

Scoped Environmental Impact Study  
for  
368 Aqueduct St. × 155 Gadsby Ave



City of Welland

Prepared by 8Trees Inc.

Feb 10, 2021

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## Declaration

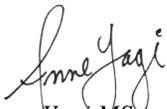
*This scoped Environmental Impact Study was completed by 8Trees Inc. under a term of reference (TOR) provided by the Region of Niagara and agreed upon by the landowner and 8Trees Inc. The TOR followed an onsite agency visit on Jan 22, 2020 and the review of a screening report which included a preliminary constraints analysis. The information contained within this EIS includes existing information from local and provincial agencies, on-line public databases (e-bird) and site data collection conducted from November 2019 to August 2020. Field surveys were scoped to target species at risk and provincially significant species (S1 to S3) that may potentially inhabit the deciduous forest habitat within the subject lands (i.e. breeding birds, plants, and maternity roosting bats).*

*Based upon seasonally appropriate field studies, I conclude that the woodland meets the criteria of significance as per the Region of Niagara's Official Policy section 7.B.1.5, due to several factors.*

- 1. Presence of large, mature oak and maple trees that are at least 100 years old.*
- 2. Confirmation of habitat use by Species at Risk Bats, Little Brown Bat (Myotis lucifugus, status endangered) during the maternity roosting season. In two locations, one over the seasonal pool habitat located within the subject lands and the second in a cluster of large oak trees within Aqueduct Park.*
- 3. From the Recovery Strategy White Wood Aster (Eurybia divaricata; status Threatened) was confirmed in the FOD community within Aqueduct Park in 2018. Species may be present along the northern boundary of the Subject Lands.*

*Therefore, I recommend that the Aqueduct Park portion of the FOD community and northward receive an environmental protection designation (EP) because the extant and recovery distribution for this White Wood Aster population is almost entirely contained within this portion of the woodland. On the other hand, species presence was not confirmed within the subject lands, although habitat may be suitable along the north property boundary. This is likely due to natural soil differences between the north and south halves of the woodland. Therefore, I recommend the woodland portion of the subject lands receive an environmental conservation (EC) level of protection to allow for some housing development in the western portion of the woodland and within the existing serviced lot along Gadsby Rd.*

*Urban woodlands provide values to the local neighborhood. However, not all community uses of the woodland are favourable. There is evidence of property encroachment or squatting, tree cutting, land conversion from forest to back yard lawns and use of the woodland as a dump for organic waste generated from outside the woodland. This increases the likelihood for invasive exotic species and pests to become established which weakens the natural integrity of the woodland. We support all opportunities to maintain as much of the woodlands as possible via a tree preservation approach, addition of a public trail to protect the White Wood aster from trampling and enhancement of habitat features such as maintaining the seasonal pool, adding bird houses, bat boxes, planting native trees, creative development designs, and a community woodland stewardship plan are important considerations for this site.*



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*President*

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## Summary

After completion of field studies and additional data gathering, we confirmed the woodland within Aqueduct Park and the subject lands is important habitat for species at risk. In 2018, the recovery strategy confirms a White Wood Aster (WWA) population (status threatened) exists within Aqueduct Park. Our field visits in September have yet to identify this species, however, two woodland aster species, Large-leaved Aster (*Eurybia macrophylla*) status S5 and Schreber's Aster (*Eurybia schreberi*)- status S2, within the park and along the northern edge of the Subject Lands are present. From the recovery strategy the WWA population resides within the FODM2-4 vegetation community and did not extend into the FODM9-2 vegetation community. The FODM9-2 vegetation community is only within the subject lands. We suspect that natural soil differences within the woodland may define the extant range of the WWA population.

In addition, we suspect there may be trees present in the woodland that are older than 100 years, especially the super canopy oak trees. We assessed whether the large oak trees were Shumard Oak (*Quercus shumardii*), however their identification is challenged by high canopy leaves, premature fruits and possible hybridization within the red oak family. Samples from the forest floor provided to NHIC were inconclusive. Additional experts from the Ministry of Natural Resources and Forestry (MNRF) were consulted and confirmed Swamp Pin Oak (S4) and Northern Red Oak (S5) are present in the woodlands.

Within the subject lands we have identified important features that require protection from the adverse effects of development they are the large oak trees, associated understory and the seasonal pool area. Large trees have an extensive shallow root system that can be twice the height of the tree. Construction within the woodland may also indirectly affect trees on adjacent lands and therefore construction setbacks are proposed to protect adjacent trees, large trees within the subject lands and their tree root zones especially those associated with the seasonal pool area. Several options are presented to protect these features with development setbacks and additional constraints (ie. no digging, filling to protect root zones and restoring seasonal pool area at Gadsby rd.). Since the development area is reduced due to environmental constraints, I recommend consideration of a land swap between the developer and the city to contain the woodlands in public ownership and to develop adjacent (non-sensitive) mowed areas into housing.

A woodland stewardship plan is recommended that includes opportunities for a public trail within non sensitive portions of the woodland to allow public viewing of the natural features and protect the White Wood Aster population from trampling. Opportunities for community involvement include tree planting, removal of invasive species, education, management and monitoring of the White Wood Aster population, and Species at Risk bats. The White Wood Aster population requires woodland habitat protection which

overlaps in some areas with the habitat needs of the bats using Aqueduct Park. Then by maintaining the seasonal pool habitat and associated trees within the subject lands will help protect habitat for the Little Brown bat during the maternity roosting season.

Therefore, we recommend designating the Aqueduct Park portion of the woodland and northward (FODM2-4), as Environmental Protection (EP) due to the presence of WWA and Species at Risk bats. Given the habitat use by Little Brown Bat within the Subject Lands and presence of mature oak trees, the woodlands on the Subject Lands should be designated as Environmental Conservation (EC), to allow for some development within the western portion of the woods and the fully serviced lot at Gadsby Rd. Considering the reduced development area, we suggest that the landowner trade the woodlands for the grassed mowed areas within the park to balance development needs in non-sensitive areas while protecting sensitive habitat for species at risk. This will allow for the development of a woodland stewardship plan that incorporates the recovery needs for species at risk within the greater public context.

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## Introduction

8Trees Inc. was retained by Lucchetta Builders Inc. to conduct a scoped Environmental Impact Study (EIS) for a proposed housing development within the City of Welland. The address is 368 Aqueduct St. and 155 Gadsby Ave, City of Welland (Fig.1).

## Background Information

Environmental Impact Studies (EISs) are required during the development planning process in Ontario, when a development is proposed within or nearby a potential Natural Heritage Feature (NHF) or the adjacent lands (120m) of a known NHF. Plan review agencies use the information within the EIS to assess whether a potential NHF requires protection under the Provincial Policy Statement (PPS).

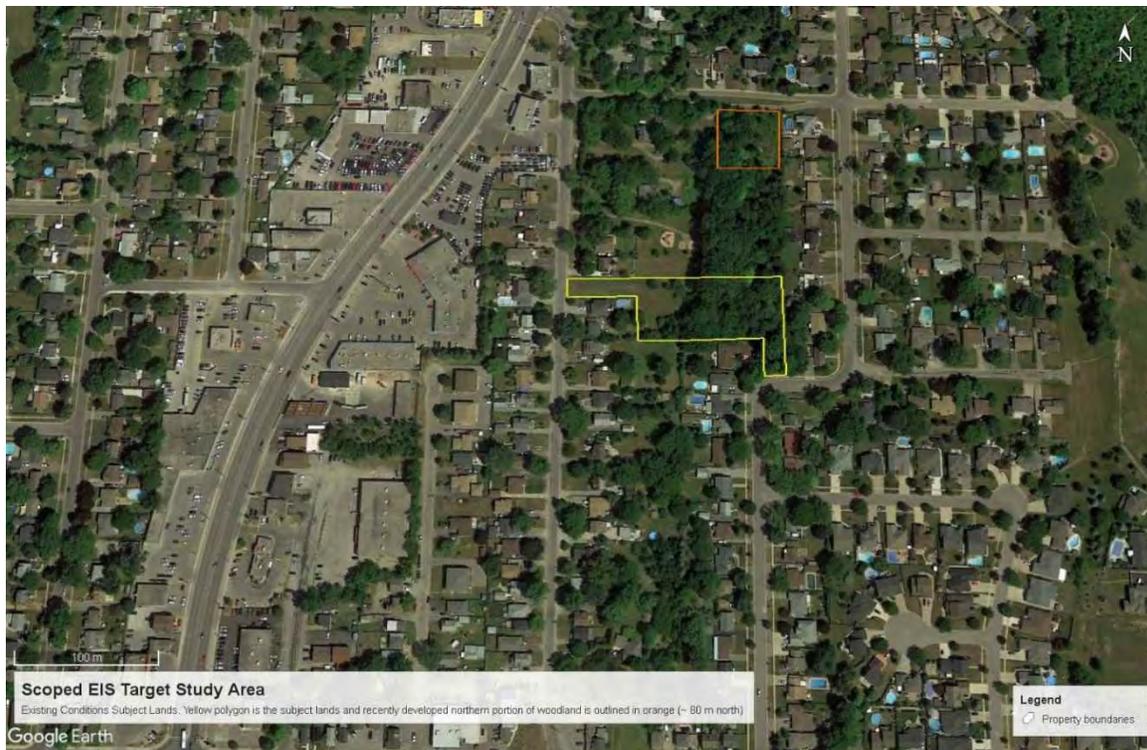


Figure 1. Proposed housing development location (subject lands outlined in yellow) east of Aqueduct, north and west of Gadsby Rd. City of Welland. The orange polygon shows the area of more recent housing development where trees are now removed.

## Planning context

A portion of the subject lands were purchased by Lucchetta Builders Inc. from the City of Welland in 2019 (Figure 1). Current zoning is low density residential and open space - recreation. The landowner is applying for a Zoning Bylaw and Official Plan Amendment, consent to sever, draft plan of condominium, and site plan approval to permit a

townhouse development on the property. A re-zoning amendment is required to change the open space-recreational portion to residential (Figure 1).

### *Description of Proposed Development*

The proposed housing development is within a fully serviced urban area. The subject lands comprised of two parcels (380 Aqueduct and Gadsby Ave.) are approx. 0.6345 ha total area (MPAC Assessment). The proposed development includes 14 units and includes a new road with cul-de-sac and additional parking (Rusit and Assoc, 2019).

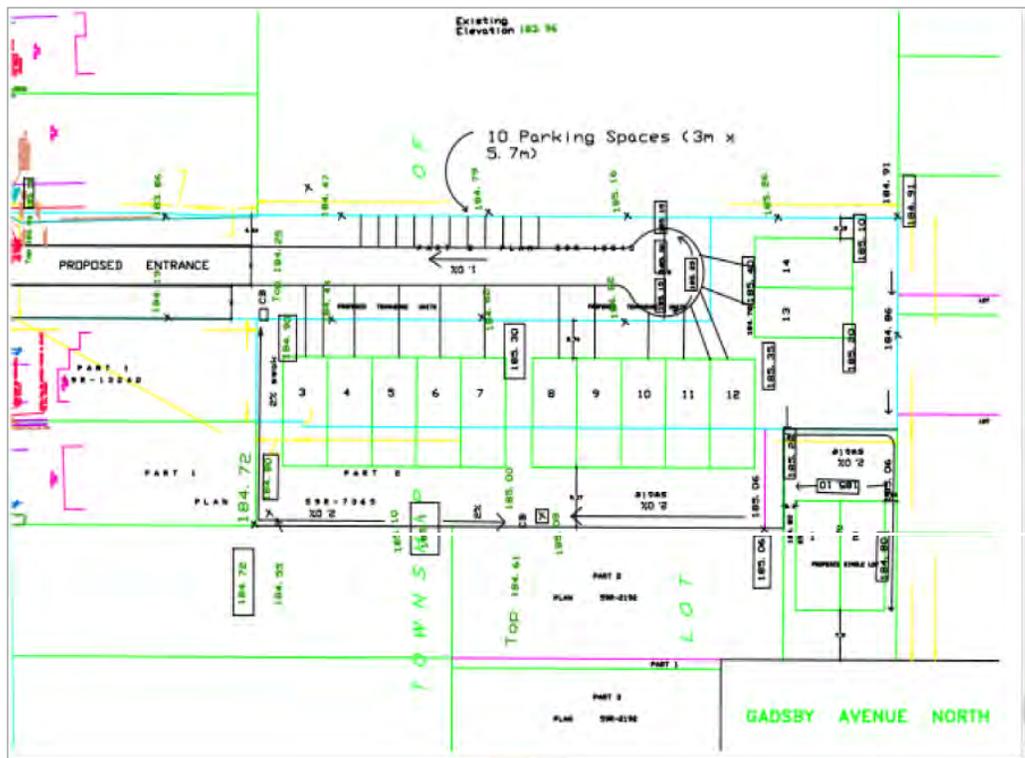


Figure 2. Draft development plan by Lucchetta Builders Inc. courtesy of Rusit and Associates, November 28, 2019.

### **General Geophysical Characteristics**

The surficial geology, topography, local climate, past and present land use all contribute to the present-day vegetation community and potential habitat features wildlife may use. The Niagara Region is located within the Great Lakes lowland region of Canada, Ecoregion 7E which is commonly referred to as the Carolinian region of Canada. Characterized by flora and fauna with a central range within the Carolina states of the USA. Soils in this area are predominantly clay or mixtures (silt, sand, clay) formed from post glacial lake formations (Tinkler, 1994). Pre-settlement conditions describe the southern portion of the region as a low gradient topography with clay – clay-sandy loam

soils that was predominantly deciduous forest, containing swamps, bogs, and upland woods (Chapman and Putman, 1984; NPCA, 2009).

### Historical Land Use

Historical air photos from 1934 to today indicate half the subject lands were once ploughed farm fields and woodlands (Figure 3). The subject lands are similar today except for the surrounding landscape which is entirely urban and no longer farmed (Figure 1 & 3).



Figure 3. Past (1934) aerial photo of the subject lands, outlined in yellow indicates a mature woodland is present within the subject lands when this photo was taken. Trees to the south are likely an orchard and trees north of woodland (north of Hilda Street today) were cutover and partially farmed.

### Preliminary Screening

Lands Information Ontario (LIO) confirmed the presence of a small woodlot that was identified as a non-sensitive woodland. Within a 1 km<sup>2</sup> grid of the subject lands, only one species at risk was identified by the Natural Heritage Information system (NHIC). This was a Northern bobwhite quail record (*Colinus virginianus*) however the record was from the 1900s. Quail require large areas of open field habitat which is not present on the

subject lands. However not all rare species information is known or contained within the NHIC database.

There were no wetlands, watercourses, valleys, fish habitat or core natural heritage system identified within 120m of the subject lands (Figure 4). The closest identified key natural heritage feature (KNHF) is the Welland River-Between the Canals (PSW) about 640m to the east. There is no direct hydrological linkage between the subject lands and the PSW. The nearest open channel watercourse is 166m to the northwest which

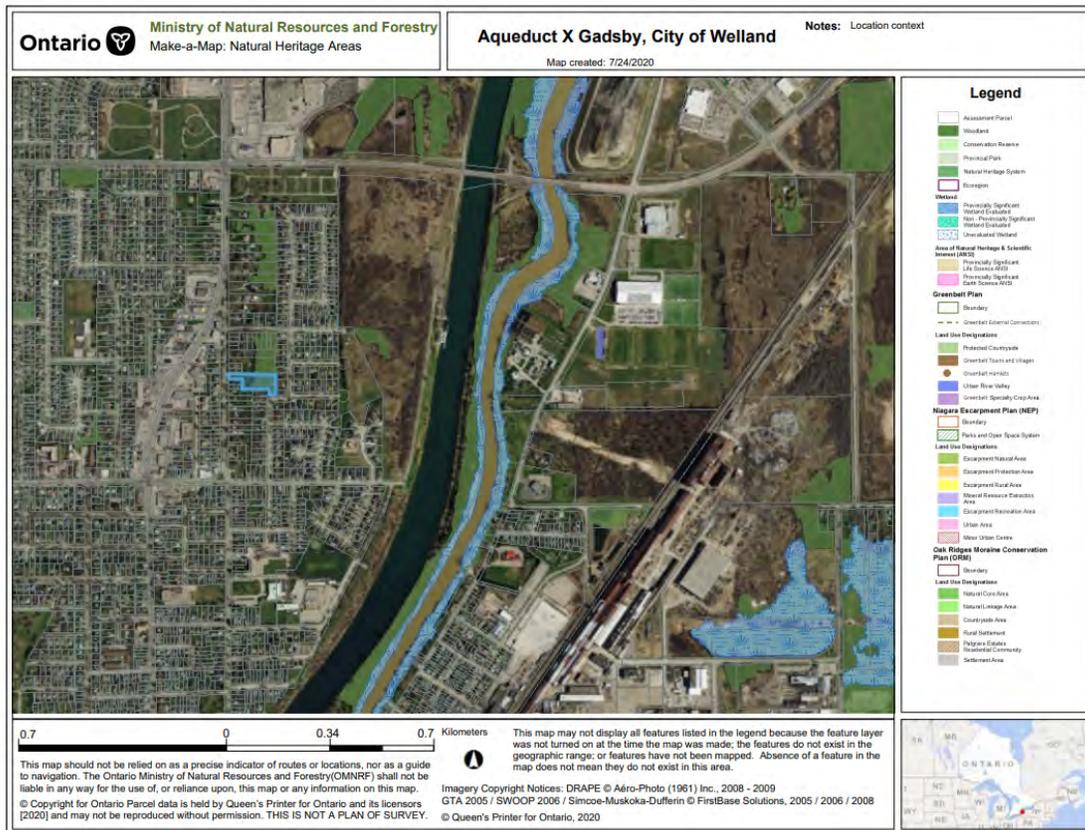


Figure 4. Key Natural Heritage Features (KNHF) mapping and the location of subject lands (outlined in blue).

contributes flow to the Welland Recreational Canal, not to the Welland River- Between the Canals (PSW). Therefore, there is no direct hydrologic connection between the subject lands and an existing KNHF (Figure 4).

### Application of Ontario Wetland Evaluation Criteria (OWES)

During the screening phase of the EIS completed in January 2020, we applied OWES size criteria to determine whether the swamp (SWDM1-3) community required a provincial wetland evaluation or whether NPCA regulations apply. One of the main premises of OWES is size and the smallest size for an individual wetland to be evaluated is 2 ha

(page13; OWES Manual). There are exceptions allowed for small wetlands when they provide important habitat for wildlife and especially when they are part of a wetland complex (minimum size criteria is 0.5ha; within 750 m; with ecological functional linkages). In the case of this woodland the total swamp component is < 0.5 ha and although it is within 750m to the “Welland River Between the Canal provincially significant complex”, there is no ecological or hydrological linkage to include this swamp community within the PSW complex because the Welland Recreational Canal forms a break in connectivity, therefore it did not meet the criteria for evaluation or for complexing (Figure 4).

For species at risk and rare birds (S1-S3) we searched e-bird an online database for reports of bird observations (1900 to 2020). We found no records on the subject lands. The nearest record for Eastern Wood Peewee was > 120m and was near Hilda Street in 2018.

The determination of woodland significance is not automatic, meaning not all woodlands are designated KNHF. Therefore, the Region of Niagara has developed a set of criteria to be used to assess significance (Region of Niagara Official Policy section 7.B.1.5). The criteria include (size, age, location, linkages to KNHF and significant wildlife habitat; Appendix D). Conclusions from this preliminary screening indicated the woodland did not meet the criteria of significance, except for the potential as habitat for rare species including Species at Risk. When there is insufficient data on species presence within or nearby a potential NHF, and the habitat is potentially suitable, the planning authorities look to the province to provide advice/methods and review of the data collected, regarding species at risk (MNR's SWH Ecoregion 7E Criterion Schedule (2015)). Since the site contains a woodlot, species at risk and rare species (S1-S3) associated with Eco-Region 7E, small woodlands and edges of woodlands are a focus of this EIS. The ecological consultant is required to make a recommendation as to the significance of the potential natural feature following the completion of a series of field studies that are contained within an agreed upon terms of reference (TOR). In the case where SAR are found, the consultant must contact the Ministry of Environment Conservation and Parks (MECP) for completion of the Endangered Species Act (ESA) “c” permit process.

### Terms of Reference

A scoped EIS focuses on the main areas of concern regarding data deficiencies that would assist planning agencies during the development planning process. An initial constraints analysis of woodland attributes, including some preliminary field work, review of existing information, correspondence with agencies and a site visit in January 2020 provided the framework for this scoped EIS (Appendix D).

The pre-consultation meeting and site visit were held on January 22, 2020 between the proponent, Lucchetta Builders Inc. (W. Lucchetta), Niagara Region (A. Boudens and L. Karlewics), and 8Trees Inc. (A. Yagi, T. Bukovics) regarding the framework for the

scoped EIS on the property at 368 Aqueduct and 155 Gadsby Avenue, in the City of Welland. The meeting provided the following general environmental classifications, policy description, and EIS requirements which we used as the Terms of Reference (TOR) for this study.

The subject site is located within an Urban area that does not include lands identified by the Provincial Natural Heritage System, nor is it located within an identified Agricultural Area. The site was generally identified under the Ecological Land Classification as deciduous forest (FOD), and was flagged to be potentially regulated by the Ministry of Environment, Conservation and Parks (MECP) and fall under the classification as an Environmental Protected Area (EP), due to the possible presence of significant threatened or endangered species on and adjacent to the subject lands. Additionally, several features on site and on adjacent lands were found to classify some areas as potential Environmental Conservation Area (EC). Such features included the presence of old growth, rare species, significant wildlife habitat (including habitat of species at risk), and significant habitat of species of concern were potentially present. Candidate significant wildlife habitat study must determine presence/absence for bat maternity roosting colonies or habitat for species of conservation concern (special concern rare wildlife species).

