eastern Flowering Dogwood	S2?	END	2008-06-17	END	N
95005	Cornus florida	Eastern Flowering Dogwood	S2?	END	1986-06-19	END	N
95120	Juglans cinerea	Butternut	S3?	END	2008-08-00	END	N
96036	Chelydra serpentina	Snapping Turtle	S3	SC	2010-06-29	SC	N

Appendix D: Ecological Land Classification Data Sheets

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunderg Waters		POLYGON: Polygon 1	
SURVEYOR(S): ZH	DATE: May 6 2015	TIME start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	3	ULMU AMER > FRAX PENN > JUGLNIG
2	SUB-CANOPY	3	3	ULMU AMER > FRAX-SP > MALUS-SP
3	UNDERSTOREY	4	4	CORYCAC > CRAT-SP > RHACATH
4	GRD. LAYER	5-7	3	ALLPOS > TOXIVIRG > CLYSTRI

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

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

STAND COMPOSITION:	BA:

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

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

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

↑ parts

SOIL ANALYSIS:

TEXTURE:	C	DEPTH TO MOTTLES / GLEY	g = 20cm	G= —
MOISTURE:	6	DEPTH OF ORGANICS:	<5cm	(cm)
HOMOGENEOUS / VARIABLE		DEPTH TO BEDROCK:	775	(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Mineral Cultural Woodland	CUW1
INCLUSION		
COMPLEX		CUT1

Notes:

Important drainage

ELC
STAND CHARACTERISTICS

SITE: Thundering Waters	
POLYGON: 0506001 – Polygon 1	
DATE: May 6, 2015	
SURVEYOR(S): ZH, DW	

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

WP 004 Dirt course

Sept 28 15

Polygon #1

ELC
SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON WP006	A	CL			
		7.6cm			
	B	SCL			
		75cm			
A TEXTURE	CL				
COURSE FRAGMENTS	-				
B TEXTURE	SCL				
COURSE FRAGMENTS	-				
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES	20cm				
GLEY	/				
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

CUWI / CUTI

Slight.

ELC PLANT SPECIES LIST

SITE: Thundering waters
POLYGON: 0506001
DATE: May 06, 2015
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Malus sp					
Popu delt					
Ulmu amer					
Frax penn					
Jugl nigr.					
QUE PALU	R			O	
QUEMAC	R				
DIRSYL		R			
CRATRUNC			A		
LINBEN2			O		
LICOINC.			C		
MALDIMI			A		
CORAMON			O		
Ribes aland					
Rubus idae					
Crat sp.			A		X
Corn race			A	A	
Rhami cat					
Rubus idaeus					
Prun virg					
Crat sp.					
Rhamn cat		A	A		

SPECIES CODE	LAYER 1	2	3	4	COL.
Frax virg					
Aari ary					
Tarax off					
Carex stip					
Polygonum sp					
Circ lute					
Moss.					
Alli pet.				A	
GLY STRI				O	
TOU VIRG				A	
ASTLATE					
TOUVIRG					
EPICIL1					
SOLRUGO				O	
HYPPERF					
CARGRAC					
VERBURT				R	
JUN TEN				R	✓
VERO FI					

09/23

RWBL
BECH
AMRO
WTSP
BRCO
YEWA
GRCA
SOSP
Towhee

Chryso or punctata

WP005 Pit (photo)

Canopy dieback — form thicket — open sections. — sent 28/15 — see GPS

ELC

SOILS ONTARIO

SITE:
POLYGON: Polygon 1
DATE:
SURVEYOR(S):

Slope / UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

ELC PLANT SPECIES LIST

SITE: Thundering Waters
POLYGON: 0506001 Polygon 1 Cont.
DATE: May 6, 2015
SURVEYOR(S): ZH, DW

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
ACER					
Ulmus sp.	O				
Fraxinus pen.	D		A	A	
Popu delt	O				
Mallus sp			O		
Jugl nigr.					
Kentucky Coffee (?)					
Ulmus ame	A				
Prunaceae sp		R			X
Prun ser.			R		
Quer (pin)	R				
Acer negund.		-			
AMELABO					
RUBIDAE			O		
ROSA sp.			R		yes
RIB sketch					
Lonic sp					X
Lonic tata.			A		
Parth vitac.			A		
Crat sp		O	A		
Toxico radi			A		
Prun virg.			O		
Rhan cat			A		

SPECIES CODE	LAYER 1	2	3	4	COL.
Carex sp					
Poly sp.					
Frag vira					
Allp pet.					
Mosses				R	
Potentilla (simplex?)				R	
Circ lut.					
Soli sp					
Co					
TOXICODE					
AGROGYP					
ASTLANC					
ASTLAEVE					
GLY STR					
LAPLANN					
PRAVIRG					
ASTRACT					

Page ..... of .....

Plum? Crab apple? Amelanch? AMRO SOSY BUCH AMCR AMGO

Red(?) ← Photo of unusual — Too early. Not in bud

Spatula

Deer tracks in small slough channel (LWP006)

Glabrous / glaucous. Long petioled. ZH.

Possibly 2 spp. ←

Ground cover ~ 20%

Forms a complex gradient w/ 0506001 (Thicket) → FOD in canopy gaps

Investigate Crat spp in 2-3 weeks (for flwrs)

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE:		POLYGON: Polygon 1
	SURVEYOR(S):	DATE:	TIME: start / finish
	UTMZ:	UTME:	UTMN:

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC STAND CHARACTERISTICS	SITE:
	POLYGON:
	DATE:
	SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Waters	POLYGON: 2
SURVEYOR(S): ZH/DW	DATE: 09/23/15
TIME: start	finish
UTMZ:	UTME:
UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	3	SALALBA = POPDELT > ULMAMER
2	SUB-CANOPY	3	4	" " > ULMAMER
3	UNDERSTOREY	4	4	CORAMOM > CORSTOL
4	GRD. LAYER	5-7	4	PHAARUN

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

CVR CODES 0= NONE 1= 0% < CVR ≤ 10% 2= 10 < CVR 25% 3= 25 < CVR ≤ 80% 4= CVR > 80%

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		SWD4-1
INCLUSION		MAM2-2
COMPLEX		

Notes:

ELC PLANT SPECIES LIST

SITE: Thunder Waters	
POLYGON: 2	
DATE: 09/23/15	
SURVEYOR(S):	

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
SALALBA	A				
JUGNIGR		O			
POPDELT	O				
ULMAMER	O				
QUERUBR				R	
LONTATA					
TOXRADI					
SOLDULC					
CORSTOL			C		
CORAMOM			A		

SPECIES CODE	LAYER 1	2	3	4	COL.
CARLUPU				O	
SCIPEND				R	
VERHAST				R	
ASTLATE				O	
PHAARUN				A	
ASTLANC					

optional incl.

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Hill		POLYGON: ~~3~~ 3 + 4	
SURVEYOR(S): ZH & DW	DATE:	TIME start	
		finish	
UTMZ:	UTME:	UTMN	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2(1)	4	QUERUBR > QUERUBRA > PICERUB
2	SUB-CANOPY	3	4	QUERUB > QUERMAC
3	UNDERSTOREY	4	4	Buffalo bush > Cornus
4	GRD. LAYER	5-7	4	SOLBP > LYTSPH > Carex sp

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

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

STAND COMPOSITION:	BA:

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

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

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

↑ some trees

SOIL ANALYSIS:

TEXTURE:	LL	DEPTH TO MOTTLES / GLEY	g =	150	G= 50
MOISTURE:	6	DEPTH OF ORGANICS:	< 2		(cm)
HOMOGENEOUS / VARIABLE		DEPTH TO BEDROCK:	765		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Buttonbush swamp / Dark Mineral	SWD 1-3
INCLUSION		MAS 2-2
COMPLEX		

Notes:

~~3~~ 3 + 4

ELC
STAND CHARACTERISTICS

SITE:	Thunder Waters
POLYGON:	3 + 4
DATE:	May 6 / 2016
SURVEYOR(S):	

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

ELC
SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON	A / B	15 Mottles CL 20 / 20 / 65cm	SiCL 45		A / B
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF MOTTLES	15cm				45cm
GLEY	50cm	(faint)			45cm
BEDROCK					
WATER TABLE	20cm				
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Apparent Bare soil in recently flooded areas

Ulmu > Quer

CL Hcm SiCL

Blue-winged Warbler. ?

KK to verify

BLJA

Log mine

ELC
PLANT SPECIES LIST

SITE: Thunder
POLYGON: 0506004 → Lump on 001 ?
DATE: May 6, 2015
SURVEYOR(S): ZH, DW

Lost w/ wpt thicket elements

Complex

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Ulmu ame	O				
Frax penn			A		
Quer rub.	A	A			
Quer mac					
QUEBICO	O				
ACEXFRX	O				
CAREARU		R			
GLYSTRI					
PENHIRS					
PENHIRS				R	
DRYCART		.		O	
LINBENZ			O		
CORSTOLO					
SALQUC					
CORRACE			R		
SYMLORC				A	
Rosa sp?					
Spiraea alba.					
Crat sp.					
Rhamcat			A		
Lonitata					
Ribes hirtellum					
Corn seri			O		
Prun Vir.					

SPECIES CODE	LAYER 1	2	3	4	COL.
Alli pet.					
Toxicodendron virginiana					
Onoclea sens.					
Allium cernuum?					
Viol spp.					
Frag Veg.					
Myosotis					
SMISTEM				O	
SCI PENDU				A	
BOECILI					
LEEORYZ					
ASTLANC				R	
GALAPH					
MITRIU					
URTDIOI					
LYCUNIF					
RUBCANA					
DENSERI					
LYTSALI					
SOLRUGO					
JUNEFFU					
AESINDI					
AERCIGA					
CAR SP					T/b?
CARCRIN					
CARTUCK					
POL hydropiper					
TYPLATI					
ASTLANC					
ELYORTH					✓
IRIVERS					

Marsh indic.

Page ..... of .....

Super patchy... Substantial Canopy elm

This area a Complex of FOD w/ elm dieoff SWT

Wetter & more open than Poly 003

Canopy closure assessment when lea- are

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON:	
SURVEYOR(S):	DATE:	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

SITE	COVER
G OPEN WATER	G OPEN
G SHALLOW WATER	G SHRUB
G SURFICIAL DEP.	G TREED
G BEDROCK	

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC
STAND CHARACTERISTICS

SITE:
POLYGON:
DATE:
SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

MAS 2 - Phal arund.

Nowson

ELC
PLANT SPECIES LIST

SITE: Thundering waters
POLYGON: 050607
DATE: May 6, 2015
SURVEYOR(S): ZH, DW

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Corn ceri					

SPECIES CODE	LAYER 1	2	3	4	COL.
Phal arun				A	
Polyg sp.				O	

e-likely

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON:	
SURVEYOR(S):	DATE:	TIME: start / finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC
STAND CHARACTERISTICS

SITE:
POLYGON:
DATE:
SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

ELC PLANT SPECIES LIST

SITE: Thunder Waters
POLYGON: 0506005
DATE: May 06/15
SURVEYOR(S): DW + ZH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Salix spp	O				
Over ash	O				
Pinu syl	R				
Yellow flowered shrub		shrub			X
Carex spp				A	
Swamp milkweed				O	
Potentilla				O	
Juncus sp.				O	

Page ..... of .....

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON: 4	
SURVEYOR(S):	DATE:	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION: ELC CODE

COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC
STAND CHARACTERISTICS

SITE:
POLYGON:
DATE:
SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

(4

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Water		POLYGON:	
SURVEYOR(S): SH / ZH / DW	DATE: Sept 1 / 2016	TIME start:	finish:
UTMZ	UTMZ	UTMN	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION: BA:

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

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

COMM. AGE		PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:		CODE:
COMMUNITY SERIES:		CODE:
ECOSITE:		CODE:
VEGETATION TYPE:		CODE:
INCLUSION		CODE:
COMPLEX		CODE:

Notes:

ELC — PLANT SPECIES LIST

SITE: NGR	
POLYGON	
DATE: SEPT 1 2015	
SURVEYOR(S): SH / ZH / DW	

LAYERS 1 = CANOPY 2 = SUB-CANOPY UNDERSTOREY 4 = GROUND (GRD LAYER

ABUNDANCE CODES R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
QUER MACR	O				
ACER SPIC	A				
QUER BICO	O				
FRAX PENN			A	A	
QUER PALU	O				
CARP CAROL		O			
CARY OVAT	O				
FAGU GRAN		O	O		
ACER SASA	A				
CARY CORD			R		
QUER RUBR	A			A	
PRUN PENN					
SAMB CANA			R		
RUBU PUBE					
BERB THUN					
RIBES SP.					
LIND BENZ					
TOXI RADI					
ROSA SPP.					
VITI RIPA					
CORN RACE					
RHAM CATH					
PART VITA					

SPECIES CODE	LAYER 1	2	3	4	COLL
ARES TRIP					
SOLI RUGO					
PERI VIRG					
EUKB DIVA					
POLYPODI SP					
DRYOPT SP					
CINN LATI					
ELYM VIRG					
CARE RADI					
SOLI FLEX					
GEUM LACI					
AGRI GRYP					
CARE TENE					
ONOC SENS					
SOLA DULC					
POA NEMO					
FRAG VIRG					

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SUGARS
ULMU AMER
POPU
ACER RUBR

CEPHALANTHS
GLYC STRI
CARE SP.
LOBE DORS
LYSI NUMM
POLY PENN
CARE INTU
THELY
BOHM CYLI
BIDE FRON
CICU MAC
CARE LUPU
CARE TUCK
CIN

125 CEPH

BECH EAWP
DGRTR ORCA

LASTEVEN GARTER
////

V. ABUNDANT QUER RUBR
SCATTERED T/O

MEADOW HAWICK

ELC SOILS ONTARIO	SITE:
	POLYGON:
	DATE:
	SURVEYOR(S):

					Slope						UTM	
	P/A	P	Dr	Type	Class	%	N pos	Nlength	E pos	Elength	Z	EAST	NORTH
1													
2													
3													
4													
5													
6													
7													
8													

SOIL ASSESSMENT:	1	2	3	4	5	6	7	8
TEXTURE x HORZON								
A TEXTURE								
COURSE FRAGMENTS								
B TEXTURE								
COURSE FRAGMENTS								
C TEXTURE								
COURSE FRAGMENTS								
EFFECTIVE TEXTURE								
SURFACE STONINESS								
SURFACE ROCKINESS								
DEPTH TO / OF								
DISTINCT MOTTLES								
PROMINENT MOTTLES								
MOTTLES + GLEY								
GLEY								
BEDROCK								
CARBONATES								
DEPTH OF ORGANICS								
PORE SIZE DISC #1								
PORE SIZE DISC #2								
MOISTURE REGIME								
SOIL SURVEY MAP UNIT(S)								
LEGEND CLASS								
TEXTURE								

Notes:

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Water		POLYGON: 5	
SURVEYOR(S): ZH	DATE: May-Sept	TIME: start / finish	
UTMZ:	UTME: 2016	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2(1)	4	QUE PALU > ACER RUB > QUE MACR > BEO > CAR Stri
2	SUB-CANOPY	3	4	ACER RUB > QUE-SPP. > FRA PEN
3	UNDERSTOREY	4	4	" " " FRA CORAN > TOX RADI
4	GRD. LAYER	5-7	4	TOX RADI > OSMCLA > CAL STRI > Carex.

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

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

STAND COMPOSITION: BA:

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

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

COMM. AGE		PIONEER		YOUNG	X	MID-AGE	X	MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE: C	DEPTH TO MOTTLES / GLEY	g = 10-20	G= 730
MOISTURE: 6	DEPTH OF ORGANICS: 22cm		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK: > 75cm		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		SWD 1
INCLUSION		SWT 2-4 + MAS2
COMPLEX		FOD 9-2

Notes:

Poor drainage

C / SiCL

Average (conditions 5-6)

ELC — STAND CHARACTERISTICS

SITE:	
POLYGON:	
DATE:	
SURVEYOR(S):	

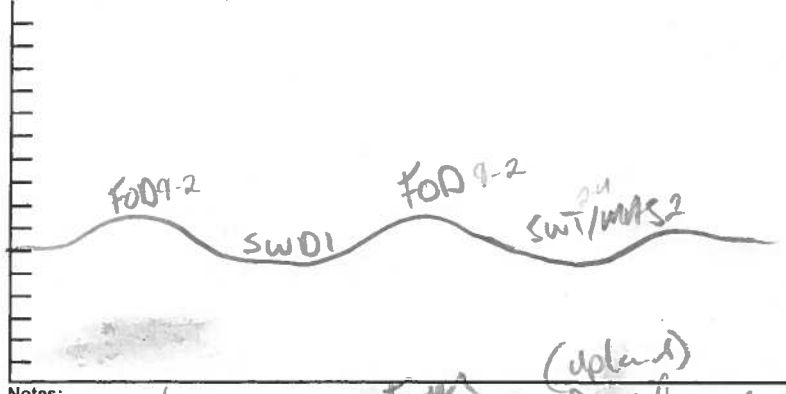
TREE TALLY BY SPECIES

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM



Notes: (Slough / Upland)

Oak Swamp + Oak-Maple Deciduous Forest

Button Bush Swamp & shallow marsh inclusions.

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON	A	CL			
	B	C			
		65			
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES	11cm				
GLEY	30cm				
BEDROCK	45cm				
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Coyote scat
Raccoon scat

Slough

ELC PLANT SPECIES LIST

SITE: ng waters
POLYGON: Polygon 6
DATE: 4.6.2.15
SURVEYOR(S): ZH, DM

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Pin oak	A				
Bur oak	O				
K	C				
Ulm ame.	O				
Fraxi p			A	A	
Ar x-fra	A				
C ovata	O				
Popu tre					
Pru vir					
AMERBBO					X
Fagus grand.			A		
Carp caroliniana			O		
Quer rubra	R				
Tilia amer.	R	R			
Acer sacc	O				
y leaves.					
Amelanchier	arborea (check)				
Ribes sp	CMUS				X
Spicebush			A		
Rubus pub.				O	
Malus sp. (Orchard tree)				O	
Toxico radic				A	
Parth vit.				O	
Ribes glandu				O	
Lonicera			O	R	
Corn race.				O	
Rubus idaeus				O	
Prun virg.				A	
Crat sp				A	

SPECIES CODE	LAYER 1	2	3	4	COL.
Fra nig					
gra					
F					
Trout lily (Yellow)					
Car mac				O	
U. acti				A	
C rela					
T un					
Sy					
Cle					
Da					
Car					
Ti					
Ac					
Ca					
On					
Agri					
Rohuvic					
Trillium tri					
Beech drops					
Claytonia Caroliniana					
Epilobium sp					
Cicuta mac.				O	
Waldsteinia sp					X
Oxalis sp					
Maian canad.					
Streptopus	Rosy twisted stalk ??				
tora var.					

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Oak-Hickory Fresh-Moist FOD

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON:	
SURVEYOR(S):	DATE:	TIME start / finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

SITE	COVER
G OPEN WATER	G OPEN
G SHALLOW WATER	G SHRUB
G SURFICIAL DEP.	G TREED
G BEDROCK	

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = APPROX EQUAL TO)
1	CANOPY			QUEPALU = QUEMACR > ~~QUERUBR~~ > QUEVELU > FRAPENN
2	SUB-CANOPY			FRAPENN >
3	UNDERSTOREY			LINBENZ > PRUSERO > CRAT
4	GRD. LAYER			LEBOREA > ? CORSTRI

HT CODES: 1 = >25 m 2 = 10<HT 25 m 3 = 2<HT 10 m 4 = 1<HT 2 m 5 = 0.5<HT 1 m 6 = 0.1<HT<0.5 m 7 = HT<0.2 m

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC
STAND CHARACTERISTICS

SITE:
POLYGON:
DATE:
SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

ELC

SOILS ONTARIO

SITE:

POLYGON:

DATE:

SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Slope Type	Slope Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON	A L B SiCL				
A TEXTURE	Loam				
COURSE FRAGMENTS	NIA				
B TEXTURE	SiCL				
COURSE FRAGMENTS	NIA				
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES	20cm				
GLEY	NA				
BEDROCK					
WATER TABLE	NA765				
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

405

ELC

PLANT SPECIES LIST

SITE: thundering waters

POLYGON: 05-06-B09

DATE: May 6/15

SURVEYOR(S): ZH/DW

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Hiekshu	D	O			
QUE PJ	-	O			
CARCAR		O			
ACEMAR	D				
ULMAMER		O	O		
TILAMER	D				
PRUSER	R				
FAGGRAN	-	D	A		
OSTVIR		O			
QUERUBR	A				
QUEALBA	R				
ACESAHA	R				
ACEXFRIE	O				
FRXAMER	R				
DRYATELA					
ULECORYMOSUM					
VAC STAM?			R		
PRUVIRG			A		
RUBPUBE			O		
LINBOR2			O		
ROS-SP			O		
RUBIDAE			O		
BARTHUN			R		
LONTATA			O		

SPECIES CODE	LAYER 1	2	3	4	COL.
FRYAMER				A	
CAR-SP				D	
FRAVIRG				A	
TRIBRAN				O	
GERMAN				O	
POT-SP				O	
RODPELT				O	
RANSEN S				A	
Clumped seed.				R	
RANA ROS				R	
EQUARVE					
DRYCARA					
PERSAB1					
BIDcern					
SCIPEND					
ASTURGP					
IRIVERS					

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ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON:	
SURVEYOR(S):	DATE:	TIME: start / finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC
STAND CHARACTERISTICS

SITE:
POLYGON:
DATE:
SURVEYOR(S):

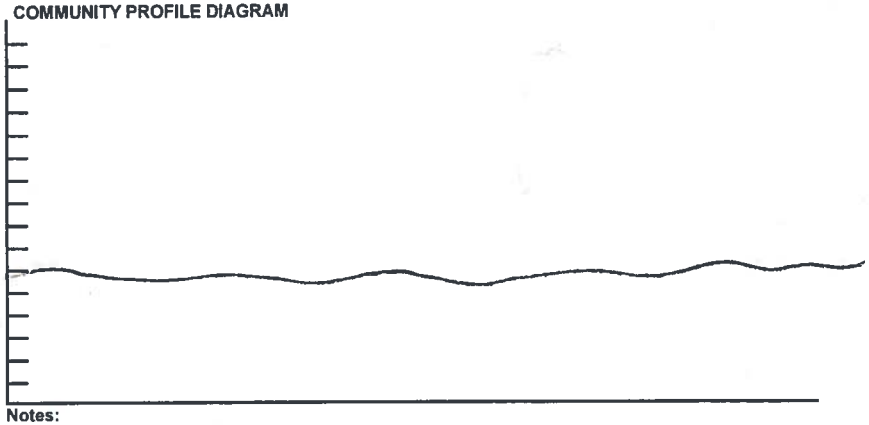
TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM



Notes:

SC05 - soil core

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Slope Position	Aspect	%	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON	A 13cm B 50cm	Soil Sample 8			
A TEXTURE	CL				
COURSE FRAGMENTS					
B TEXTURE	SiCL				
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES	14				
GLEY	N/A				
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

SWD

ODD

Slash forest

Trees greater than 50 cm DBH are rare

5-20 cm DBH abundant

20-50 cm DBH is occasional

Slash forest.