The following field survey requirements were determined and outlined by the Region of Niagara after the January 2020 site visit:

- Ecological Land Classification mapping including soils
- Botanical Inventory, single season with specific screening for White Wood Aster (*Eurybia divaricata*) status threatened (THR)
- Breeding Bird Survey (two surveys minimum)
- Bat Survey- maternity roosting (MECP)
- Species at Risk Screening (MECP)
- Tree Saving Plan (required if woodland is determined to be significant)

### [Review of Background Reports and Online sources of data](#)

The following list outlines the sources of data and information used to accumulate the historical and current baseline information to conduct this scoped EIS:

1. Review Servicing Design Brief by Rusit & Associates Ltd. Nov. 28, 2019
2. Review Pre-consultation Meeting (PCM), City of Welland, Region of Niagara, NPCA and landowner Nov 7, 2019.
3. City of Welland Zoning Bylaw
4. Agency correspondence received (NPCA Nov 7, 2019; MECP May 2020)

5. Review of Ontario Wetland Evaluation System (OWES) criteria
6. Review existing Natural Heritage Feature reports and information from provincial, municipal, and regional sources.
7. Lands Information Ontario (LIO) mapping, information, aerial photography.
8. NPCA Watershed Explorer GIS attribute mapping information.
9. Natural Areas Inventory NPCA 2009
10. Niagara Reptile and Amphibian Survey 2008.
11. Ontario Nature and Province of Ontario web sites for species account mapping
12. Provincial fish base online database
13. Review of aerial photography from 1934 to present (Google Earth).
14. Contact Region of Niagara Region Planning Department, NPCA and MECP
15. Review Policy 7.B.1.5 of the Region's Official Plan
16. Conduct 3 days of site visits (November and December 2019) and scoped field surveys (March to July 2020)
17. Site visit with Region of Niagara Jan 22, 2020
18. Terms of Reference for Scoped EIS investigation from Region of Niagara
19. E-bird screening for local forest bird observations (1900 to present)
20. Screening for SAR bats and rare forest plants (NHIC list X range maps)
21. Recovery Strategies for White Wood Aster and Little Brown Bat
22. Contacted local birding groups
23. Breeding Bird Survey Protocol
24. Provincial Bat Survey Protocol
25. Consultation with MECP regarding bat survey, and botanical survey results

## Existing Conditions Study Area

### Ecological Land Classification (ELC)

#### *Background*

The study area sits within the Mixed-wood Plains Ecozone of Ontario and the Lake Erie-Lake Ontario Ecoregion 7E of Central and Southern Ontario. The Mixed-wood Plains Ecozone is defined by climate variables, elevation, limestone, and bedrock that occurs south of the Precambrian Shield. It is the southernmost ecozone in Ontario and contains the highest number of species at risk. Ecoregion 7E is bounded by Lake Huron, Lake Erie, Lake Ontario, and the Niagara River. The Mixed-wood Plains Ecozone is known for its diverse vegetation, with natural areas dominated by deciduous tree species typical of Carolinian forests. Characteristic trees and wildlife within this ecoregion include Oak, Sugar Maple, American Beech, White Ash, Eastern Hemlock, Eastern White Pine, Striped Skunk, White-tailed Deer, Raccoon, Southern Flying Squirrel, Wild Turkey, Red-bellied Woodpecker, American Toad and Eastern Gartersnake (MNRF, 2012).

#### *Methods*

The forest community (approx. 0.81 ha) and adjacent parklands (approx. 0.62 ha) was assessed using Ecological Land Classification for Southern Ontario SCSS Field Guide FG-02 (Lee et al, 1998) and Southern Ontario Ecological Land Classification Vegetation Type List (Lee, 2008). Soil cores were collected within the FOD ecosite to define the community types. We used a standard forestry hand auger 1.2m in length. Core samples were photographed and depth to water table estimated (Appendix B). Soils were analyzed using the “Field Manual for Describing Soils in Ontario 4<sup>th</sup> Ed” (University of Guelph, 2009).

Table 1. Summary of the approximate sizes of ELC communities within subject lands, city lands, private, and overall. Measured using Arc GIS software.

Ecosite	Eco-Community	Subject lands (ha)	City Lands (ha)	Other Private (ha)	Total Woodland (ha)
Deciduous Forest	FODM2-4	0.0169	0.2498	0.1566	0.4064
Deciduous Forest	FODM9-2	0.1742	0	0	0.1742
Deciduous Swamp	SWDM1-3	0.1613	0.0703	0	0.2316
Parkland/other	CGL_2	0.2766	0.3447	0	0
	Total	0.6340	0.6659	0.1566	0.8122

*Results and Conclusion*

Soil cores and vegetation communities indicate the subject lands fall mostly within FODM9-2, SWDM1-3 and CGL\_2 parkland ELC communities (Appendix B). The forest within Aqueduct park (soil core #1) had a sandy top layer and soil core #2 within the

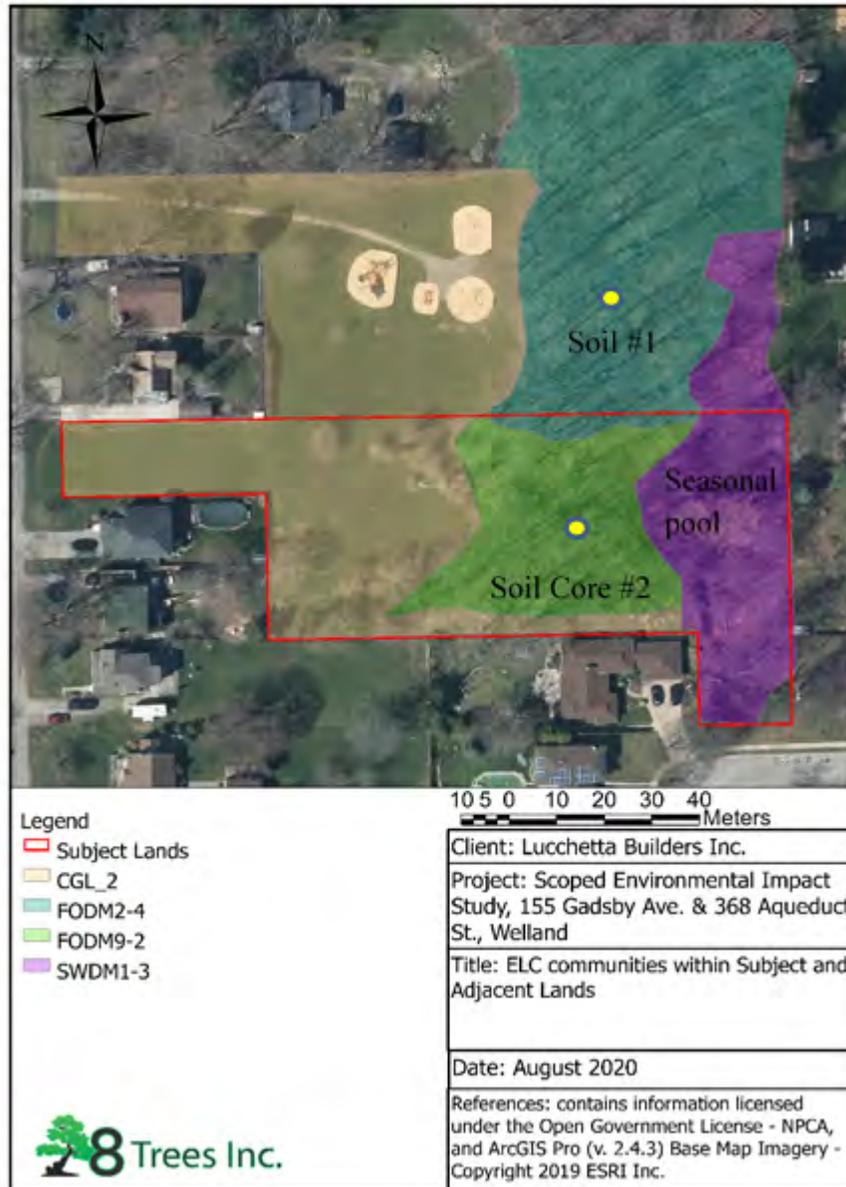


Figure 5. Ecological Land Classification (ELC) communities. The FOD communities are divided into two; FODM2-4 within Aqueduct Park and FODM9-2 within subject lands. The remaining areas surrounding the subject lands are residential. A seasonal pool (Nov to July) is located within the SWDM1-3, on the subject lands. Approximate soil core locations are indicated. Subject Lands are highlighted in red.

subject lands did not. A shallow water table was evident within the Subject Lands core compared to Aqueduct Park (Appendix B). Therefore, we divided the FOD ecosite into two communities FODM2-4 within the park and FODM9-2 within the subject lands (Figure 5, Table 1).

## Single Season Vegetation Survey

### *Background*

Surface hydrology, microtopography, soils and site history affect how plants colonize the site. In actively disturbed sites, shrubs and trees do not become established and the land maintains an open character and usually containing mixtures of native and exotic grasses, sedges and herbaceous plants that prefer full sun and moist conditions. In urban woodlands exotic plant species may become established overtime. In the study area we expect to find a predominance of deciduous forest species within the FODM9-2 and SWDM1-3 communities and nonnative grasses in the CGL\_2 to the west.

### *Methods*

We accessed provincial and federal sources of information and compiled a list of eleven potential rare plant species (S1-S3) that are characteristic of deciduous forest and swamp communities of ecoregion 7E that may also be found in FOD and SWD habitats in south Niagara (Appendix B- Table B3). We collected incidental plant species observations during each site visit. For example, Eastern Flowering Dogwood (status endangered) flowers in early spring and is readily detectable by the presence of large showy white flowers. We also conducted specific searches for evidence of White Wood Aster (status threatened) as specified in the initial TOR. According to the White Wood Aster (*Eurybia divaricata*; status threatened) recovery strategy, this species was confirmed present in 2018 within in Aqueduct Park, City of Welland (MECP, 2019) and other nearby FOD ecosites (Figure 6).

### *Results*

Tree and shrub species were inventoried in December 2019, and again in May 2020 to include the woodland feature (Aqueduct Park and Subject Lands) prior to surveying for bats (Bat Protocol; MNR, 2014). Ground cover surveys were conducted throughout the growing season incidentally while conducting bird and bat surveys to complete a single season plant inventory. Most plant species identified were common and typical of a dry to wet deciduous forest, except for possible Shumard Oak (*Quercus shumardii*; S3; Table B9). Shumard oak is part of the red oak family (Red, Black, Pin, Shumard) and is challenging to identify especially when leaves are high in the canopy and acorns have not yet formed. This species of oak may be present in both FOD and SWD communities in the heavy clay soils of the Niagara Region especially near seasonal pools (Photos Appendix B). Plant voucher samples were collected from the forest floor in September 2020 to discern Shumard Oak (status special concern) from the more common Red Oak.

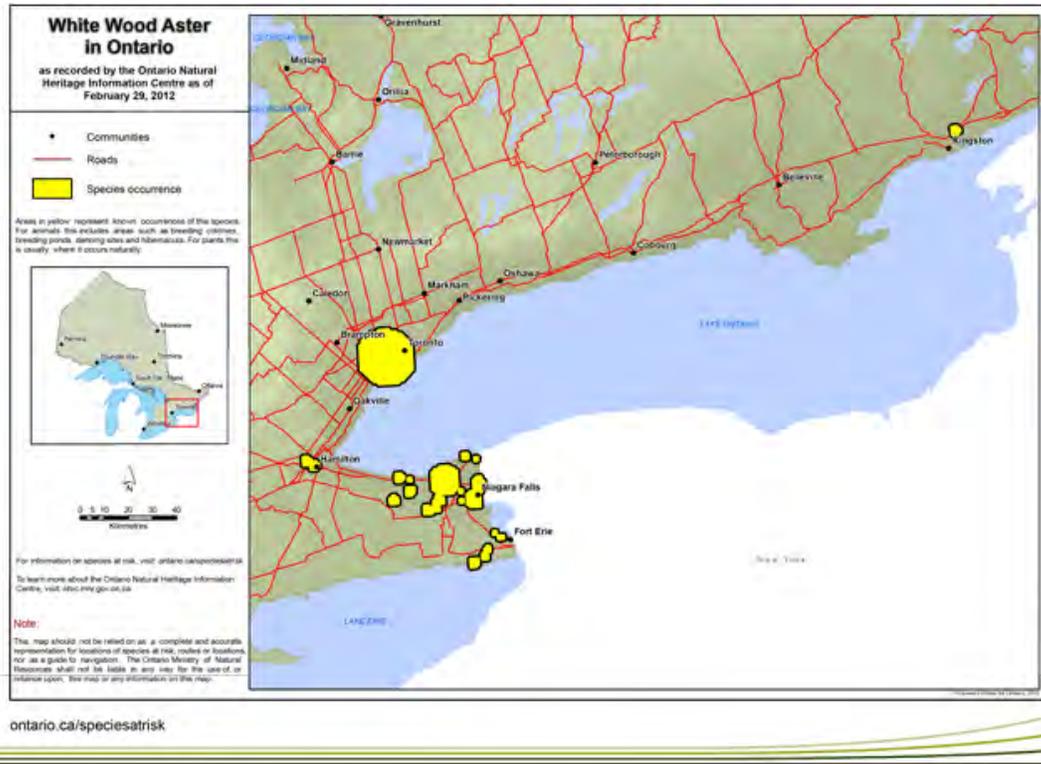
A list of plant species is provided in Appendix B. Consultation to confirm ID with NHIC was inconclusive (Appendix E). Specimens have been sent to experts at the University of Buffalo for determination. White Wood Aster (status threatened) was confirmed as present in Aqueduct Park in 2018 (MECP, 2019). Presence within the Subject Lands has not been confirmed because this species blooms in late summer / fall season (late August-September). We did confirm a similar looking but common species, Large-leaved Aster in the late July surveys (Figure 7), and a woodland aster (not flowering) was documented in August surveys at the northern border of the Subject Lands and throughout Aqueduct Park (Figure 8).

### *Conclusions*

Given the continuity of the FOD community into the subject lands, White Wood Aster is likely present within the Subject Lands. Patches of aster basal leaves were evident in Aqueduct Park and along the edge of the northern property line within the FODM2-4 community during our August site visits. The approximate extent of woodland asters (*Eurybia* sp.) is shown in Figure 8. The woodland asters look wilted, trampled, or damaged in some patches within the Aqueduct park. The damage may be attributed to people using the park or due to the dry and hot weather conditions this summer. An additional site visit in early September, during flowering is recommended to confirm presence on subject lands.

### **Additional Field Note**

Early samples sent to NHIC identified only *Eurybia macrophylla* and comments suggests the plants appear stressed (Appendix E). Several weekly September field visits confirmed two species of woodland aster are present; they are, *Eurybia schreberi* (status S2) and *Eurybia macrophylla* (status S5). We contacted the author of the recovery strategy Paul O'Hara and a local expert Albert Garofolo for their assistance. After discussions and field visits, we conclude that *Eurybia divaricata* may be present on private lands and in the park but they have not bloomed this year due to environmental stressors (trampling, drought, hydrology changes and recent woodland removal along Hilda St.). A follow up survey is recommended in 2021.



### White Wood Aster and ESA Regulations

Figure 6. The distribution of White Wood Aster in Ontario is predominantly in the Niagara Region within FOD ecosites. The study area and adjacent city lands contain suitable habitat for this species. Mapping from the Ontario Natural Heritage Centre (NHIC).

ESA regulated habitat is not defined but recommends the federal definition of critical habitat is used to define the area of recovery habitat for the White Wood Aster (WWA). In the federal recovery strategy “the extent of biophysical attributes up to 80 m (radial distance) around existing mapped observations of the WWA. In addition, in cases where the suitable habitat extends for less than 50 m around WWA, a critical function zone capturing an area within a radial distance of 50 m is also included as critical habitat (Environment and Climate Change Canada, 2018).”



Figure 7. Comparison of White Wood Aster (left), Large-leaved Aster (S5) (middle) found in study area July 21, 2020 and unknown asters (right). Photo middle by T. Bukovics and on right A. Yagi.

“At present, the minimum area of suitable habitat required to allow for the maintenance of viable local population or subpopulations of the White Wood Aster, and to also allow for natural processes related to population dynamics and reproduction (e.g., dispersal) to occur, is unknown. Existing research provides a logical basis for suggesting an area with a minimum radial distance of 80 m to support the maintenance of suitable habitat for the White Wood Aster by minimizing edge effects and associated threats such as invasion by exotic species and White-tailed Deer browse (Gratton and Nantel, 1999; Ranney et al. 1981). Therefore, an 80 m distance from any White Wood Aster mapped observation is deemed an appropriate distance to ensure that a minimum area of suitable habitat is maintained and incorporated in the identification of critical habitat”.

Based upon the location of non-flowering basal aster leaves in August, the extent of woodland asters (*Eurybia* sp.) is entirely within the FODM2-4 community and does not extend into the FODM9-2 community. Their occurrence may be related to the sandy soil layer, slightly more open canopy conditions or the lack of ground cover competitors such as poison ivy. Poison Ivy dominates the groundcover conditions within FODM9-2 community and is not common in the FODM2-4 community. Therefore, the recovery planning area is naturally limited to the FODM2-4 community (Figure 8).

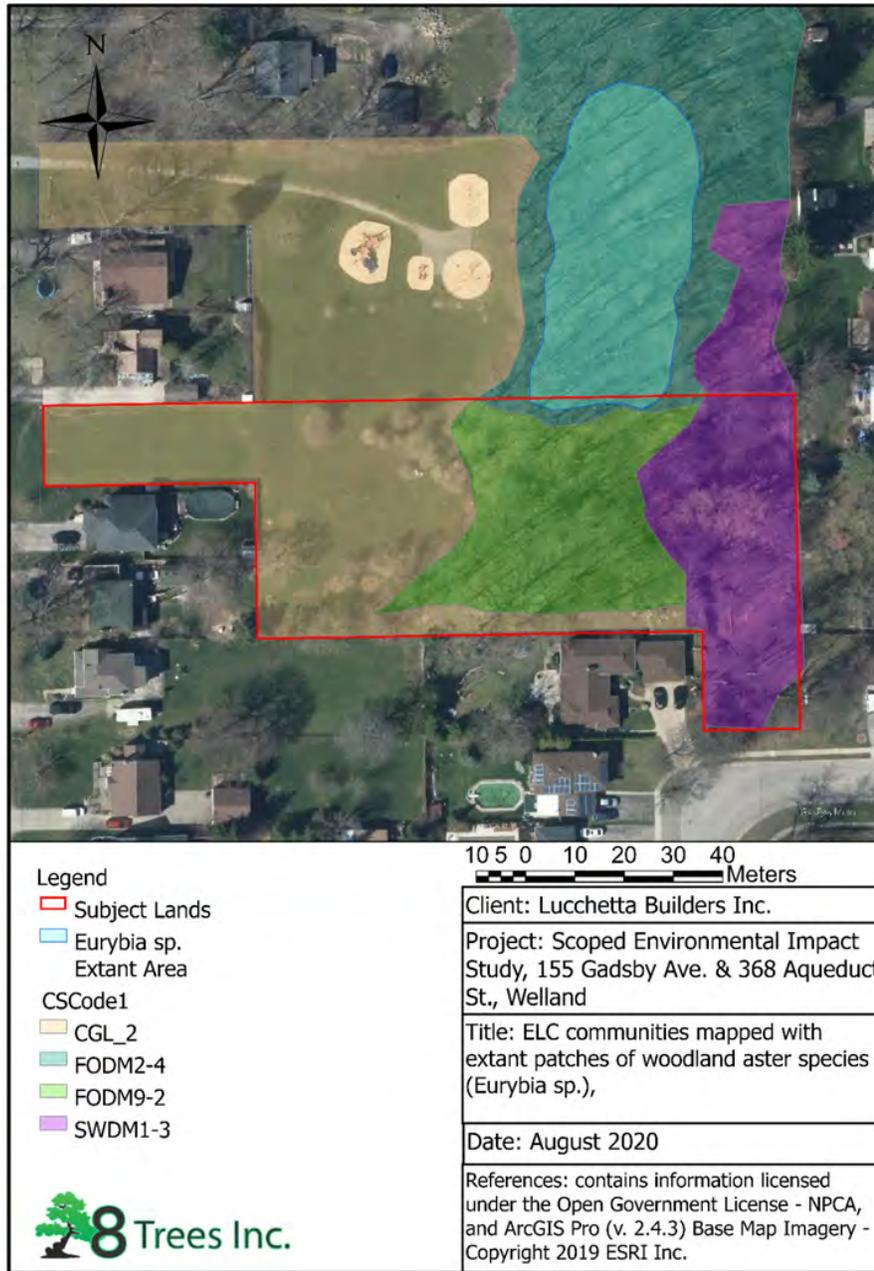


Figure 8. Approximate extent of the woodland aster community within the subject and adjacent lands observed in mid-August 2020.

## Bird Surveys and Incidental Wildlife Observations

### *Background*

The bird breeding season depends on whether the species is resident or migratory. Resident breeding birds include birds of prey (hawks, owls, falcons, and eagles), game birds (Wild Turkey, Ruffed Grouse, Pheasants, Partridge) and perching birds (cardinals, nuthatch, blue jays etc.). Resident birds breed earlier in the year. For example, Bald Eagles begin breeding in January/ February and usually are nesting by early March, rearing young in April to June. Migratory birds include the remaining birds that breed in this area, and they arrive ready to breed. Depending on weather conditions migratory birds may begin breeding in April, but usually May to June is the prime season for them. There are over 200 species of birds known to breed or stop over in Niagara Region during the spring-fall season, especially near the Lake Erie shoreline. However, there are only a few species that are “at risk” or provincially rare and even fewer that would also use forested, forest edge habitats for breeding (Appendix E- e-bird list). We did not expect breeding to occur within the parkland habitat, although perching and feeding was expected.

Spring (approx. March – June) is the optimal time to identify breeding birds. Identifying bird species presence is traditionally accomplished by watching for activity (e.g. in a woodlot before leaves are out) and listening for their unique songs.

### *Methods*

The subject lands includes forest, forest-edge and seasonal pool swamp habitat, we therefore screened the provincial bird species list for all rare species (S1 to S3 and SAR species) and accessed e-bird database for potential rare species use in the Niagara region. We identified 12 possible rare forest breeding bird species that could use the habitats found on the Subject Lands (Table B4). We conducted incidental and targeted breeding bird surveys between March and July 2020.

Breeding bird atlas survey protocols and timing were followed, as recommended by Region of Niagara. Evening and/or morning call surveys were conducted during May and June. In addition, we recorded incidental calls and made observations of bird breeding activity during site visits. We also consulted with 3 local naturalists clubs: Niagara Nature Club, Peninsula Field Naturalists, Bert Miller Club, the on-line e-bird database and local residents. We surveyed from two locations to cover the Subject Lands and the adjacent Aqueduct Park (deemed too close to be able to separate, survey area = Subject Lands + Aqueduct Park). A nearby reference site, Woodland Park was also surveyed to provide local context. We recorded bird singing during the survey periods and had the recordings reviewed by our local bird expert (Appendix A).

## *Results*

A complete list of birds singing or observed during two breeding seasons call surveys in May - June (Appendix Table B8). The list also includes incidental observations from the site outside that sample window or during site visits for other purposes.

## *Conclusions*

We did not detect any S1-S3 bird species or Species at Risk birds on the subject lands, adjacent lands or nearby reference site during our breeding bird surveys, or incidentally during our site visits. In addition, e-bird data also did not identify SAR birds using the study area.

## Bat Maternity Roost surveys

### *Background*

The Endangered Species Act (ESA) defines habitat as an area on which a species depends directly or indirectly to carry out its life processes. Life processes include reproduction, rearing, hibernation, migration or feeding and places where SAR aggregate. In 2013, the Little Brown Myotis (*Myotis lucifugus*) and Northern Myotis (*Myotis septentrionalis*) were added to the endangered species list and the Tri-coloured bat (*Perimyotis subflavus*) was added in 2016. The Small-footed Myotis (*Myotis leibii*) was added in 2017. All four SAR bats are listed as endangered because of a high extinction risk associated with a disease called “White nose syndrome” (Blehert et al., 2009; Humphrey and Fotherby, 2019). White nose syndrome (WNS) is caused by a particularly virulent fungus that invades the respiratory tract of hibernating bats or invades skin lesions causing the infected bats to arouse frequently during hibernation which in turn depletes energy reserves and the infected bats die overwinter (Frick et al., 2010). Frick et al., (2010) estimated the regional extinction of Little Brown Myotis within sixteen years (estimated 2024-2026). It is assumed that the remaining individuals comprise small bat populations made up of WNS survivors with some resistance, or those that inhabit WNS free hibernaculum. Thus, the remaining individuals are at further risk from direct mortalities associated with wind farm developments or due to urbanization (Environment and Climate Change Canada, 2018). However, simple population growth principles would predict near exponential growth of small populations living in an area with widely available habitat and resources (i.e. a small population size with a large carrying capacity). However, the fecundity of bats is low, and individuals are long lived and together these biological factors add to a slow recovery rate. Therefore, hibernation sites, swarming sites, maternity sites and their associated foraging and roosting habitat for Little Brown Myotis, Northern Myotis and the Tri-coloured bat are regulated habitats (Humphrey and Fotherby, 2019).

Little Brown Myotis, Northern Myotis and Tri-colored Bat are tree dwelling bats during the active season. They tend to use older forested stands for maternity roosting habitat,

rather than stands of younger, smaller trees (Brigham et al., 1997). The older trees likely have higher snag availability for roosting (Barclay et al., 1996, Krusic et al. 1996). The Little Brown bat will also use buildings and other human structures, however fragmented forests (i.e. edge habitat) favour habitat use by *Myotis* sp. (Ether and Fahrig, 2011). According to the provincial survey protocol for bats, “any coniferous, deciduous or mixed wooded ecosite, including treed swamps, that includes trees at least 10cm diameter-at-breast height (DBH) should be considered suitable maternity roosting habitat for Little Brown Myotis, Northern Myotis and Tri-colored Bat (MNRF, 2017).

The home range limits of pregnant and lactating Little Brown bats are estimated from telemetry studies to average 17 ha (range 8 to 45ha; Henry et al. 2002; RS page 15), with lactating females having smaller home ranges returning to the roost several times during the first 3 hours after emergence (Henry et al., 2002). Males tend to have a larger home range estimated at 661 ha (Yates et al., 2011). Large home ranges do not support claims for roosting site fidelity, whereas small home ranges as exhibited by lactating females suggest site fidelity. Site fidelity in bats emphasizes the importance of remnant habitat such as mature forest communities.

Bat species that feed primarily on insects tend to use forest habitat edge near seasonal water, where the large and mature trees provide ideal maternity roosting sites (Jantzen and Fenton, 2013). Bat foraging activity varies by species, but generally occurs at dusk and has been found to range from 1.8 to 4.4km away from their roosting sites (Brigham 1991; Vanhof and Barclay, 1996). Previous studies suggest that tree-roosting bat species may switch their roosting site every 2-3 days depending upon proximity to alternate suitable roosting trees (Brigham, 1991; Olson and Barclay 2013).

Therefore, this EIS is focusing on detecting SAR bats during maternity roosting season when females show site fidelity to specific trees and have the smallest home range. The maternity roosting season, when females give birth and are lactating, normally occurs from mid-May to mid-July at this latitude.

### *Methods*

Most Niagara Region mature forests (FOD and SWD type) are likely suitable maternity roosting habitat for SAR bat species such as the Little Brown Myotis, Northern Myotis, and the Tricolored Bat (Table B6). However, SAR are declining in abundance and are therefore rare to find. We followed the MNRF (2017) bat protocol to determine whether suitable habitat is present on the subject lands and adjacent woodlands. Optimal roost trees for Northern Myotis and Little Brown Myotis were assessed during leaf-off on 21 Dec 2020, and the study area was visited again to assess potential roosting habitat on May 01, 2020 for the Tricolored Bat (Appendix B).

Due to the potential to draw bats in from other roosting sites with a longer sample period and thus dilute our sample, our approach for this study site was to focus our survey effort within a 2hour period beginning ½ hour before sunset. This period also allowed opportunities for biologists to view bats flying in the study area just prior to complete darkness. We used a walking “roving” approach with stop-points for echolocation detection around trees previously identified to contain optimal roosting habitat, instead of the current stationary “bat box” approach (MNRF, 2017). Under the current survey protocol, a stationary bat echolocation recording device is placed (2 per ecosite) and set to record for the first five hours each night, for at least 10 survey nights under optimal weather conditions (> 10°C, no rain, no fog, low wind- not defined on Beaufort scale), or until a SAR bat is detected. According to methods outlined in other local EIS’s reviewed prior to this study (Hunter’s Point and Harbourtown EIS), the biologist sets up the recorders to monitor echolocations for the first 5 hours of the evening. The stationary equipment is left in the field according to their best guess on where bat activity will occur and then the biologist leaves the site, returning in 10 days. There is no requirement for factoring in weather effects or requirements to measure other factors that may affect bat activity such as flying insect abundance. Biologists then analyses the echolocation data using a software program to assess bat activity that happened in the 10 previous days. Since the microphone is limited to a maximum detection range of 20m, gaps exist in the survey field. Therefore, the protocol requires a minimum of two stationary bat boxes per hectare per eco-site (FOD and SWD). Finally, the costs of bat acoustic equipment are expensive ranging from \$3000 USD per box and software costs, to a lower rental cost of \$500 per bat box per survey day. For this study area 4 bat boxes would be needed to acoustically cover the ELC ecosite (protocol is 4 per ha to a maximum of 10 per ELC ecosite) resulting in a rental fee of \$2000 per sample day.

Our method employs new technology and challenges the existing protocol established by the province in 2017. We chose this method because the woodland is small (< 1ha), accessible by walking in the dark. Biologists can visually track bats initially and can adjust effort in the areas with higher bat activity. Biologists can also collect data on ambient temperature, wind and insect abundance during the survey. We can also study the bats on optimal nights and stop surveys when the weather becomes unfavorable. Finally, survey costs are much lower, only requiring costs for salaries and the echolocation microphone and software (approx. \$200-\$300 per sample day in total).

Our method uses a Wildlife Acoustics’ Echo Meter Touch 2 Pro bat acoustic detector equipped with a SMM-U2 ultrasonic microphone (same microphone as in the stationary “bat box”). This equipment was used to record bat echolocations in real-time using a handheld smart phone or iPad. A GPS tracker used with a WiFi personal hotspot was also enabled to track locations while walking. Kaleidoscope Pro Auto-ID classifiers were applied to recordings in real-time to automatically identify echolocation calls from a

North American database. The database was set to New York as this selection includes the eight Ontario bat species plus the Evening Bat. Evening bat has been recorded in Ontario (pers.comm., H. Fotherby, 2020), and we wanted to include possible species expansions. All recorded bat calls were also manually vetted using the USGS North American Bat Monitoring Program (NABat) guidelines (see Reichert et al., 2018 to manually check bat acoustic data). Acoustic data was stored as a full-spectrum WAV file and sent to MECP.

Two biologists conducted a survey each night beginning just before sunset and continuing for the next 2 hrs (approx. 9 pm to 11pm). Each Biologist began at different ends of the transect (Figure. 8) and walked slowly with a hand-held smartphone bat detector, stopping along the transect if bat activity was detected or if they were near a potential maternity roost tree previously identified as per MNRF protocol.

Point stations included specific snags identified with the tree survey, and the seasonal pool area, as well as point locations within and around the edge of the forest, that appeared to be ideal bat roosting sites. Due to the small size of the site, the sample area (Aqueduct Park and Subject Lands) was covered multiple times during the 2-hour period. A small portion of the forest is privately owned adjacent to the north edge of Aqueduct Park was not traversed. All recorded calls were analyzed for total call length (in seconds), pulse ratio (percentage of individuals calls, or pulses positively used to identify species). Wav files were saved and analyzed using Auto-ID and manually using Kaleidoscope software. Date of echolocation recordings, time, GPS location were automatically recorded by the app. We also manually recorded air temperature (Celsius), insect abundance, and wind (Beaufort scale).

We developed an insect activity index to estimate abundance, by counting the number of flying insects passing through a beam of light within a 50 cm space from the light source (headlamp) over a 10 second time frame. We assessed insect activity up to five times per survey. According to our protocol, five categories were used to represent index ranges (Table 2). Correspondence with MECP regarding acceptance of new techniques is provided in Appendix E.

**Table 2.** Insect Abundance Index is measured multiple times during survey period.

<b>Abundance Category</b>	<b>Description</b>
None	None observed in a flashlight beam over 10s interval
Few	<10 counted in 10s
Moderate	>10 in 10s
Abundant	>30 in 10s
Full Emergence	Many seen, some swallowed accidentally or inhaled, accumulations in hair, ears, nose, sinuses.

Note: 5-10 second light shine minimizes count duplication and minimizes effect of light on bat sampling.

### *Results*

We conducted five bat surveys on warm, calm nights above 15°C. We found that bat activity varied throughout the 2-hr survey window but decreased closer to the end of the 2 hours. There were two areas with consistently high bat activity, one within the city woodland and the other near the seasonal pool on the subject lands (Figure 8). Five bat species were auto-detected. One species was the Little Brown Myotis (*Myotis lucifugus*) detected on June 20, 2020 at 21:45 hrs. The biologist noted viewing multiple bats foraging over the seasonal pool during this time (Table 3; Figure 9). On June 21, 2020, Little Brown Myotis may have also been detected between 22:18 and 21:33 hrs over the seasonal pool. Since all SAR bats have echolocations > 40Khz including the Red bat, we also manually detected this group presence on June 17<sup>th</sup>, 20<sup>th</sup> and 21<sup>st</sup> (Appendix E). Additional manual reviews of the remaining eolocation files are recommended especially for complex recordings that were not auto-ID (Appendix B).

### *Conclusions*

The Little Brown Myotis echolocations were auto-detected once during the five survey periods and manually detected the following evening based upon recorded frequencies and pulse duration. This positive detection acknowledges the methods used were suitable and met the provincial expectations for bat acoustic surveys in suitable maternity roosting habitat (MNRF, 2017; Appendix E). Species that are rare have a lower overall probability of detection than more abundant species. Nevertheless, species abundance cannot be determined using this method or the stationary “bat box” method. The best outcome for an echolocation study is determining the probability of detection versus not detected. Probability of detection for Little Brown Myotis was 0.4 or 40%, general 40 Hz SAR group was 0.6 or 60% at this site. Whereas, the Big brown bat, which is a common species, was detected each survey having a probability of 1.0 or 100%. Given the habitat is suitable and there were a high number of complex recordings resulting in NO-ID status and frequency ranges within the SAR bat range, wave files are also being reviewed by the province for their interest.

According to the North American Guide to processing bat acoustic data, some species echolocations overlap such as Big Brown Bat and Silver-haired Bat; Eastern Red Bat (LABO), and Tri-colored bat; LABO and Little Brown Myotis (MYLU; Reichert et al., 2018). In Ontario, all Myotis sp. are endangered, therefore a detection to genus is a species at risk detection. In addition, identification may be confounded by the presence of multiple species or multiple individuals, background noise and destructive interference from echoes. Therefore, manual review of the data is recommended.

During this study multiple bats were observed flying over the seasonal pool on June 20<sup>th</sup> and the echolocation software Auto-detected the Little Brown Myotis (MYLU). Since there were multiple bats present and to confirm ID we also manually reviewed each session for MYLU, LABO and MYLU + LABO possibilities or just Species at risk bats. In addition, the wave files were sent to MECP for verification and determining next steps (Appendix E).

Following a positive detection of a SAR bat, the next step in the provincial bat protocol is to assess the significance of the habitat within each ecosite (MNRF, 2017). This is completed in part by calculating the density of snags per ecosite. The two FOD communities are approximately 0.60 ha with 14 snags > 25cm DBH (23 snags/ha) and the SWDM1-3 ecosite is 0.23 ha with 18 snags > 25cm DBH (78 snags/ha). In the protocol a snag density of 10/ ha is considered a high-quality site. Therefore, according to the provisions of the provincial protocol an ecosite 0.23 ha would automatically exceed high quality for SAR bats with 2.3 snags present. In the case of this forest there are 32 snags > 25cm DBH; therefore, in the case of small ecosites < 1 ha, snag density criteria, biases the significance of the ecosite mathematically. Therefore, other considerations of habitat quality should be made such as bat activity areas, presence of mature oak trees, proximity to water and proximity to other suitable habitat beyond the scope of the study area (Figure 9 and 10).

The home range for Little Brown Myotis is 8ha to 45ha (mean 17ha; Harvey et al., 2012 in RS page 15) and the maximum linear distance a female moved during a night from the roosting tree is estimated at 450m. Although not assessed in this EIS, there may exist potentially suitable habitat for SAR bats outside of the woodland area (Figure 10). Definitive confirmation of habitat use requires mist netting or radio telemetry which is beyond the scope of the provincial protocol.

From the Recovery strategies for Little Brown Myotis, Northern Myotis and Tri-colored Bat, it is recommended that maternity habitat be identified based on the contiguous ecosite or contiguous anthropogenic site where all known observations of roosting adult females and juveniles between May 15 and July 31 have been made, unless the habitat is no longer suitable, or bats are no longer roosting at the site.” Based upon these criteria (snag density and presence of SAR bat group.) the FODM2-4 and SWPM1-3 communities are important habitat for maternity roosting SAR bats (Figure 9).

Table 3. Bat transect-stop point roving survey conducted by two biologists using two hand-held iPad bat detectors equipped with Wildlife Acoustic's Echo Meter Touch 2 PRO Ultrasonic Module equipped with SMM-U2 ultrasonic microphone. Survey details Appendix B.

Date of Evening Survey	Survey Interval	Insect Abundance Index	Wind (Beaufort Scale)	Temp. Range (C)* start to end	Species Detected (D) or Not Detected (ND)					
					Big Brown Bat	Red Bat	Hoary Bat	Silver-Haired Bat	Myotis sp.	Little Brown Bat
08 June 2020	20:55 - 23:01	None- Few	0-2	20.4 - 15.7	D	D	D	D	ND	ND
09 June 2020	20:53 - 23:31	Few- Moderate	0-2	24.9 - 20.9	D	D	D	D	ND	ND
17 June 2020	20:50 - 23:25	Few- Moderate	0-2	22.4 - 19.0	D	D	D	D	D	ND
20 June 2020	21:04 - 23:35	None- Abundant	0-2	23.9 - 21.5	D	D	D	D	D	D
21 June 2020	20:58 - 23:35	None- Moderate	0-2	24.2 - 22.1	D	D	D	D	D	D

\*Note: Air temperature and bat activity generally decreased as the evening progressed and air temperature readings were found to be generally warmer within the forest than at the forest edge.

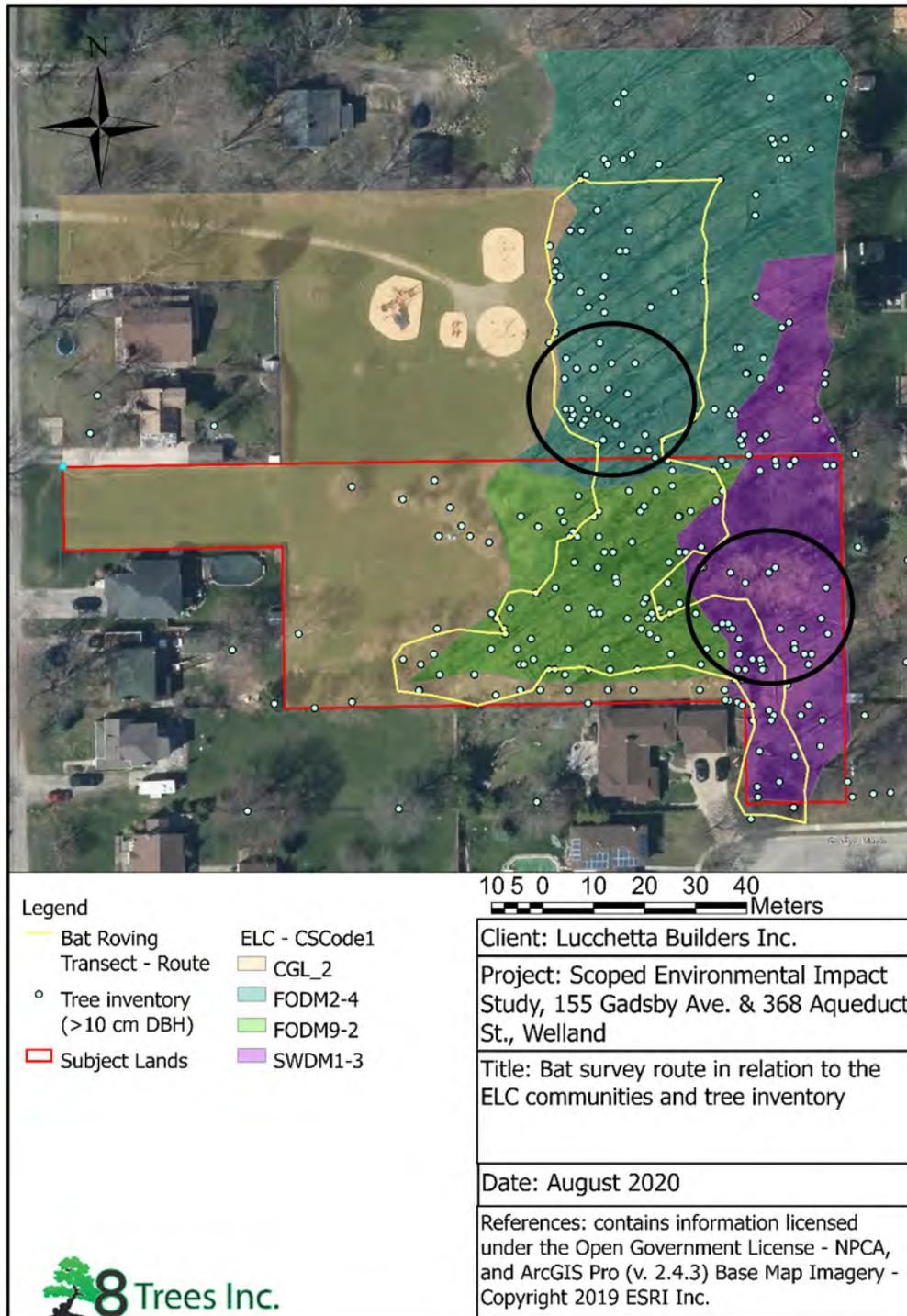


Figure 9. Bat survey roving point-stop transect method on subject lands and adjacent forest communities. Path is indicated in yellow. Individual tree locations are shown as a pink dot overlaying the ELC communities. Myotis sp. activity areas are circled in black with Little Brown Myotis confirmed using the SWDM1-3 community and Myotis sp. Using the FODM2-4 community.



Figure 10. Home range estimates for lactating female Little Brown Bats. Subject lands are outlined in red. Minimum home range is 8ha indicated by light blue circle and the maximum home range is 45 ha indicated by the dark blue circle. The green line is a 450m maximum linear distance recorded for a lactating Little Brown bat from a radio telemetry study and applied to this site (data applied from Recovery Strategy). From this view there are other potentially suitable maternity roosting habitat within 450m of the subject lands (white outline).

## Analysis of Ecological Features

### *Background*

Tree protection during construction is recommended for all trees identified as important. Since the woodland communities comprises about 60% of the Subject Lands, protecting every tree would significantly affect the viability of the development project (Table 1). Therefore, the determination of importance should be based upon existing bylaws, regulations, policies, and an objective determination of ecological significance.

The City of Welland does not have a tree protection by-law or construction mitigation guidelines to protect trees. In addition, the woodlot is undersized to receive automatic environmental conservation (EC) status under the RMON policies. The SWD ecosite is also too small to receive protection within the provincial wetland evaluation process or NPCA's regulations. The provincial ESA review of the bat survey and the White Wood Aster survey may dictate some level of habitat protection, or it may recommend alternative compensation. At the time of writing this EIS we do not know what the outcome of the provincial ESA review, nor have we confirmed the presence of White Wood Aster within the Subject Lands. Nevertheless, there are attributes of the woodland that are worthy of protection from an ecological and social perspective such as adjacent trees (private and city lands), the large oak and maple trees, the seasonal pool area and associated flora.