Chorus frogs

Spicebush note

silky

Alternate

Abundant

Pond 8

ELC

PLANT SPECIES LIST

SITE: Thundering waters
POLYGON: 05-08 G 20
DATE: May 05, 2015
SURVEYOR(S): DW + KB

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	LAYER 2	LAYER 3	LAYER 4	COL.	SPECIES CODE	LAYER 1	LAYER 2	LAYER 3	LAYER 4	COL.
POPU DEL	O					TROOT l.lv				O	
TILI AME	R					FRAG VIR				R	
ULM AME	O					GEK MAC				O	
FAGUS	R					Soli sp				R	
Hybrid/Kilermob						Aster sp				O	
Quer Palu	A					PODO PELT				O	
Quer Rub	R					ONE SENI				O	
FRAX PEN	O					CARD DIGLAS				R	
Tree Sp					GPS	MIAN CANA				O	
CARP CAR						ARIS TRIF				O	
QUER MAC						UVULARIA GRAND				R	
(*) Acer slv / hybrid?						DRIOPT SP				R	
ULM AME'	R					Lady fern				R	
						Sedge sp				R	X
						Lg Carex sp				R	
						Blue violet				R	
						Carex 3				R	X
						Ascl Incar				R	X
						Carex 4				R	X
						Tali um Sp					X
						Equis ARV					
						CLAY VIR				R	
						PRENANTHES SP				R	
						Sm [illegible]				R	X
PARTH VIT				R		Imp cap ?				R	
Rham CAT				R		ALI PETI				R	
RIBES						CIRC MAC				R	
Button bush		A			PEEN	Potamogeton Sp				R	
[illegible] wood Shrub					X	duckweed				R	
Shrub Sp					X	RANU ABOR				R	
SPICEBUSH						IRIS SP				R	

Page 1 of 8

* large one near Pond 8 w DBH > 100 cm

CWT F

edge

edge.

Robin + nest w eggs.

Pond 8 no flowers

flowers [illegible] from

in pond

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON:	
SURVEYOR(S):	DATE:	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

60–75%

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

Button bush + collected shrub dominant in Pond 8

↳ Revisit Pond 8 later (alot of sp. diversity)

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON		A B 24inch (55-60 cm)			
A TEXTURE		L			
COURSE FRAGMENTS		—			
B TEXTURE		S.CL			
COURSE FRAGMENTS		—			
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES		—			
GLEY		—			
BEDROCK					
WATER TABLE		—			
CARBONATES					
DEPTH OF ORGANICS		1-2cm			
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

1-2 cm organics - more upland - deer stand.

ELC PLANT SPECIES LIST

SITE: Rondeau waters
POLYGON: 05 08-20
DATE: May 05, 2015
SURVEYOR(S): DW + KB

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	1	2	3	4	COL.
ACE SAC	O				
ACE RUB	O				
ACE NEG	R				
TIL AME		R			
ULM AME		R			
FAG GRA	O				
along corridor cleared					
ALI PLANT				R	
EUONYMUS (bone set)				R	
ACE SAC				R	
KARINSKYA SP				R	
SYMPH NIV				R	
VERB SP.				R	
SAL BEBB.				R	
PHAL ARUN				R	
ERIGAR PHILA				R	
CIR VULG				R	
DACTYLIS GLOM				R	
OXALIS MONT				R	
PHYSOCARPUS SP				R	
SAL ERICA				R	
Bristly currant				R	

SPECIES CODE	1	2	3	4	COL.
ACER NEGUNDO				R	
*STREPTOPUS LANCEOLATUS				R	
Solomon Seal				O	
Osmund Royal				R	✓
Fern Sp OSMCINN				R	✓
Sedge sp (Sm)				R	✓
lycopus americanus				R	
pilea pumila				R	
duckweed				R	
Sparganium sp				D	
ambro Trif ?				R	
hier sp.				R	
Carex Vulp				R	
anem kink				R	
money wort				R	
Juncus sp				R	
Pot symplex				R	
Carex sp				R	✓
lily of the valley				R	
Poa sp				R	
neck ci sp?				R	✓
Hype perf				R	
Thalictrum sp				R	
lettuce sp.				R	
Purple Cress				R	

Species recorded below are from May 15, 2015 by DW + KB

Carex pyrate

Carex gracillima

Epilobium sp (R)
Woodland sp (R)
Forb sp (meadow sweet like) R

Collect later for verification

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thundering Waters | POLYGON: 20

SURVEYOR(S): VB DW & ZH | DATE: May 08 & 15, 2015 | TIME: start / finish

UTMZ: | UTME: | UTMN:

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	1	4	ACER > Oak > beech
2	SUB-CANOPY			
3	UNDERSTOREY	4	3	Spice bush (closer to 50%)
4	GRD. LAYER		3	(closer to 25%)

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

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

STAND COMPOSITION: | BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		FOD
INCLUSION		
COMPLEX		

S:

- Section of Poly 20 is up wetter on western edge.
- many pockets of standing water
- lots of construction noise
- becomes more beech maple dominant & more open in the understory in the NW corner

Rehabbe

- Polygon 20 may be large enough in enough mast producing sp. to be considered a "Foraging Area in abundant mast"
- Not old enough for old growth
- button bush Swamp incl(?) if large enough would be an S3 rare habitat
- 1-2 12" plastic pipe along exit access road.

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Blue heron Floriby

SPPES audible to east

SA

ELC PLANT SPECIES LIST

SITE: Thundering waters
POLYGON: 0506807
DATE: May 6, 2015
SURVEYOR(S): BH, VW

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Acer saccl	R				
Corn seri					
Corn race					

SPECIES CODE	LAYER 1	2	3	4	COL.
Purple loosestrife					
Galium sp					
Ranunculus sp					
Floating aquatic veg ~10%					
Iris versicolor					
Carex spp					
Alisma plantago-aquatica					
Lemna					
Carex stricta (?)					
Scirpus sp					
Asclep incarn					

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Sloughs

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON:	
SURVEYOR(S):	DATE:	TIME start / finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC
STAND CHARACTERISTICS

SITE:
POLYGON:
DATE:
SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

ELC PLANT SPECIES LIST

SITE: Thunder Waters
POLYGON: 05-06-011
DATE: 05/06/15
SURVEYOR(S): DW/ZH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
FRXPENN			D		
QUEELIP	A	O			
ACESPE	A				
ULMRUBR?		O			
QUEMAGR	R				
PRUAVIU			R		
PRUSERO		R	R		
ACESASA					
VIBRENT					
TOXRADI			A		
SPIALBA			O		
LINBOR2			O		
ERA-SP			A		
MALPUMI			R		
RUBIDAE			A		
CORRACE			O		
ROSA-SP			O		
RIB_SP			A		
CRAPHK/CRU?		A	A		
LONTAT			A		
PRUVIR			A		
RHACATH			O		

SPECIES CODE	LAYER 1	2	3	4	COL.
THUOCCI					
POTSP					
ARITRIP					
TRIGRAN					
FRAVIRG					
ERIANER					
POPTRE					
CIRLUTE					
STRROSE?					
CLAYUIRG					
ALLPET					
AGRGRYP					
SOLSP					
ATHFELI					

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ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON:	
SURVEYOR(S):	DATE:	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	4	QUE ELIP > ACE SPE > FRX PENN
2	SUB-CANOPY	3		~~ACE SPE~~ FRX > CRAT-SP
3	UNDERSTOREY	4		~~CORACE~~ FRX > COR RACE
4	GRD. LAYER	5-7		

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC
STAND CHARACTERISTICS

SITE:
POLYGON:
DATE:
SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

ELC PLANT SPECIES LIST

SITE: Thundering waters
POLYGON: 05-06-01A
DATE: 05/06
SURVEYOR(S): 2H /DW

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
FRXPENN	A		A	A	
ACEXFRE	O				
QUERUB	R				
PINRIGS					
CORRACE	A		A		D?
AMEL-SP					
MALPUMI					
RIB-smooth					
TOXRADI					
LINBENZ			R		
RHACATH		O			
Tall Rose					
CRAT-SP		A			
RUBIDAE					
VIBLENT					
PRUVIRI					
SPI ALBA					

SPECIES CODE	LAYER 1	2	3	4	COL.
TOXVIRG					
FRAVIRG					
SOL-SP					
GEUM-S					
TRIGRAN					
ONOSENS					
IRIVERS					SL
ARITRIP					
RANARBU					
PRUnella					

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ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON:	
SURVEYOR(S):	DATE:	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			CRAT. CORNUS ? RHAMNUS
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC
STAND CHARACTERISTICS

SITE:	
POLYGON:	
DATE:	
SURVEYOR(S):	

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON: 5	
SURVEYOR(S):	DATE:	TIME: start	
		finish	
UTMZ:	UTME.	UTMN:	

POLYGON DESCRIPTION

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

SITE	COVER
G OPEN WATER	G OPEN
G SHALLOW WATER	G SHRUB
G SURFICIAL DEP.	G TREED
G BEDROCK	

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			QUEALBA > ACERUBR > QUEMACR/BICO (Carya > Ash > Beech
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

Pond

ELC PLANT SPECIES LIST

SITE: Hardy M20	
POLYGON: 5	
DATE: Sept 28/15	
SURVEYOR(S): DW/ZH	

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
CARCORD					
QUEALBA					
LARLAR			O		
UACCORY			R?		
RUBHISP				O	

SPECIES CODE	LAYER 1	2	3	4	COL.
CINLATI					
ELYHIST					
GLYSTRI					
CARLUPU				O	
CARPROT?					
CARTENE/TECH				O	
LEEORYZ				A	
GERMACU				O	
TOUVIRG				A	
CARCRIN					
LYCUNIF					
ASTLANC					
DILPUMI					
ASTLATI				O	
ERIVIRG				O	
OAKSEAS					
ASTMACR					
AGRGRYP					
CARINTU					
THEPALU					
HYPPUNC				R	
POLACHR					
CHEGLAB					
SCULATI					
RANHKP					
GSMCINN					

Pond

KE. PRINT OF RIPPED PAGE

ELC
SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON	A	CL			
	B	C			
		65			
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF MOTTLES					
GLEY	30cm				
BEDROCK	45cm				
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

SC
OA

Beech Hedge
HALO
RUBWO
NOFL
AMTOsea
CHFR
SPPE
GRTR
TUVUx2
NOLF

Pin oak
OAKS > Elm
+Hickory
Swamp?
Acersacch
Slough forest
Prev coll.

Cyste Scat
Raccoon Scat
Slough

ELC
PLANT SPECIES LIST

SITE: Thundering waters
POLYGON: 05SB Polygon 6
DATE: May 6, 2015
SURVEYOR(S): JH, Dial.

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Pin oak	O				
Red oak	O				
White oak	O				
Elm spp.	O				
Fras penn			A	A	
Acer x-free	O				
Carya ovata					
Populus trem.					
Prunus avium					X
AMELRBU					
Fagus grand.			A		
Carp caroliniana					
Quer rubra					
Tilia amer.					
Acer sacc.					
Leaves.					
Amelanchier arborea (leaves)					
Ribes sp (stem)					X
Spicebush.					
Prunus pens.					
Malus sp. (Orchard tree)					
Toxico radic.					
Earth vit.					
Ribes glandulosum					
Lonicera tatarica					
Corn sp.					
Rubus idaeus					
Prunus virg.					
Grass sp			A		

SPECIES CODE	LAYER 1	2	3	4	COL.
Fras virg					
Solv canad					
Podo pelt					
Trout lily (Yellow)					
Car mac					
Alli tri					
Carex sp				E	
Trillium sp					
Blue violet					
Claytonia virg					
Dentaria laciniata					
Cardamine douglassii					
Ethyrium filix-femina					
Arisaem triphy					
Carex sp					X
Onoclea sens					
Agrimoni gryp					
Poranus abbreviatus					
Trillium triflorum					
Beech drops.					
Claytonia Caroliniana					
Epilobium sp					
Cicuta mac.					
Waldesteinia sp					X
Oxalis sp					
Maian canad.					
Streptopus	Rare twisted stalk ??				
Taraxacum					

CARDIPU
CARPEN Red Xinger
Glandu

Page ..... of .....

Oak-Hickory Fresh-Moist FOD

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

ELC
PLANT SPECIES LIST

SITE: Thunderingwaters
POLYGON: 05-06 008
DATE: May 6/15
SURVEYOR(S): ZH IDW

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
ACEXFRE	A	A	O		
FRXPENN	A	A	A	A	
QUEPALU	O	O			
ULMAMER		O	O		
QUERUBR?					
PRUSERO		R			
CARCAT	R				
QUE MAR					
CRAPUNC					
CORSERI					
ROSA-SP					
PRUVIR					
RHARATH					
VIBLENT			O		
CrabApple			O		
RUBIDAE			A		
CRAT-SP			A		
LON-SP TATA			A		
AMEARBO			O		
RIB smooth			O		
RUBALLE					
CORRACE					
SPIALBA					
MAL-SP					

SPECIES CODE	LAYER 1	2	3	4	COL.
AGRGRYP					
RUB. Red.					
ONOSENS					
GEUM-SP					
TAROFFI					
POT-SP					
TOXVIRG					
SOL-SP					
FRAVIRG					
CARBLAN?					C previously
ARITRIP					
ERYANGER					
CIRLUTE					
CICMACU					
CAR-SP					

Polygon #6

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Waters		POLYGON: 6	
SURVEYOR(S):	DATE:	TIME start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	4	FRAPENN > ACERUBR > QUEPALU
2	SUB-CANOPY	3	4	" " > " " > ULMAMER
3	UNDERSTOREY	4	4	CRAT-SP > LONTATA > AMECAN > RUBIDAE
4	GRD. LAYER	5-7	2	

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Green Ash Mineral Deciduous Swamp	SWD2-2
INCLUSION	Grey Dogwood Swamp	SWT2-9
COMPLEX		

Notes:

ELC STAND CHARACTERISTICS

SITE:	Thunder W. Fen
POLYGON:	6
DATE:	May 6th 2016
SURVEYOR(S):	ZH NW

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

ELC

SOILS ONTARIO

SITE: thundering Waters
POLYGON: 7
DATE: 2015
SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

saline exotics

only cattails

ELC PLANT SPECIES LIST

SITE: thundering waters
POLYGON: Ditch 05-06-10
DATE: 05/06/2016
SURVEYOR(S): DW + ZH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
FRAPENN		O			
ULM AMER		R			
ACEXER		R			
SAL FRAG		R			
POP DELT		R			
Crab APPLE					
TOXRAD					
JUNVIRG					
PRUVIR					
Salix sp					
CORSERI			O		
CORRACE			O		
ROS-SP					

SPECIES CODE	LAYER 1	2	3	4	COL.
FRAVIRG				A	
TRIF SP				A	
SOL SP				A	
SOLIDAG					
AGROGYP				O	
LYTSALI				O	
RANCARD				A	
TUSFARF				O	
VIC-SP					
PHRAUST				O	
ASTLANC				A	
AST PILO?					
ASTERIC					
CICINTY					

numerous

GBHE

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Waters		POLYGON: 7	
SURVEYOR(S): ZH + OW	DATE: 05062016	TIME: start	finish
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	3	1	FRX PENN > others.
2	SUB-CANOPY			
3	UNDERSTOREY	4	2	Cornus spp > others
4	GRD. LAYER	5-7	4	Exotic grasses > TOXI sp > FRAVIR

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		CUM
INCLUSION		
COMPLEX		CUT → edges along forest

Notes:

ELC STAND CHARACTERISTICS

SITE:	
POLYGON:	
DATE:	
SURVEYOR(S):	

TREE TALLY BY SPECIES:

PRISM FACTOR:

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

Polygon #8

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Thundering Waters	POLYGON: 05-15-13
	SURVEYOR(S): KB + ZH	DATE: May 15, 2015
		TIME: start 10:30 finish
	UTMZ:	UTME: UTMN:

POLYGON DESCRIPTION

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

Cardinal (Female)

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	1-2	3	FRAX PENN >
2	SUB-CANOPY	3	2	CRAT. > Malus
3	UNDERSTOREY	4	4	RHA CAT > PRUVIRG
4	GRD. LAYER	6	2	RHA CAT >

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

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

STAND COMPOSITION:	BA:

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

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

COMM. AGE		PIONEER		YOUNG	X	MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE: C	DEPTH TO MOTTLES / GLEY	g = 15	G= 30
MOISTURE: G	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Green Ash Swamp	SWD 2-2
INCLUSION		
COMPLEX		

Notes:

- ash seem to be dying back → lots of chickadees + many little leaf and at crown, some insect/woodpecker marks on trees.
- wet pockets w some standing water
- less mature/less canopy closer than other side of road

Shrub layer dominant

Polygon #8

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

ELC PLANT SPECIES LIST

SITE: THUNDERING WATERS
POLYGON: 05-15-13
DATE: MAY 15, 2015
SURVEYOR(S): KR, ZH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Ulm Ame	O				
FRAX PENN	A				
MALU PUMI	R	R			
CRAT PLAT					
CRAT SP.		O			
POPU TRE				R	
Quer rub.				R	
Quer Ellip					
	R				
Elaa ANG			R	R	
VIC CRAC				R	
VIB			R		
CORNSER			R		
RUB IDE			R		
PAR TH VIT			O	O	
RHAM CAT			A	A	
CORN RACE			A		
LONI TAT			O		
Prun VIRG			O		

SPECIES CODE	LAYER 1	2	3	4	COL.
TARA OFF				O	
SYMPH N-A				R	
FRAG VIR				A	
VAC OFF				O	
Grass Sp.				O	
Tox Rad				R	
CAREX ROSEA				R	
BRAS NIGRA				R	
Rubb hirt				R	
Equisti arv				O	

Page ..... of .....

Polygon #8

ELC
SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Slope Type	Slope Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL TEXTURE x HORIZON	1	2	3	4	5
	0cm A 9cm B 50cm	Soil core 6			
A TEXTURE	C Loam				
COURSE FRAGMENTS					
B TEXTURE	S. CL				
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES	15cm				
GLEY	30cm				
BEDROCK					
WATER TABLE	45cm				
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

AMERADO?
Brown Cow
Yellow Warbler
AMEROB
Song Sparrow
Blackcap
Chickadee
AMGO
FISP?

Flood plain
Thicket

ELC PLANT SPECIES LIST

SITE: Thundering Waters
POLYGON: 05-08013
DATE: May 08 2015
SURVEYOR(S): DW & KB

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Frax Penn	R				
ULM AME	R				
POP DELT	O				
PRUN AVI	O				Prev
QUER RUB	R				
* RIBE AME			R		
CRAT SP.			O		
VITS RIP			R		
LONI TAT			O		
RHAM CAT			A		
Rosa sp.			R		
PRU VIR			O		
COR SERI			R		
COR RACE			R		

SPECIES CODE	LAYER 1	2	3	4	COL.
ASTER SP				O	
TARA OFF				O	
VINCA MIN				R	
FRAG VIR				O	
TOXI DEN	RAD			R	
AGRI GRIP				O	
TROUT LILY				R	
CIRC LUTE				O	
ALI PETI				O	
INCLUSION					
RHAM CAT			A		
SALI SP	R				
FRAX PENN	A				
CORN RACE			A		
CORN SERI			A		

Dogwood dominant

20-40% cover

↳ Standing water

* yellow glands discovered

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE:		POLYGON:	
	SURVEYOR(S):	DATE:	TIME start:	
			finish:	
	UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

SWT
LD Standing water in inclusion

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)	
1	CANOPY		2	FRAX ≥ PRUN SP ≥ POP DELT	20%
2	SUB-CANOPY		3		50%
3	UNDERSTOREY				55%
4	GRD. LAYER				

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		SWT
INCLUSION		
COMPLEX		

Notes:

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE Thunder Waters	POLYGON: 9 of 45
	SURVEYOR(S) DW & KB	DATE May 8/15
	TIME start / finish	
	UTMZ.	UTME
	UTMN	

POLYGON DESCRIPTION

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

SITE	COVER
G OPEN WATER	G OPEN
G SHALLOW WATER	X SHRUB
X SURFICIAL DEP	G TREED
G BEDROCK	

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	R	FRXPENN > POPDELT > ULMAMER
2	SUB-CANOPY	3	R	" "
3	UNDERSTOREY	4	4	CORRACE > FRXPENN
4	GRD. LAYER	5-7	4	SOLSP > Grasses

} edge

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Gray Dogwood	SWT 2-9
INCLUSION		MAM — Phragmites marsh inclusion
COMPLEX		

Notes:

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Polygon 414

ELC
PLANT SPECIES LIST

SITE: Thunderwaters
POLYGON: 05-08-414
DATE: May 08 2015
SURVEYOR(S): DW + KR

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
ULM AME	R				
FRAX PEN	R				
CORN RACE				O	
RUBUS IDE				O	
CRAT SP				R	
Shrub SP				O	
SALL SP				O	X

SPECIES CODE	LAYER 1	2	3	4	COL.
DAUC CAR				O	
TARA OFF				O	
PLAN MAJ				O	
SOLI SP				A	
VICI CRA				O	
ASTER SP				O	
FRAG VIR				O	
VIT RIP				O	
TRIF PRAT				O	
GRASS SP				A	
EQUI ARV				O	
ASPARAGUS				R	
ACHILL MIL				O	
ASCL SYR				R	
PARTH VIT				R	

Golden Rod
Fisp
Blue Jay
Robin
Viola
Rose bracted Grasspea
Prunus

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Polygon #4

Standing water

Clearing Soggy in poly

Yellow warbler

NoLE

~~BARES~~ BADR (Pair)

RWBB

ELC PLANT SPECIES LIST

SITE: Thundering waters
POLYGON: 05-08-015
DATE: May 08, 2015
SURVEYOR(S): DW, KB

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
POPU DELT	O				
FRAX PENN	A	A	A		
ULMAMER	O				
CRAT SP			O		
CALI SP			O		
CORN RACE			A		
CORN SERI			O		

SPECIES CODE	LAYER 1	2	3	4	COL.
PARAG				D	
THIF PRA				O	
FRAG VIR				R	
PLANT MAJ					
FRAX PENN					
TARAOFF					
CRAT SP					
CORN RACE					

(X) Moving back

121.