### *Methods*

We conducted a tree inventory on the subject property and included trees on adjacent properties that may be affected by site alteration (Figure 11). Then we partitioned only trees located on adjacent lands and buffered each tree by 15m (no construction zone; Figure 12). Second, we partitioned out the older large trees including snags (DBH > 20cm), assuming these have the best bat habitat attributes and mapped their distribution across the woodland (Figure 13). Third, we completed a similar analysis using just large oak trees (Figure 14). Finally, the fourth analysis was the application of a 10m buffer (no construction zone, vegetation regeneration zone) outward from the SWDM1-3 eco community. We then combined protection of adjacent trees, large oak trees and SWD and calculated the area and tree impacts within each ELC community.

### *Results*

The SWDM1-3 ELC community within the subject lands is 1,610 m<sup>2</sup> (0.16 ha) and the FODM9-2 community is 1,742 m<sup>2</sup> (0.17 ha). The total woodland is approximately 8,122 m<sup>2</sup>, and the subject lands contain 69% of the total SWDM1-3 community and 100% of the total FODM9-2 community (Table 1).

The Subject Lands' SWDM1-3 community contains 57 trees (> 10cm DBH) and the FODM9-2 community contains 93 trees (> 10 cm DBH) for a total of 150 trees including snags (Table 4; Figure 11). The distribution of large trees indicates three clusters, one in

the north in Aqueduct Park (FODM2-4), and two within the Subject Lands. One cluster in the FODM9-2 community and one within the SWDM1-3 community near the seasonal pool (Figure 11). Oak trees formed two main clusters, one concentrated in the north on city lands (FODM2-4) and the second near the seasonal pool area (Figure 12).

Scenario 1: The application of 15m buffer to trees located on adjacent lands would include 38 trees > 10cm DBH on the subject lands of which 13 are oak species (Table 4). This includes 23 large trees (> 20cm DBH) of which 10 are oak species (Table 4; Figure 11).

Table 4. Estimated woodland area protected for each preservation scenario within each ELC community within the subject lands.

	All Trees > 10 cm DBH	Large trees > 20 cm DBH	Number of Trees		Reference
			All Oaks > 10 cm DBH	Large Oaks > 20 cm DBH	
<b>Existing Conditions</b>					
SWDM1-3	57	30	25	15	Figure 11, 12, 13
FODM9-2	93	45	32	16	
<b>Tree Protection Scenarios</b>					
1. Adjacent Trees Buffer Area	38	23	13	10	Figure 14
2. SWDM1-3 + 10m buffer	93	44	37	21	Figure 15
3. Combination (Adjacent Trees Buffer + Swamp community buffer)	99	48	40	23	Figure 16

Scenario 2: The application of a 10m buffer to the swamp community would include 93 trees > 10cm DBH of which 37 are oak species, 44 large trees (> 20cm DBH) of which 21 are oak species.

Scenario 3: By applying setbacks to protect adjacent trees and the swamp community, and adjusting for overlap, 99 trees (> 10cm DBH) are protected of which 40 are oak species. This includes 44 large trees > 20cm DBH of which 23 are oak species.

### Conclusions

We chose these three options for discussion purposes focusing on the protection of ecologically relevant habitats for bats (seasonal pool feature and large trees- primarily oak species). We have not considered added requirements for protecting any potential White Wood Aster or Shumard Oak should their presence be confirmed on the Subject Lands. Since the province has identified White Wood Aster as present in the adjacent lands (i.e. Aqueduct Park) this EIS should be reviewed by the province to confirm whether the subject lands contains any recovery planning habitat or whether additional studies are required to define the recovery planning area for WWA. For example, the

woodland aster community mapped in Figure 6 appeared impacted by drought, trampling or other factors. Temporary exclosures fencing may provide some protection during the growing season, followed by defining a public trail from Aqueduct park through to the SWD community.

Our recommendation to the province is the WWA recovery area is limited within the existing conditions of the subject lands due to the change in soil type, higher clay content, tighter canopy, and presence of poison ivy. However, these factors may change with development making the site more suitable for WWA expansion especially during drought conditions and increased climatic variability that is expected in this region over time.

In addition, each scenario was analyzed with respect to the scenario itself and not on the ramifications of protecting tree root zones for the trees contained within the buffer area. Therefore, the actual buffer to establish a no construction zone may be larger than shown in Figures 14, 15 and 16.

Our recommendation includes a combination of adjacent tree buffer and swamp buffer to protect ecologically important trees, their associated understory and habitat features within the Subject Lands (Figure 16).

This spatial analysis was completed using ArcGIS Pro (v2.6.0) from field data collected using handheld GPS units with an error estimated from 3 to 10m. Although we have corrected our locations according to spring season aerial photography, the precise locations of each tree may vary from the maps in this EIS. Once a scenario is approved by regulatory agencies, we recommend marking trees to be removed and retained in the field and delimitating a no construction with a “limit of work fence”. Due to the presence of SAR species within the Subject Lands, we recommend that an ecologist flag ecologically important trees for protection in the field. Protection of the ecologist identified trees must also include their root protection zone established as twice the canopy radius ( $2r$ ), or as determined by a certified forester or arborist (Figure 17). In addition, no trees should be removed until late fall season to avoid nesting migratory birds and SAR bats.

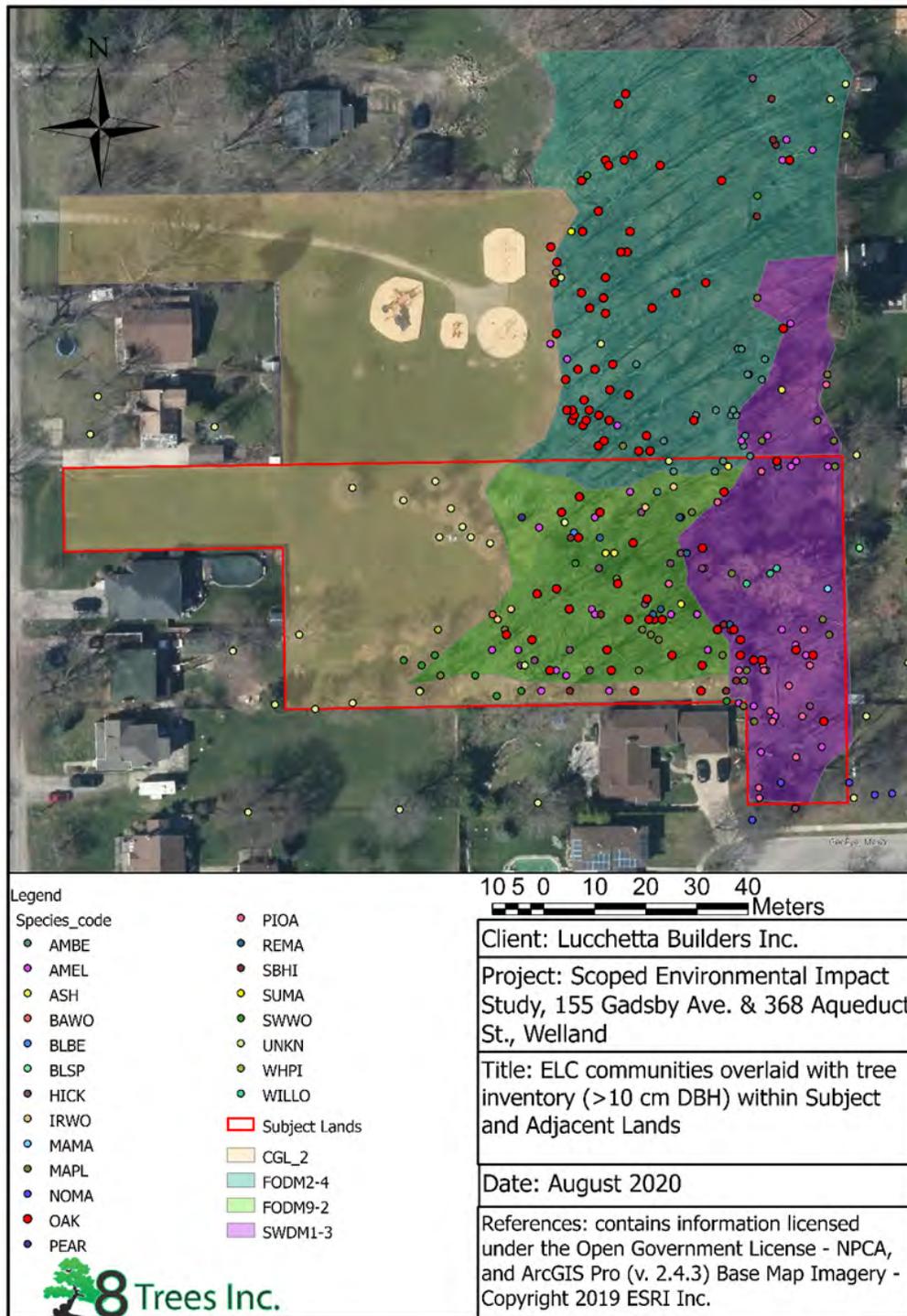


Figure 11. Tree Inventory (all trees > 2m height and > 10cm DBH) within each ELC Community. A dashed black line shows the division between the two FOD communities.

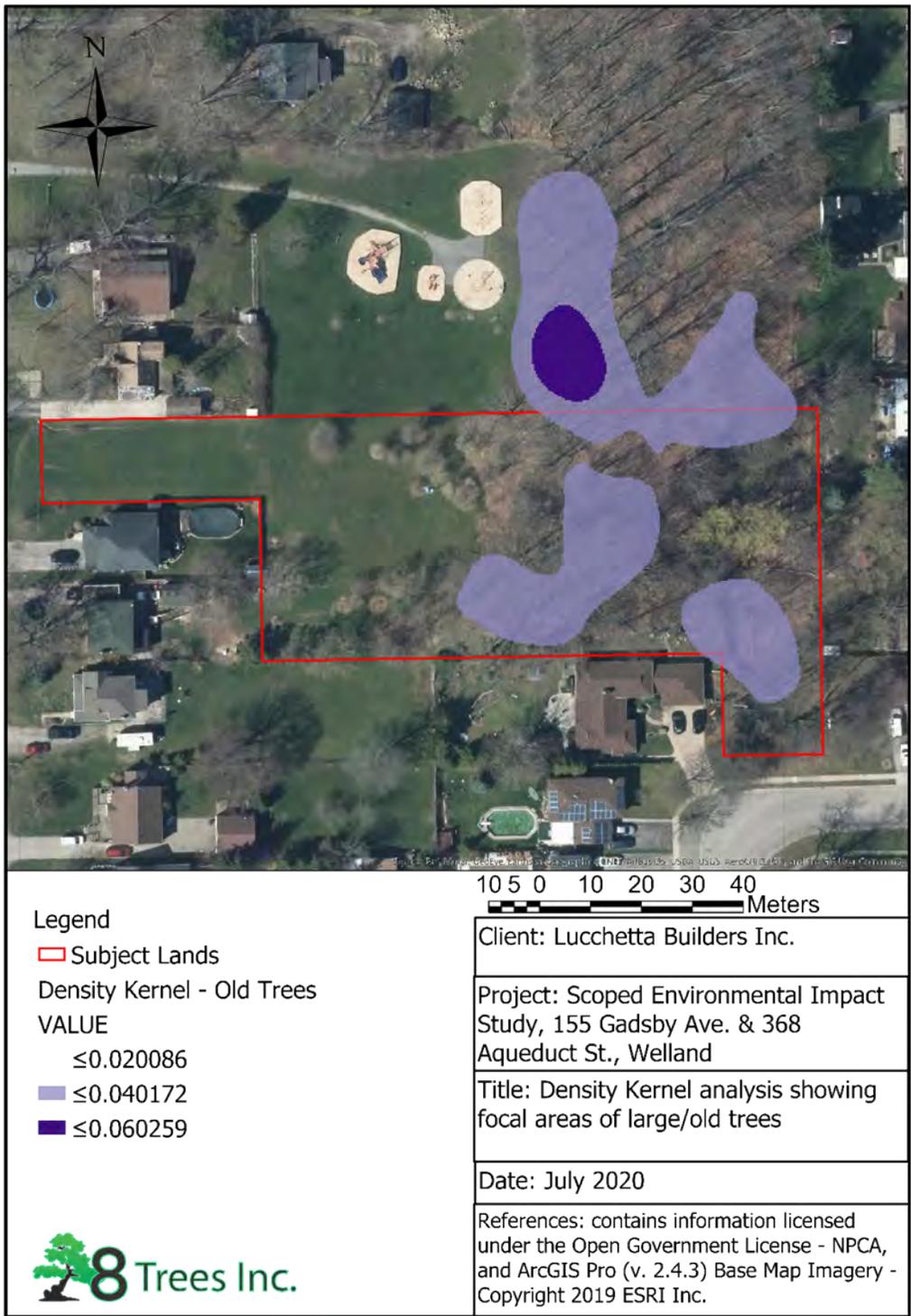


Figure 12. Density kernel analysis showing areas with higher density of large or older trees (DBH > 20cm).

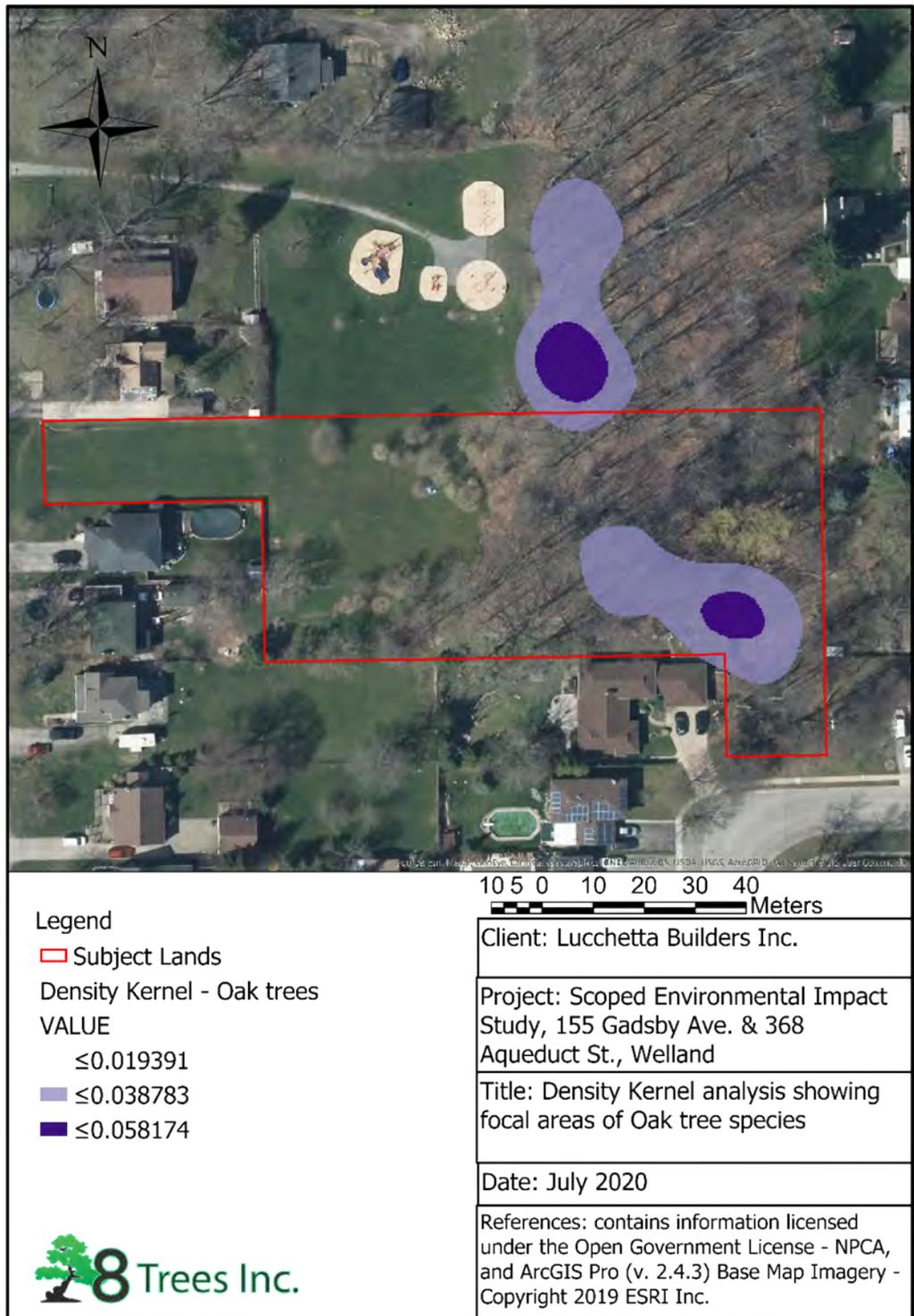


Figure 13. Density kernel analysis showing areas of highest density of large oak trees (DBH > 20cm).

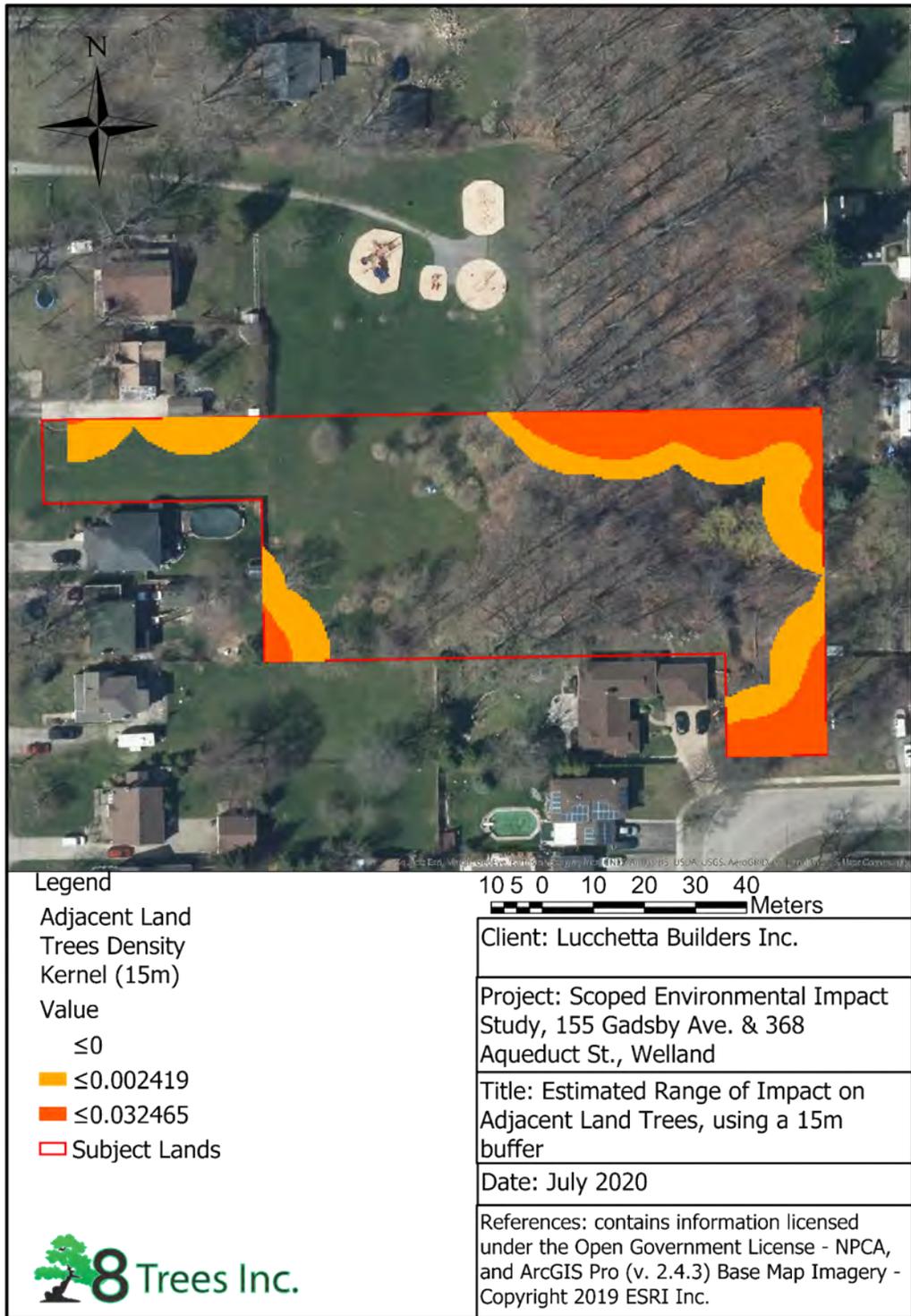


Figure 14. Adjacent land trees (outside Subject Lands) were buffered by 15m to protect root zones from construction activities such as excavation, trenching, filling, and drainage. Mapping shown here demonstrates a minimum construction set back zones.