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON: 05-08-05	
SURVEYOR(S):	DATE:	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

Phrag marsh w gray dog inclusion

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thundering Waters		POLYGON: 10	
SURVEYOR(S): DW & KB	DATE: May 8/15	TIME: start / finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	3	SAL-SP >, POP DELT
2	SUB-CANOPY	3	3	" "
3	UNDERSTOREY	4	4	CORSER >, RHAM CAT H >, LONTATA
4	GRD. LAYER	5-7	4	PHR AUST

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

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

STAND COMPOSITION: BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Willow Deciduous Swamp	SWD4-1
INCLUSION		
COMPLEX		

Notes:

ELC

SOILS ONTARIO

SITE:

POLYGON: 10

DATE:

SURVEYOR(S):

Standing water

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

RWBB west

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE	0+				
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Poly ID

ELC PLANT SPECIES LIST

SITE: Thundering Waters

POLYGON: 05-08-016

DATE: May 08 2015

SURVEYOR(S): DW & KB

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
POP DELT	A				
Sal SP	A				
RHAM CAT	O				
CORN SER	O				
LONI DIO	O				

SPECIES CODE	LAYER 1	2	3	4	COL.
PhRAG ACUS					

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Water		POLYGON: 11	
SURVEYOR(S): DW & KB	DATE: May 8/2015	TIME start:	finish:
UTMZ	UTME	UTMN	

POLYGON DESCRIPTION

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

SITE	COVER
G OPEN WATER	G OPEN
G SHALLOW WATER	X SHRUB
X SURFICIAL DEP.	G TREED
G BEDROCK	

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	1	POPDELT >> FRAXPENN
2	SUB-CANOPY	3	1	
3	UNDERSTOREY	4	4	CORRACES > PRUVIRG > CRAT SP?, RHAMCATH
4	GRD. LAYER	5-7	2	PRUVIRG > RIBSTI

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

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

STAND COMPOSITION: BA:

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

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

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

SOIL ANALYSIS:

TEXTURE: SiCl	DEPTH TO MOTTLES / GLEY	g = 15	G= NO
MOISTURE: 6	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Gray Dogwood Thicket	CUT 1-4
INCLUSION		
COMPLEX		

Notes:

Add Juniperus Virg. to drain polygon
Can always go back to Poly 17

ELC

SOILS ONTARIO

SITE:

POLYGON:

DATE:

SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Polygon #11

ELC
PLANT SPECIES LIST

SITE: Thunder waters

POLYGON: 05-88-017

DATE: May 08-2015

SURVEYOR(S): DW + EB

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
POP U DEL	O	O			
FRAX PENN	O	O			
PRUNACEA	O	O			PRE
QUER ELIP	R				
POPU TRE	R				
AME SP.		R			X
RUB IDEA					
ROSA SP					
LONI TAT					
CORN SERI		R			
RHAM CAT		O			
PRUN VIR		O		O	
CORN RACE		D			
CRAT SP		O			

SPECIES CODE	LAYER 1	2	3	4	COL.
AGRI GRIP				O	
FRAX VIR				A	
Daffodils					
TARA OFF					
ASTER SP				A	
GRASS SP					
ALI PETI				A	
GER MACU					
TOXI RAD				A	
PARTH AGS				O	
INCLUSION					
QUER MAC	O				
POP TREM	R				
ULM AME	O				
TOXI RAD					
~~ACER SUGAR~~					

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ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope / UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON	A 12cm / B				
A TEXTURE	CL				
COURSE FRAGMENTS					
B TEXTURE	S.CL				
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES	15cm				
GLEY	N/A				
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Soil core 7 65cm

CWW
60% canopy closure Gartersnake on path TETO EAPS (phoebe) RBWP Crawfordsville LD Brown-ish LD markings down dorsal Deer tracks

ELC PLANT SPECIES LIST

Ly # 11 - CWW Inclusions

SITE: Thunder Waters
POLYGON: 05-008-08
DATE: May 08 2015
SURVEYOR(S): DW & KB

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
ACER SUG					
FRAX PEN					
ULM AME					
QUER ELIP					
POPU DELT					
PRUN VIR					
RHAM CAT					
RUBI IDA					
CRAT SP					
LONI TAT					
COR RACE		A			

SPECIES CODE	LAYER 1	2	3	4	COL.
SOLI SP					
ASTR SP					
TARA OFF					
TOXI RAD					
Potentilla SP.					
FRAG VIR					
ARIS TRIF					
CIRS LUTE					
GEUM SP.					
PART VIT					
AGRI GIP					
ONE SENS					
GRASS SP					
TOVAR V.					

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE:		POLYGON:	
	SURVEYOR(S):	DATE:	TIME start	
			finish	
	UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		CUW
COMPLEX		

Notes:

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunders H2O		POLYGON: 12	
SURVEYOR(S): DW + KB	DATE: May 2015 May 2016	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2(1)	4	QUE-SP > ACE-SP > (ABOVAT, ULMAMER
2	SUB-CANOPY	3	4	QUE-SP " "
3	UNDERSTOREY	4	4	LINBEN2 > " "
4	GRD. LAYER	5-7	4	PARINSE > CIRLUTE > ERYAMER > (ERIMAC

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

↑ pockets

TEXTURE:	SiCL	DEPTH TO MOTTLES / GLEY	g = 15	G= NA
MOISTURE:	6	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE		DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Oak Swamp	SWD1
INCLUSION		
COMPLEX		

Notes:

Same on either side of railroads

Near north eastern tip polygon tapers more, Shrubs ring around edges.

Very Mixed species composition

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

ELC

PLANT SPECIES LIST

SITE: Thunder Waters
POLYGON: 05-08-019
DATE: May 5th (or 8th?) May 2010
SURVEYOR(S): DW + KB

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
PRUN SP					PREV
FRA X PEN	O				
ULM AME	O				
ACER SUG	R				
ACER SASA	R				
QUER PALU	O				
QUER RUB	O	O			
QUER MAC	R			R	
CARY OVA	O				
PRUN SER	R				
CARP CAR	R				
TILI AME	R				
CELOCI			R		
ACER NEG	R				
ACER SACH	O				
TARAXACUM	O				
RIBES SP					PREV
FAGUS GRAND			O-A		
RIBES SP			R		
AMEL SP					
RUB ALEG			R		
RUB IDE		S	O		
PRUN VIR			O		
RHUS CAT			O		

SPECIES CODE	LAYER 1	2	3	4	COL.
CARE SP				O	
POPU BALS				R	
PARTH VIT				O	
FRAG VIR				R	
AGRI GRIP				O	
ASTER SP				O	
TOXI RAD				R	
CRIS LUTE				O	
TOVARA V.				R	
TROUT lily				O	
ARIS TRIF				R	
GER MAC				O	
ONE SENS				R	
CLAY CAR				R	
ALI Peti				R	
VIRG Waterleaf				R	
CLAY VIR				R	
PHRAG AUS				R	
THAL SP					

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Chromodrags Call
Slumps

Deer tracks
- Similar to FOD 5 on many of. ROBIN
Series of Slumps
Standing water

NOCA
Edge effects
Present
Patches
& direct
Sunlight
reaching
understory

Grey Squirrel
Deer Skull found + Bones
- Northern Shrike
- Path cleared for a hydro corridor.

Water

(A) Sharp spine at node

(*) Small not flowering

(*) No yellow glands, weak prickles/hairs & weak spines, hairy leaf

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Waters		POLYGON: 13	
SURVEYOR(S): ZH	DATE: Nov 16/15	TIME: start / finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	1	4	POPDELT >> FRAXPENN
2	SUB-CANOPY	2-3	4	FRAXPENN > POPDELT
3	UNDERSTOREY	4-5	4	FRAXPENN > CORSERACE > RHAMCATH > RUBIDAE
4	GRD. LAYER	6-7	3	ALLDELT > Gram-sp > FRAVIRG

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

UA

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Ash Mixed Dec. Forest	FOO7-2
INCLUSION		
COMPLEX		

Notes:

ELC PLANT SPECIES LIST

SITE: Thunder Waters	
POLYGON: 13	
DATE: Nov 16/15	
SURVEYOR(S): ZH	

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
ACEBRUGR		O			
ACESACSP			O		
FRAXPENN	A	A	A		
LONAUST		O			
QUERUBR		R			
RHAMCATH			R		
POPDELT	A	O			
PRUNSER		R			
QUERUBR				O	
RHAMCATH			R		
RUBIDAE		O	O	O	
		C	O	O	
ILEVIRG			O		
VIBRACER			R		
CORSERACE			O		
RHAMCATH			A		
			A		

SPECIES CODE	LAYER 1	2	3	4	COL.
ALLIARIA				A	
Gram-sp				A	
SALIX SP				O	
LONICERA				O	
OAK-SP				O	
FRAVIRG				A	

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON: 14	
SURVEYOR(S):	DATE:	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	4	POPDELT
2	SUB-CANOPY	3	3	POPDELT
3	UNDERSTOREY	4	4	CORRACE > RHACALTH
4	GRD. LAYER	5-7	3	SOL >> AST-SP >> JUN-SP > SCIMACR

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

CVR CODES 0= NONE 1= 0% < CVR ≤ 10% 2= 10 < CVR 25% 3= 25 < CVR ≤ 50% 4= CVR > 50%

STAND COMPOSITION: BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Poplar Deciduous Forest	FOD8-1
INCLUSION		
COMPLEX		

Notes:

spp list copied from notes & ELC sheet for July 26

ELC PLANT SPECIES LIST

SITE: Thunder Waters
POLYGON: 14
DATE: June 3/15 / Oct 5/15
SURVEYOR(S): ZH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
POPDELT	D				
RHACALTH			O		
VIBTRIL			O		
CORRACE			A		

SPECIES CODE	LAYER 1	2	3	4	COL.
ASTNOVA				O	
ASTERIC				O	
AST PILO				O	
AST LANC				O	
SCIMACR				O	
LYTSALI				O	
JUN-SP				R	
SOL-SP				O	

Moist pockets edge

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SURVEYOR(S): ZH	DATE: June 3/15	TIME: start / finish
UTMZ:	UTMZ:	UTMN:

POLYGON DESCRIPTION

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

SITE	COVER
☐ OPEN WATER	☐ OPEN
☐ SHALLOW WATER	[X] SHRUB
[X] SURFICIAL DEP.	☐ TREED
☐ BEDROCK	

Polygon 15

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	1	ULMAMER > FRAXPENN
2	SUB-CANOPY	3	3	CRAT SP > CORRACE > RHACATH
3	UNDERSTOREY	4	4	CORRACE > FRAXPENN
4	GRD. LAYER	5-7	3	FRAVIRG > ASTLANC > CIRALTE > GEUM SP

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

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

STAND COMPOSITION:	BA:

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

ULMAMER

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:		CODE:
COMMUNITY SERIES:		CODE:
ECOSITE:		CODE:
VEGETATION TYPE:	Mineral Cultural Woodland	CODE: CUW1
INCLUSION		CODE:
COMPLEX		CODE: CUT1

Notes:

New ELC: WODM5-2 Elm Woodland.

ELC STAND & SOIL CHARACTERISTICS

SITE: Dunlop Rd	
POLYGON: [redacted]	
DATE: June 3/15	
SURVEYOR(S): ZH	

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TALLY 6	TALLY 7	TALLY 8	TOTAL	REL. AVG
TOTAL										100
BASAL AREA (BA)										
DEAD										

STAND COMPOSITION:

SOIL ASSESSMENT:	1	2	3	4	5	6	7	8
EFFECTIVE TEXTURE								
DEPTH TO: MOTTLES (g)	g=	g=	g=	g=	g=	g=	g=	g=
GLEY (G)	G=	G=	G=	G=	G=	G=	G=	G=
DEPTH OF ORGANICS								
DEPTH TO BEDROCK								
MOISTURE REGIME								

COMMUNITY PROFILE DIAGRAM

Notes:

Polygon #15

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	P	Dr	Type	Class	Slope %	N pos	Nlength	E pos	Elength	Z	UTM EAST	UTM NORTH
1													
2													
3													
4													
5													
6													
7													
8													

SOIL ASSESSMENT:	1	2	3	4	5	6	7	8
TEXTURE x HORIZON								
A TEXTURE								
COURSE FRAGMENTS								
B TEXTURE								
COURSE FRAGMENTS								
C TEXTURE								
COURSE FRAGMENTS								
EFFECTIVE TEXTURE								
SURFACE STONINESS								
SURFACE ROCKINESS								
DEPTH TO / OF								
DISTINCT MOTTLES								
PROMINENT MOTTLES								
MOTTLES + GLEY								
GLEY								
BEDROCK								
CARBONATES								
DEPTH OF ORGANICS								
PORE SIZE DISC #1								
PORE SIZE DISC #2								
MOISTURE REGIME								
SOIL SURVEY MAP UNIT(S)								
LEGEND CLASS								
TEXTURE								

North side

Marsh (Lock(P)
West Marsh?
Crescent?
see picture
also pond

common
Yellow
thront

Tree
standin
26.1

ELC PLANT SPECIES LIST

SITE: Niagara H20
POLYGON: 28
DATE: June 2/05
SURVEYOR(S): ZH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
POPDELD	R				
FRXPENN	O	O	O	A	
ACENEGU	R				
ULMAMER	O				
ULMRUBR?	R				Bark
POPDELT	D				
LONTATA					
VIBTRIL					
CORRACE			A		
RIBGLAN			R	R	Smooth
PRUVIR			O		
TOXRADI			R	R	
RUBIDAE				R	
PARINSE			O	O	
VITRIPA					
CRA-SP		A			* Mail
CRATAUC		A			
AMACAN					
CORSER1					

SPECIES CODE	LAYER 1	2	3	4	COLL.
ASTNOVA				R	
LOLPRAT/ARAM				O	
TRI-RED					
CHRLEUC					
DACGLOM					
SOL ALT1/CA					
FRAVIRG				A	
RANACR1				R	
ACH MILL				R	
DAUCARO				R	
PLUMRAC					
ASTLANC				A	
CARCRAC				O	
LAPCOMM				R	
COELUM-SP				A	
GLY-SP?				A	X
ONOSENS				R	
HYPPERF				O	
ARITRIP				R	
Black Mustard				R	
OXA MONT				O	
CIRLUTE				A	
Epilobium-sp?				O	X
TORVIRG				R	
POTSIMP				O	
TARGFF1				R	
JUN-SP				O	∞
MOSS				A	∞
LYSNUMM					
VINMINO					
POAPRAT					
POACOMP					
SOL JUNC					

(1) includes Juncus

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

ELC PLANT SPECIES LIST

SITE: Niagara Thunder
POLYGON: 26-2
DATE: June 3/15
SURVEYOR(S): ZM

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
ULMUAMER	O			R	
SALIBA	R				
QUERBICO?			O		G
CARYA-SP				O	
QUERUBRA		O	O		
FRxPENN	O	O	O	A	
PRUNUS					
POSTRE			R		
CRATPUNC					
RUBIDAE				O	
LIRTRIF			R		
CRAT-SP		D			
PRUNVIR		A			
MORMUS	O				
TOXRADI				O	
ROSA-SP					
UTRIPA					
PARTSE				A	
LONTATA			O		
RIBGLAN			A		
LINNBOR			R		
FRAAMER					
CORRACE					
SOLDULC					

SPECIES CODE	LAYER 1	2	3	4	COL.
HEMPUMI					
CAR-SP					
PRAVIR				R	
ELE-SP				R	X
LYCUNIF				R	
CIRARV				R	
VICCRAC				O	
ONOSENS				R	
~~RHOPUMI~~					
BORCIL				R	
IMPCAPE				R	
BROMINE?					X
MYO-SP					G
ALLPET				R	
CAMPSP					2G.
EQUARVE					
DRY-SP				R	X
ERIANNU					
CAREGRAS				O	
CAR-SP				A	Black? X
CIRCUTE				A	
COELISP				IA	
TOUVIRG				A	O
ARCABYLIN				R	
RANARBOR				O	
VIO-SP				O	
POAPRAT					

Page ..... of .....

less dense understory 25-50% - less dogwood

Stripper blue

Lichy → R

05-1m deep water in pond/ slough

GLFR

Broad leaved 2-10 X

Tree stand-

CRA-SP? CRATPUNC

Lupu? no fls

O Ford / Ditch ⇒ constructed?

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Slope Position	Slope Aspect	Slope %	Slope Type	Slope Class	UTM Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON	A 24"				
A TEXTURE	CL Clay loam				
COURSE FRAGMENTS	Very few				
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES	>50cm				
GLEY	NA				
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Polygon #16

ELC

PLANT SPECIES LIST

SITE: Thunderin Waters
POLYGON: 2 05 - 15 - 22
DATE: May 15, 2015
SURVEYOR(S): KB & ZH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	LAYER 2	LAYER 3	LAYER 4	COL.
ULM AME	O			R	
POPU DELT	R				
Juni VIR			R	R	
FRAX SP		O	O		
OLIVE ?			R		✓
CRAT SP			O		
PRUN VIR				O	
MULIS SP				R	
CORN SERI			O		
CRAT PUNT? ~~CRUS~~?			A		

SPECIES CODE	LAYER 1	LAYER 2	LAYER 3	LAYER 4	COL.
FRAG VIR				O	
C				O	
DA CAR				O	
SYMPH NHA				O	
hieracium sp				O	
Soli GRICILLIA				R	
SYSRI MONT				R	
SOLI J.				R	
TRIF SP				R	
eqiu ARV				R	
Carex Sp					✓
Antnaria CANA				R	
Symph euro				R	
Plant Lanc				R	
CAREX FLAVA?				R	✓
AGRI GRIP				R	
SALI CANA				R	
Liatris spic				R	

↳ Garden Escape?

Page .... of ....

Northern Flicker
Ring-billed Gull
Robin
Molly dead

Yibbeco

Some w/ [illegible]

Linear Grass & Snake

nemo-

early

small

Thicket

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Water		POLYGON: 05-15-22	
SURVEYOR(S): ZH	DATE: May 15/2015	TIME: start	finish
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	1	ULM AMER > POP DELT > FRX.SP
2	SUB-CANOPY	3	2	CRAT-SP > ULM AMER > FRX.SP
3	UNDERSTOREY	4	3	CRAT-SP > R! M H (ROSA ACI
4	GRD. LAYER	5-7	H	AST-SPP > FRA VIR > SOL GRIS + SPP.

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

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

STAND COMPOSITION: BA:

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

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

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

SOIL ANALYSIS:

TEXTURE: FL	DEPTH TO MOTTLES / GLEY	g = NA	G= NA
MOISTURE: D-2 variable	DEPTH OF ORGANICS:	N/A	(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:	NA	(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		CUT1
INCLUSION		
COMPLEX		

Notes:

- dry ish
- water course in lower section of polygon.

Shrub layer is in many spots 60% but in others it is between 25-60% leaning towards 60%

hawthorn savannah?
US manual has dense in some parts.

Hawthorn thicket

New ELC: THDM2-11

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON	A (15cm) / B / C (30 inches)	6 cm			
A TEXTURE	FSL - Fine sandy loam				
COURSE FRAGMENTS	—				
B TEXTURE	SiL				
COURSE FRAGMENTS	—				
C TEXTURE	LvfS				
COURSE FRAGMENTS	—				
EFFECTIVE TEXTURE					
SURFACE STONINESS	—				
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES	—				
GLEY	—				
BEDROCK	—				
WATER TABLE	22-23cm				
CARBONATES					
DEPTH OF ORGANICS	1cm				
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Crack ? Smaller than PQP data

deer trail + Tracks

Rabbit remains (Scat only) (Photo + GPS)

1 introduced one

Wet elevation of polygon

ELC PLANT SPECIES LIST

SITE: Thunder Waters
POLYGON: 05-15-21
DATE: May 15 / 2015
SURVEYOR(S): [redacted] ZH, SB

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
POPU DEL	O				
SALIX SP	O				
Ulm amer	R				
FRAX PENN	R				
Quer PALU				R	
RHAMNUS					
SALI EXIG			R		
PARTH VIT					
SALI BEB			R		✓
VIT OPUL			O		
VIT RIP			R		
FRAN ALN			R		
CORN SER			O		
CORN RACE			A		
CRAT SP.			O		
PRUN VIR			O		
CRAT PUN			?		

SPECIES CODE	LAYER 1	2	3	4	COL.
FRAG VIR				A	
Equi ARVE				O	
Plant Lanc.				O	
SYMPH LANC				O	
TARA OFF				R	
SOH CANA				R	
Lami Amp				R	
CAREX brisca				R	?
heliopteris					✓ Helop2357
mentha arve				R	
Equisetum sylva				R	
trif sp.					
ASCL INC				R	
SALI CAYOSE	whola			R	
SALI DISCOLOR				R	
JUNO ARIOS	ephila			R	?
LICOPUS UNI				R	
TUSS FARF				O	
CHRYSANTHIMUM SP				O	
TOXI RAD				O	
SYMPH Lanc.				O	
GLYSTRI				A	
CAR ECHI				A	

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Thundering Waters	POLYGON: 05-15-21	
	SURVEYOR(S): KB + ZH	DATE:	TIME: start / finish
	UTMZ:	UTME:	UTMN:

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	3	POPU DEL = SALIX SP
2	SUB-CANOPY	4	4	RHACAT = CORN RACE > RHAFRAG
3	UNDERSTOREY			CRAT SP.
4	GRD. LAYER		4	CAREX SP > CARCAN > FRAVIRG

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

TEXTURE: SiL	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE: 6-7	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION: **ELC CODE**

COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Willow - Poplar Swamp	SWD 4-1
INCLUSION		
COMPLEX		

Notes:

Standing water in a channel like feature

Must have had standing water in spring

- likely mature into a young Pin Oak Swamp.

- Shrubs become more clumped & patchier as you move east

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Hamden Water		POLY #: 10	
SURVEYORS:	Mey L	TIME:	
UTMZ	UTME: 56	UTMN	

Notes: See All Wpts

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL X WETLAND G AQUATIC	G ORGANIC G MINERAL SOIL X PARENT MIN G ACIDIC BEDRK G BASIC BEDRK G CARB BEDRK	G LACUSTRINE G RIVERINE X BOT UPLAND G TERRACE G VALLEY SLOPE G TABLELAND G ROLL UPLAND G CLIFF G TALUS G CREVICE CAVE G ALVAR G ROCKLAND G BEACH BAR G SAND DUNE G BLUFF	X NATURAL G DISTURBED	G PLANKTON G SUBMERGED G FLOATING LVD G GRAMINOID G FORB G LICHEN G BRYOPHYTE X DECIDUOUS G CONIFEROUS G MIXED	G LAKE G POND G RIVER G STREAM G MARSH X SWAMP G FEN G BOG G BARREN G MEADOW G PRAIRIE G THICKET G SHORELINE G RIPARIAN G DUNES G PLANTATION
SITE			**COVER**		
G OPEN WATER G SHALLOW WATER G SURFICIAL DEP G BEDROCK			G OPEN G SHRUB X TREED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN, = ABOUT EQUAL TO)
1	CANOPY		4	FRX PENN > POPDELT > ULMAMER
2	SUB-CANOPY		4	FRX PENN > ULMAMER
3	UNDERSTOREY		3	RHACATH > VIT RIPA > COR-SP
4	GRD. LAYER		3	Leersia > Asteae

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

CVR CODES: 0 = NONE 1 = 0% < CVR 10% 2 = 10 < CVR 25% 3 = 25 < CVR [illegible] 4 = [illegible]

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

TEXTURE: CL	DEPTH TO MOTTLES / GLEY	g = 25	G = —
MOISTURE: 6	DEPTH OF ORGANICS: 0-5cm		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK: >50cm		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Green Ash Swamp	SWD 2-2
INCLUSION	Moist Poplar Forest	FOD 8-1
COMPLEX		

Notes:

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

18

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

w/ Ash + Elm Cottonwood Swamp incl. / (Complex possible

BRCA x2

ELC PLANT SPECIES LIST

SITE: T. Waters
POLYGON: 100501
DATE: Oct 5, 2015
SURVEYOR(S): ZH, DW

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Frax Penn	O	O	O		
Rhamnet.	O	O	O		
Quer pin.				R	
Cary ovat			R		
Ulm x ame	O	O	O		
Cornamom			O		
Ruballen				R	
Parth vit				O	
Toxic rad.				O	
Corn Sem			O		
Vit ripa.			A		
Rhamcat			A		

SPECIES CODE	LAYER 1	2	3	4	COL.
Ast lanc			O		
Geum sp.				R	
Leersoryz				O	
Carex lupu.				R	
Verb hast			R		
Glyc striata				R	
Lobsan canaden				R	
Oxalis sp				R	
Soli rugos			R		
Carex Utrib/pra					Coll prev (photo 08/2

Page ..... of .....

Polygon #18

ELC
SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON A	Loam	10cm			
B	CL				
C		50cm			
A TEXTURE	L				
COURSE FRAGMENTS	NO				
B TEXTURE	CL				
COURSE FRAGMENTS	NO				
C TEXTURE	/				
COURSE FRAGMENTS	/				
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF MOTTLES	25				
GLEY	/				
BEDROCK	/				
WATER TABLE	>50cm				
CARBONATES					
DEPTH OF ORGANICS	1cm				
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

ELC
PLANT SPECIES LIST

SITE: Thunderbird
POLYGON: 05-15-23
DATE: May 15-2015
SURVEYOR(S): KB ZH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
FRAX PENN	O				
POPU DEL	R				
JUG NIG	R				
[illegible] SYR				R	
SALIX SP.	O				
ULMUS AME			R		
Hickory sp				O	
QUER RUB	R	R			
QUER BIC	R			O	
QUER MAC			O		
ACER PEN			O		
ACER NEG	R				
TSUG CAN	R				
CAR Stony	L				
SAMBUCUS		O	O		
FRAX AME					
VIBURNUM			O		
ROSA SP			O		
LINNAEA			R		
VIBURNUM			R		
RUB IDE				R	
RIBE GLAN				R	
CORN SERI				R	
PARTH VIT				O	
VIT RIP				O	
CRAT SP			A	O	
RHAM CAT			A	A	
PRUN VIR					
CORN RACE				A	

SPECIES CODE	LAYER 1	2	3	4	COL.
EQUI ARV				O	
CAREX GRAC				O	
SCIRP SP				O	
CIR LUTE				O	
FRAG VIR				O	
SOLI CANA				R	
TARA OFF				R	
VIOLA AFIN				R	
ALI PETI				R	
TARA RAD				R	
VERB SP				R	
CIRS VULG				R	
ONOSENS					
GEUM SP					
ARITRIP					
ASTICANE				O	
CAR SP				O	
SOLANU					
CIN LATI				O	
EQUISETUM				A	
EPI SP				R	
SCIRPUS				R	
EUPATORIUM				R	
ASTER UM				R	
LYCOPUS				O	
GLYCERIA				A	
CAREX SPP					
MENTHA SP					
CIRSIUM SP					

Page ..... of .....

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON:	
SURVEYOR(S):	DATE:	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

Some tributaries coming out of poly 22 into this poly.

Ash mostly dead, but downed

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			FRAX PENN > QUERUB > POPDELT (ind) > QUEMAC
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		SWD 2-2
INCLUSION		
COMPLEX		

Notes:

Polygon 18

ELC
SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	P/A	PP	Dr	Position	Aspect	Slope %	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON	A	0-5cm 25			
	B				
A TEXTURE	CL				
COURSE FRAGMENTS	YES				
B TEXTURE	L				
COURSE FRAGMENTS	Yes				
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF MOTTLES	5cm				
GLEY	N				
BEDROCK					
WATER TABLE	50				
CARBONATES					
DEPTH OF ORGANICS	5cm				
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Swamp?

ELC
PLANT SPECIES LIST

SITE: Thunder Bay Water
POLYGON: 18
DATE: 05/15/15
SURVEYOR(S): ZH/KB

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
MAL_SP		A			VOLUNTEER
ERXPER	A	A	A	A	
~~QUEPALU~~				R	
ULMAMER		O			
TILAMER	R		O		
QUERUBR	R				
POPDELT	O				
ACERUBR	O				
QUEMACR	O				
QUEMBIC	R				
VIB ARROW			O		
CORSER1			O		
LONTATA			O		
CORRACE			O		
TOXRADI			O		
UTTRIPA		O	O		
CRA_SP		A			
LIGBULG			R		
KALACATH		A	A		
PRUVIRG			A		
RIBGLAN			A		

SPECIES CODE	LAYER 1	2	3	4	COL.
ALLPET1				A	
FRAVIRG				A	
GEUM_SP				A	
TOVVIRG				A	
TAROFF				D	
CIRLUTE				A	
CAR_SP				O	C in 22/23
ASTNOVA				R	
SOL_SP				O	
EQUARVE					
CARGRAC					
LYTSALI					
GERMACU					

Page ..... of .....

- cow
- wet

- several culverts along road.

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE:		POLYGON:	
	SURVEYOR(S):	DATE:	TIME: start	
			finish	
	UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

Polygon #18

ELC
SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

GPS 091??

SOIL	1	2	3	4	5
TEXTURE x HORIZON	9cm Ah 20cm B 70cm+ B	SiCl SiCl			
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES	/				
GLEY	/				
BEDROCK	/				
WATER TABLE	/				
CARBONATES	/				
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

GPS
090 small dug pond
092 Large Salix
093 Fern
OLD DUGOUT AREA

ELC PLANT SPECIES LIST

SITE: THUNDERING WATERS
POLYGON: 25-1
DATE: JUNE 3/2015
SURVEYOR(S): SH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

BIRDS
VEER
BWWA
GCFL
EAWP

SPECIES CODE	LAYER 1	2	3	4	COL.
POPU DELT	O	R			
MALU PUMI	R	O			
FRAX PENN	O	A	A	D	
SALI BLAN	R				?
ULMU AMER	R	R		R	*
CARY OVAT		R	R	R	
PRUN AMER	R				
QUER PALU	R				
CARY CORD		R			
CORN RACE			A	O	
RIBE GLAN		O	O		
LIND BENZ		R			
LONI TATA		R	R		
VIBU OPUL		O			
PRUN VIRG		O			
PRIVET			O		
CRAT PUNC		A	A		
CRAT ?		A	A		
TOXI RADI		O	O	O	
PART VITA		A	A	A	
EQUI ARVE				A	
VITI RIPA				A	
RHAM CATH		A	A	A	

CRUS-GALLI

SPRUCE KNOB

SPECIES CODE	LAYER 1	2	3	4	COL.
CARE BLAN?				A	x
ERIG PHIL				R	
GLYS STRI				O	
GEUM SP				O	
ARIS TRYP				O	
CIRC LUTI				A	
ONOC SENS				R	
Fern (Polypod?)				R	x
CARE NECT				R	x
SPARG CHAN				R	
POPU DELT				R	
RANU ABORI				R	
VIOLA SP				R	
LAPS COMM				R	

093 - check

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON: 19	
SURVEYOR(S):	DATE:	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	1-2	2	POPU DELT ~ FRAX PENN > ULMU AMER
2	SUB-CANOPY	3	3	RHAM CATH ~ CRAT SP ~ FRAX PENN
3	UNDERSTOREY	4	4	FRAX PENN > RHAM CATH
4	GRD. LAYER	E-3	2	RHAM CATH > CIRC LUTI

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:	CUT	
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		CUW1
INCLUSION		
COMPLEX		CUT1

Notes:

ELC
STAND CHARACTERISTICS

SITE:	
POLYGON:	
DATE:	
SURVEYOR(S):	

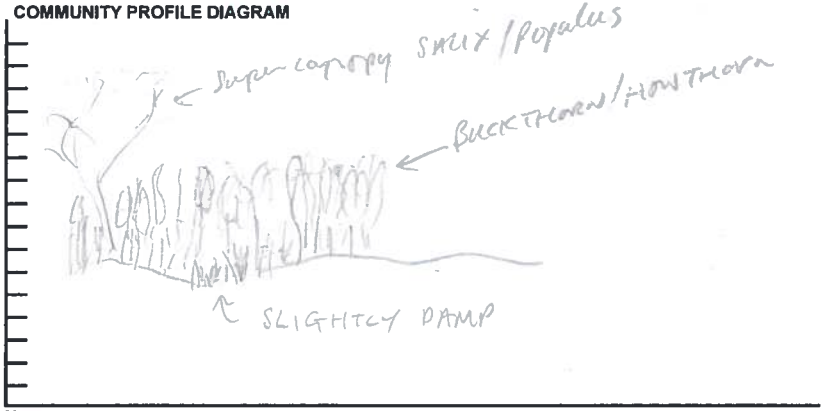
TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM



Notes:

VERY SUBTLE ROLLING TOPOGRAPHY,
LOW AREAS SUPPORT SOME WETLAND INDICATORS,
eg. ONOC SENS, GLYC STRI

PREDOMINANTLY MESIC UPLAND WITH DENSE
CRAT SP, RHAM CATH, FRAX PENN UNDERSTOREY
SOME SUPER CANOPY POPU DELT, SALIX SPP.

See other page. Polygon 20

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thundering Waters
POLYGON: 20
SURVEYOR(S):
DATE:
TIME: start
finish
UTMZ:
UTME:
UTMN:

POLYGON DESCRIPTION

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

SITE	COVER
○ OPEN WATER ○ SHALLOW WATER ☒ SURFICIAL DEP. ○ BEDROCK	☒ OPEN ○ SHRUB ☒ TREED

See other page

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			SAL_SP > POP DELT > QUEPAL
2	SUB-CANOPY			" "
3	UNDERSTOREY			COR SERI > RHA_SP
4	GRD. LAYER			SCI_SP > GLYSTRI > Sedges & Forbs.

HT CODES: 1 = >25 m 2 = 10<HT≤25 m 3 = 2<HT≤10 m 4 = 1<HT≤2 m 5 = 0.5<HT≤1 m 6 = 0.2<HT≤0.5 m 7 = HT<0.2 m
CVR CODES 0= NONE 1= 0% < CVR ≤ 10% 2= 10 < CVR 25% 3= 25 < CVR ≤ 60% 4= CVR > 60%

STAND COMPOSITION:
BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		SWD4-1
INCLUSION		MAS3-2
COMPLEX		

Notes:

ELC
PLANT SPECIES LIST

SITE: Thundering Waters
POLYGON: 20
DATE: June 3 2015
SURVEYOR(S): SH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.	SPECIES CODE	LAYER 1	2	3	4	COL.

Polygon #20

SWD +MAS inclusion? or poly?

ELC
SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

PIN

GPS
94 N WMT
95 W
↓
100 ← I think.

PIN OAK! Cottonwood on outside

ELC
PLANT SPECIES LIST

SITE: THUNDERING W VE
POLYGON: 25.2 (Large wmp/MAS
DATE: June 3 / 2015
SURVEYOR(S): SH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
ACER DELT	D				
DILER PALU	R				
FRAX PENN	R				
ULMU AMER	R				
SALI	A				
COR RACE			R		
TOXI RADI				R	
RUBU IDAE					
CRAT MOND		R			
CORNSER			A	A	
RHAM FRAN			O	O	
RHAM CATH			D	D	

SPECIES CODE	LAYER 1	2	3	4	COL.
CARE (LACU)				R	X
SYMP LONC				R	
CARE STRI				R	
GLYC STRI				D	
GALIUM SP.				R	R
EUPHMACU				R	
SCIR				A	
CARE VULP				R	
CARE (OVALES)				R	
ELUS MACU				R	
ASCL INCA				R	
SIUM SUAV				R	
ASCL INCA				R	
SCHO TABE				R	
LYCO AMER				R	
ALIS PLAN				R	

Young Plants NATIVE PLANTS

RBGR

RBWD EXWD

PICS

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON:	21, 23, 24
SURVEYOR(S): ZH + DW	DATE:	TIME: start / finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

SITE	COVER
G OPEN WATER	G OPEN
X SHALLOW WATER	G SHRUB
G SURFICIAL DEP.	X TREED
G BEDROCK	

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2(1)	3	POP DELT > SALALBA > FRXPENN
2	SUB-CANOPY	3	4	" "
3	UNDERSTOREY	4	4	RHACATH
4	GRD. LAYER	5-7	4	

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Poplar/Willow Swamp	SWDM-1
INCLUSION		
COMPLEX		

Notes:

See Polygon 20 List

ELC — PLANT SPECIES LIST

SITE:	Thunder Waters
POLYGON:	21, 23, 24
DATE:	Aug 2016
SURVEYOR(S):	ZH + DW

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
POPDELT	A				
SAL-SP	A				
QUPALU	R	O			
FRXPENN	O	O			
MALPUMI		O			
CORACE			O		
RHAFRAN			O		
RHACATH			A		

SPECIES CODE	LAYER 1	2	3	4	COL.
CAJOSENS				O	
CLYSTRI				O	
FRAVIRG				O	

35.37

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Water		POLYGON: 22, 34, 47	Notes:	
SURVEYORS: ZH & KB & DW	DATE: May-Oct 2015	TIME START / FINISH		
UTMZ	UTME	UTMN		

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
X TERRESTRIAL G WETLAND G AQUATIC	G ORGANIC X MINERAL SOIL G PARENT MIN G ACIDIC BEDRK G BASIC BEDRK G CARB BEDRK	G LACUSTRINE G RIVERINE G UPLAND X TERRACE X VALLEY SLOPE G TABLELAND G ROLL UPLAND G CLIFF G TALUS G CREVICE / CAVE G ALVAR G ROCKLAND G BEACH / BAR G SAND DUNE G BLUFF	G NATURAL X CULTURAL	G PLANKTON G SUBMERGED G FLOATING LVD G GRAMINOID G FORB G LICHEN G BRYOPHYTE X DECIDUOUS G CONIFEROUS G MIXED	G LAKE G MUD G RIVER G STREAM G MARSH G SWAMP G FEN G BOG G BARREN G MEADOW G ALPINE G THICKET G SAVANNAH X WOODLAND G TREES G PLANTATION
SITE			**COVER**		
G OPEN WATER G SHALLOW WATER G SURFICIAL DEP G BEDROCK			G OPEN X SHRUB X REED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN, = ABOUT EQUAL TO)
1	CANOPY	2		FRX PENN > POPDELT > CARYA
2	SUB-CANOPY	3		" "
3	UNDERSTOREY	4		RHACATH > CRAT-SP
4	GRD. LAYER	5-7		FRA.VIRG > SOL-SP > ASTER

HT CODES: 1 = >25 m 2 = 10<HT 25 m 3 = 2<HT 10 m 4 = 1<HT 2 m 5 = 0.5<HT 1 m 6 = 0.25<HT 0.5 m 7 = HT<0.2 m

CVR CODES: 0 = NONE 1 = 0% < CVR 10% 2 = 10 < CVR 25% 3 = 25 < CVR 50% 4 = 50 < CVR

STAND COMPOSITION:	BA:

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

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

COMM. AGE		PIONEER	X	YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE: CL	DEPTH TO MOTTLES / GLEY	g = >20	G = —
MOISTURE: 4-6	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Mineral Cultural Woodland	CUW
INCLUSION		
COMPLEX		

Notes:

Polygon # 22 & 34 & 47, 35, 37

ELC

SOILS ONTARIO

SITE:
POLYGON: 20, 34, 47
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE	CL				
COURSE FRAGMENTS					
B TEXTURE	L				
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES	20-?				
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

See soil for 18

CUT (Buckthorn) w/ Cedar complex (Ash)

ELC PLANT SPECIES LIST

SITE: T. Waters
POLYGON: 23
DATE: Oct 5 2015
SURVEYOR(S): (TH) DW

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Frax penn.	O	O	A	A	
Carya ovat	O	O	O	O	
Popu del	O	O			
Rub idaeus					
Fragaria					
Linnaea borealis					
Ribes cyn					
Corn rack					
Parthen.					
Toxic rad.					
Prun virg.					
Crat sp.		A	A	A	
Rhamnus		A	A	A	

SPECIES CODE	LAYER 1	2	3	4	COL.
Frax virg					
Gem ap.					
Lapsana comm.					
Ast lanc.					
Viola sp.					
Soli rugo.					
Ast lanc.					
Carex sp					(no flrs/fr)
Ath fem					
Eup cuparissias			D		

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Waters		POLYGON: 25	
SURVEYOR(S): ZH	DATE: June 2/15	TIME: start	finish
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

Fill

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	1	POPDELT > SALERAG
2	SUB-CANOPY	3	1	" "
3	UNDERSTOREY	4	2	CORRACE > RHACATH > CRAT SP
4	GRD. LAYER	5-7	3	TRIFOLIUM > LOLMUL > UNCRAC

Bare Soil

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

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

STAND COMPOSITION: BA:

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

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

COMM. AGE:		PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH
	X		\							

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Mineral Cultural Meadow	CUM1
INCLUSION		
COMPLEX		

Notes:

ELC — STAND CHARACTERISTICS

SITE:	Thunder Waters
POLYGON:	25
DATE:	June 2/15
SURVEYOR(S):	

TREE TALLY BY SPECIES:

PRISM FACTOR:

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

Polygon 25

ELC
SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Conifer & Snake

ELC
PLANT SPECIES LIST

SITE: Thunder Hill
POLYGON: 29
DATE: June 3/15
SURVEYOR(S): ZH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
POPDEL	O				
SALIX SPP					
CORACE			O		
CRATSPE			R		
MALCORO			R		
GRASP			O		
RHITYPH			O		

SPECIES CODE	LAYER 1	2	3	4	COL.
TRIPRAT				A	
LONARBA				A	
PHRAUST				L	
FRAVIRG				O	
VICCRAC				A	
CORVARI				O	
CHRLEUC					
DAUCARO					
CIRNUTA					
STAROPH					
CONARVE					
EUTGRAM					
POAPRAT					
PLALANC					
SOLNEMO					
LONDRAC					
CORVARI					
APO_SP CANA					upright
SOL_SPEC					
SYMLAE					
CARPELL				R	
TYPLATI				R	wet prairie
MENARVA					
ROSARC					

PRAT

Bare soil - trails

Similar to 1B

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

SITE		POLYGON:	26 d 39
SURVEYOR(S)	DATE	TIME start / finish	
UTMZ	UTME	UTMN	

POLYGON DESCRIPTION

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

STAND DESCRIPTION

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			ULMAMER >= FRAPENN > POPDELT
2	SUB-CANOPY			
3	UNDERSTOREY			RHACATH > CORRACE > CRAT-SP
4	GRD. LAYER			SOLRUGO > ASTLANC

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

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

STAND COMPOSITION:	BA:

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

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

COMM. AGE		PIONEER		YOUNG	X	MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		SWD2-2
INCLUSION		
COMPLEX		

Notes:

ELC — STAND CHARACTERISTICS

SITE:	Thunderer Waters
POLYGON:	26 d 39
DATE:	
SURVEYOR(S):	

TREE TALLY BY SPECIES

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

SOILS ONTARIO

DATE:

SURVEYOR(S):

Slope

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL TEXTURE x HORIZON	1	2	3	4	5
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

lump w/ 2c

ELC PLANT SPECIES LIST

SITE: T. Waters

POLYGON: 26-2

DATE: Oct 5, 2015

SURVEYOR(S): (ZH) DW

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Fraxpen					
Rhamnac					
Cor rata.					
Rib idaeus					
Corn sari					
Crat sp.					
Rham cAt.					
Rosa multi.					
Corn race					

SPECIES CODE	LAYER 1	2	3	4	COL.
Coli rug					
Ast lae.					

Notes

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE		POLYGON	
SURVEYOR(S)	DATE	TIME start / finish	
UTMZ	UTME	UTMN	

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL G WETLAND G AQUATIC	G ORGANIC G MINERAL SOIL G PARENT MIN G ACIDIC BEDRK G BASIC BEDRK G CARB BEDRK	G LACUSTRINE G RIVERINE G BOTTOMLAND G TERRACE G VALLEY SLOPE G TABLELAND G ROLL UPLAND G CLIFF G TALUS G CREVICE / CAVE G ALVAR G ROCKLAND G BEACH / BAR G SAND DUNE G BLUFF	G NATURAL G [illegible]	G PLANKTON G SUBMERGED G FLOATING-LVD G GRAMINOID G FORB G LICHEN G BRYOPHYTE G DEC SHRUB G CONIFEROUS G MIXED	G LAKE G [illegible] RIVER G STREAM G MARSH G SWAMP G FEN G BOG G BARREN G MEADOW G [illegible] G THICKET G SHORELINE G [illegible] G [illegible]
SITE			**COVER**		
G OPEN WATER G SHALLOW WATER G SURFICIAL DEP G BEDROCK			G OPEN G SHRUB G TREED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

CVR CODES 0 = NONE 1 = 0% < CVR 10% 2 = 10 < CVR 25% 3 = 25 < CVR [illegible] 4 = [illegible]

BA:

STAND COMPOSITION:

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

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

COMM. AGE		PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope | UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Mature slough forest

Complex of wetland/upland

Oak dom.

Pin ~ Bur > Swamp white oak red white

ROSA ECGLANTERIA

ELC PLANT SPECIES LIST

SITE: T. Waters
POLYGON: 27
DATE: Oct 5, 2015
SURVEYOR(S): (ZH) (KW)

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Carya cord	A	A	O		
Acer sac					
Quer rubra	O	O			
Fraxinus	R	O	O		
Popu del	R				
Pic glau	O	O			
Ulmu ame.		R			
Carp car.			R		
Quer mac.	R	R			
Quer bicolor	R	R			
Acer rubrum	O	O			
Quer alba	R				
Prun ser.	R	R			
Tilia ame.	R	R	R		
Fagus grand	R	R	R		
Ostr virg		R	R		
Acer x Freem	O	O	O		
Samb nigra can			R		
Euonymus			O	O	
Lindera benzoin			O	O	
Rosa multi			R		
Toxic rad.				R	
Parth vita				R	
Corn amom			R		
Rub allegh			I	R	
Rub idaeus				R	
Vib lat			R		
Crat sp			R	R	
Corn ser.			R		
Prun virg			R		
Rhamn cath			O		
Berb thunb				R	
Vib acer				R R	
Hamamelis virg	R				

SPECIES CODE	LAYER 1	2	3	4	COL.
Ast lanc.			O		
Toxic virg			O		
Potentilla sp.				R	
Lap-s comm				R	
Frag. virg				R	
Solid rug			R		
Carex lupuli				R	
Hera mac.				R	
Viol sp.				R	
Verb hast.			R		
Sol stri				O	
Aster mac				R	
Athyr fil-fem				R	
Poeth cylind				R	
Onoc sens				R	
Tall cyperacea					
Chel majus					
Rubus hispid.					
Maian rac					
Caltium P.					
Lyco uniff.					
Ast later.					
Cicuta mac					
Epil lat			R		
Ast divar				R	
Phrag aust			R		
No. Klute sedge			R		
Ast nova			R		
Bidens cernua					

(Photos)

GPS + photo

LID LOES

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Waters | POLYGON: 27

SURVEYOR(S): ZH, SH, DW | DATE: May-Oct | TIME: start / stop

UTMZ | UTME | UTMN

POLYGON DESCRIPTION

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

SITE
G OPEN WATER G SHALLOW WATER G SURFICIAL DEP G BEDROCK

COVER
G OPEN G SHRUB G TREED

STAND DESCRIPTION

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	4	4	Quer spp > Carya ovat > Acer rub > Frax penn, Acer sas >> Ulm ame, Pop delt
2	SUB-CANOPY	3	3	Quer spp > Carya ovat Acer rub,
3	UNDERSTOREY	4	4	Frax penn Quer spp Carya ovat > Acer spp >> Carp car
4	GRD. LAYER	6	2	Asters Tree seedlings

HT CODES: 1 = ≤.5 m 2 = .5–2 m 3 = 2–10 m 4 = 10–17 m 5 = 17–25 m 6 = 25–32 m 7 = 32–40 m

CVR CODES: 0 = NONE 1 = 0% < CVR 10% 2 = 10 < CVR 25% 3 = 25 < CVR 50% 4 = 50–75%

STAND COMPOSITION: | BA:

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

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

COMM. AGE		PIONEER		YOUNG		MID-AGE	X	MATURE		OLD GROWTH

SOIL ANALYSIS

TEXTURE: SiCL	DEPTH TO MOTTLES / GLEY	g = 16	G = 20
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

Notes

SWD1/FOD9-2 complex w SWT2-4 & MAS2 inclusion.