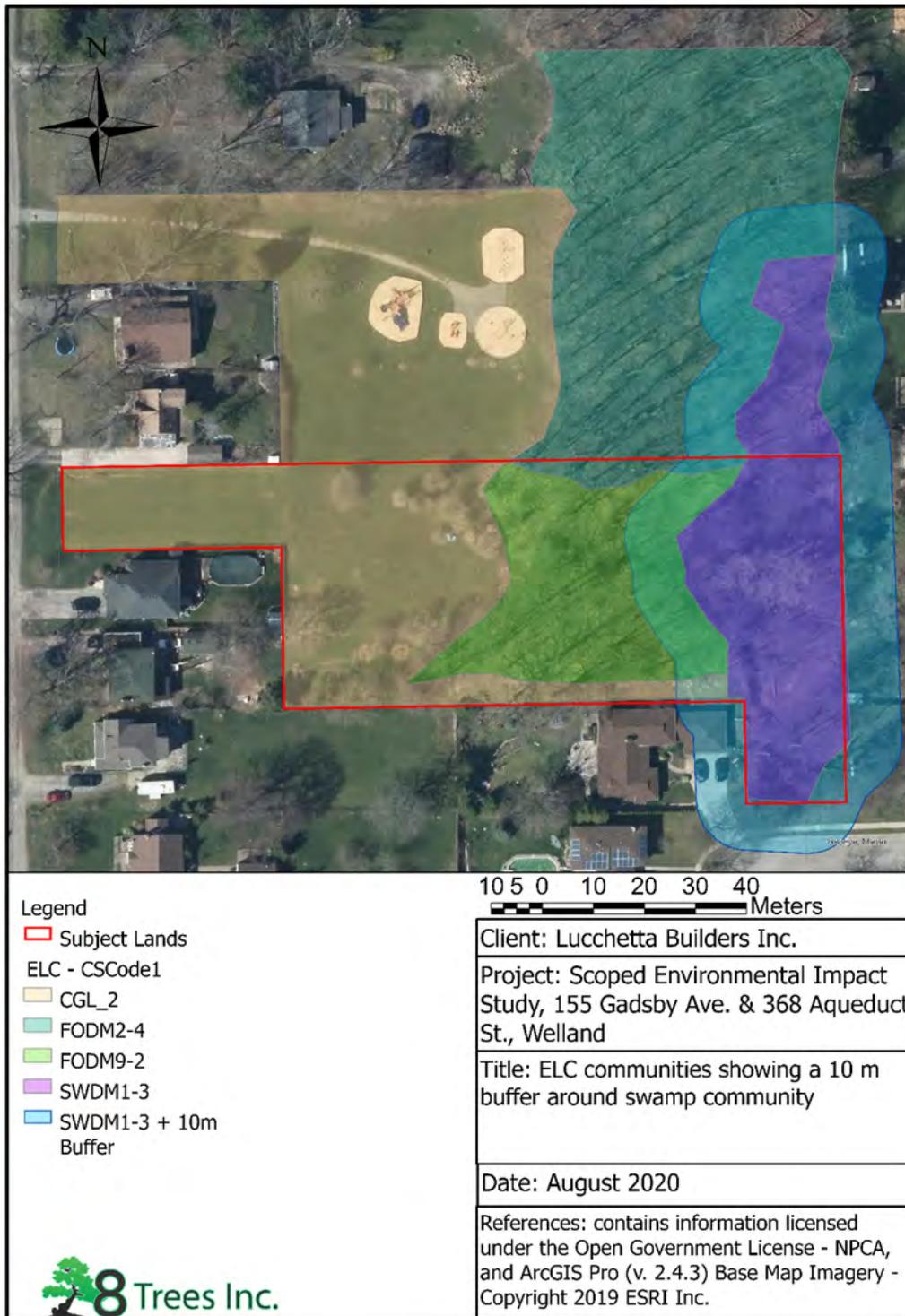


Figure 15. Application of a 10m buffer outward from the SWDM1-3 community to protect the seasonal pool area, were used by Little Brown bat during maternity roosting season.



Figure 16. Recommended habitat protection area combines adjacent trees protection with protection of the swamp community to protect important ecological features within the subject lands.

## Impact Assessment and Mitigation

### Background

Construction within woodlands may result in direct or indirect impacts to woodland vegetation especially large or older trees. Direct impacts include physical harm (canopy, branches, bark, and root damage) and indirect effects caused by reduced oxygen from soil compaction by heavy machinery or the addition of soil fill, changes in water table or increased damage from wind exposure. Small trees (< 1m height) can be transplanted to a suitable offsite location in the early spring season. However large and older trees require additional mitigation, and consideration of protecting the tree root zone which extends well beyond the canopy circumference or drip line (Benson et al., 2019a and b; Figure 17). The root zone is generally twice the height of the tree and most roots are also within the top 30 to 50 cm of the ground surface. Minor feeder roots may regenerate therefore, protection of dripline plus  $2 \times$  canopy radius will protect about 60% of the root zone area. Traditional mitigation is 12:1 ratio or 12times the DBH. However, this traditional approach is insufficient to protect tree viability (Benson et al., 2019a and b). This is important to acknowledge if excavation, filling, utility bore, or trenching is proposed. By excavating too close to the root zone, roots will be cut, and trees may lose their structural support and topple. When removing edge trees, interior trees may weaken and be more vulnerable to wind damage. The selection of which trees to protect and which trees to

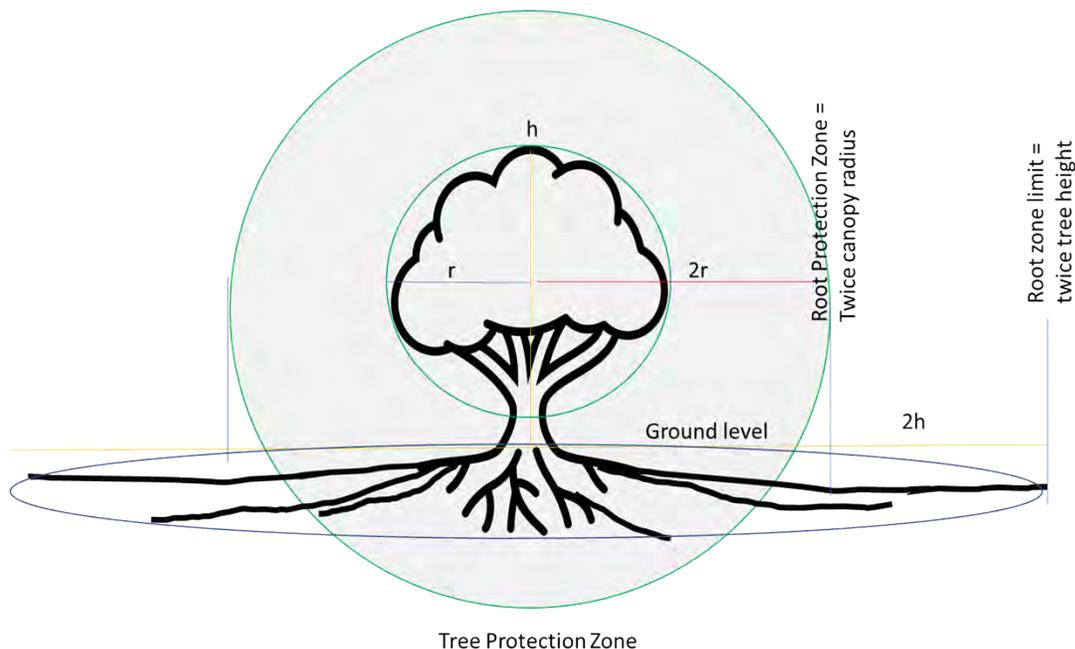


Figure 17. Recommended tree protection zone for trees (no disturbance zone, above and below ground) identified as important **within the subject lands**. Examples from other cities are included in the Appendix. Not to scale. A 15m buffer is recommended to protect adjacent land trees.

remove requires careful consideration and the effects of construction on the root system may not be seen until years later (Fisette and Ryan, 1999).

In addition, there may be agency requirements (ESA review process), to protect habitat features (trees, snags) or to restore or enhance habitat features (i.e. seasonal pool area), and add cavity features within the site, after construction is finished.

### *Methods*

A GIS analysis was completed to demonstrate the effects of recommended habitat protection zone on the proposed development area (Table 4).

1. Existing draft plan no changes (Figure 18).
2. Applying a habitat protection zone for adjacent trees and SWD feature, and changes in developable area (Figure 19).
3. Shifting the development plan to accommodate habitat protection measures and adding an alternative land area via a proposed land swap with the city (Figure 20).

### *Results*

The application of a habitat protection zone will reduce the number of units and the overall development area by approximately 1,356 m<sup>2</sup> (Table 4). The loss in development area may be offset by swapping open park land owned by the City with woodlands owned by the developer (net change – 340 m<sup>2</sup>). This change would nearly balance the development area with the original plan (Table 4). The number of large oak trees impacted by the alternative development area is 5 or 6 trees compared to losing 31 large oak trees from direct and indirect impacts with the original design.

The Gadsby Rd lot is a fully serviced lot and a highly valued part of the proposed development. However, this lot is within the SWD community and the recommended woodland protection area. Therefore, the landowner proposes to build within a smaller portion of the lot acknowledging protection of the seasonal pool functions is important ecological consideration for SAR bats. Therefore, additional constraints within the final building area are recommended in two sites.

Northwest: No digging or filling of soil within the adjacent tree buffer measured as a radius of 15m from trunk (Figure 20). Area would be suitable for back yard.

Northern portion of Gadsby Rd lot: No tree cutting and repair the edge of the seasonal pool to retain existing hydroperiod (Figure 20). This should protect woodland trees from changes in the seasonal groundwater table.

Monitoring of both sites is recommended during and after construction.

Table 5. Development Impact Assessment before and after applying a habitat protection zone, and consideration of development site alternatives and constraints within the woodland feature on subject lands.

	Alternatives	Road (m <sup>2</sup> )	Extra parking (m <sup>2</sup> )	Housing lawns and driveways (m <sup>2</sup> )	Total (m <sup>2</sup> )
I	Existing Plan- No Change (Figure 18)	748.31	141.30	3028.07	3,917.68
II	Applying the recommended habitat protection zones (Figure 19)	591.61	141.30	1828.51	2,561.42
	Impact on development plan	Decrease -156.70	Same	Decrease -1,199.56	Decrease -1,356.26
III	Considering alternate use of adjacent city lands in a land swap with woodlands and retaining Gadsby development lot (Figure 20).	564.27	175.95	2908.98	3649.20
	Overall Change from original plan (Figure 20).	Decrease	Increase	Decrease -119.09	Decrease -268.48
IV	additional development constraints areas added for within woodlands (Figure 20).				-333.32

### Conclusions

The proposed development footprint including direct and indirect effects caused by disturbing, trenching, excavating, and draining the SWDM1-3 area within the woodland is expected to result in almost 100% loss of trees within site and loss of the seasonal pool habitat. This loss would directly impact existing ecological functions including maternity roosting habitat for Species at Risk bats and potential recovery area for White Wood aster. In addition, there are potential losses to adjacent private land trees. The environmental impact (direct loss of trees) is reduced by applying the recommended habitat protection zones (Figure 19). However, the development planning area is also significantly reduced (Table 5). By shifting the development location to the west and negotiating a land swap with the city, the area suitable for development increases almost back to the original development area (Figure 20). The configuration of the road, parking, housing, and gardens with innovative deck designs in the rear yards may further reduce loss of existing trees and maintain developable areas.

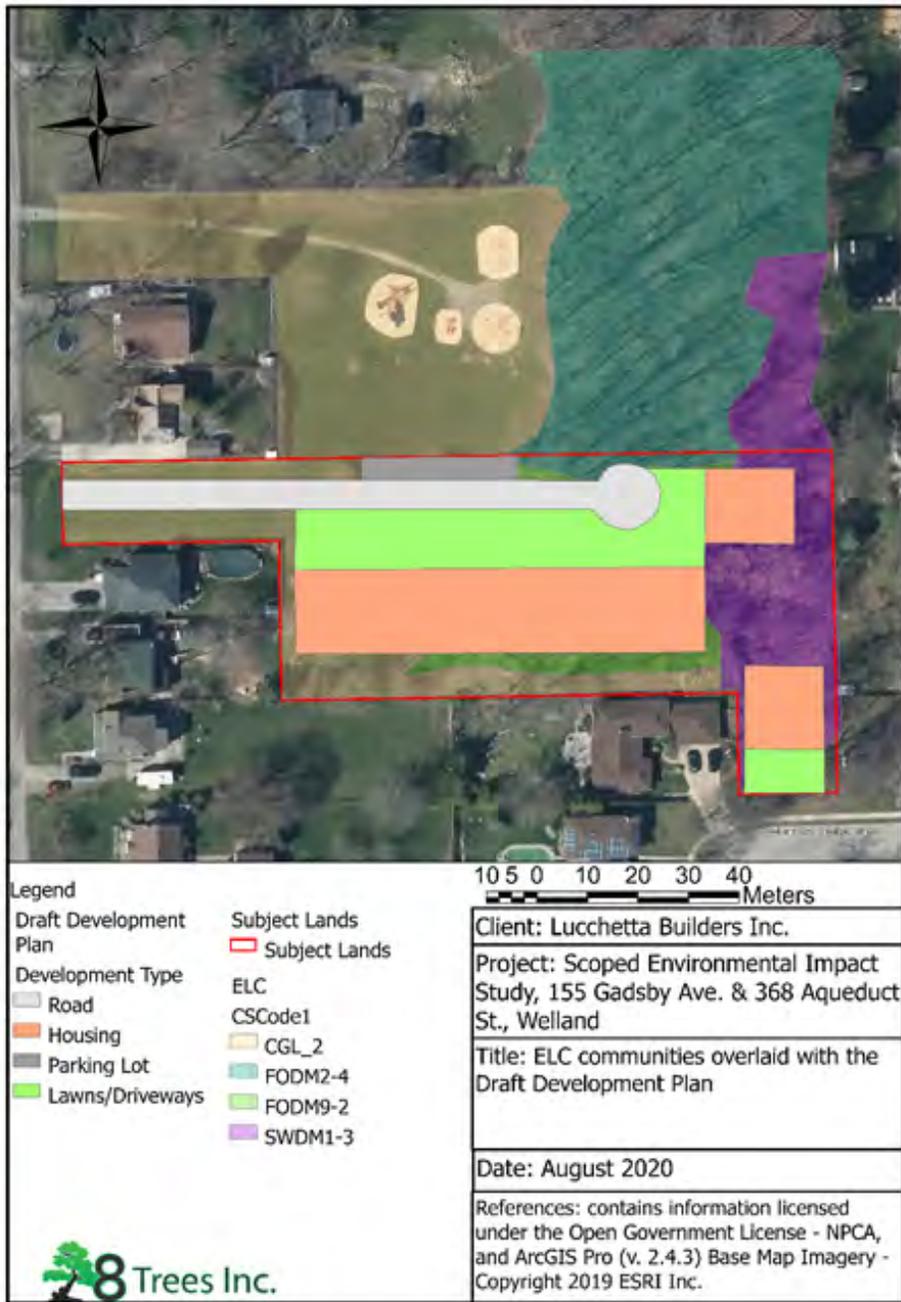


Figure 18. Original Proposed Draft Plan for the townhouse (12) and semi-detached development site on Gadsby Ave. The site plan location was derived from a tif file and geo-rectified using Arc GIS software. The precise location may vary and should be considered approximate. ELC communities are indicated.

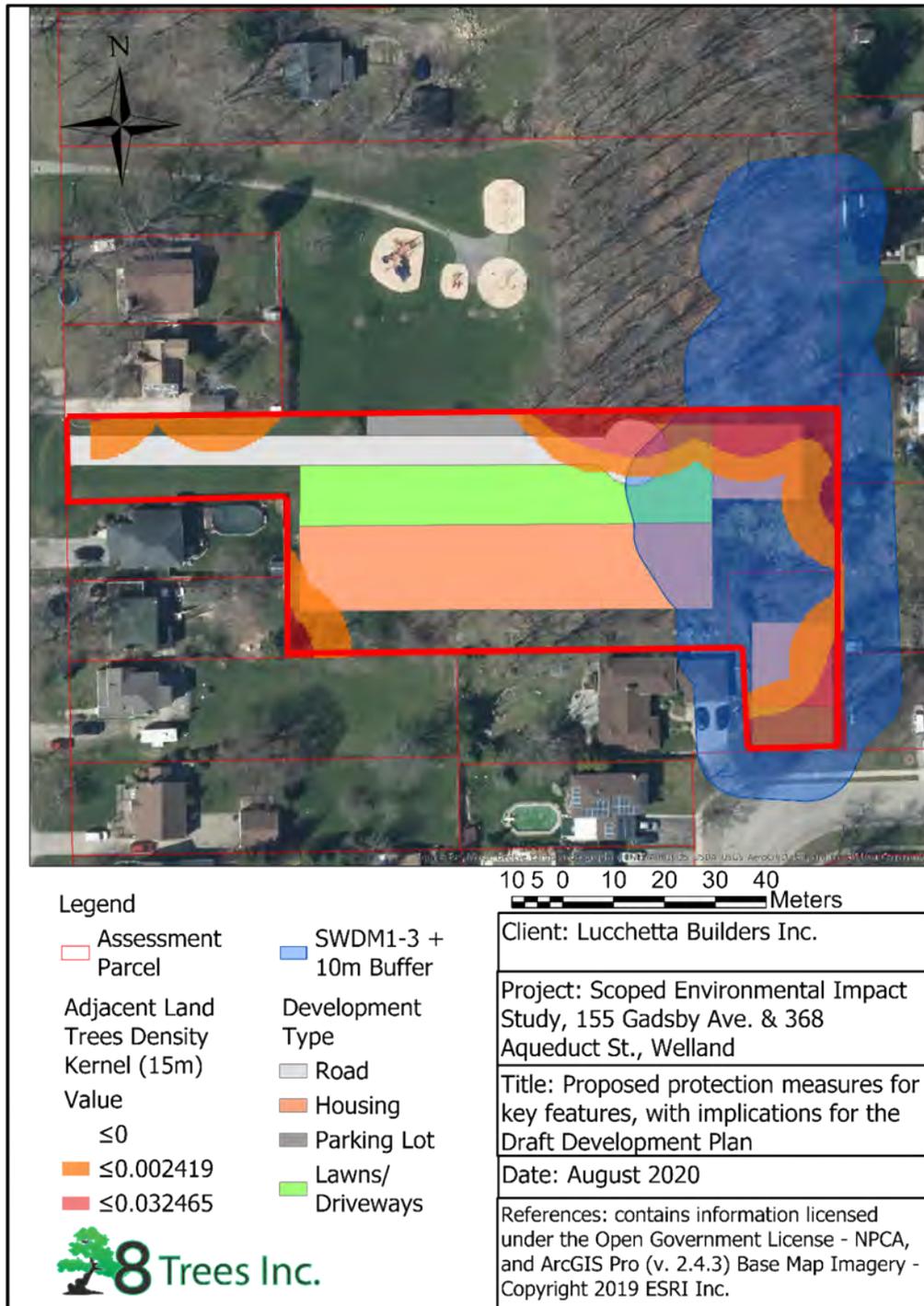


Figure 19. Original proposed development area with habitat protection measures added.



Figure 20. Suggested alternative development area incorporating habitat protection zone with possible land swap with city. Impacts are reduced to loss of 12 large oak trees compared to a loss of 31 large oak trees with original prosed design. Additional construction constraint areas are indicated. Tree locations may vary  $\pm$  GPS error.

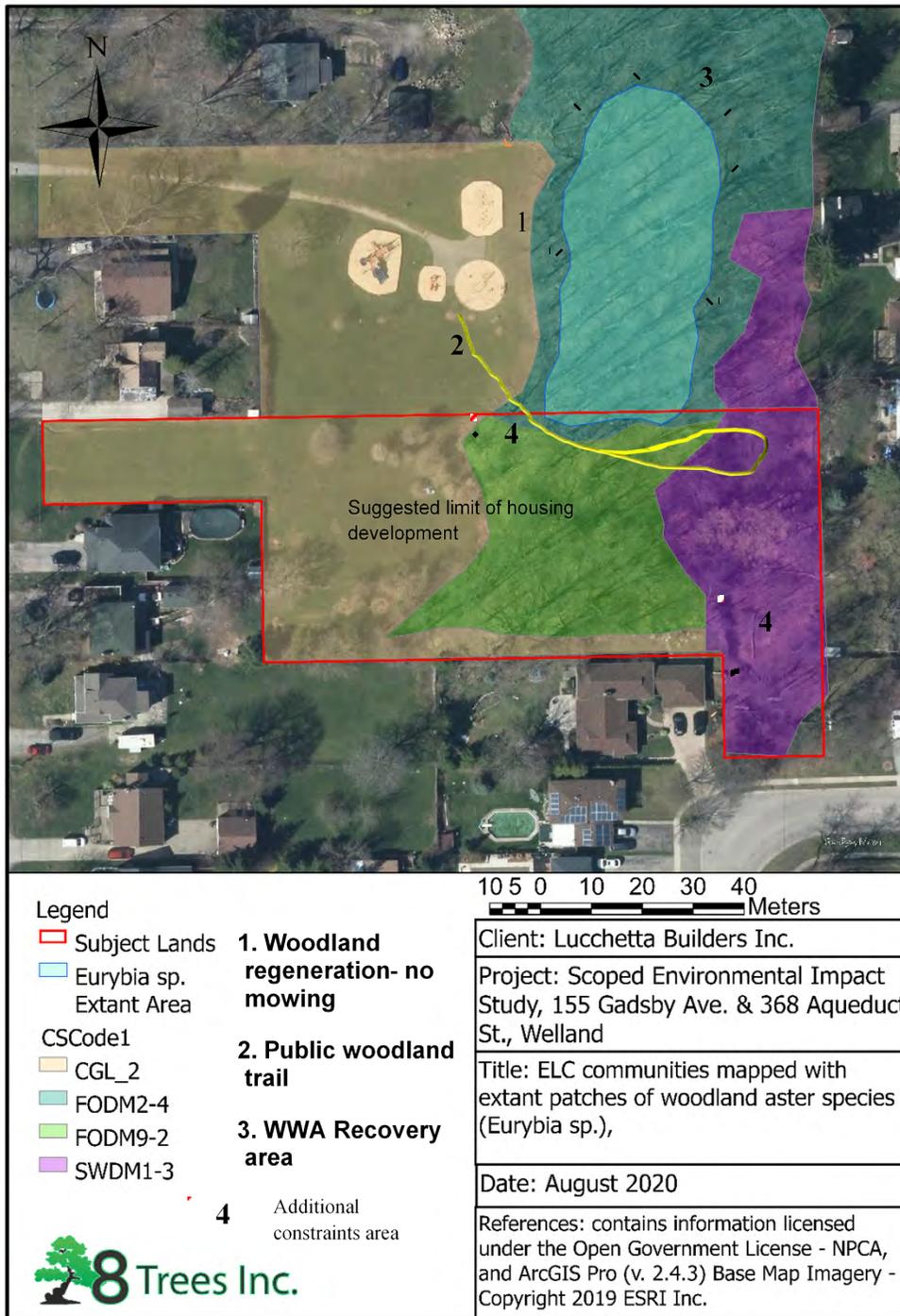


Figure 21. Combined development planning area with protection of habitat to meet provincial objectives for Little Brown Bat and White Wood Aster recovery. Additional development constraint areas are indicated.