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

GPS 102

SOIL	1	2	3	4	5
TEXTURE x HORIZON	11cm Ah 30cm B1 48cm B2 B3 60cm				
A TEXTURE (Ah)	S,CL				
COURSE FRAGMENTS					
B TEXTURE	S,CL				
COURSE FRAGMENTS					
C TEXTURE	S;CL	B3->C1			
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES	11cm				
GLEY	30cm				
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

B3

ELC PLANT SPECIES LIST

SITE: FLUNDER WATERS
POLYGON: 27
DATE: Jul 3
SURVEYOR(S): SH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
ULMU AMER	O				
QUER PALU	A				
QUER MACR	R				
CARY CORD		R		R	
PRUN SERO	R				
CARY OVAT	R				
ACER SACH	O				
QUER RICO	R				
FRAX PENN	O	O	A	A	
QUAT CRUS		R			
LIND BENZ			R		
SALI BEBB			R		
RUBU IDAE			O	O	
VITI RIPA			A	A	
PART VITA			A	A	
CORN RACE			A		
LONI TATA			O		
RHAM CATH		A			
ROSA SP.			O		
TOXI RADI			A	A	

STAGG

SPECIES CODE	LAYER 1	2	3	4	COL.
IMPA CAPE				A	
SYMP LANC				D	
GLYC STRI				A	
CARE HYST ?				R	X ?
FRAG VIRG				R	
PANI VAGR				O	
GLYC SS				R	X Poa Nem ?
CARE ROSE				R	
CARE LACU				R	X
ONOC SENS				O	
BOTR CYLI				R	
ARRH ELAT				R	PIC
CIRS RETRO				O	?
ASCL INCA				R	
LEER SMOO				R	
~~ONOC SENS~~					
CARE INTU				R	
DRYO SP.				R	X
CICU MACU				R	
CARE GRAC				R	
ASTE MACR				R	
Ranunculus				R	X
CIRC LUTI				R	
GEUM SP				R	
TRIA VIRG				R	

? BY

PHOTO

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE:		POLYGON:	
	SURVEYOR(S):	DATE:	TIME: start	
			finish	
	UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

SITE	COVER
G OPEN WATER	G OPEN
G SHALLOW WATER	G SHRUB
G SURFICIAL DEP.	G TREED
G BEDROCK	

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			QUER PALU > ULMU AMER? ACER SACC
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC STAND CHARACTERISTICS	SITE:
	POLYGON:
	DATE:
	SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

ELC

SITE:	
POLYGON:	
DATE:	
SURVEYOR(S):	

Slope / UTM

	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1										
2										
3										
4										
5										

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

ELC PLANT SPECIES LIST

SITE:	
POLYGON:	27a
DATE:	
SURVEYOR(S):	

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
FRXPENN				A	
QUEMAC				O	
OSMIRG				A	
ULMAMER				O	
ACESACA				O	
CAR Stricta	a				a
~~ACESECT~~					
ACERUBR	r				
CARCAR2					
FAGGRAN	R				
TILAMER	R				
PRUVIR					
QUEALBA	R				
QUERUBR	R				
QUEPALU	R				
POPDELT	R				
VIBACER			R		
HAMVIRG				R	
VIBRAFU				R	
CEPOCCI			A		
CORSER1					
RHACATH					
PRUVIR1					
CRAPUNC				R	
VITRIPA				O	
RUBIPAE				A	
SOLDULC					

SPECIES CODE	LAYER 1	2	3	4	COL.
IMPCAPE				A	
ASTLANC				O	
TORVIRG				A	
FRAVIRG				O	
GEUM-SP				O	
CAR GRAY?				A	x
SOLRUGO				O	
ELYVIRG				R	
CARAQUASP				O	x
GLYSTRI				O	
POAPRAT				R	
CARLURD/ROS				R	x
GERRAPUNCU				·	
COM-SP				O	
POTSIMP				O	
EPI-SP				R	26
HIEPRAT				R	
HYP-SP					x
VEROFFI					
ASTMACR					
ONO SERS					
CARCARE					
ORY-small					v
Tall sedge sp.	2			D	
SILSUAV				O	
Leersia virginica				O	
STEROSE					
~~ARCAES~~?					
MYO-SP					26
EQUPALU					
AIRPRAT					

ALL PETI

CARTENE? X

Page 1 of .....

Black?

Reals or xcafe

Rose hearted goosefoot

edge

B&S Drawn American lady?

1 open sedge marsh meadow

D on slough

A clods

Ovules

26 ???

v

In pocket

smooth

IMG 1046-48

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:		POLYGON:	
SURVEYOR(S):	DATE:	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC
STAND CHARACTERISTICS

SITE:
POLYGON:
DATE:
SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

ELC

SOILS ONTARIO

SITE:

POLYGON:

DATE:

SURVEYOR(S):

	P/A	P	Dr	Type	Class	Slope %	Slope N pos	Slope Nlength	Slope E pos	Slope Elength	Z	UTM EAST	UTM NORTH
1													
2													
3													
4													
5													
6													
7													
8													

SOIL ASSESSMENT:	1	2	3	4	5	6	7	8
TEXTURE x HORIZON								
A TEXTURE								
COURSE FRAGMENTS								
B TEXTURE								
COURSE FRAGMENTS								
C TEXTURE								
COURSE FRAGMENTS								
EFFECTIVE TEXTURE								
SURFACE STONINESS								
SURFACE ROCKINESS								
DEPTH TO / OF								
DISTINCT MOTTLES								
PROMINENT MOTTLES								
MOTTLES + GLEY								
GLEY								
BEDROCK								
CARBONATES								
DEPTH OF ORGANICS								
PORE SIZE DISC #1								
PORE SIZE DISC #2								
MOISTURE REGIME								
SOIL SURVEY MAP UNIT(S)								
LEGEND CLASS								
TEXTURE								

Less canopy, more dense understory

ELC PLANT SPECIES LIST

SITE:

POLYGON: 27B

DATE:

SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
ACERUBR	A			O	
PRUSER				R	
QUEPAL	O	O		O	
POPGRA	O				
ULMAME	A				
FRXPENN	O	O			
SALAMY					
UNCALBA	R				
P BIR				A	
MSTNOVA				R	
UG				A	
T				O	
CINLATI				R	R ✓
SIUSUAV					
BAD MELA					✓
L OR P					
AR					
LEMMA.SP				R	
ROS-SP					fw
FRXSP					
MAR OSS					
AG					✓
CARHYST					
M?				R	✓
SPIALBA					
ILE MUCR					
SALBEBB				R	
SORDUE				R	
RUB SP			R		Canes? x2
TOXRYDB			A		
LIN BOR2			D		

SPECIES CODE	LAYER 1	2	3	4	COLL.
CAR SP					✗ small clumps
CARGRAN					
BROSER1				O	
AGROCYP				R	
Sm Fern (mosses)				R	2 cent
IMPCAPE					
JUN SP					
Bladderwort				A	✗
CARPENN				R	
GLYSTR1				A	
CARSTIP					
GAL SP				R	2C3
LYCUNIF				A	
LYTSALI				O	
PHAARUN				R	
CER SP				R	X
CAR SP				R	✗ Bladd
TYPLATI				A	
CARSTR1 ?				L	✗ Tuss
EUPPERF				O	
CAC MACU				O	
AMIPSAM					
MEDLUPU				R	) on Trail
PLMMAJ				R	
LEMMA					
CAR SP					✗
+CARCRIN/GRA					
CALTRIB/RECU					
ARTLANC				A	
GL ✗					

Page ..... of .....

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE:		POLYGON:	
	SURVEYOR(S):	DATE:	TIME: start	
			finish	
	UTMZ:	UTMZ:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:		CODE:
COMMUNITY SERIES:		CODE:
ECOSITE:		CODE:
VEGETATION TYPE:		CODE:
INCLUSION		CODE:
COMPLEX		CODE:

Notes:

ELC STAND & SOIL CHARACTERISTICS	SITE:
	POLYGON: 27b (left side of flat)
	DATE:
	SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TALLY 6	TALLY 7	TALLY 8	TOTAL	REL. AVG
TOTAL										100
BASAL AREA (BA)										
DEAD										

STAND COMPOSITION:

SOIL ASSESSMENT:	1	2	3	4	5	6	7	8
EFFECTIVE TEXTURE								
DEPTH TO: MOTTLES (g)	g=	g=	g=	g=	g=	g=	g=	g=
GLEY (G)	G=	G=	G=	G=	G=	G=	G=	G=
DEPTH OF ORGANICS								
DEPTH TO BEDROCK								
MOISTURE REGIME								

COMMUNITY PROFILE DIAGRAM

Notes:

Inclusion in 27

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thurlow Road | POLYGON: 26.3

SURVEYOR(S): EH | DATE: 08/5/15 | TIME: start / finish

UTMZ: | UTME: | UTMN:

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			QUERUBRA > ULMAMER
2	SUB-CANOPY			ACERSAC > SYMRACE > SALCA
3	UNDERSTOREY			
4	GRD. LAYER			LYCANN > LAPR > CAREX SP

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

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

STAND COMPOSITION: | BA:

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

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

COMM. AGE	PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC — STAND CHARACTERISTICS

SITE:

POLYGON: 26.3

DATE:

SURVEYOR(S):

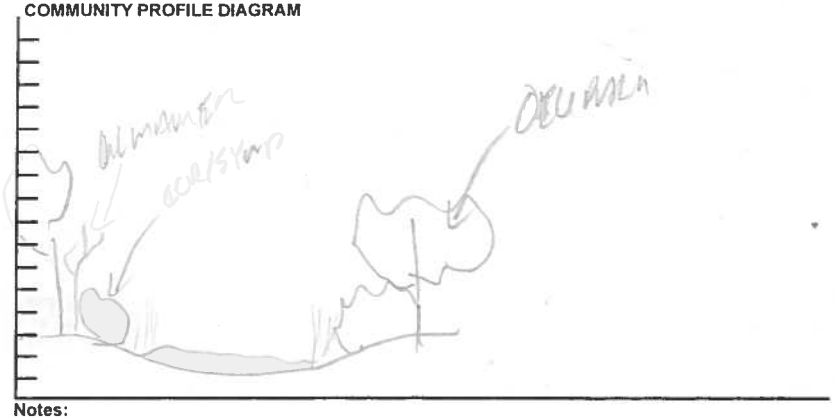
TREE TALLY BY SPECIES

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM



Notes:

Inclusion -

JUNEFFU
POASPALU
C. tenera var echinodes
Iler verticelleten
Salix nigra
Glyceria sp - TBD
Agrostis stolonifera

Polygon #28

ELC
SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

South side

Slope | UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

Dogwood thicket

Corn race? Corn seri

W/CUM1-1 complex

Check for possible escape options.

ELC
PLANT SPECIES LIST

SITE: T. Waters
POLYGON: 28
DATE: Oct 5, 2015
SURVEYOR(S): AI DW

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
Frax penn	R	R			
Acer rubrum	R				
Quer "pin"	R	R			
Prun ser	R				
Ulm amer	R	R			
Quer mac			R		
Jugl nigr			R		
Rose egla (?)					
Salix bebb			R		
Spiraea alba				R	
Vit ripa.				O	
Corn race.			A	A	
Parth vit				R	
Toxico rad.				R	
Crat sp.			D	O	
Lonic				R	
Rubus allegh.				R	
Rham cat.			A	A	
Corn seri			O	O	

SPECIES CODE	LAYER 1	2	3	4	COL.
Ast nova				O	
Ast lanc				O	
Ast late					
Maianthemum				O	
Verb hast					
Plan major				R	
Asclepias syr				R	
Soliana.			A		
Bidens cernua				O	
Trif repens				R	
Eoth gram				R	
Daucus car.					
Achill mille.				R	
Bidens frond				R	
Elymus cana				R	
Cally sp.				R	
Prunell vula.				R	
Centaur nigra.				A	
Poly hydro.				R	
Thal dioic.				R	
Vici crac.				R	
Eup perf			R		
Lyc lanceo				R	
Parthenium sedoides				R	✓ (?)
Lyth sali					
Ast pur					
Apo andro					
Silene dou					
Solidyb.					
Cuthpg					
Scut. lutea.					

Knock sets

Page ..... of .....

Quite moist - wet in some low spots.

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE		POLYGON	
SURVEYOR(S)	DATE:	TIME: start / finish	
UTMZ	UTME	UTMN	

POLYGON DESCRIPTION

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

SITE
G OPEN WATER G SHALLOW WATER G SURFICIAL DEP G BEDROCK

COVER
G OPEN G SHRUB G TREED

STAND DESCRIPTION

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	1	Frax penn, Ulmu amp, Prun ser
2	SUB-CANOPY	3	1	"
3	UNDERSTOREY	4	3	Corn race > Rham cat, Crat sp, Corn ser
4	GRD. LAYER	0	3	Solidago cana > Grass spp >> rest

HT CODES: 1 = >25 m 2 = 10<HT 25 m 3 = 2<HT 10 m 4 = 1<HT 2 m 5 = 0.5<HT 1 m 6 = 0.1<HT 0.5 m 7 = HT<0.1 m

CVR CODES: 0 = NONE 1 = 0% < CVR 10% 2 = 10 < CVR 25% 3 = 25 < CVR [illegible] 4 = [illegible]

STAND COMPOSITION:	BA:

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

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

COMM. AGE		PIONEER	X	YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Grey Dogwood Thicket	CUT1-4
INCLUSION		
COMPLEX		

Notes:

Notes

Small SWD east of Polygon 27

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Waters | POLYGON: 29
SURVEYOR(S): ZH | DATE: Nov 16/15 | TIME: start / finish
UTMZ: | UTME: | UTMN:

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	2	QUEPALU > QUERUBR / QUEMAGR
2	SUB-CANOPY	3	4	" "
3	UNDERSTOREY	4	4	
4	GRD. LAYER	5-7	3	CAREX > AST ISOL SP

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

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

STAND COMPOSITION: | BA:

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

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

COMM. AGE :		PIONEER		YOUNG	X	MID-AGE	C	MATURE		OLD GROWTH

Oaks

SOIL ANALYSIS:

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

500 Poly 27

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	Oak Swamp	SWD1
INCLUSION		
COMPLEX		

Notes:

ELC PLANT SPECIES LIST

SITE: Thunder Waters
POLYGON: 29
DATE: Nov 16/15 + earlier.
SURVEYOR(S): ZH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
QUEPALU	A	O			
QUERUBR	O	O			

SPECIES CODE	LAYER 1	2	3	4	COL.
COLSTRIC				O	
PENSPICA				O	
PHAARUN				O	
CARTRIS				O	
CARLEPH				O	
AST SP				O	
GEN-SP				O	

Disturbed trail through slough

Page ..... of .....

ELC

SOILS ONTARIO

SITE:

POLYGON:

DATE:

SURVEYOR(S):

	P/A	PP	Dr	Slope Position	Slope Aspect	Slope %	Slope Type	Slope Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

SOIL TEXTURE x HORIZON	1	2	3	4	5

	1	2	3	4	5
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					

DEPTH TO / OF	1	2	3	4	5
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DSC #1					
PORE SIZE DSC #2					
MOISTURE REGIME					

SOIL SURVEY MAP					
LEGEND CLASS					

Significant Wildlife Habitat

(Mark all that may apply. If possible, confirm others later.)

Seasonal Concentration Areas

- ☐ **Bat maternity colonies** – Candidate site if snag/cavity tree density ≥ 10 snags/ha of trees ≥ 25 cm dbh in FOM & FOD (not SWM). Surveys should be conducted during the leaf-off period.
- ☐ **Snake hibernacula** – Potential sites include animal burrows, rock crevices & other areas below the frost line. Individuals observed basking in early spring & late fall may suggest a hibernaculum is nearby.

Rare Vegetation Communities or Specialized Habitats for Wildlife

- ☐ **Rare vegetation communities** – Includes all S1–S3. Also consider targeted vegetation communities ranked S3S4–S5 in the Great Lakes Conservation Blueprint, or IDed as rare in the Oak Ridges Moraine.
- ☐ **Forests providing a high diversity of species** – Relatively large & mature forests. Those including a variety of age classes, high proportion of mature trees, uneven-aged stands, numerous tree cavities, a variety of tree species, near water, and with little or no management, are more significant.
- ☐ **Old growth or mature forest stands** – Woodlands ≥ 0.5 ha in size and older than 90 years of age.
- ☐ **Foraging areas with abundant mast** – Relatively large forests with numerous nut producing trees (*e.g.* beech, oak) and more open areas with large patches of berry-producing shrubs.
- ☐ **Cliffs and caves** – Consider all cliff, talus, crevice or cave communities. Note associated species.
- ☐ **Seeps and springs** – Seeps = diffuse discharge; Springs = point discharge. Note size, abundance, permanency, presence of fish habitat, rare species, and surrounding vegetation communities.
- ☐ **Amphibian breeding habitat (woodland)** – Are typically shallow, unpolluted, contain emergent or submerged vegetation, and provide shoreline structures for calling. Can be permanent or temporary in nature.
- ☐ **Turtle nesting areas** – Often in exposed sands & gravels < 100 m from a wetland (*e.g.* pond, lake or river). Count # of nests. Note size & shape of any eggshell fragments. Unraided nests may appear slightly convex on the surface and if recently laid, slightly darker in appearance. Turtles typically nest during the evening or early morning hours from late May to end of June, especially when soils are moist.
- ☐ **Terrestrial Crayfish** – Look for mud burrows/chimneys in meadows and shallow marshes.

Species of Conservation of Concern

- ☐ **Provincial "Special Concern" species**
- ☐ **Sp. that are rare within the planning area**
- ☐ **S1 to S3 species**
- ☐ **Species important to the municipality**

Animal Movement Corridor

- ☐ **Animal movement corridor** – Hedgerows/windbreaks, shorelines, wetland buffers, stream & river valleys, woodlands, hydro & pipeline corridors etc. Note wildlife signs (*e.g.* tracks, observations, scat, etc.).

List any other SWH categories present:

Notes:

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thunder Water		POLYGON: 30 & 38, 40		
SURVEYOR(S): ZH/SH	DATE: June 3/04	TIME start: 5	finish:	36
UTMZ	UTME: 2015	UTMN		

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	4	QUERUBR > CARYA spp > ACERSASA > QUE sp.
2	SUB-CANOPY	3	4	" "
3	UNDERSTOREY	4	4	PRUNSRO > PARINSE > RHAMFRA > crataegus
4	GRD. LAYER	5	3	FRAGVIR > ART-SP > CIRLUTE > PARINSE

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

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

STAND COMPOSITION: BA:

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

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

COMM. AGE		PIONEER		YOUNG	X	MID-AGE	X	MATURE		OLD GROWTH

↑ edge ↑ slope

SOIL ANALYSIS:

TEXTURE: SiCL	DEPTH TO MOTTLES / GLEY	g =	G=	
MOISTURE: 2-4	DEPTH OF ORGANICS:			(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:	>100cm		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	FM - Oak - Maple - Hickory Deciduous	FOOD
INCLUSION		
COMPLEX		

Notes:

ELC — STAND CHARACTERISTICS

SITE: Thunder Waters
POLYGON: 30
DATE: Oct 5/15
SURVEYOR(S):

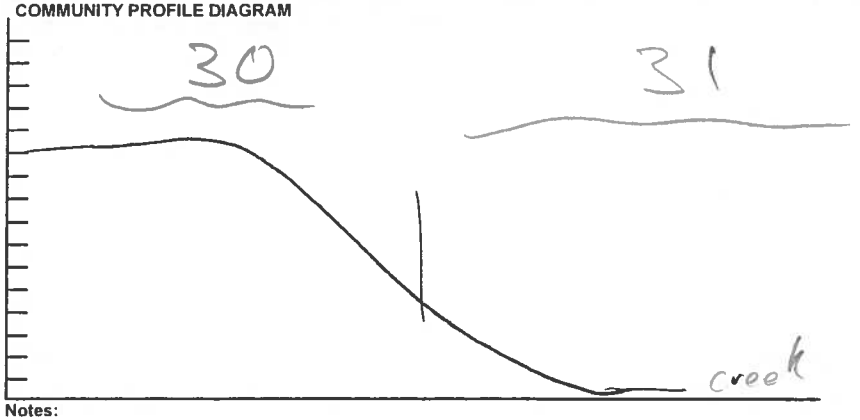
TREE TALLY BY SPECIES

PRISM FACTOR:

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM



Notes:

see spp. list for polygon 31 – similar but more upland. Oak-Hickory more than maple.

Upland Areas are polygon 30 Polygon 2

ELC

SOILS ONTARIO

SITE: Thunder Waters
POLYGON: 30/ST
DATE:
SURVEYOR(S): ZH / SH

30/31

	P/A	PP	Dr	Position	Aspect	Slope %	Type	Class	Z	UTM EASTING	UTM NORTHING
1											
2											
3											
4											
5											

GPS 103 for 1 slope leads to flood plain

SOIL	1	2	3	4	5
TEXTURE x HORIZON	Ah 10cm B 60cm	- No mottles - Mid slope		GPS 104	
A TEXTURE	SiCl				
COURSE FRAGMENTS					
B TEXTURE	SiCl				
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES	>60				
GLEY	>60				
BEDROCK	>60				
WATER TABLE	>60				
CARBONATES	-				
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

30 upland 31 flood plain

Swamp

ELC PLANT SPECIES LIST

SITE: THUNDER WATERS
POLYGON:
DATE: J
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
QUER	A	A			
FRAX PENN	A	A			
PRUN SERO	R				
FRAX AMER	O				
CARY	A			R	
ULMU AMER	O				
QUER RUBR	R			R	
BU ALBA	R				
QUER MCO	D				
FAG					
ACER	D				
Q MACR	D				
ULMUS		R			
BETULA		D			
PRUNUS					
FRA					
ROSA					
RIBE GLAN				R	
PRUN VIRG			O		
PART VITA			A	A	
TOXI RADI			O	O	
CRAT PUNC		O			
RHAM CATH		A	A		

SPECIES CODE	LAYER 1	2	3	4	COL.
ALLI PETI					
VOLV SP					
GEUM SP				R	
LONI CANA				O	
EUP P				R	
PHALARIS				R	
LATO ANA				R	
CAREX				R	
SYM C				O	
C (LUT)					
T G VIRG				G	
A				R	
QUEC STR				O	
LIGUSTRUM				R	
O RE				R	
ASCLEPIAS					
T ANC					
R					
ARCTIUM					
AR					
ASTERACEAE					
A mix					
EP					
IMPATIENS					
FRAGARIA					
RT-SP					
APOCYNUM					
ARCTIUM					
CHENOPODIUM					
MEDICAGO					

Page ..... of .....

Upland but 3 50-100 cl Dal low

throw GLECHOMA 15-20c db Rw tall

Zone 16 5/15

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Ha	POLYGON: 31	
	SURVEYOR(S):	DATE:	TIME: start / finish
	UTMZ:	UTME:	UTMN:

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	4	QUE RUBR > QUE SP > FRAX PENN
2	SUB-CANOPY			FRAX PENN > QUE SP
3	UNDERSTOREY			FRAX PENN > RHUS TYPH > ACER SACC
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		SW01
INCLUSION		
COMPLEX		

Notes:

Red Oak Swamp >> Pin Oak

ELC STAND CHARACTERISTICS	SITE:
	POLYGON: 31
	DATE:
	SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thundering Waters		POLYGON: 32	
SURVEYOR(S): SH, DW, ZH	DATE:	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2(1)	4	QUE-SP > ACE-SP
2	SUB-CANOPY	3	4	" "
3	UNDERSTOREY	4	4	LIN BEN2 > COR RAM6 > TOX RAD1
4	GRD. LAYER	5-7	4	

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		SWD1
INCLUSION		
COMPLEX		FOD9-2

Notes:

See polygon 27 +5

ELC — STAND CHARACTERISTICS

SITE:	
POLYGON:	
DATE:	
SURVEYOR(S):	

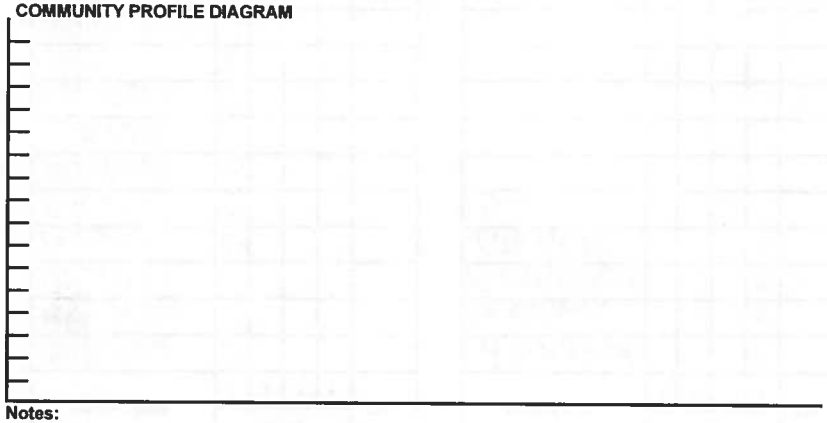
TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM



Notes:

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

Slope UTM

	P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING
1											
2											
3											
4											
5											

SOIL	1	2	3	4	5
TEXTURE x HORIZON					
A TEXTURE					
COURSE FRAGMENTS					
B TEXTURE					
COURSE FRAGMENTS					
C TEXTURE					
COURSE FRAGMENTS					
EFFECTIVE TEXTURE					
SURFACE STONINESS					
SURFACE ROCKINESS					
DEPTH TO / OF					
MOTTLES					
GLEY					
BEDROCK					
WATER TABLE					
CARBONATES					
DEPTH OF ORGANICS					
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME					
SOIL SURVEY MAP					
LEGEND CLASS					

ELC PLANT SPECIES LIST

SITE: Thundery Waters
POLYGON: 32 J
DATE: 2015/09/28 + June?
SURVEYOR(S): CH, DW, ZH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
QUEMAC	G				
FRAPENN					
ULMAMER					
ACESASA	R				
QUEALB	O				
QUERUBR	O				
CARCARO	O				
FAGGRAN	R				
ACESACH	O				
POPDELT					
CARCAT					
TILAMER	O				
ION-SP					
ACERUBR	O				
ERIANER					
OSTVIRG		R			
ACENEGU					
PRUVIR					
RHUTYPH					
LARLEBB					
BERTHU					
RUBIDAE					
AMEINEU					
CEPOCC					
LINBENZ			A		
CORRACE			A		
TOXRADI			A		
PARINSE			A		

Uplands

or XFRE

SPECIES CODE	LAYER 1	2	3	4	COL.
ASTMACR				A	
DOELIMBE				R	
GERMACR				O	
ERIANNER				A	
Gen-SP					

or SCHR

Polygon 33

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Thunder Waters	POLYGON: 33
	SURVEYOR(S): ZH	DATE: Oct 5/11
	TIME: start / finish	
	UTMZ:	UTME:
	UTMN:	

POLYGON DESCRIPTION

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

SITE	COVER
G OPEN WATER	G OPEN
G SHALLOW WATER	G SHRUB
G SURFICIAL DEP.	G TREED
G BEDROCK	

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	4	PR BN JUSPAL
2	SUB-CANOPY	3	4	FRAXNIG/ACRU RAT> (MAPSPI)
3	UNDERSTOREY	4	4	RHACATH > CORRACE
4	GRD. LAYER	5-7	4	FRAVIRG > AST/SOL > TOXRADI

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	White Pine Plantation	CUP3-2
INCLUSION		
COMPLEX		

Notes:

ELC STAND CHARACTERISTICS	SITE: Thunder Waters
	POLYGON: 33
	DATE: Oct 5/11
	SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL. AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND COMPOSITION:

COMMUNITY PROFILE DIAGRAM

Notes:

See reverse for species →

33

TOXENDR

LMPCOMM

ASTCMNC

PARUSE

PRMUIVI

ASTLATIE

RUBDAE

Coem-sp.

POLVIRG

*RAVIRG

ARL-sp

CAR sp (small)

SULALM

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Thundering Waters		POLYGON: 41	
SURVEYOR(S): ZM	DATE: May-06/15	TIME: start	
		finish	
UTMZ:	UTMZ:	UTMN:	

POLYGON DESCRIPTION

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

Fill? Concrete

Industrial land.

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:		CODE:
COMMUNITY SERIES:		CODE:
ECOSITE:		CODE:
VEGETATION TYPE:		CODE: ANTH
INCLUSION		CODE:
COMPLEX		CODE:

Notes:

ELC
STAND & SOIL CHARACTERISTICS

SITE:	Thundering Waters
POLYGON:	41
DATE:	June 5/15
SURVEYOR(S):	

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TALLY 6	TALLY 7	TALLY 8	TOTAL	REL. AVG
TOTAL										100
BASAL AREA (BA)										
DEAD										

STAND COMPOSITION:

SOIL ASSESSMENT:	1	2	3	4	5	6	7	8
EFFECTIVE TEXTURE								
DEPTH TO: MOTTLES (g)	g=	g=	g=	g=	g=	g=	g=	g=
GLEY (G)	G=	G=	G=	G=	G=	G=	G=	G=
DEPTH OF ORGANICS								
DEPTH TO BEDROCK								
MOISTURE REGIME								

COMMUNITY PROFILE DIAGRAM

Notes:

ELC

SOILS ONTARIO

SITE:

POLYGON:

DATE:

SURVEYOR(S):

	P/A	P	Dr	Type	Class	Slope %	Slope N pos	Slope Nlength	Slope E pos	Slope Elength	Z	UTM EAST	UTM NORTH
1													
2													
3													
4													
5													
6													
7													
8													

SOIL ASSESSMENT:	1	2	3	4	5	6	7	8
TEXTURE x HORIZON								
A TEXTURE								
COURSE FRAGMENTS								
B TEXTURE								
COURSE FRAGMENTS								
C TEXTURE								
COURSE FRAGMENTS								
EFFECTIVE TEXTURE								
SURFACE STONINESS								
SURFACE ROCKINESS								
DEPTH TO / OF								
DISTINCT MOTTLES								
PROMINENT MOTTLES								
MOTTLES + GLEY								
GLEY								
BEDROCK								
CARBONATES								
DEPTH OF ORGANICS								
PORE SIZE DISC #1								
PORE SIZE DISC #2								
MOISTURE REGIME								
SOIL SURVEY MAP UNIT(S)								
LEGEND CLASS								
TEXTURE								

Most spp lumped w/ adj. Poly's.

ELC

PLANT SPECIES LIST

SITE: Thundering Waters

POLYGON: 41

DATE: May - Oct 2015 June 5/16

SURVEYOR(S): ZH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
ACENEGU					
RHAPUTH					
RHUTYPH					

SPECIES CODE	LAYER 1	2	3	4	COLL.
PHRAUST					
SOL SP					
ART SP					

ELC

SOILS ONTARIO

SITE:
POLYGON:
DATE:
SURVEYOR(S):

	Slope									UTM	
P/A	P	Dr	Type	Class	%	N pos	Nlength	E pos	Elength	Z	EAST	NORTH
1												
2												
3												
4												
5												
6												
7												
8												

SOIL ASSESSMENT:	1	2	3	4	5	6	7	8
TEXTURE x HORIZON								
A TEXTURE								
COURSE FRAGMENTS								
B TEXTURE								
COURSE FRAGMENTS								
C TEXTURE								
COURSE FRAGMENTS								
EFFECTIVE TEXTURE								
SURFACE STONINESS								
SURFACE ROCKINESS								
DEPTH TO / OF								
DISTINCT MOTTLES								
PROMINENT MOTTLES								
MOTTLES + GLEY								
GLEY								
BEDROCK								
CARBONATES								
DEPTH OF ORGANICS								
PORE SIZE DISC #1								
PORE SIZE DISC #2								
MOISTURE REGIME								
SOIL SURVEY MAP UNIT(S								
LEGEND CLASS								
TEXTURE								

ELC

PLANT
SPECIES
LIST

SITE: thunder Waters
POLYGON: 42, 45, 44
DATE: June - Oct 2015
SURVEYOR(S): ZH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER				COLL.
	1	2	3	4	
ACENEGU					

SPECIES CODE	LAYER				COLL.
	1	2	3	4	
PHRAUST				O	
ART-SP				O	
DAUCARO				O	
TRIF-SP				A	
POAPRAT				A	

Page .... of ....

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE:		POLYGON:	
	SURVEYOR(S):	DATE:	TIME: start	
			finish	
	UTMZ:	UTMZ:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

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

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

STAND COMPOSITION:	BA:

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

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

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

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:		CODE:
COMMUNITY SERIES:		CODE:
ECOSITE:		CODE:
VEGETATION TYPE:		CODE:
INCLUSION		CODE:
COMPLEX		CODE:

Notes:

ELC STAND & SOIL CHARACTERISTICS	SITE: 42, 43, 44
	POLYGON:
	DATE:
	SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TALLY 6	TALLY 7	TALLY 8	TOTAL	REL. AVG
TOTAL										100
BASAL AREA (BA)										
DEAD										

STAND COMPOSITION:

SOIL ASSESSMENT:	1	2	3	4	5	6	7	8
EFFECTIVE TEXTURE								
DEPTH TO: MOTTLES (g)	g=	g=	g=	g=	g=	g=	g=	g=
GLEY (G)	G=	G=	G=	G=	G=	G=	G=	G=
DEPTH OF ORGANICS								
DEPTH TO BEDROCK								
MOISTURE REGIME								

COMMUNITY PROFILE DIAGRAM

Notes:

FOV outside of HG

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE		POLYGON:	
SURVEYOR(S):	DATE:	TIME. start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2(1)	4	CARQUAT > QUE SP > IRXPENN
2	SUB-CANOPY	3	4	" " ULMAMER
3	UNDERSTOREY	4	4	
4	GRD. LAYER	5-7	4	See Polygon 5

4pp 1st 4 spp for 5 lower layers.

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

CVR CODES 0= NONE 1= 0% < CVR ≤ 10% 2= 10 < CVR 25% 3= 25 < CVR ≤ 50% 4= CVR > 50%

STAND COMPOSITION:	BA:

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

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

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

} May be old growth elements

SOIL ANALYSIS:

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

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC PLANT SPECIES LIST

SITE:	
POLYGON:	48
DATE:	
SURVEYOR(S):	

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
CARQUAT	A				
QUEPALU	O				
QUEMAC	O				
IRXPENN	O	O			
ULMAMER		O			

SPECIES CODE	LAYER 1	2	3	4	COL.

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: THUNDERING WATERS		POLYGON: 32	
SURVEYOR(S): SH, ZH, DW	DATE: Sept 1 2015	TIME start	
		finish	
UTMZ	UTMZ	UTMN	

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☐ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☒ NATURAL	☐ PLANKTON	☐ LAKE
☒ WETLAND	☒ MINERAL OIL	☐ RIVERINE	☐ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN	☒ BOTTOMLAND		☐ FLOATING LVD	☐ RIVER
	☐ A TIDAL BEDRK	☐ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ AS BEDRK	☐ VALLEY SLOPE		☐ FORB	☐ MARSH
SITE	☐ CARB BEDRK	☐ TABLELAND		☐ LICHEN	☒ SWAMP
☐ OPEN WATER		☐ ROLL UPLAND	COVER	☐ BRYOPHYTE	☐ FEN
☐ SHALLOW WATER		☐ CLIFF		☒ DECIDUOUS	☐ BOG
☒ SURFICIAL DEP		☐ TALUS	☐ OPEN	☐ CONIFEROUS	☐ BARREN
☐ BEDROCK		☐ CREVICE / CAVE	☐ SHRUB	☐ MIXED	☐ MEADOW
		☐ ALVAR	☒ TREED		☐ PRAIRIE
		☐ ROCKLAND			☐ THICKET
		☐ BEACH / BAR			☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

STAND DESCRIPTION

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN, > GREATER THAN, = ABOUT EQUAL TO)
1	CANOPY	1	4	QUER sp > ACER sp > TILI
2	SUB-CANOPY	2	2	QUER sp > CARY sp > FRAX
3	UNDERSTOREY	3,4	2	RHAM CATH ~ CORN RACE > LIND BENZ
4	GRD. LAYER	5-7	2	IMPA CAPE ~ SYMP LATE > CARE ~ GRASS sp.

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

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

STAND COMPOSITION							BA	
SIZE CLASS ANALYSIS	O	< 10	A	10 - 24	D	25 - 50	R	> 50
STANDING SNAGS:	R	< 10	O	10 - 24	R	25 - 50	R	> 50
DEADFALL / LOGS:	R	< 10	O	10 - 24	R	25 - 50	R	> 50

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

COMM AGE		PIONEER		YOUNG		MID-AGE	X	MATURE		OLD GROWTH

SOIL ANALYSIS

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

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS		CODE
COMMUNITY SERIES	SWD	CODE
ECOSITE	SWD1	CODE:
VEGETATION TYPE		CODE:
INCLUSION		CODE:
COMPLEX		CODE

Notes:

ELC PLANT SPECIES LIST

SITE	
POLYGON	
DATE	
SURVEYOR(S)	

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
QUER MACR	O	R		A	?
ACER SACC	O	O			
ACER FREE	O	O			
TILI AMER	O	R			
QUER PALU	A	A		?	
QUER RUBR	O				
FRAX PENN	O		A	O	
CARP CAro			O		
CARY OVA	O	O		O	
CARY CORD		R			
QUER BICO	O				
FAGU AMER	O	O	R		
CORN RACE		A	O		
BERB THUN			R		
CEPH OCCI		O	O		IN SWAMP
PART INSE			A		
RUBUS IDAE			O		
PRUN VIRG		O	A		
LIND BENZ		O	O		
RHAM CATH		A	A		

SPECIES CODE	LAYER 1	2	3	4	COLL
LEERORYZ				O	
LYSI NUMM				R	
OXAL MONT				R	
GLYC STRI				O	
SICI CANA				O	
SYMPLATE				A	
THEL PALU				O	
CARE TUCK				R	
CARE INTU				D	
RANUNCABOR				R	
LAPO CANA				O	
ELRY SCHR				R	
FRAG VIRG				A	
IMPA CAPE				O	
LYCOPUS				R	
CIRC CANA				O	
CINNLAT				O	
EUPA PERF				R	
DNOCSENS				O	
CAREX LUPU				R	
CICU MACU				O	
L					

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Appendix E: Salamander DNA Testing Results

Appendix E: Results from DNA testing of Salamander tail tips collected from the Thundering Waters property (spring 2015):

Pond	Trap	Trap Sample No.	Date	UTM	ID
1	**2**	1	08-Apr-15	654300.00 m E 4769302.00 m N	**LLLJ**
1	**5**	1	13-Apr-15	654300.00 m E 4769302.00 m N	**LL**
1	**5**	1	10-Apr-15	654300.00 m E 4769302.00 m N	**LLJ**
1	**5**	2	10-Apr-15	654300.00 m E 4769302.00 m N	**LLJ**
1	**5**	3	10-Apr-15	654300.00 m E 4769302.00 m N	**LLJ**
1	**5**	4	10-Apr-15	654300.00 m E 4769302.00 m N	**LLLJ**
1	**5**	5	10-Apr-15	654300.00 m E 4769302.00 m N	**LLJ**
1	**5**	6	10-Apr-15	654300.00 m E 4769302.00 m N	**LL**
1	**5**	7	10-Apr-15	654300.00 m E 4769302.00 m N	**LLJ**
1	**5**	8	10-Apr-15	654300.00 m E 4769302.00 m N	**LLJ**
1	**5**	9	10-Apr-15	654300.00 m E 4769302.00 m N	**LL**
1	**5**	10	10-Apr-15	654300.00 m E 4769302.00 m N	**LLJ**
1	**5**	11	10-Apr-15	654300.00 m E 4769302.00 m N	**LLJ**
1	**5**	12	10-Apr-15	654300.00 m E 4769302.00 m N	**LL**
1	**5**	1	08-Apr-15	654300.00 m E 4769302.00 m N	**LLLJ**
1	**5**	2	08-Apr-15	654300.00 m E 4769302.00 m N	**LLLJ**
2	**1**	1	10-Apr-15	654409.00 m E 4769296.00 m N	**LLJ**
2	**4**	1	10-Apr-15	654409.00 m E 4769296.00 m N	**LL**
2	**4**	2	10-Apr-15	654409.00 m E 4769296.00 m N	**LL**
2	**4**	1	08-Apr-15	654409.00 m E 4769296.00 m N	**LLJ**
3	**1**	1	10-Apr-15	654350.00 m E 4769391.00 m N	**LL**
3	**1**	2	10-Apr-15	654350.00 m E 4769391.00 m N	**?**
3	**1**	1	08-Apr-15	654350.00 m E 4769391.00 m N	**LLJ**
3	**2**	1	10-Apr-15	654350.00 m E 4769391.00 m N	**LL**
3	**2**	2	10-Apr-15	654350.00 m E 4769391.00 m N	**LLJ**
3	**2**	1	08-Apr-15	654350.00 m E 4769391.00 m N	**LL**
3	**2**	2	08-Apr-15	654350.00 m E 4769391.00 m N	**LLJ**
3	**4**	1	13-Apr-15	654350.00 m E 4769391.00 m N	**LL**
3	**4**	2	13-Apr-15	654350.00 m E 4769391.00 m N	**LL**
4	**1**	1	13-Apr-15	654472.00 m E 4769409.00 m N	**LL**
4	**1**	1	08-Apr-15	654472.00 m E 4769409.00 m N	**LLJ**
4	**2**	1	10-Apr-15	654472.00 m E 4769409.00 m N	**LL**
4	**3**	1	10-Apr-15	654472.00 m E 4769409.00 m N	**LLJ**
6	**1**	1	08-Apr-15	654694.00 m E 4769529.00 m N	**LLJ**
6	**2**	1	13-Apr-15	654694.00 m E 4769529.00 m N	**LLJ**
6	**2**	1	10-Apr-15	654694.00 m E 4769529.00 m N	**LLLJ**
6	**2**	2	10-Apr-15	654694.00 m E 4769529.00 m N	**LL**

6	**3**	1	10-Apr-15	654694.00 m E 4769529.00 m N	**LLJ**
6	**5**	1	13-Apr-15	654694.00 m E 4769529.00 m N	**LLJ**
7	**1**	1	10-Apr-15	654267.00 m E 4768964.00 m N	**LL**
7	**1**	2	10-Apr-15	654267.00 m E 4768964.00 m N	**LL**
7	**2**	1	10-Apr-15	654267.00 m E 4768964.00 m N	**LL**
7	**2**	2	10-Apr-15	654267.00 m E 4768964.00 m N	**LL**
7	**3**	1	10-Apr-15	654267.00 m E 4768964.00 m N	**LLJ**
7	**4**	1	08-Apr-15	654267.00 m E 4768964.00 m N	**LL**
7	**5**	1	08-Apr-15	654267.00 m E 4768964.00 m N	**LL**
8	**1**	1	10-Apr-15	654434.00 m E 4769119.00 m N	**LLJ**
8	**1**	2	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	1	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	2	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	3	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	4	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	5	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	6	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	7	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	8	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	9	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	10	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	11	10-Apr-15	654434.00 m E 4769119.00 m N	**LLJ**
8	**4**	12	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	13	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	14	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	15	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	16	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**
8	**4**	17	10-Apr-15	654434.00 m E 4769119.00 m N	**LL**

Appendix F: Nocturnal Amphibian Call Station Survey Results

Station[1]	Date (2015)	Proximity	Frog Species[2] and Breeding Evidence Codes[3]					
			Spring Peeper *Pseudacris crucifer*	**American Toad** *Anaxyrus americanus*	**Western Chorus Frog** *Pseudacris triseriata*	**Northern Leopard Frog** *Lithobates pipiens*	**Gray Treefrog** *Hyla versicolor*	**Wood Frog** *Lithobates sylvaticus*
1 (180°)	April 19	< 100 m	L2(4)					
		> 100 m	L2(5)	L2(3), L2(5)	L2(8)			
	May 28	< 100 m						
		> 100 m						
	June 24	< 100 m					L1(1)	
		> 100 m		L1(1)				
2 (180°)	April 19	< 100 m	L2(3)		L2(3), L2(8)			
		> 100 m						
	May 28	< 100 m						
		> 100 m	L1(1)					
	June 24	< 100 m		L1(1)			L1(1)	
		> 100 m						
3 (90°)	April 19	< 100 m			L2(3)			
		> 100 m	L2(3)					
	May 28	< 100 m						
		> 100 m	L1(1)				L1(1)	
	June 24	< 100 m						
		> 100 m						
4 (100°)	April 19	< 100 m						
		> 100 m	Distant					
	May 28	< 100 m						
		> 100 m	L1(1)				L1(3), L1(1)	
	June 24	< 100 m						
		> 100 m					L1(1)	
5 (100°)	April 19	< 100 m	L2(5)		L2(3)			
		> 100 m						
	May 28	< 100 m					L1(2)	
		> 100 m						
	June 24	< 100 m						
		> 100 m						
6 (50°)	April 19	< 100 m	L2(3), L1(1)	L2(7)	L1(1)	L1(1)		
		> 100 m	L2(8) offsite		L1(2)			
	May 28	< 100 m					L1(1)	
		> 100 m						
	June 24	< 100 m						
		> 100 m						
7 (30°)	April 19	< 100 m	L2(4)	L2(5)	L2(3)			
		> 100 m						
	May 28	< 100 m						
		> 100 m					L1(1)	
	June 24	< 100 m						
		> 100 m						
8 (20°)	April 19	< 100 m	L2(3), L2(3)		L1(1)			
		> 100 m		L2(5)/L3				
	May 28	< 100 m	L1(1)				L1(2)	

Station[1]	Date (2015)	Proximity	Frog Species[2] and Breeding Evidence Codes[3]					
			Spring Peeper *Pseudacris crucifer*	**American Toad** *Anaxyrus americanus*	**Western Chorus Frog** *Pseudacris triseriata*	**Northern Leopard Frog** *Lithobates pipiens*	**Gray Treefrog** *Hyla versicolor*	**Wood Frog** *Lithobates sylvaticus*
		> 100 m						
	June 24	< 100 m						
		> 100 m						
9 (0°)	April 19	< 100 m	L3		L3, L3			
		> 100 m						
	May 28	< 100 m					L1(2), L2(3)	
		> 100 m						L1(1)
	June 24	< 100 m					L1(1)	
		> 100 m						
10 (0°)	April 19	< 100 m		L3(2)	L2(3), L2(3)			
		> 100 m						
	May 28	< 100 m					L1(1)	
		> 100 m					L1(1)	
	June 24	< 100 m					L1(1)	
		> 100 m					L1(2)	
11 (130°)	May 28	< 100 m					L1(1), L2(2)	
		> 100 m					L2(3)	
	June 24	< 100 m					L1(1), L1(1), L2(2)	
		> 100 m					L2(2)	
12 (110°)	May 28	< 100 m					L2(2), L1(2), L1(1)	
		> 100 m					L3	
	June 24	< 100 m					L1(1), L1(1), L2(2), L1(1)	
		> 100 m						
13 (185°)	May 28	< 100 m						
		> 100 m						
	June 24	< 100 m					L1(2), L1(1)	
		> 100 m					L1(1)	

Legend

1. Point count station locations are depicted on Figure 3. Numbers in the brackets indicate survey direction in degrees.
2. Nomenclature, common names and scientific names follow Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico (Crother *et al*., (2008)).
3. Breeding Evidence Codes based on the Marsh Monitoring Program (BSC, 2009).