## Recommendations

Public support for urban green spaces is an increasing trend in our society (Almas and Conway, 2015). During the COVID-19 pandemic, people turned to walking trails for exercise and entertainment while maintaining social distancing. People were prohibited from gathering at recreational areas such as playgrounds. Local places for people to go and experience nature such as natural trails within subdivisions are socially desirable but are not common.

Many municipalities have developed tree protection guidelines or by-laws, which often include protecting existing trees by adding measures to protect the root zones, limiting access to the construction site, and posting signs describing what work may or may not be done near the trees (e.g. Brampton, Burlington, Toronto, Hamilton, London, Waterloo). We did not find any tree protection guidelines for the City of Welland. Some municipalities have also approved creative measures to include housing developments and public trails within forested areas (City of Waterloo- treetops design). Some municipalities develop a management plan and stewardship approach for encouraging people to visit and enjoy the benefits of natural areas and discourage inappropriate use such as loitering, garbage dumping and cutting trees that are not on their lands. Urban housing lots with large trees are highly valued and sought-after places to live. With expected increases in climate variability, especially drought and high temperatures, incorporating large trees will provide canopy protection to surrounding houses, lower summer temperatures and may reduce household energy costs associated with air conditioning (Ziter et al. 2019).

Aqueduct Park offers the greatest opportunity to meet recovery planning objectives and protect the White Wood Aster population. Which is why we recommend an environmental protection designation for the north half of the remaining woodland. The addition of a public trail for viewing the natural amenities and protecting the White Wood aster from trampling is recommended (Figure 21). In addition, city ownership of the remaining woodland areas would secure future protection of this feature in the greater public interest. A management / stewardship plan and brochure can also be made to provide guidance to adjacent landowners regarding protection, enhancement, and monitoring of the ecological values into the future. 8Trees Inc. would be pleased to assist the city in developing this brochure, meet with landowners and develop a management plan for Aqueduct Park.

For the subject lands we recommend an environmental conservation designation which will permit some development while protecting the seasonal pool functions and associated large trees to maintain habitat for the Little Brown Bat (Figure 21). A detailed mitigation and ecological restoration plan are recommended in consultation with regulatory agencies, 8Trees Inc. and the landowner. Any future tree removal within the

woodland should occur in the fall-early winter season to prevent direct impacts to species at risk bats and migratory birds. Due to the sensitivity of the woodland an ecologist experienced with SAR bat habitat should mark trees designated for removal in consultation with an arborist or professional forester.

### Final Development Plan Jan 20, 2021

After planning agency review, the final development plan includes a reduced footprint into the woods, a reduced number of housing units (from 14 to 9) and designates part of the lands as Open Space & Recreation (Figure 22). The reduction was completed through an analysis of ecological functions and incorporates the recommended development setbacks to protect important habitat features as identified within this EIS (Figure 23). We estimated that 30 large trees would be removed out of 102 remaining on the subject lands. Additional measures to protect existing trees in the proposed backyard and side yard is recommended where feasible. (Figure 23).

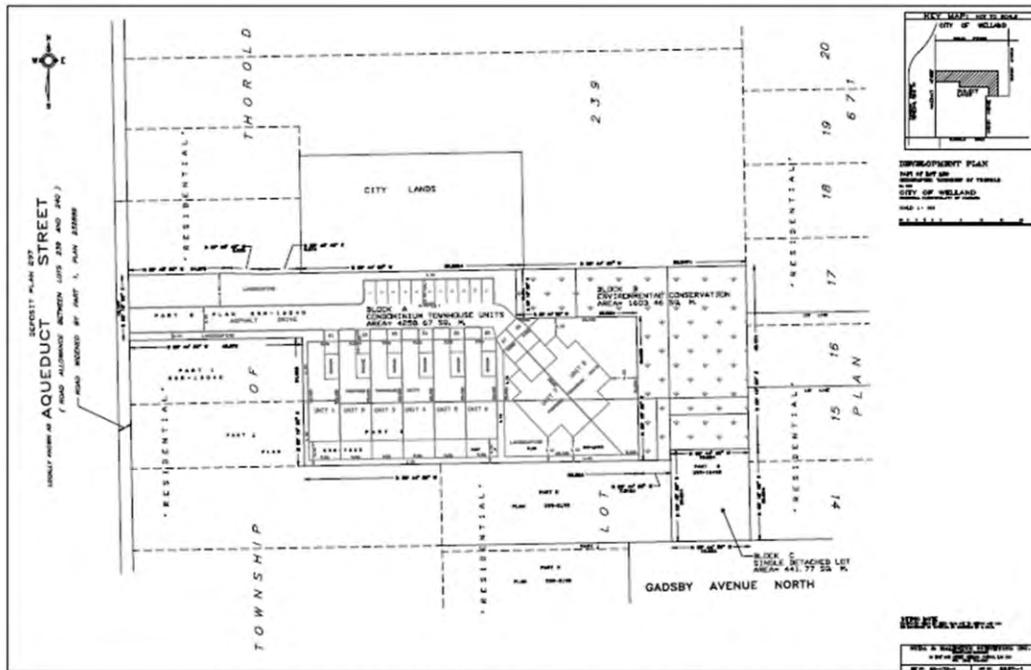


Figure 22 Final Development Plan, prepared by Joe Tomaino for Lucchetta Builders Inc.

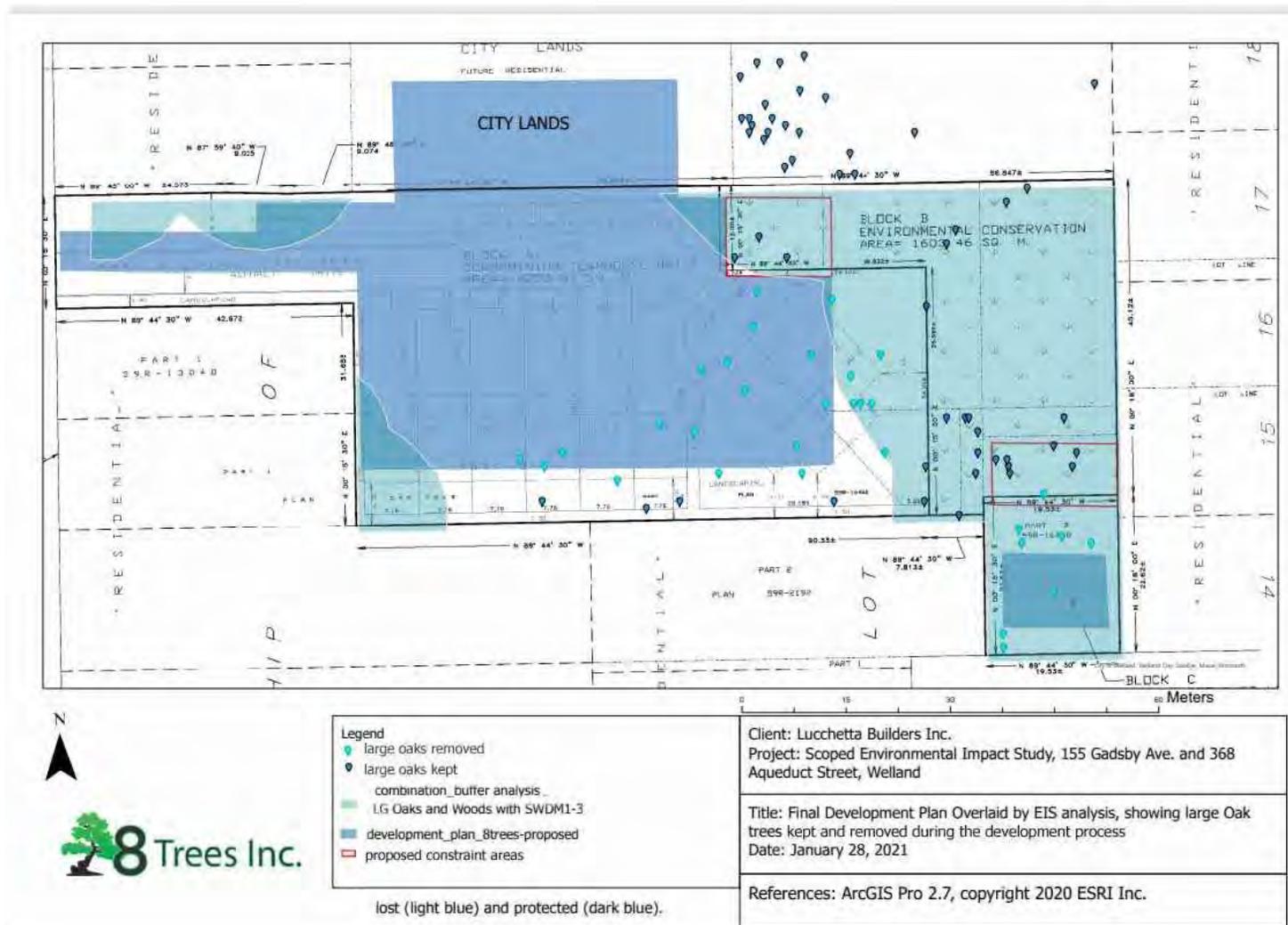


Figure 23 Final analysis comparing proposed development planning area to the final development plan indicating there was good general adoption of EIS recommendations for setbacks to protect important features and functions.

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## APPENDIX A - 8Trees Inc. Staff and Associates



### **Anne R. Yagi**

#### **President, 8Trees Incorporated**

November 2016 - Present

MSc. Biological Sciences (Ecology and Evolution) Brock University

BSc. Honours Zoology University of Guelph

ECO Canada Certified Environmental Professional (EP)

Certified Ecological Restoration Professional (CERP)

[www.8trees.ca](http://www.8trees.ca)

8Trees Incorporated is a non-government environmental consulting company that aims to carry out innovative approaches to ecological restoration, enhance science-communication with the public, and mentor students in the fields of biological conservation, ecology, and environmental policy.

Go to Google Play store or Apple store and download 8Trees newly developed free software; “My Field App” and contribute to citizen science biological data collection in your neighborhood. Coming soon, “My Fish App” which measures and organizes your fish catch data.

#### **Current 8Trees Projects:**

- “Managing an ecological trap on the reptile community inhabiting a partially mined peatland in Southern Ontario”; OSARF 2017 to 2020; CWS winter 2018 and 2019.
- “Monitoring the human impact on Fowler’s toad at Niagara Beaches”; OSARF 2018 to 2021
- Science Advisor “Haldimand County Gray Ratsnake (*Pantherophis spiloides*) population recovery project”; OSARF 2017 to 2020
- “Building on Success: Using Habitat Modeling and outreach to confirm presence of Gray ratsnake and Foxsnake in Niagara-Hamilton”, OSARP 2020
- Science Advisor “Pelee Island Blue Racer (*Coluber constrictor foxii*) Hibernation habitat restoration project”; OSARF 2018 to 2020
- PhD committee member for J. Choquette 2019-2023 “Managing translocations for Massasauga Recovery in Ojibway Prairie” Laurentian University
- Fowler’s toad Recovery Implementation Team Chair.

**8Trees Staff:** Two full-time biologists, four part-time seasonal, summer students and associates.

**M.Sc. Thesis:** “Flood survival strategies of overwintering snakes”, defended June 2020.

**Memberships:** Canadian Herpetological Society, Society for the Study of Amphibians and Reptiles and Society for Ecological Restoration. Past member of American Fisheries Society.

Canadian Herpetological Society 2019 award recipient: “Blue Racer Award” in recognition of significant contributions to the conservation of amphibians and reptiles in Canada.

**Management Biologist (Retired Sep 30, 2016 after 35 years’ public service)**

**Ministry of Natural Resources and Forestry (Vineland Field Office, Guelph District)**

My career at MNR began in 1981 as a summer student conducting a creel survey. After eight years of “back to back” contracts I was hired as the Fisheries Enhancement Officer and then as the Fish and Wildlife District Biologist. I continued in this position for 26 years until I retired in 2016. Although retired from government, my interest in fish and wildlife resources and mentoring continues within my graduate studies, pursuit of research, development of citizen science products, planning and development, proactive projects in natural resource management and ecosystem restoration.

***Career Highlights:***

- Identified, examined, and accepted as an expert witness (Federal, Provincial Court and OMB hearings) in the areas of fish biology and habitat, wetlands, deer biology, freshwater turtles, Massasauga rattlesnakes and general wildlife biology.
- Provincial Wetland Evaluations Niagara- Hamilton-Haldimand (est > 200 evaluations)
- Fish Community Monitoring Project Niagara River Watershed (1997 to 2016)
- Winter Habitat Use by Wildlife: via Helicopter Surveys (White-tailed deer, wild turkeys, raptors, swans, ducks, geese)
- Niagara River Remedial Action Plan- Fish population Impairment- Determination of Delisting Criteria
- Field Investigation of Headwater Channel Erosion and related impacts on the Fenwick Regional ANSI, Provincially Significant Wetlands and Species at Risk
- Welland River Fish Passage White Sucker and Walleye Telemetry Project at Old Welland Canal Junction (2000, 2013 to 2015)
- Navy Island Deer Enclosures project and management recommendations
- Restoration of Walleye in the Welland – Niagara River system
- Grand River Fisheries Management Plan and advocate for the removal of the Dunnville Dam
- Species at Risk Habitat Stewardship and Education projects (Fowler’s toad, Massasauga, Spotted turtle, Blanding’s turtle, Gray Ratsnake, Allegheny Mountain Dusky and Northern Dusky salamander) included managing field technicians and summer students and external funding sources annually since 2000 with an operating budget \$50K to \$100K. All projects included surveys and monitoring, habitat enhancement, restoration, and design and creation of outreach and educational

products. These projects also included mentoring and liaison with partners including universities, agencies, landowners and other interested stakeholders.

- As part of this species at risk team we were the first to identify Allegheny Mountain Dusky Salamander in the Niagara Gorge
- Ecosystem restoration project (1998 to present) - managing two species at risk populations Massasauga and Spotted turtle before, during and after water levels were increased in the central historically peat mined area. This included mark –recapture (> 200) massasaugas and (>400) spotted turtle observations since 1998. Radio telemetry technique for both species was used to confirm habitat use. With increasing conservation concerns raised about massasaugas and the potential that the mined peatland to become an ecological trap on the population. Radio telemetry was abandoned in favour of my innovative and successful coverboard design and survey technique to continue to monitor massasaugas and the resident snake community. During this time, I designed and implemented a hibernation habitat study where I introduced the “life zone” hypothesis. A “life zone” is a subterranean space where snakes successfully overwinter. This space does not freeze or flood completely and is the focus of my graduate studies. “Overwintering behaviour and survival of temperate neonatal snakes” and the development of the “forced hibernation technique”. This technique is a biological test of the life zone to confirm snakes can survive within the associated habitat. It is only used in areas where physical measures have confirmed a physical space is maintained in harsh and mild winters. Once a habitat is biologically tested using neonate gartersnakes (model species), species at risk neonates can be forcibly hibernated in these good habitats. This technique will aid in repopulating good habitat because snakes use homing behaviour to return to previously occupied burrows thus removing the ecological trap associated with the mined peatland.
- Fowler’s toad Recovery Team Chair, Ontario Dusky Salamander Recovery Team Co-Chair, Gray Ratsnake and Massasauga rattlesnake and Ontario SAR turtle Recovery Team member
- Peregrine Falcon Recovery and Master Bander (1996 to present)

***Other Highlights include:***

- Provincial Amethyst Award: Grand River Fisheries Management Plan (1999)
- OMNR Pride Award: Recovery of Peregrine Falcon (2000)
- NPCA: Welland River Restoration Committee Recognition Award (2002)
- NPCA Conservation achievement awards (2002 to 2008)
- Niagara River Bathymetry, Habitat Mapping, and habitat creation projects
- Niagara Region Fish Habitat Types with Management Rationale for municipal planning
- Binbrook Reservoir Electrofishing, and live trap netting projects
- Adult Walleye transfer from Bay of Quinte, Lake Ontario to Binbrook Reservoir
- Spring thermal flux studies Niagara River and Upper Niagara River Tributaries
- Long term thermal monitoring of last remaining Brook trout fishery Upper Twelve Mile Creek
- Upper Twelve Mile Creek Brook Trout Population Assessment 1984, 2000, 2008
- Upper Twelve Mile Creek Restoration Projects (1989 to 1995)

- Frenchman’s Creek Grass Roots Watershed Restoration Project (1991 to 1995)
- Point Abino Drain Fisheries Study- Pre and Post Drainage Works 2001 – 2002
- Welland River Fish Community Assessment 1997
- Walleye Restoration Project, Grand River, Welland River and Community Involvement
- Lake Ontario Littoral Zone, Lake Gibson, Martindale Pond and Old Welland Canal Fish Community
- Wild turkey reintroduction, trap and transfer International project (1986 to 1996)
- Ontario Conservation Fishing and Hunting Licence, Pleasure Boat Certificate, Class 1 Electrofishing Certificate (all types), Standard First Aid and CPR, ROM Fish ID, Wetland Evaluation Certifications, Active golf enthusiast

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- Yagi, A. R., Planck, R.J., Yagi, K.T. and Tattersall, G.J., 2020. A Long-Term Study on Massasaugas (*Sistrurus catenatus*) Inhabiting a Partially Mined Peatland: A Standardized Method to Characterize Snake Overwintering Habitat. *Journal of Herpetology*, 54(2), pp.235-244.
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### **Government Publications and Reports**

- Yagi, A. R., et al. 2019. Managing an Ecological trap in a Partially Mined Peatland on the Resident Reptile Community which includes Five Species at Risk; Massasauga; Eastern Ribbon; Spotted turtle; Snapping turtle and Blanding’s turtle. Final Report for 2019-20. Species at Risk Stewardship Fund, Ontario Ministry of Natural Resources and Forestry.
- Yagi, A. R., et al. 2018. Managing an Ecological trap in a Partially Mined Peatland on the Resident Reptile Community which includes Five Species at Risk; Massasauga; Eastern Ribbon; Spotted turtle; Snapping turtle and Blanding’s turtle. Final Report for 2018-19. Species at Risk Stewardship Fund, Ontario Ministry of Natural Resources and Forestry.
- Yagi A.R., et al. 2017. Managing an Ecological trap in a Partially Mined Peatland on the Resident Reptile Community which includes Five Species at Risk; Massasauga; Eastern Ribbon; Spotted turtle; Snapping turtle and Blanding’s turtle. Final Report for 2017-18. Species at Risk Stewardship Fund, Ontario Ministry of Natural Resources and Forestry.

- Yagi, A.R., A. Brant, S. Meyer, D.M. Green, S. Dobbyn, B. Johnson, and R. Tervo†. 2017. The Fowler's toad Stewardship Guide. prepared for Environment Canada Habitat Stewardship Program 61pp.
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- Yagi A.R., T. Markle, A. Brant and R. Tervo. 2010. Quebec and Ontario Stream Salamander Stewardship Guide, prepared for Environment Canada Habitat stewardship Program 37 p + iii
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- Yagi A.R and R. Tervo. 2008b. Species at Risk Habitat Mapping for the Northern Dusky Salamander (*Desmognathus fuscus*)- a Test of Draft Habitat Mapping Guidelines. Unpublished report for Ontario Ministry of Natural Resources Species at Risk, Peterborough, Ontario 12pp.
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- Yagi A.R and C. Blott. 2008d. Niagara River Watershed Fish Community Assessment (2003 to 2007) Ontario Ministry of Natural Resources unpublished report 197pp.
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## Katharine. T. Yagi, PhD

### SUMMARY OF QUALIFICATIONS



Katharine Yagi is currently a Research Associate and Post-Doctoral Fellow with 8Trees Inc. and Brock University. She received her B.Sc. (Hon) in biological sciences from the University of Guelph in 2008, M.Sc. in biology from Laurentian University in 2010, and her doctorate in 2018 from McGill University in Renewable Resources.

Her past research investigates the impacts of habitat change on endangered populations of amphibians and reptiles. She is currently pursuing several research projects on ecological restoration, and anthropogenic impacts on amphibian and reptile behaviour, dispersal, survival, and overall population dynamics.

- Recent Course Instructor “Ecology of a Changing Planet” and “Principles of Ecology” Brock University (2019-2020)
  - Species at Risk Biologist MNRF (2011)
  - Habitat Stewardship Technician with Land care Niagara (2010-2011)
  - Teaching assistant, Laurentian University (2005-2008) and McGill University (2012 – 2016)
  - Summer Field Technician, MNRF (2005 – 2008)
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- Wetlands 101 (authorized by Ducks Unlimited Canada)
  - Certified Ecological Restoration Practitioner-in-training/CERPIT (authorized by the Society of Ecological Restoration)

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- Yagi, K.T., and D.M. Green. 2020. Extinction risk in an endangered toad population: A case study on the Fowler’s toads (*Anaxyrus fowleri*) in Long Point, Ontario. *Herpetological Conservation and Biology*. In Review (HCB 2019-053).
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- Yagi, K.T. 2010. The effects of flooding on the spatial ecology and thermoregulation on Spotted turtles (*Clemmys guttata*) in a southern Ontario population. MSc Thesis. Laurentian University.

## Cathy Blott, B.Sc. (Hon)

### SUMMARY OF QUALIFICATIONS

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Cathy Blott is currently an Associate Habitat Restoration Biologist with 8Trees Inc, specializing in hydrological system monitoring. She graduated with an Honours B.Sc. majoring in Biology from the University of Waterloo in 1993 and has 27 years of experience working on fish and wildlife restoration and conservation projects. Some of her responsibilities at 8Trees Inc. include conducting field work, analyze data, prepare reports and proposals, and help younger staff, students, and volunteers in the field. Cathy also conducts outreach events and builds partnerships with landowners, municipalities, and agencies to gain support for several ongoing projects.