   L1 = Level 1 = Individuals can be counted; calls not simultaneous;
   L2 = Level 2 = Calls distinguishable; some calls simultaneous;
   L3 = Level 3 = Full chorus; calls continuous and overlapping. A more accurate abundance estimate is not possible;
   ( ) = numbers in brackets following L1 or L2 refer to estimates of individuals present

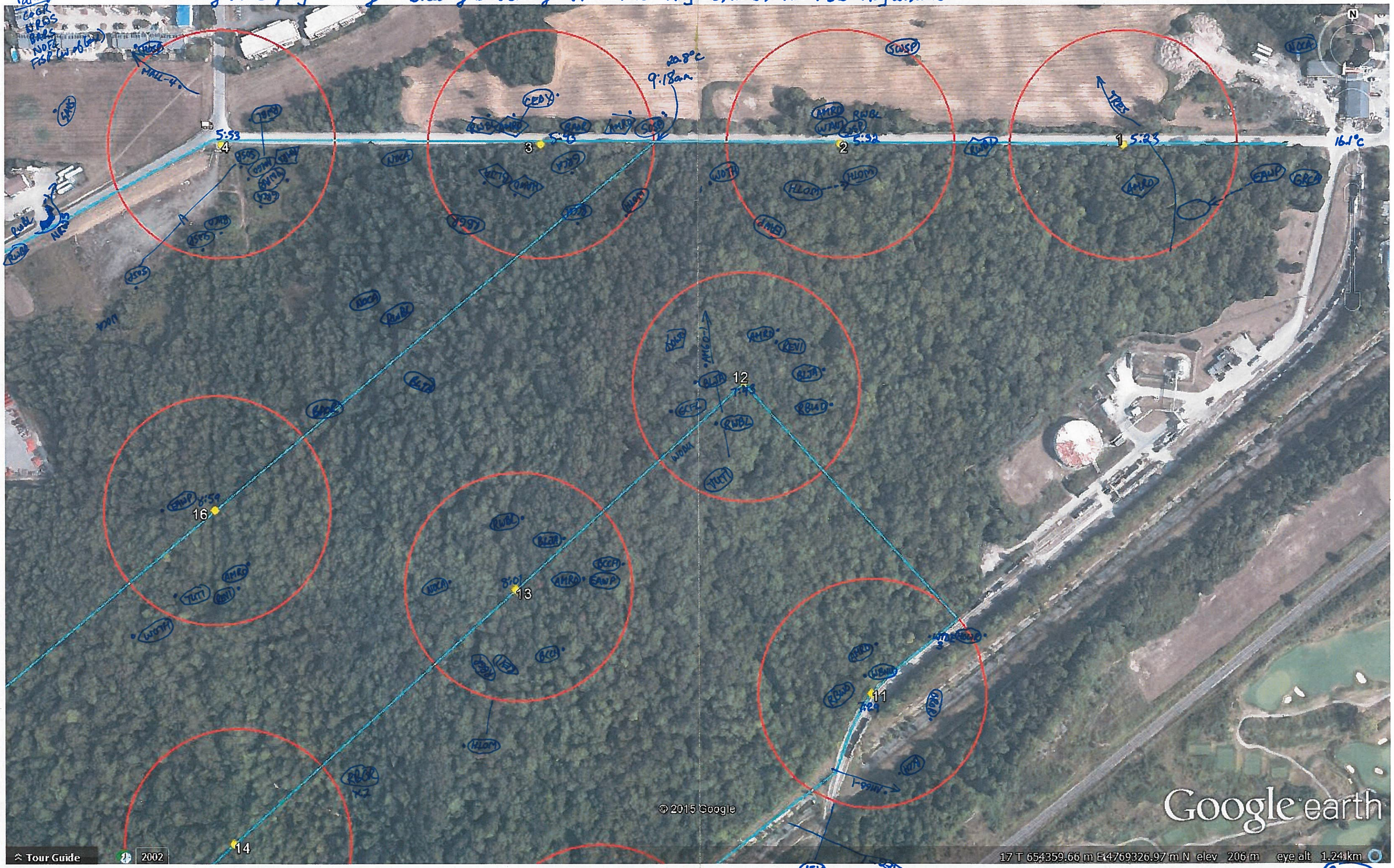
References

BSC (Bird Studies Canada). 2009. Marsh Monitoring Program Participant's Handbook for Surveying Amphibians. 2009 Edition. 13 pages. Published by Bird Studies Canada in cooperation with Environment Canada and the U.S. Environmental Protection Agency. February 2009.

Crother, B. I. (ed.). 2008. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, pp. 1–84. SSAR Herpetological Circular 37.

Appendix G: Breeding Bird Survey Data

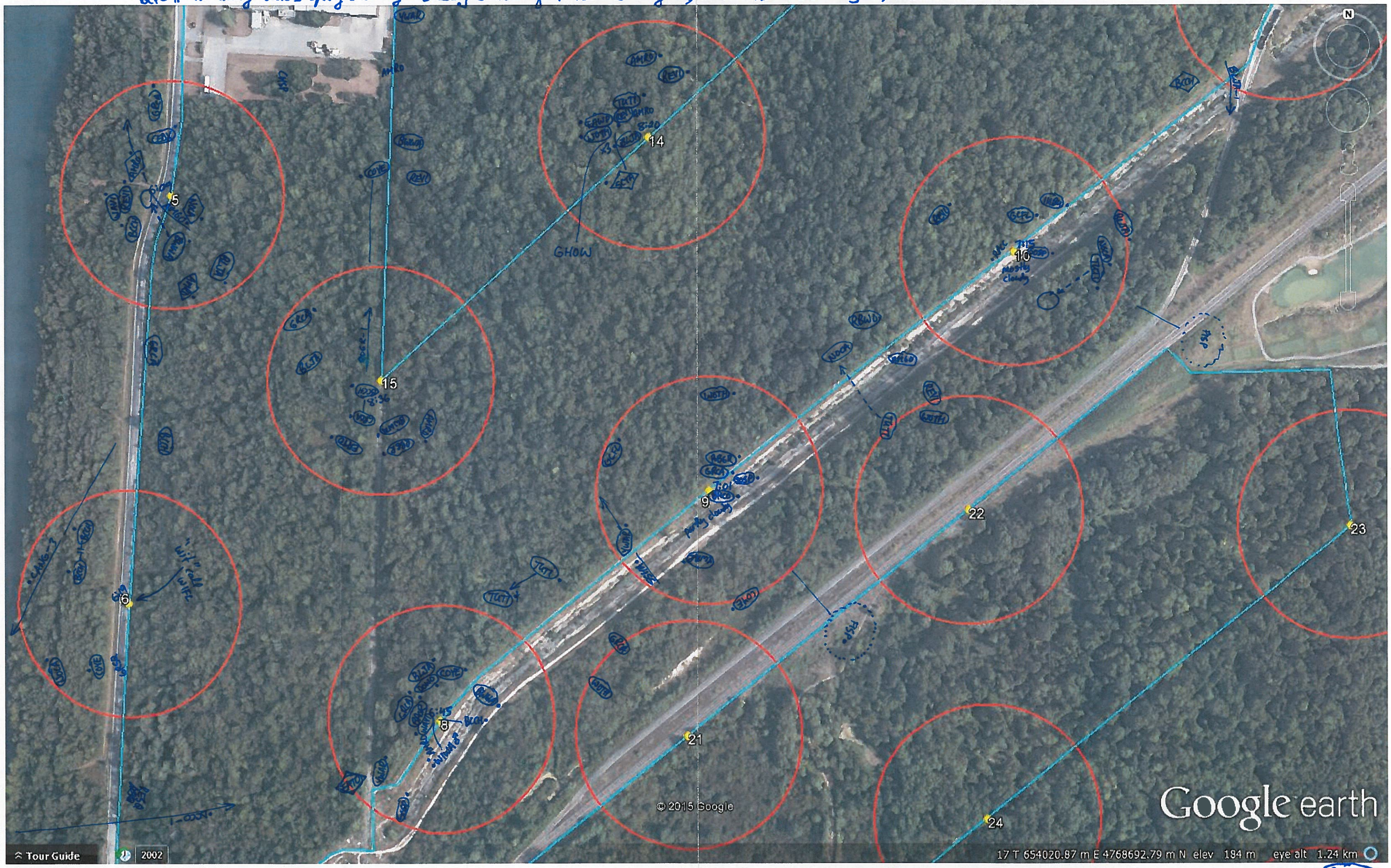
Pal Finger DA15-014-01 Thundering Waters Spring Inventory – Breeding Bird Survey #1. Pts. 1-16 = May 28, 2015; Pts. 17-32 = May 29, 2015



Surveyor = Karl Konze

Mostly sunny on May 28, 2015. Winds from WNW. Speeds variable (near calm to 15 km/hr.). Partly sunny to mostly cloudy. Winds light from south, 0-9 km/hr. ← May 29th

DA15-014-01 BCFL-18 Thundering Waters Spring Inventory – Breeding Bird Survey #1 Pts. 1-16 = May 28, 2015 Pts. 17-32 = May 29, 2015



Surveyor = Karl Konze Mostly sunny on May 28, 2015. Winds from wNW. Speeds variable (near calm to 15 km/hr.) Partly sunny to mostly cloudy on May 29, 2015. Winds light from south, 0-9 km/hr.

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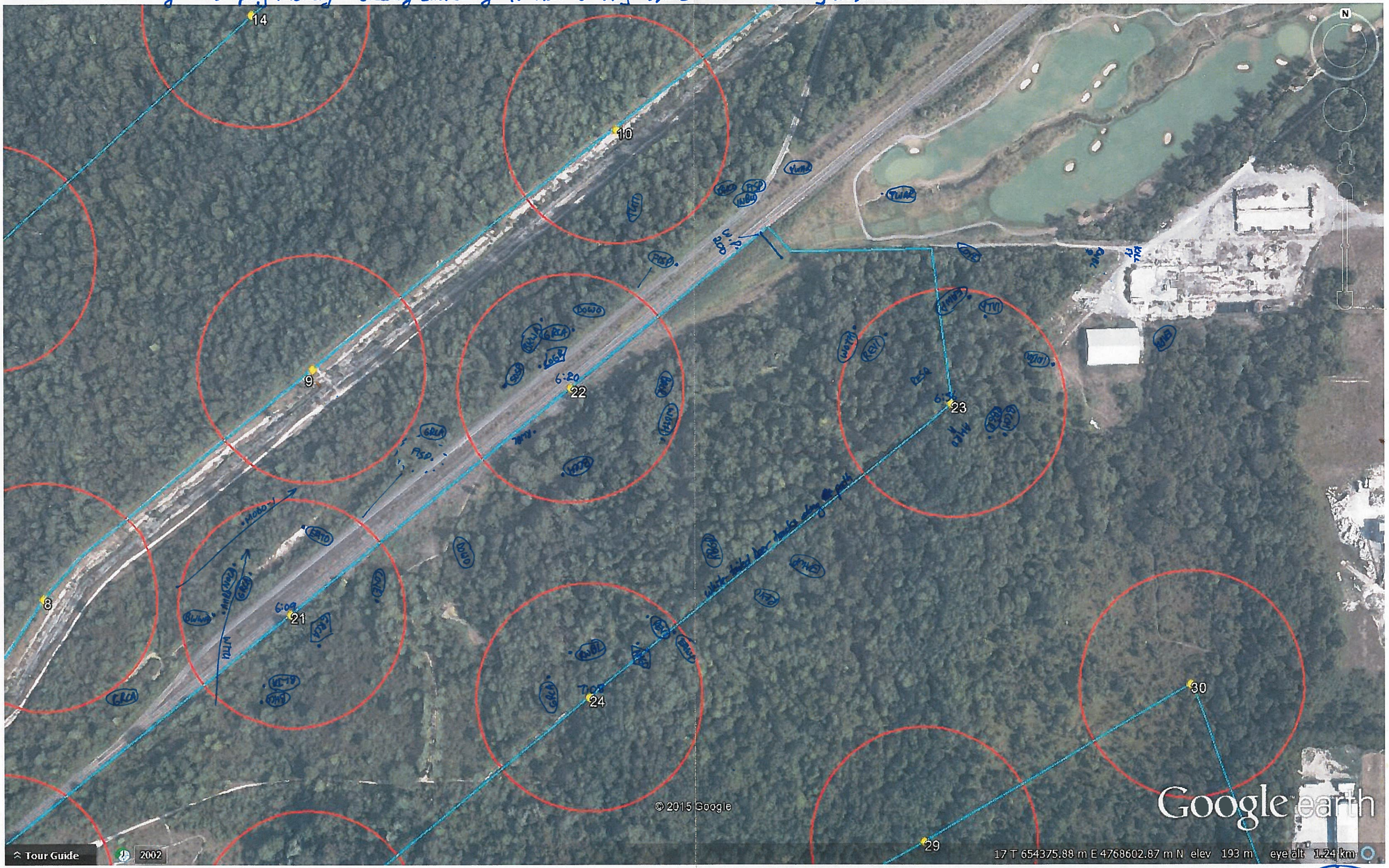

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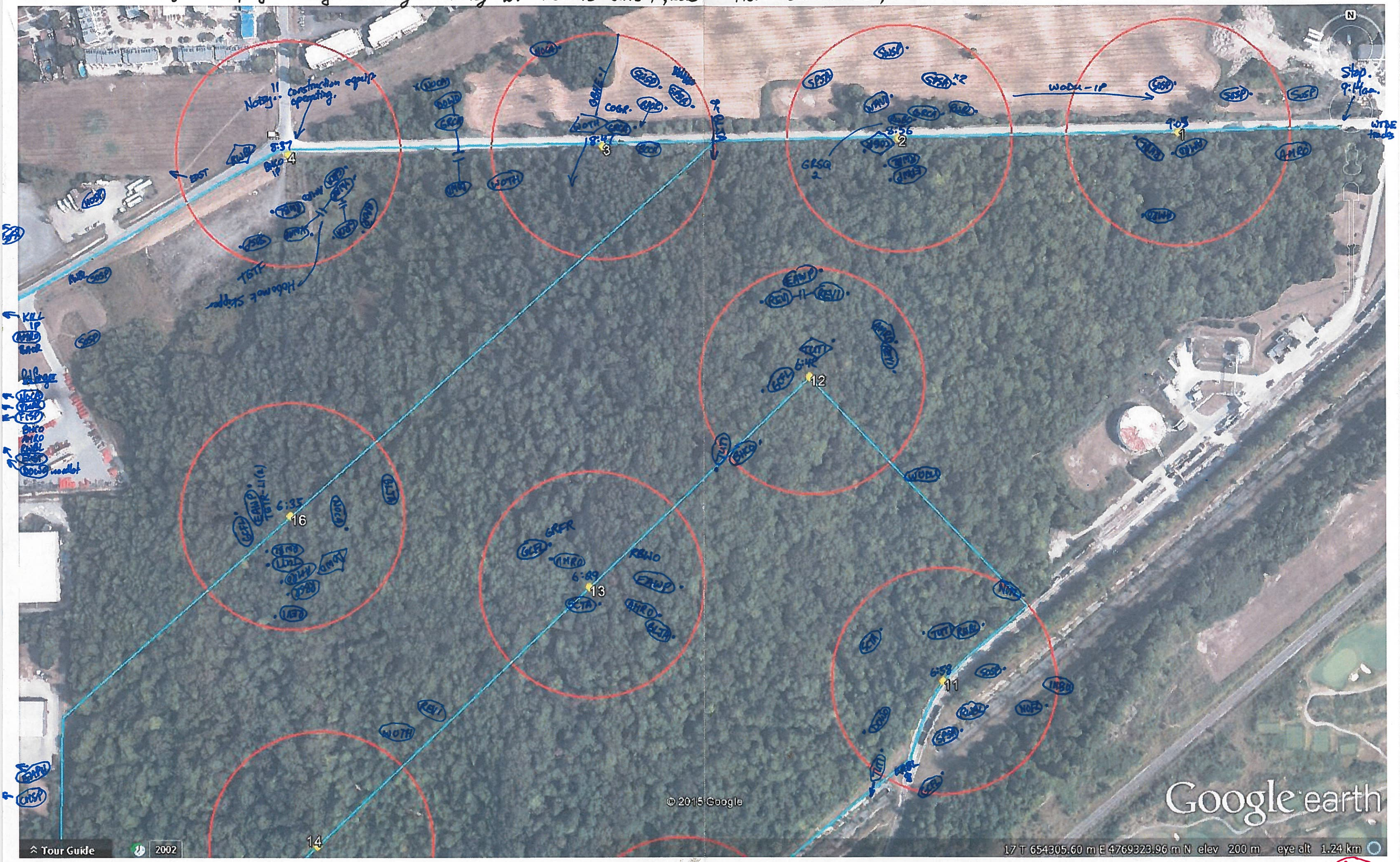
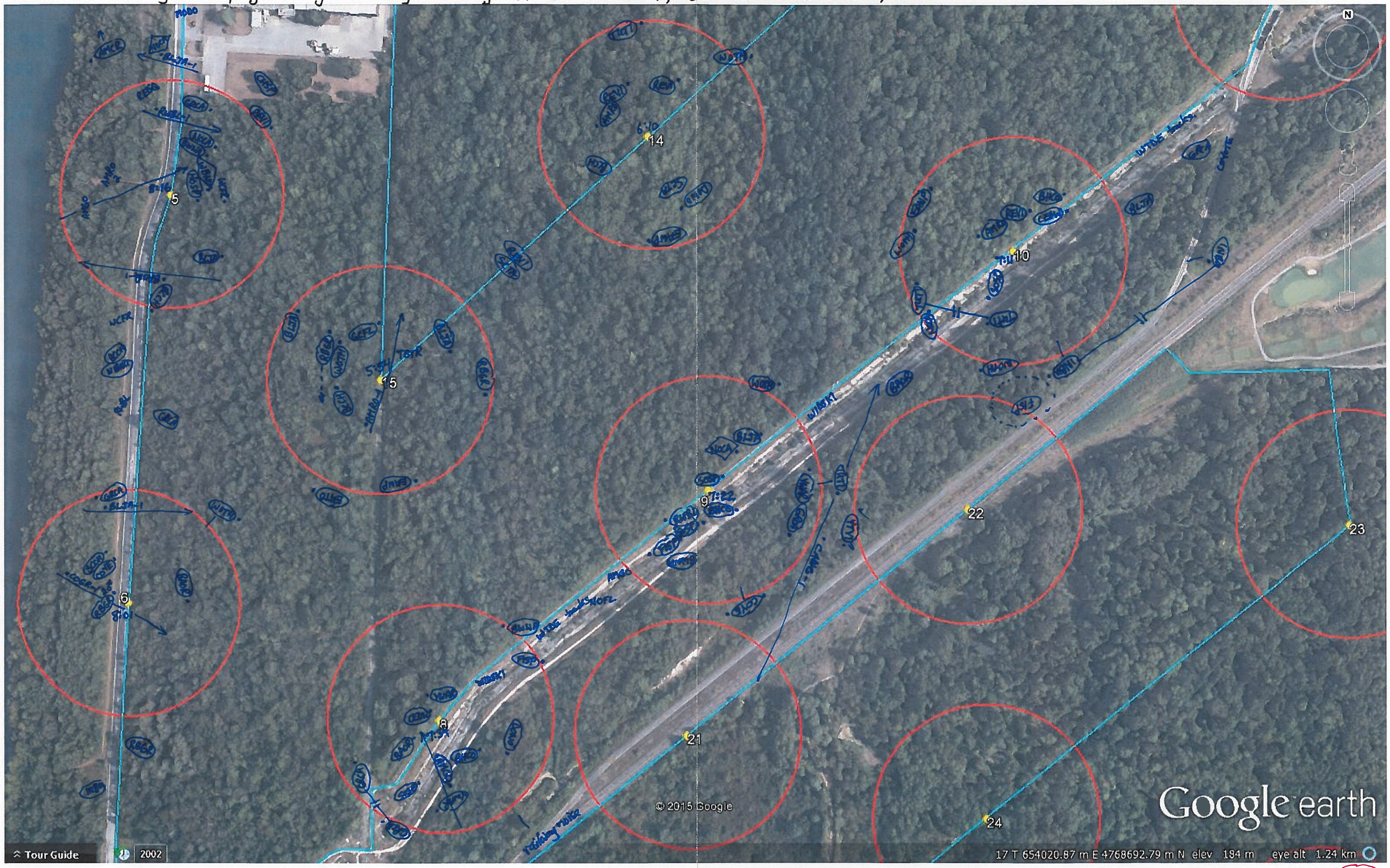
DA15-014-01 Thundering Waters Spring Inventory - Breeding Bird Survey #2. Pts. 1-16 = June 4th, 2015 Pts. 17-32 = June 5th, 2015



Surveyor = Karl Konze

Conditions were sunny & clear on June 4th; becoming totally cloudy by the end. 11.4°-18.8°C, Mostly calm. — June 5th a mix of sun & cloud & mostly calm. 16.8°-21°C.