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Cathy is currently working with 8Trees Inc. on several projects. She is managing the hydrological monitoring of groundwater levels in the Wainfleet Bog including liaison with public and agencies. She also collects winter hibernation habitat data for the snake survival studies in Wainfleet bog. Cathy conducts the hydrology, soils, vegetation, amphibian, bird, fisheries, and fish habitat assessments for each EIS.

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#### ***Work Experience***

Managing Environmental restoration projects for Lower Grand River Land Trust (2017 to present).

Fisheries Biologist and Acting Management Biologist MNRF (2007 – 2010; 2012 – 2017)

Consulting Biologist for Limnoterra Ltd., Waterloo ON 1993 – 2007

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- Coauthored Niagara Fish Community and Niagara River RAP reports
- Analyzed and managed MNRF's digital fish database
- Managed fish telemetry data collection at Welland River Siphons
- Managed thermal studies of Upper Niagara River and Upper 12 Mile Creek
- Completed bathymetry, substrate, aquatic vegetation surveys and velocity studies of the Upper Niagara River and tributaries
- Great Lakes Acoustic (GLATOS) monitors in the Niagara River watershed
- Fish Crew Leader Welland River Fish Assessment (Seine, Back-Pack, E-Boat)
- Fish Crew Leader MNR Zone 8, 10 & 11 North Bay, ON. (2009) Sault Ste Marie/Blind River (2008) and Gill net surveys from (Broad Scale Fisheries Management Program).
- In Kamloops BC fish community habitat assessments & impacts for 5 rivers for proposed Independent Power Production hydro-electric projects. I also monitored impacts to river habitat during Ministry of Transportation riverbank repairs. I also conducted fish passage culvert inspections for the Ministry of Forests and prioritized Ministry of transportation culvert replacement candidates based upon fish community and habitat parameters.
- Assisting Habitat Haldimand in restoring of brook trout stream on Grand River
- Draft Environmental Resource Study document for impending Class C Environmental Assessment of brown trout stocking in Lake Huron. (2010)
- Sturgeon sampling and commercial catch sampling, Nottawasaga Bay, southern Georgian Bay MNR Owen Sound District (2010)

**Theresa A. Bukovics, M.Sc.**

**SUMMARY OF QUALIFICATIONS**

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Theresa Bukovics currently works for 8Trees Inc. as a Habitat Stewardship Biologist and Volunteer Coordinator. She graduated with her B.Sc. in Ethnobotany, minoring in Anthropology, from the University of Hawaii in 2010, and completed her M.Sc. in Biological Sciences (Ecology and Evolution) at Brock University in 2016.

Her M.Sc. research focused using photographic time series to quantify age-specific changes in morphology and survival in *Rhizocarpon geographicum* over a 4-yr period at Illecillewaet Glacier, BC. Theresa has since taken an avid interest in the field of herpetology. During her time in the field, Theresa enjoys familiarizing herself with the native flora including rare plants, lichen, and fungi of the Niagara region.

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**8 Trees Inc., Fonthill, ON**

**May 2017 – Present**

*Habitat Stewardship Biologist*

- Permitted lab and field work on species at risk, including Spotted Turtle and Eastern Massasauga Rattlesnake, Fowlers toad, Fox Snake and Gray ratsnake.
- Completed Data collection (vegetation, ELC, birds, soils, trees, bat surveys and habitat) and GIS mapping for Environmental Impact Studies and summary reports
- Conducted road surveys and worked with two municipalities to install animal crossing signs.
- Assisted in preparing proposals and reports and analyzing and managing different types of data.

**Brock University, St. Catharines, ON**

**Sept 2012 – Dec 2017**

*Lab Demonstrator & Teaching Assistant*

- Instructed university students at all levels in complex principles in biology, botany, and ecology; Updated and refined lab material, created biweekly power points, constructed and administered marking schematics.
- Provided verbal and written evaluations on in-class assignments, take-home assignments, and presentations.

**University of Hawaii Botany Department, Honolulu**

**Aug 2009 – Mar 2010**

*Ethnobotany Research Assistant:*

- Established and managed a database comprised of texts in 6 foreign languages focusing on 18<sup>th</sup> & 19<sup>th</sup> Century European expeditions throughout Southeast Asia;
- Collaborated with and oversaw fellow researchers from various academic departments;
- Collected, translated, and evaluated quantitative and qualitative data.
- Developed research methodologies and assisted in restoration projects;
- Conducted and led field surveys, identified plant species in the field, and recorded and collected voucher specimens of Hawaiian native and invasive flora;
- Prepared a variety of technical reports weekly both independently and as part of a team.

## Marcie Jacklin

### SUMMARY OF QUALIFICATIONS

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Marcie is our bird identification expert. Retired from Brock University after 25 years of service, achieving the title 'Librarian Emeritus'. Marcie now has a bit of time available to mentor our biologists.

Marcie began birding in 1989 in Ottawa. She has given multiple nature presentations to the Niagara community and leads many bird watching hikes. She has served as a compiler for many years for Christmas Bird Counts and as a director for the Buffalo Ornithological Society and the Ontario Field Ornithologists.

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Marcie wrote four chapters in Niagara Birds edited by John Black and Kayo Roy. She is currently Chair of the Niagara Birding Conservation and Tourism Collaborative which is hoping to improve conditions for birds and birders visiting Niagara.

She is proud to be the recipient of the Bert Miller Nature Club Award and the R.W. Sheppard Award (Niagara Falls Nature Club).

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## APPENDIX B –Surveys, Field Data, Notes and Photographs

### *Schedule of Field Activities*

**Table B1.** Summary of time periods when field surveys were conducted

Activity	Nov 2019	Dec, 2019	Jan, 2020	Feb, 2020	Mar, 2020	Apr, 2020	May, 2020	Jun, 2020	Jul, 2020	Aug, 2020
General site orientation, (aquatic and terrestrial attributes)	X									
Incidental Wildlife	X	X	X		X	X	X	X	X	
ELC Communities, soils		X					X			
Tree / Snag Survey		X					X			
Agency Site Visit			X							
Breeding Birds							X	X		
Bat Acoustic Surveys								X		
Plant Vegetation Survey		X					X	X	X	X

*ELC Community Notes and Soil Cores*

Soil Core 1. UTM 642759 // 4763112

Property: Aqueduct Park, red oak dominant canopy with American beech. Saplings: red oak, sugar maple, ash, white spruce and American beech. Ground cover: moss, solemn seal, grass and 50% bare ground.

Soil: Sandy loam, gritty, barely makes a cast at 0-40cm below grade, clay at 40-60cm below grade with mottling at 54cm and gravel inclusions <2%, over a hard clay from 60-72cm below grade. Borehole depth ended at 72cm because it was too difficult to bore into the lower clay layer. Water table was at 67cm below grade at 1004hr and slowly filling by seeping droplets. Water table was at 48cm below grade after 68min (at 1112hr) and was still filling at approximately the same rate.



Soil Core # 2. UTM 642755 // 4763038

Property: subject property. Red Oak forest with Swamp Pin Oak and Shumard Oak (not confirmed), Red or Freeman maple, Black Willow, Bitternut and Shagbark hickory.

Understory: (sparse) grey dogwood, hickory, elm, sugar maple, red oak and basswood saplings. Ground cover dominated with jewelweed, poison ivy, Thicket and Virginia Creeper, covering >70% of the area, and few patches of Jack-in-the-pulpit. Remainder of area contains a vernal pool with standing water until July 2020.

Soil: clay from 0-45cm below grade with mottling starting at 22cm below grade. At 45cm below grade mottling becomes noticeably dark brown. Much more gleying at 60-75cm below grade. Borehole ended at 75cm below grade because it was too difficult to bore further into the bottom clay layer.

Water table at 15cm below grade at 1113hr (after waiting 10 minutes) and was still filling through seeping droplets.



*General Screening Information for Species at Risk plants in Deciduous Forests*

*Ecoregion 7E - Ontario:*

Due to the COVID-19 pandemic we were challenged with communicating directly with provincial staff as they were working from home without access to their files, therefore we relied upon online sources for screening SAR and our local knowledge of SAR locations (Appendix A). One source was

<https://www.ontario.ca/page/species-risk-ontario>

The Ontario Ministry of Natural Resources- Natural Heritage Information Centre monitors species that are declining provincially (S- Ranks 1 to 3) and those considered by the scientific community (COSSARO) as;

Extirpated (EXP)– native to Ontario and still exists in the world, but no longer found here

Endangered (END)– imminent danger of becoming extinct or extirpated

Threatened (THR) – not endangered, but likely at risk if steps not taken

Special Concern (SC) – not endangered or threatened, but at risk due to identified threats

**Table B2** Ontario Species at Risk screening Forested Plants Ecoregion 7E

<b>Species</b>	<b>Status</b>	<b>Habitat</b>	<b>General and nearest Location</b>
<b>American Chestnut</b>	Endangered (prior to ESA 2008)	dry upland deciduous forests with sandy, acidic to neutral soils	Carolinian Zone Nearest Fonthill Kame
<b>American Columbo</b>	Endangered (prior to ESA 2008)	dry upland woods, but in parts of its range it has been found in grasslands, moist woods and swampy habitats	Carolinian Zone Nearest Fonthill Kame
<b>Blue Ash</b>	Special Concern (prior to ESA 2008)	deciduous floodplain forests, and along sandy beaches and on limestone outcrops associated with Lake Erie.	Carolinian Zone (not confirmed in Niagara)
<b>Broad Beech Fern</b>	Special Concern (prior to ESA 2008)	grow in rich soils in deciduous forests, often in areas dominated by maple and beech trees. It requires moist soil and	Southern Ontario Fonthill, Welland area

		usually grows in full shade.	
<b>Butternut</b>	Endangered (prior to ESA 2008)	deciduous forests edges or openings. Dry to moist, well-drained soil and is often found along streams.	Southern Ontario, Including Niagara Region
<b>Cherry Birch</b>	Endangered (prior to ESA 2008)	well-drained clay loam soil over limestone bedrock with White Oak, Red Oak, Eastern Hemlock, Sugar Maple and other deciduous trees.	Two known sites in Niagara peninsula only. Nearest Fonthill Kame
<b>Common Hoptree</b>	Threatened	Dry sandy soils	Lake Erie Dunes, Fonthill, Niagara Falls
<b>Cucumber Tree</b>	Endangered (prior to ESA 2008)	upland moist deciduous or mixed forest habitats, where they grow in rich, well-drained soils, often in headwater areas or on rises within low swampy areas.	Carolinian Zone ; Fonthill Kame, Fenwick, and Ridgeville
<b>Dwarf Hackberry</b>	Threatened	dry, sandy areas near lakeshores, inland dunes, ridge tops and limestone alvars.	Carolinian Zone; Niagara Falls Rare habitats
<b>Eastern Flowering Dogwood</b>	Endangered February 18, 2009	floodplains, slopes, bluffs and in ravines, and is also sometimes found along roadsides and fencerows	Carolinian Zone; Woodlawn Rd. Niagara College
<b>Green Dragon</b>	Special Concern (prior to ESA 2008)	wet deciduous forests along streams, particularly maple forest and forest dominated by Red Ash and White Elm trees	Carolinian Zone; West Lincoln, Fort Erie
<b>Kentucky Coffeetree</b>	Threatened (prior to ESA 2008)	Edges of deciduous forests or openings moist, rich soil. Consequently, it is often found in floodplains, though it will tolerate shallow rocky or sandy soils.	Carolinian Zone: Known to occur in Fonthill, Short Hills area but may have been planted.
<b>Round-leaved Greenbriar</b>	Threatened (prior to ESA 2008)	open moist to wet woodlands, often growing on sandy soil.	Carolinian Zone: Pelham; Niagara Falls

<b>Shumard Oak</b>	Special Concern (prior to ESA 2008)	moist soils and can grow close to water, and in swampy areas. It typically grows in deciduous forest or along fencerows.	Carolinian Zone: Niagara Falls, NOTL, Navy Island, Fort Erie, Welland
<b>White Wood Aster</b>	Threatened (prior to ESA 2008)	open, dry deciduous forests that are dominated by Sugar maple and American beech trees. It is often found mixed in with other asters.	Carolinian Zone; Niagara region from Fort Erie to Niagara Falls, Fonthill, Beamsville

*Plant Survey Results for SAR Screening*

**Table B3.** Screening table survey results for Species at Risk Plants that may occur in Forests and Woodlands of South Niagara. List compiled from Provincial and Federal sources COSEWIC and COSSARO lists

Species	COSEWIC / COSSARO Status	S- Rank	General Habitat Information	Nearest Area	Subject Lands
American Chestnut	END/END	S1	The range is restricted to southwestern Ontario where it occurs in deciduous forests. Trees are being lost through cutting and suburban expansion. Few trees lack Chestnut Blight cankers, and healthy trees are extremely rare, although suckers and stump sprouts are locally common in the Carolinian Zone of Ontario (NHIC).	Fonthill	Not present
Blue Ash	THR/SC	S2	Floodplains, sandy woods and alvar woodland in southwestern Ontario Threatened by the introduced Emerald Ash Borer. Ash trees have been decimated in southwestern Ontario by Emerald Ash Borer and populations of Blue Ash are declining, however this species has a higher survival rate than other native ash species following Emerald Ash Borer invasion (NHIC).	SW Ontario	Not present

Species	COSEWIC / COSSARO Status	S- Rank	General Habitat Information	Nearest Area	Subject Lands
Cherry Birch	END/END	S1	At risk due to habitat destruction, only stand in Canada located in Niagara peninsula.	Niagara Region	Not present
Shumard Oak	SC/SC	S3	Rare and local in moist deciduous woods in southwestern Ontario. Easily confused with similar oaks and not detected in Ontario until 1978 by Gerry Waldron near Amherstburg, Essex County. The status of populations in the Niagara area (i.e. whether <i>Q. shumardii</i> or not) is uncertain (NHIC).	South Niagara Region, Navy Island, Fort Erie Waverly Woods	Not confirmed
Dwarf Hackberry	THR/THR	S2	Dry, open sandy woods and dunes; and alvar woodland in southwestern Ontario. Most common in the province in the Grand Bend area (Lambton County) on forested dunes. Also disjunct at a few calcareous rocky woodland sites in southeastern Ontario (NHIC).	SW Ontario	Not Present
Red Mulberry	END/END	S2	Rich woods, sometimes on floodplains, and confined to the Carolinian Zone of southwestern Ontario. Hybridization with	Niagara Region	Not present

Species	COSEWIC / COSSARO Status	S- Rank	General Habitat Information	Nearest Area	Subject Lands
			the introduced <i>Morus alba</i> is occurring at most Ontario <i>M. rubra</i> locations; also threatened by habitat loss and several diseases.		
Cucumber Tree	END/END	S2	Rich deciduous woods; confined in Ontario to the Norfolk County and Niagara Region in the Carolinian Zone	Fenwick and Ridgeville, ON	Not present
Kentucky Coffee-tree	THR/THR	S2	Rich woods and marsh edges in the Carolinian Zone; open Hackberry woods on shallow soil over limestone on the Erie Islands.	Short Hills area	Not present
Black Gum		S3	Uncommon and local (occasionally common) in moist or dry woods and savannas; restricted to the Carolinian Zone	South Niagara	Not present
Eastern Flowering Dogwood	END/END	S2	Formerly a widespread species of deciduous woods in the Carolinian Zone now much reduced and declining due to habitat loss and dogwood anthracnose, a probably introduced fungal disease.	Woodlawn rd. Niagara College	Not present

Species	COSEWIC / COSSARO Status	S- Rank	General Habitat Information	Nearest Area	Subject Lands
White Wood Aster	THR/THR	S3	Mesic to dry deciduous woods in southwestern Ontario where threatened by habitat loss and invasive species. Recently found at a number of new sites in Niagara Regional Municipality (NHIC). <b>Blooms in the late summer-fall season.</b>	Short Hills Area, Woodlawn Rd., Aqueduct Park	Large-leaved Aster confirmed in July 2020. Schreber's Aster (S2) confirmed in Sep, 2020 <b>White Wood Aster confirmed in 2018 within Aqueduct Park.</b>

*Bird Survey Results for SAR Screening*

**Table B4.** Rare forest breeding bird screening table and survey results. Breeding habitat screened is deciduous forest habitats in Southern Ontario Eco-region 7E. List compiled from many sources, NHIC, e-bird, MNR 2011.

Species	Occurrence	COSEWIC / COSSARO Status	S-Rank	Where to Find	Subject Lands	Reference Site (Woodlawn Rd park)	e-Bird Frequency (%) 20km grid (1900-2020)	e-Bird Database nearest & recent records
Red-headed Woodpecker	B, M, W	END/SC	S4	Open woodlands, high in the canopy foraging for mast (oak, beech, hickories. Consumes beech and oak mast, seeds, nuts, berries, fruit, insects, bird eggs, nestlings, and mice. They forage primarily on dead trees, but will also forage on the ground, and catch insects in the air.	Not found	Not found	0-2%	NW of Site near Port Robinson (Circa 1980s)
Eastern Wood Pewee	B, M	SC/SC	S4	Open woodlands, forests, perches in lower to mid-canopy singing or scanning for food. May call just after dusk.	Not found	Not found	2-10%	Hilda St. 350m NE Aqueduct St. (Oct. 2018)

<b>Species</b>	<b>Occurrence</b>	<b>COSEWIC / COSSARO Status</b>	<b>S-Rank</b>	<b>Where to Find</b>	<b>Subject Lands</b>	<b>Reference Site (Woodlawn Rd park)</b>	<b>e-Bird Frequency (%) 20km grid (1900-2020)</b>	<b>e-Bird Database nearest &amp; recent records</b>
Acadian Flycatcher	B, M	END/END	S2S3	Typically associated with water, selecting sites with high, dense canopy and an open understory within undisturbed forest. Areas with no or little ground cover are preferred. Acadian Flycatchers eat a wide variety of insects and larvae, from ground level to lower canopy. The highly fragmented landscape and small woodlot size in southern Ontario limit populations.	Not found	Not found	Not reported	DeCew Rd. Thorold (2003)
Barn Swallow	B, M	THR/THR	S5	The Barn Swallow lives in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures.	Not found	Not found	10-25%	southwest Aqueduct Park on Lillias St and Price Ave., Welland (2014)

Species	Occurrence	COSEWIC / COSSARO Status	S-Rank	Where to Find	Subject Lands	Reference Site (Woodlawn Rd park)	e-Bird Frequency (%) 20km grid (1900-2020)	e-Bird Database nearest & recent records
Wood Thrush	B, M	THR/SC	S4	mature deciduous and mixed (conifer-deciduous) forests. They seek moist stands of trees with well-developed undergrowth and tall trees for singing perches.	Not found	Not found	0-2%	1km south Aqueduct park, Welland (May 2013)
Cerulean Warbler	B, M	END/THR	S3	Breeds in mature, deciduous forests with large, tall trees and an open understory, mature deciduous forests. It is rather intolerant of intensive habitat disturbance. spends most of its time in the canopy of mature stands.	Not found	Not found	Not reported	St John's CA (June 2020)
Prothonotary Warbler	B, M	END/END	S1	Only warbler in eastern North America that nests in tree cavities. Restricted to open deciduous swamp forests.	Not found	Not found	Not reported	Mud Lake CA (circa 1982)

<b>Species</b>	<b>Occurrence</b>	<b>COSEWIC / COSSARO Status</b>	<b>S-Rank</b>	<b>Where to Find</b>	<b>Subject Lands</b>	<b>Reference Site (Woodlawn Rd park)</b>	<b>e-Bird Frequency (%) 20km grid (1900-2020)</b>	<b>e-Bird Database nearest &amp; recent records</b>
Louisiana Waterthrush	B, M	SC/THR	S3	The Louisiana Waterthrush is an area-sensitive species that requires large contiguous tracts of mature or late-successional forests with shady riparian or stream habitats.	Not found	Not found	0-2%	SHPP (circa 1982)
Canada Warbler	B, M	THR/SC	S4	Breeds in a range of deciduous and coniferous, usually wet forest types, all with a well-developed, dense shrub layer. Dense shrub and understory vegetation help conceal Canada Warbler nests that are usually located on or near the ground on mossy logs or roots, along stream banks or on hummocks.	Not found	Not found	0-2%	Fonthill (May 2020)  Welland -1km south (2014)
Eastern Whip-poor-will	B, M	THR/THR	S4	Breeds in dry deciduous or evergreen-deciduous forest	Not found	Not found	0-2%	Wainfleet Bog (May 2020)

Species	Occurrence	COSEWIC / COSSARO Status	S-Rank	Where to Find	Subject Lands	Reference Site (Woodlawn Rd park)	e-Bird Frequency (%) 20km grid (1900-2020)	e-Bird Database nearest & recent records
				with little or no underbrush, close to open areas				
Common Nighthawk	B, M	SC/THR	S4	Nests in both rural and urban habitats including woodland clearings, open forests, and urban roof tops	Not found	Not found	0-2%	1km South of Aqueduct Park (May 2014)
Chimney Swift	B, M	THR/THR	S4	Nests on cave walls and in hollow trees or tree cavities in old growth forests, chimneys also used. They also tend to stay close to water as this is where the flying insects, they eat congregate.	Not found	Not found	2-10%	1km South of Aqueduct Park (May 2014)

Legend: Occurrence= B— Breeding, M — Migrant, W — Wintering, R — Resident; Status = END — Endangered, THR — Threatened, SC — Special Concern, NAR — Not at Risk.

*Bat Survey Results for SAR Screening*

**Table B5.** Screening table for Ontario SAR bat species. There are four potential SAR bat species (\*) and three common species that may use Niagara woodlands during the maternity roosting season (May- June). Note we reviewed the following sources to provide a screening table, they are NHIC Ontario species list, distribution maps, Ontario Nature and Ontario government recovery strategies.