DA15-014-01 Thundering Waters Spring Inventory – Breeding Bird Survey #2. Pts. 1-16 = June 4th, 2015 Pts. 17-32 = June 5th, 2015



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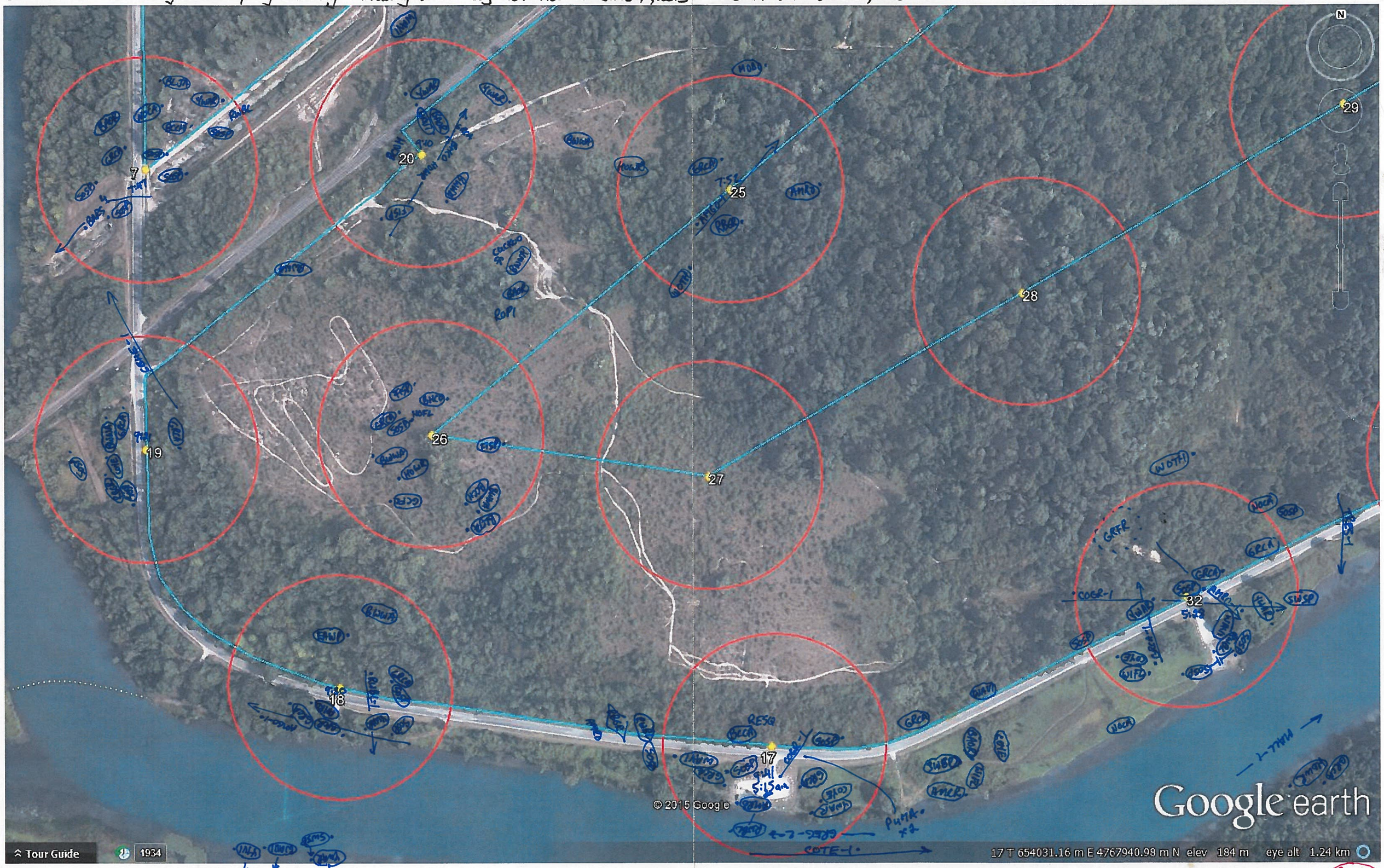

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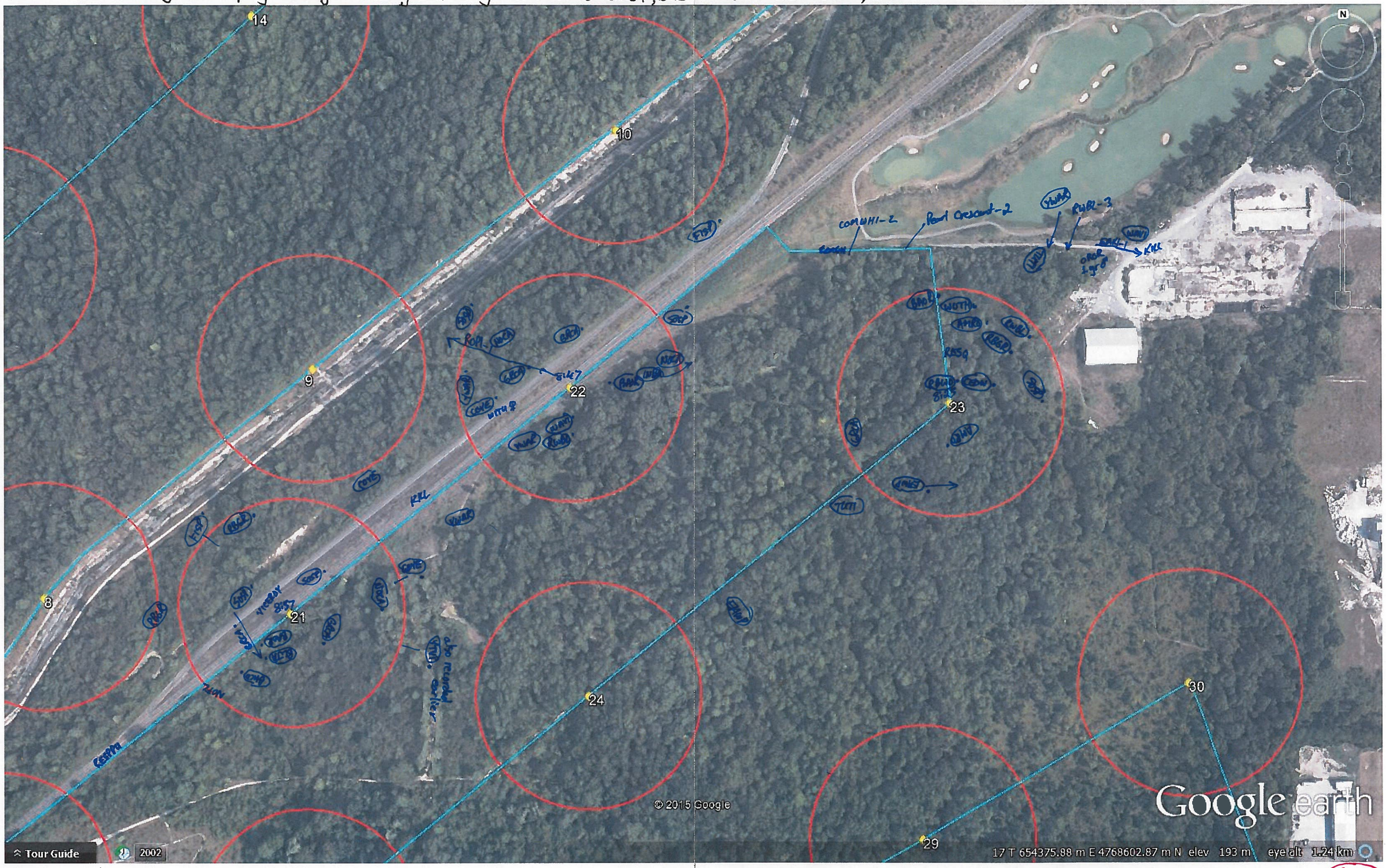

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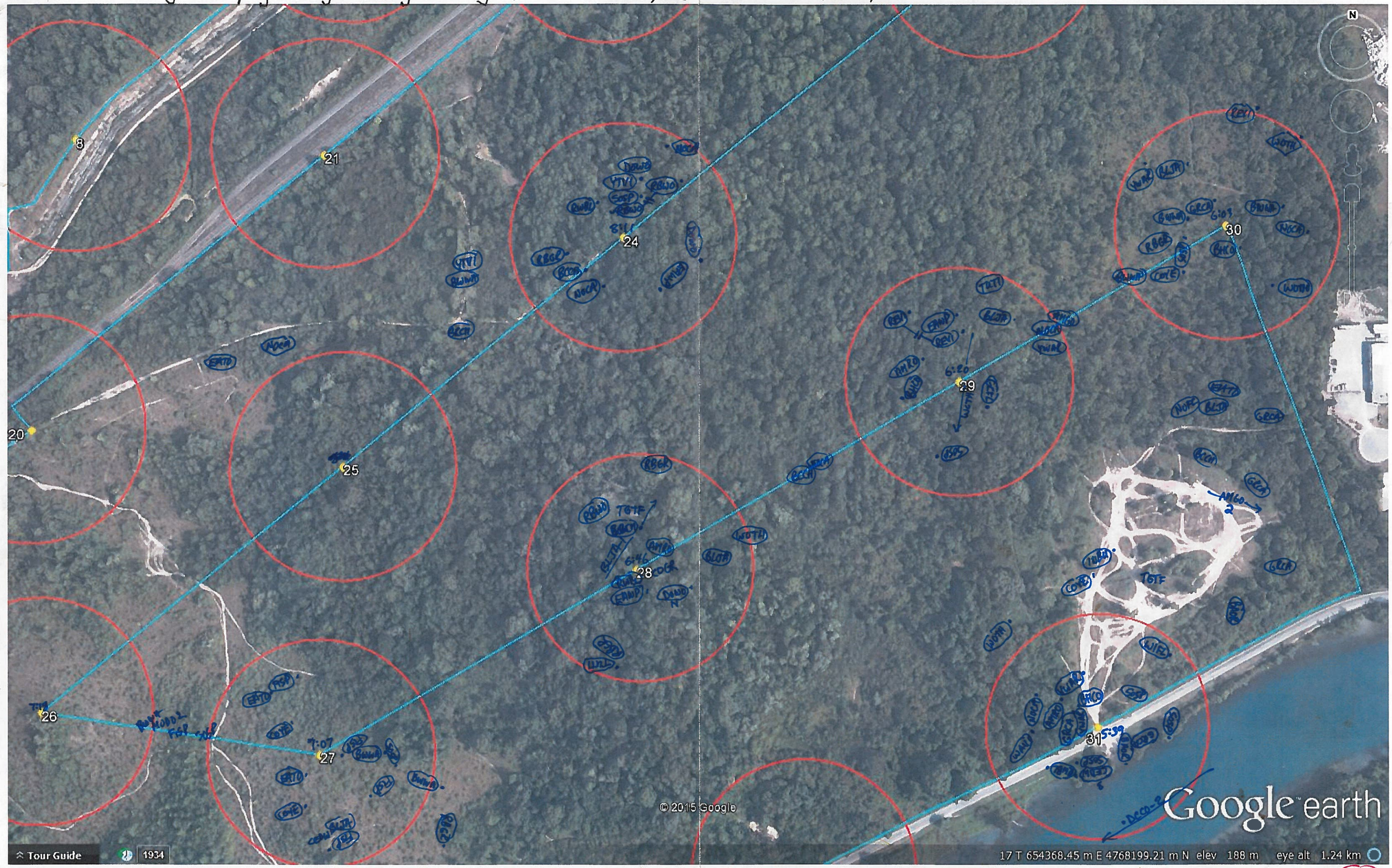

Surveyor = Karl Konze Conditions were sunny & clear on June 4th. becoming totally cloudy by the end. 11.4-18.8°C. Mostly calm. — June 5th. a mix of sun & cloud & mostly calm. 16.8°C - 21°C.

Appendix H: Photo Inventory of Watercourse Surveys

Photograph 1. April 11, 2015. Shoreline view of Welland River. While there were shallow wet areas inland, there was no connection to the river.

Photograph 2. April 11, 2015. Shoreline view of Welland River.

Photograph 3. April 11, 2015. Watercourse 1, approximately midway between source and the Welland River.

Photograph 4. April 21, 2015. Emergent vegetation Immediately upstream of Dorchester Road culvert in Watercourse 1, near the Welland River.

Photograph 5. October 6, 2015. Mouth of Watercourse 1 showing emergent and submergent rooted aquatic vegetation. Welland River in background.

Photograph 6. April 12, 2015. Downstream view in the upstream end of Watercourse 2 within the subject property.

Photograph 7. April 12, 2015. Meandering clay/mud channel of Watercourse 2, approximately 592 m upstream from the Welland River.

Photograph 8. April 21, 2015. Watercourse 2 with coarse material mixed into the clay/mud substrate, approximately 113 m from the Welland River.

Photograph 9. April 12, 2015. Structure of Watercourse 3.

Photograph 10. October 6, 2015. Collapsed rock-filled gabions in sloped section of Watercourse 3, approximately 30 m upstream from mouth.

Appendix I: Bat Roost Habitat Survey Results

Sample Station Number	Polygon	Snags below 25cm DBH	Snags 25cm to 50cm DBH	Snags greater than 50cm DBH	Total >25cm	Plot Area (ha)	Snags/ha	Polygon
1	1	0	1	0	1	0.05	20	1
2	3	0	1	0	1	0.05	20	3
3	1	0	2	0	2	0.05	40	1
4	1	0	1	0	1	0.05	20	1
5	6	0	2	0	2	0.05	40	6
6	6	0	1	0	1	0.05	20	6
7	6	0	2	0	2	0.05	40	6
8	6	0	0	0	0	0.05	0	6
10	6	0	0	0	0	0.05	0	6
11	6	0	0	0	0	0.05	0	6
12	12	0	2	0	2	0.05	40	12
13	12	0	0	0	0	0.05	0	12
14	12	0	1	0	1	0.05	20	12
15	12	0	0	0	0	0.05	0	12
16	1	0	1	0	1	0.05	20	1
17	17	5	2	1	3	0.05	60	17
18	13	0	0	0	0	0.05	0	13
19	13	2	2	0	2	0.05	40	13
20	13	1	1	0	1	0.05	20	13
21	12	4	0	0	0	0.05	0	12
22	12	0	1	0	1	0.05	20	12
23	12	1	0	0	0	0.05	0	12
24	12	2	0	0	0	0.05	0	12
25	29	1	1	0	1	0.05	20	29
26	29	3	1	0	1	0.05	20	29
27	29	8	1	0	1	0.05	20	29
28	30	1	0	0	0	0.05	0	30
29	30	3	0	0	0	0.05	0	30
30	19	1	0	1	1	0.05	20	19
31	19	2	0	0	0	0.05	0	19
32	18	1	0	0	0	0.05	0	18
33	18	14	0	0	0	0.05	0	18
34	18	2	2	0	2	0.05	40	18
35	18	3	0	0	0	0.05	0	18

Appendix J: Environmental Management Principles

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March 22nd, 2016

Draft Environmental Management Principles for the Thundering Waters Secondary Plan Natural Heritage System

Following a Technical Advisory Meeting on January 26th, 2016, it was recognized that the natural heritage strategy for the Thundering Water's project should be guided by a set of overarching natural heritage system planning and implementation principles.

The outcome being to:

(i) provide information on key issues and opportunities to the technical advisory team, agencies, stakeholders, and proponent
(ii) to develop an environmental strategy that is consistent with provincial, regional and municipal policy; and
(iii) to provide a framework that allows the secondary plan, subdivision and associated environmental impact assessment to proceed on a basis of meeting the agreed upon principles.

This document ("Management Principles") provides guidance to the land-use, infrastructure, and servicing planning teams to ensure the protection of key natural heritage features and functions are maintained on and adjacent to the Thundering Waters property. They will also be used as a tool in the Environmental Impact Assessment (EIA) to determine the potential for development. These principles are currently presented as a work-in-progress, and once vetted and a consensus among agencies reached, will be finalized with the submission of the Environmental Impact Study (EIS).

As outlined in summaries of the Master Plan, the vision for natural heritage protection and integration with the proposed development includes:

- Ensuring protection and linkage of key wetland features
- Avoiding impacts, and where possible, improving the hydrological function of protected wetland areas
- Where necessary, enhance the condition of the natural areas that will be protected and identify areas for restoration
- Incorporate green space into the built form that provide complementary functions for wildlife that use the protected natural areas

Consistent with the Master Plan vision, four guiding principles for environmental management were outlined in the preliminary Environmental Characterization report circulated by D&A in early November 2015:

- Consolidate and complement the existing protected areas where important woodland features (i.e. having old-growth forest characteristics) are adjacent to and contiguous with the PSW/EPA boundaries
- Promote opportunities/functional linkages of protected areas (known PSW/EPA areas, and those to be identified) using a combination of natural and anthropogenic corridors.
- Identify areas on-site that provide practical opportunities for enhancement and/or compensation for natural areas that will be impacted in the context of future urban uses.
- Outline appropriate inventory and monitoring methods to assess the environmental management strategy objectives and targets and establish adaptive measures.

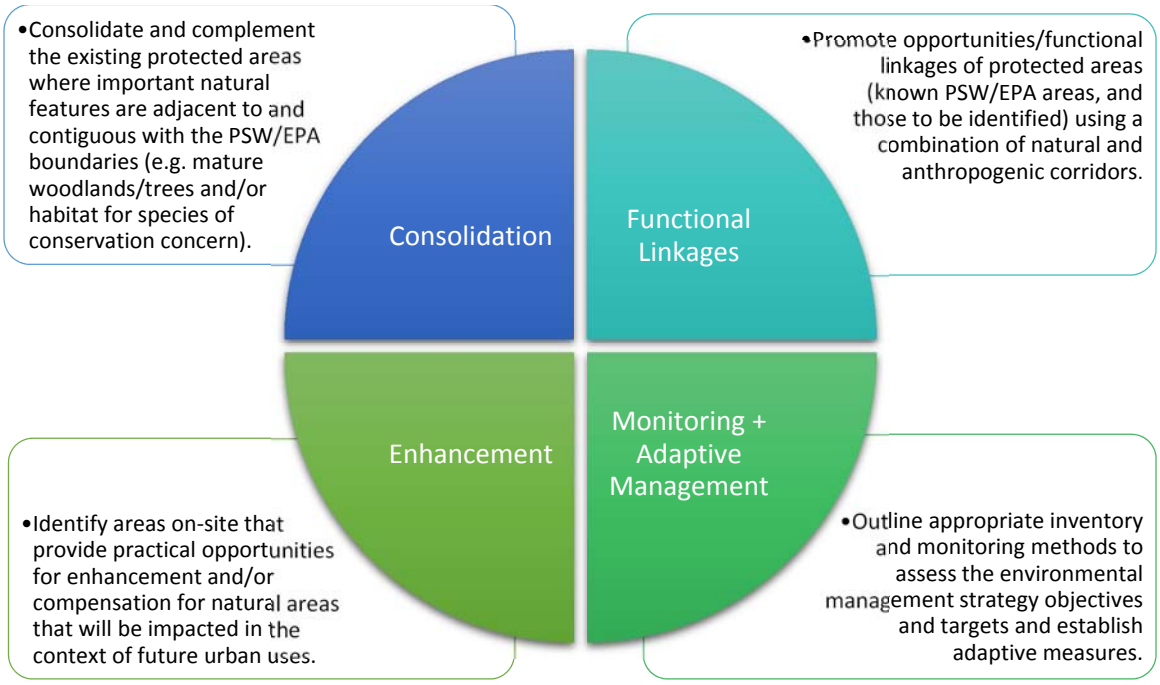

Figure 1 - Guiding Environmental Management Principles

The fundamental principle guiding the development of the Natural Heritage System is one of 'No Net Loss' of ecological features and functions. The following five themes outlined some specific working goals and objectives to support the proposed environmental management principles:

1. Recommendations for protection
2. Opportunities for enhancement and compensation
3. Special consideration areas (e.g. rail corridor, Conrail Drain)
4. Integration with built form
5. Implementation/permitting considerations

1. Recommendations for Protection

Protection and conservation of natural features and functions should focus on maintaining the high biodiversity value and ecosystem function that is present on the property. Priority should be placed on protecting core areas, ensuring linkage opportunities are maintained and/or created, and ensuring the features that are maintained will sustain enough habitat to support viable populations of key species. Natural elements that are currently present on the property and should be represented in the post-development NHS include:

- Environmental Protection Areas (EPA), which includes the Niagara Peninsula Slough Forest Provincially Significant Wetland (PSW)
- Environmental Conservation Areas (ECA) (including woodlands with old-growth characteristics adjacent to designated EPA areas)
- Endangered/Threatened Species at Risk and their associated habitat
- Old growth/Mature Forest Habitat
- Shrub/Early Successional Bird Habitat
- Bat Maternity Roost Habitat
- Mast Tree Habitat
- Amphibian Breeding Habitat (Woodland Type)
- Habitat for Provincially Rare and/or Species of Special Concern (Schreber's Aster, Honey Locust, Eastern Wood-Pewee, Wood Thrush, and Snapping Turtle)
- Reptile Hibernacula
- Deer Winter Congregation Areas
- Rare Vegetation Communities
- The permanent watercourse present on the east side of the property

2. Opportunities for Enhancement and Compensation

Opportunities exist on the property to improve degraded areas that exist within protected areas, and to improve and/or establish new natural areas. This will help to offset reductions in green space that will occur within the developed areas of the property. The main objective will be consolidating the key areas, and maintaining/creating linkages among them. Opportunities include:

- Enhancement of degraded provincially significant wetland areas through recreating vernal pond habitats, removal of invasive species, and establishment of native understory species (in both wetland upland areas).
- Revegetation of areas that are currently anthropogenic/cultural that will not be incorporated into the developed area.
- Wetland creation in identified compensation areas to offset any loss of pond and wetland habitats and functions that are removed as part of the development lands.
- Revegetation of Stormwater Management Facilities and the Conrail Drain with a focus on early successional shrub habitats.
- Use of native plant species to revegetate of natural and anthropogenic corridors (created linkages).

3. Special Consideration Areas (e.g. Rail Corridor, Conrail Drain, Park blocks)

A number of existing human-made and natural elements on the subject property provide opportunities for maintaining and/or enhancing the ecological features and functions following development. These include, but are not limited to the rail corridor, the Conrail Drain, and individual trees.

- Rail Corridor – identify opportunities for natural heritage enhancements along the rail corridor setbacks; identify opportunities for eco-passages under the rail to facilitate long-term linkage opportunities for amphibians and other small wildlife
- Conrail Drain – identify opportunities for natural heritage enhancement within and along the Conrail Drain
- Individual Trees - large mature trees scattered across the site; where grading permits they should be identified during detailed site planning, and preserved if possible.

4. Integration with Built Form

The built form of the proposed secondary plan area will include land-uses that support and/or complement feature and functions of the core and linkage areas. For example, Storm Water Management facilities, parks, and trail areas can provide opportunities for restoring native plant communities, creating habitat for wildlife, and other ecological functions. Recommendations include, but are not limited to:

- Buffers – use of buffers to ensure hydrological function of key features is protected and/or enhanced; allowance for trails within buffer areas to direct pedestrian movement and avoid encroachment into key features; allowance for variable width buffers depending on adjacent land uses and trail alignments
- Grading – identify opportunities to direct clean runoff into and/or away from the protected NHS to ensure local hydrologic conditions of vernal pools and ponds are not impacted; and identify opportunities to redirect clean runoff into vernal pool and other pond restoration areas
- Encroachment Management – ensure edge of NHS is demarcated using interpretative signs and fencing where necessary
- Storm Water Management – identify opportunities for natural heritage enhancements within SWM blocks
- Trails – to the extent feasible, identify trail opportunities outside of the NHS; where entering the NHS, avoid core areas within the core features (i.e. existing vernal pools, most interior areas, mature old-growth areas); make use of dead-end trails; use boardwalks where feasible to avoid impacts to wetlands and compaction of forest floor
- Park Blocks – identify natural heritage enhancement opportunities within park blocks;
- Road Crossing Designs – where road crossings bi-sect corridor areas between core features, identify location and type of eco-passages that will facilitate movement of amphibians and other small wildlife
- Watercourse Crossing Designs – where watercourse crossings are proposed, ensure ecological linkage for wildlife is incorporated into design considerations

5. Implementation & Permitting Considerations

Consideration of factors that reduce impacts during pre-development, construction, and post development phases will help with the successful implementation and long-term sustainability of the NHS. Recommendations that are provided below outline considerations related to timing of disturbances, use of an adaptive management framework, and use of on-site plant materials for rehabilitation and restoration of degraded core areas, where compensation areas are identified, and within enhancement areas on built form land-uses:

- Avoid and/or minimize disturbance in and adjacent to defined NHS areas (particularly core features)
- Time development to avoid key life-history periods for wildlife (e.g. spring breeding of amphibians and nesting for migratory birds) and when soils on the site are saturated (e.g. following the spring melt)
- Initiate natural heritage enhancement and compensation works prior to development, and/or in-step with development phasing to ensure proposed enhancement and compensation projects are successful
- Adaptive management and adjustments during detailed design to avoid significant species and/or habitats that have not currently been identified (e.g. snake hibernacula, Species at Risk)
- Use of native plant species to minimize establishment of non-native invasive species
- Biodiversity Salvaging: Rescue and relocation of wildlife such as amphibians and turtles, and native plants. Many opportunities exist for collecting and using existing plant and animal species for relocation into existing and/or restored areas on the property. This will ensure that representative plant and wildlife species that exists in impacted areas will be retained for use as part of the overall restoration and enhancement strategy. Measures include:
  - Seed collection to ensure a supply of locally adapted native plants are archived for future restoration/enhancement initiatives
  - Removal, storage, and re-use of soil propagule banks (e.g. top soil from areas with a high concentration of native seeds, rhizomes, bulbs, and other plant reproductive material)
  - Salvaging of other ecosystem elements that can provide habitat structure (e.g. logs, tree stumps, boulders, and large rocks)