Common Name	Scientific Name	Niagara distribution, known to use woodlands for feeding and roosting	Status	Subject Lands
Little Brown Myotis*	<i>Myotis lucifugus</i>	yes	END	Detected
Big Brown Bat	<i>Eptesicus fuscus</i>	yes	S4	Detected
Tricolored Bat*	<i>Perimyotis subflavus</i>	yes	END	Under Manual review SAR bat group detected
Northern Myotis*	<i>Myotis septentrionalis</i>	yes	END	Under Manual review SAR bat group detected
Eastern Small-footed Myotis*	<i>Myotis leibii</i>	possibly - closest Hamilton	END	Not detected
Silver-haired bat	<i>Lasionycteris noctivagans</i>	yes	S4	Detected- possible overlap with Big Brown bat
Eastern Red bat	<i>Lasiurus borealis</i>	yes	S4	Detected-possible overlap with SAR bat group.*****
Hoary Bat	<i>Lasiurus cinereus</i>	yes	S4	Detected

*Trees Inventory Results for Maternity Roosting habitat*

**Table B6.** Trees Inventory Results for Maternity Roosting habitat for SAR bats; Total woodland < 1 ha composed of two ELC Ecosites FODM9 Fresh - Moist Oak - Maple - Hickory Deciduous Forest and SWDM1 Oak Mineral Deciduous Swamp Ecosite. Tree attributes: Cavity; loose bark; crack in trunk; knot = knot hole; Snag 10m? = another snag or preferred tree species within 10m? Decay Class 1-3 where 1 = alive; 2 = declining; 3 = recent dead; 4 = dead

Table B6: Tree Survey Leaf off Conditions														
Date	Tree#	Species	DBH (cm)	Height Class	Tree Attributes						Eastings	Northings	Notes	
					cavity	Loose Bark	crack	knot	Snag 10m?	Decay (1-3)				
21-Dec-19	1	Unknown			x					x	4	642776	4763045	senescent tree with hollow trunk and branches
21-Dec-19	2	<i>Pinus strobus</i>	13							x	1	642719	4763034	healthy, nice shape.
21-Dec-19	3	<i>Quercus bicolor</i>	29							x	1	642715	4763027	healthy, multi-stem
21-Dec-19	4	<i>Quercus bicolor</i>	25							x	1	642712	4763028	healthy
21-Dec-19	5	<i>Quercus palustris</i>	32							x	1	642715	4763022	healthy, multi-stem
21-Dec-19	6	<i>Quercus bicolor</i>	23							x	1	642718	4763029	healthy
21-Dec-19	7	<i>Acer sp.</i>	27							x	1	642719	4763025	REMA or Freeman maple, or Norway maple
21-Dec-19	8	<i>Quercus bicolor</i>	16							x	1	642726	4763025	healthy
21-Dec-19	9	<i>Tilia americana</i>	28							x	2	642729	4763037	leaning, rows of woodpecker holes (sapsucker).
21-Dec-19	10	<i>Quercus sp.</i>	42				x			x	2	642732	4763033	1 stem dead with sloughing bark, other 2 stems healthy
21-Dec-19	11	<i>Ulmus americana</i>	21		x	x				x	2	642729	4763030	1 stem dead, dead branches in crown, sloughing bark
21-Dec-19	13	<i>Carya sp.</i>	12							x	1	642737	4763028	Bitternut Hickory
21-Dec-19	14	<i>Carya sp.</i>	13							x	1	642735	4763027	Bitternut Hickory
21-Dec-19	15	<i>Ulmus americana</i>	13							x	1	642734	4763030	
21-Dec-19	16	<i>Quercus sp.</i>	74	1						x	1	642740	4763026	

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Table B6: Tree Survey Leaf off Conditions												
				Tree Attributes								
21-Dec-19	17	<i>Ulmus americana</i>	13					x	1	642742	4763026	
21-Dec-19	18	<i>Ulmus americana</i>	14					x	1	642744	4763025	
21-Dec-19	19	<i>Carya sp.</i>	30					x	1	642744	4763030	Bitternut Hickory
21-Dec-19	20	<i>Carya sp.</i>	21					x	1	642748	4763026	Bitternut Hickory
21-Dec-19	21	<i>Quercus sp.</i>	81	1				x	1	642752	4763030	old healthy, Shumard?
21-Dec-19	24	<i>Acer sp.</i>	16.5		x			x	2	642758	4763026	one stem dead, dead branches
21-Dec-19	27	<i>Acer sp.</i>	11					x	1	642762	4763032	REMA, Freeman? NOMA
21-Dec-19	28	<i>Quercus sp.</i>	18					x	1	642764	4763029	
21-Dec-19	30	<i>Quercus sp.</i>	23					x	1	642770	4763027	
21-Dec-19	31	<i>Ulmus americana</i>	12					x	1	642771	4763030	
21-Dec-19	32	<i>Quercus sp.</i>	51			x		x	2	642778	4763032	diseased and leaning.
21-Dec-19	33	<i>Acer sp.</i>	30.5		x			x	2	642774	4763029	REMA, Freeman? NOMA
21-Dec-19	34	<i>Carya ovata</i>	29			x		x	1	642777	4763024	lots of peeling bark
21-Dec-19	35	<i>Acer sp.</i>	12				x	x	3	642778	4763024	main stem dead, live side branches, bark has cracks
21-Dec-19	36	<i>Acer sp.</i>	11					x	2	642779	4763026	showing same signs of disease as 54
21-Dec-19	37	<i>Quercus palustris</i>	25					x	1	642782	4763027	
21-Dec-19	40	<i>Ulmus americana</i>	10					x	1	642786	4763034	
21-Dec-19	41	<i>Acer sp.</i>	43					x	1	642783	4763026	REMA or freeman
21-Dec-19	42	<i>Ulmus americana</i>	24					x	1	642788	4763030	
21-Dec-19	44	<i>Ulmus americana</i>	12					x	1	642789	4763031	

**Table B6.** Trees Inventory Results for Maternity Roosting habitat for SAR bats; Total woodland < 1 ha composed of two ELC Ecosites FODM9 Fresh - Moist Oak - Maple - Hickory Deciduous Forest and SWDM1 Oak Mineral Deciduous Swamp Ecosite. Tree attributes: Cavity; loose bark; crack in trunk; knot = knot hole; Snag 10m? = another snag or preferred tree species within 10m? Decay Class 1-3 where 1 = alive; 2 = declining; 3 = recent dead; 4 = dead

Table B6: Tree Survey Leaf off Conditions													
				Tree Attributes									
21-Dec-19	45	<i>Quercus sp.</i>	20.5						x	2	642789	4763030	One stem broken
21-Dec-19	49	<i>Acer sp.</i>	17						x	1	642795	4763033	
21-Dec-19	50	<i>Acer sp.</i>	24		x				x	1	642794	4763036	
21-Dec-19	51	<i>Acer sp.</i>	51.5	2	x	x			x	2	642795	4763042	older and leaning, 2nd stem decayed and broken with live branches
21-Dec-19	52	<i>Salix sp.</i>	52	3	x				x	1	642785	4763046	Vernal pool; dead branches and cavities
21-Dec-19	53	<i>Salix sp.</i>	46	3	x				x	1	642784	4763045	Vernal pool; dead branches and cavities
21-Dec-19	54	<i>Salix sp.</i>	52	3	x				x	1	642779	4763043	Vernal pool; 10cm diameter hole high in trunk
21-Dec-19	55	<i>Acer rubrum</i>	74	1	x	x			x	2	642766	4763056	dead branches, holes in bark
21-Dec-19	56	<i>Quercus sp.</i>	18						x	1	642775	4763061	leaning
21-Dec-19	57	<i>Quercus palustris</i>	26	3	x				x	2	642773	4763059	leader broken
21-Dec-19	58	<i>Fraxinus sp.</i>	20			x			x	2	642775	4763066	holes, sloughing bark
21-Dec-19	59	<i>Quercus palustris</i>	71	2	x				x	2	642782	4763065	dead branches
21-Dec-19	61	<i>Ulmus americana</i>	17				x		x	2	642789	4763067	some cracking in bark
21-Dec-19	62	<i>Ulmus americana</i>	30.5						x	1	642788	4763066	
21-Dec-19	63	<i>Acer sp.</i>	64	1	x				x	2	642796	4763066	multi stemmed. dead branches at top
21-Dec-19	64	<i>Ulmus americana</i>	11						x	1	642778	4763071	
21-Dec-19	65	<i>Fagus grandifolia</i>	48	2	x				x	2	642773	4763065	dead at top

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Table B6: Tree Survey Leaf off Conditions												
				Tree Attributes								
21-Dec-19	66	<i>Fagus grandifolia</i>	12					x	1	642774	4763067	leaning from snag fallen onto it, snag has cavity
21-Dec-19	69	<i>Ostrya virginiana</i>	12					x	1	642765	4763062	
21-Dec-19	70	<i>Ostrya virginiana</i>	10					x	1	642759	4763058	
21-Dec-19	71	<i>Acer sp.</i>	27					x	1	642768	4763057	
21-Dec-19	72	<i>Acer rubrum</i>	21					x	2	642767	4763049	some dead branches,
21-Dec-19	73	<i>Quercus sp.</i>	14					x	1	642770	4763050	
21-Dec-19	74	<i>Carya sp</i>	23					x	1	642766	4763049	
21-Dec-19	76	<i>Ulmus americana</i>	11					x	1	642771	4763046	
21-Dec-19	77	<i>Carya sp</i>	12					x	1	642770	4763046	leaning
21-Dec-19	78	<i>Quercus palustris</i>	27					x	1	642764	4763043	
21-Dec-19	79	<i>Fraxinus sp</i>	14		x			x	2	642766	4763039	mostly dead, sloughing bark
21-Dec-19	80	<i>Acer rubrum</i>	12					x	1	642762	4763038	
21-Dec-19	82	<i>Quercus sp.</i>	45	1				x	1	642761	4763036	Leaning
21-Dec-19	83	<i>Acer sp.</i>	10		x	x		x	2	642760	4763033	cracked and hollow trunk
21-Dec-19	84	<i>Quercus sp.</i>	11					x	1	642760	4763036	
21-Dec-19	85	<i>Ulmus americana</i>	14					x	1	642764	4763037	
21-Dec-19	86	<i>Ulmus americana</i>	12					x	1	642769	4763037	
21-Dec-19	87	<i>Quercus sp.</i>	12					x	1	642773	4763034	
21-Dec-19	89	<i>Acer rubrum</i>	19					x	1	642776	4763035	
21-Dec-19	90	<i>Quercus sp.</i>	10					x	1	642776	4763034	
21-Dec-19	91	<i>Quercus sp.</i>	12					x	1	642776	4763034	leaning.
21-Dec-19	92	<i>Ulmus americana</i>	33					x	1	642760	4763040	healthy, leaning

**Table B6.** Trees Inventory Results for Maternity Roosting habitat for SAR bats; Total woodland < 1 ha composed of two ELC Ecosites FODM9 Fresh - Moist Oak - Maple - Hickory Deciduous Forest and SWDM1 Oak Mineral Deciduous Swamp Ecosite. Tree attributes: Cavity; loose bark; crack in trunk; knot = knot hole; Snag 10m? = another snag or preferred tree species within 10m? Decay Class 1-3 where 1 = alive; 2 = declining; 3 = recent dead; 4 = dead

Table B6: Tree Survey Leaf off Conditions													
				Tree Attributes									
21-Dec-19	93	<i>Quercus sp.</i>	53	1	x	x			x	2	642762	4763036	sloughing bark near base, dead branches
21-Dec-19	94	<i>Quercus sp.</i>	54	1					x	1	642759	4763040	sorry Just wrote down 'red'. Healthy with some dead branches. I think it was REOA
21-Dec-19	96	<i>Acer sp.</i>	12						x	1	642759	4763034	
21-Dec-19	98	<i>Carya ovata</i>	22			x			x	1	642750	4763037	
21-Dec-19	99	<i>Ulmus americana</i>	12						x	1	642749	4763038	
21-Dec-19	100	<i>Quercus sp.</i>	18						x	1	642737	4763032	
21-Dec-19	101	<i>Acer sp.</i>	20.5						x	2	642732	4763034	dead branches and small holes in bark on both trunks
21-Dec-19	102	<i>Ostrya virginiana</i>	22.5		x				x	2	642733	4763038	one stem leaning, dead branches
21-Dec-19	104	<i>Quercus sp.</i>	75	1					x	1	642738	4763041	Large, tall, canopy
21-Dec-19	105	<i>Quercus sp.</i>	68	1					x	1	642742	4763042	Large, tall, canopy
21-Dec-19	106	<i>Quercus sp.</i>	11						x	2	642744	4763038	leader is dead but rest looks healthy
21-Dec-19	107	<i>Ulmus americana</i>	24		x				x	2	642749	4763037	some dead branches in canopy
21-Dec-19	108	<i>Quercus sp.</i>	70	1					x	1	642754	4763043	tall high canopy
21-Dec-19	110	<i>Quercus sp.</i>	30						x	2	642757	4763051	some crown died back
21-Dec-19	111	<i>Fraxinus sp.</i>	20			x			x	3	642753	4763049	dead, sloughing bark
21-Dec-19	112	<i>Fraxinus sp.</i>	17			x			x	3	642751	4763049	dead, sloughing bark

**Table B6.** Trees Inventory Results for Maternity Roosting habitat for SAR bats; Total woodland < 1 ha composed of two ELC Ecosites FODM9 Fresh - Moist Oak - Maple - Hickory Deciduous Forest and SWDM1 Oak Mineral Deciduous Swamp Ecosite. Tree attributes: Cavity; loose bark; crack in trunk; knot = knot hole; Snag 10m? = another snag or preferred tree species within 10m? Decay Class 1-3 where 1 = alive; 2 = declining; 3 = recent dead; 4 = dead

Table B6: Tree Survey Leaf off Conditions													
				Tree Attributes									
21-Dec-19	113	<i>Carya sp.</i>	12						x	1	642750	4763046	
21-Dec-19	114	<i>Quercus bicolor</i>	11						x	1	642745	4763047	
21-Dec-19	115	<i>Carya ovata</i>	38			x			x	1	642745	4763052	
21-Dec-19	117	<i>Pyrus sp.</i>	29		x				x	2	642735	4763056	mostly dead
21-Dec-19	118	<i>Quercus sp.</i>	14						x	1	642743	4763057	leaning
21-Dec-19	119	<i>Quercus sp.</i>	57		x				x	2	642746	4763060	burles and some dead branches
21-Dec-19	120	<i>Ulmus americana</i>	16.5						x	1	642749	4763056	
21-Dec-19	121	<i>Acer rubrum</i>	31.5				x		x	2	642750	4763052	cracks trunk
21-Dec-19	122	<i>Quercus sp.</i>	17						x	1	642746	4763052	
21-Dec-19	125	<i>Quercus sp.</i>	60	1	x	x			x	2	642750	4763057	die back, burling at base
21-Dec-19	126	<i>Ulmus americana</i>	22						x	1	642756	4763061	leaning
21-Dec-19	127	<i>Carya sp</i>	11						x	1	642758	4763057	
21-Dec-19	128	<i>Quercus sp.</i>	25						x	1	642777	4763026	
21-Dec-19	129	<i>Quercus sp.</i>	10						x	1	642778	4763029	
21-Dec-19	130	<i>Quercus sp.</i>	12						x	1	642782	4763028	
21-Dec-19	131	<i>Quercus sp.</i>	62	1	x				x	1	642787	4763023	some cavities
21-Dec-19	132	<i>Quercus sp.</i>	51	1					x	1	642784	4763016	
21-Dec-19	133	<i>Quercus sp.</i>	60	1	x				x	2	642784	4763018	crown die back
21-Dec-19	134	<i>Quercus sp.</i>	31						x	1	642790	4763017	
21-Dec-19	135	<i>Carya sp</i>	25						x	1	642791	4763019	Bitternut
21-Dec-19	136	<i>Quercus sp.</i>	68	1					x	1	642794	4763016	
21-Dec-19	137	<i>Quercus sp.</i>	56	1					x	1	642789	4763009	leaning slightly

**Table B6.** Trees Inventory Results for Maternity Roosting habitat for SAR bats; Total woodland < 1 ha composed of two ELC Ecosites FODM9 Fresh - Moist Oak - Maple - Hickory Deciduous Forest and SWDM1 Oak Mineral Deciduous Swamp Ecosite. Tree attributes: Cavity; loose bark; crack in trunk; knot = knot hole; Snag 10m? = another snag or preferred tree species within 10m? Decay Class 1-3 where 1 = alive; 2 = declining; 3 = recent dead; 4 = dead

Table B6: Tree Survey Leaf off Conditions													
				Tree Attributes									
21-Dec-19	138	<i>Ulmus americana</i>	26						x	1	642794	4763011	
21-Dec-19	139	<i>Ulmus americana</i>	10						x	1	642785	4763017	
21-Dec-19	141	<i>Acer sp.</i>	14				x		x	2	642778	4763019	dead branches and cracking
21-Dec-19	142	<i>Acer sp.</i>	13				x		x	2	642778	4763016	dead branches and cracking
21-Dec-19	145	<i>Ulmus americana</i>	16						x	1	642778	4763010	
1-May-20	149	<i>Quercus sp.</i>	42	1					x	1	642748	4763077	
1-May-20	150	<i>Quercus sp.</i>	72	1					x	1	642747	4763074	
1-May-20	151	<i>Quercus sp.</i>	54	1					x	1	642749	4763085	
1-May-20	152	<i>Quercus sp.</i>	32	1					x	1	642745	4763075	
1-May-20	153	<i>Quercus sp.</i>	30	1					x	1	642745	4763076	
1-May-20	154	<i>Quercus sp.</i>	40	1					x	1	642748	4763075	
1-May-20	155	<i>Quercus sp.</i>	54	1					x	1	642752	4763075	
1-May-20	156	<i>Quercus sp.</i>	40	1					x	1	642750	4763070	
1-May-20	157	<i>Acer sp.</i>	18				x		x	2	642755	4763070	cracked bark.
1-May-20	158	<i>Quercus sp.</i>	50	1	x				x	1	642758	4763069	broken branches/small high cavities
1-May-20	159	<i>Quercus sp.</i>	42	1	x				x	1	642760	4763069	broken branches/small cavities high
1-May-20	160	<i>Quercus sp.</i>	20						x	1	642759	4763072	
1-May-20	161	<i>Fagus grandifolia</i>	19						x	1	642765	4763065	
1-May-20	162	<i>unk</i>	40		x				x	3	642764	4763067	Good cavity habitat.
1-May-20	163	<i>Fagus grandifolia</i>	14						x	1	642763	4763071	
1-May-20	165	<i>Quercus sp.</i>	60	1					x	1	642769	4763075	

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Table B6: Tree Survey Leaf off Conditions													
				Tree Attributes									
1-May-20	166	<i>Fagus grandifolia</i>	14						x	1	642769	4763076	
1-May-20	167	<i>Fagus grandifolia</i>	10						x	1	642773	4763077	
1-May-20	168	<i>Fagus grandifolia</i>	38	1	x				x	3	642776	4763076	dead
1-May-20	169	<i>Fagus grandifolia</i>	14		x				x	1	642777	4763076	broken branches/small cavities high
1-May-20	170	<i>Fagus grandifolia</i>	28						x	1	642779	4763072	
1-May-20	171	<i>Fagus grandifolia</i>	40	2	x				x	2	642778	4763070	
1-May-20	172	<i>Fagus grandifolia</i>	16						x	1	642780	4763068	
1-May-20	173	<i>Quercus sp.</i>	70	1					x	1	642785	4763067	broken branches at top
1-May-20	174	<i>Ulmus americana</i>	42						x	1	642783	4763072	
1-May-20	175	<i>Acer sp.</i>	48	2					x	2	642782	4763071	sloughing bark.
1-May-20	176	<i>Acer rubrum</i>	30			x			x	2	642785	4763066	sloughing bark
1-May-20	177	<i>Ulmus americana</i>	29						x	1	642795	4763066	
1-May-20	178	<i>Acer sp.</i>	64	1	x	x			x	2	642796	4763071	3 stem, 1 stem cut, some sloughing bark, and rot starting where trimmed.
1-May-20	179	<i>Acer sp.</i>	16				x		x	2	642793	4763075	starting to get cracking of bark on lower part of trunk
1-May-20	180	<i>Acer sp.</i>	22						x	1	642795	4763084	
1-May-20	181	<i>Quercus palustris</i>	28						x	1	642795	4763082	
1-May-20	182	<i>Unk</i>	14						x	2	642786	4763081	
1-May-20	183	<i>Fagus grandifolia</i>	28		x				x	2	642776	4763077	
1-May-20	184	<i>Fagus grandifolia</i>	24		x				x	3	642782	4763083	

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Table B6: Tree Survey Leaf off Conditions													
				Tree Attributes									
1-May-20	185	<i>Fagus grandifolia</i>	12						x	1	642779	4763084	
1-May-20	186	<i>Fagus grandifolia</i>	24						x	2	642783	4763087	
1-May-20	187	<i>Fagus grandifolia</i>	46						x	3	642779	4763084	
1-May-20	188	<i>Fagus grandifolia</i>	36						x	2	642777	4763089	
1-May-20	189	<i>Fagus grandifolia</i>	16						x	2	642778	4763089	
1-May-20	190	<i>Acer sp.</i>	32						x	1	642781	4763099	
1-May-20	191	<i>Quercus sp.</i>	38	2					x	1	642786	4763093	
1-May-20	192	<i>Ulmus americana</i>	36						x	1	642788	4763094	
1-May-20	193	<i>Quercus sp.</i>	86	1					x	1	642765	4763100	broken branches at top, so possibly cavities
1-May-20	194	<i>Quercus sp.</i>	70	1					x	1	642760	4763097	broken branches at top, so possibly cavities
1-May-20	195	<i>Quercus sp.</i>	48	2					x	1	642771	4763102	broken branches at top, so possibly cavities
1-May-20	196	<i>Quercus sp.</i>	40	2					x	2	642774	4763122	broken branches at top, so possibly cavities
1-May-20	197	<i>Carya ovata</i>	20						x	1	642781	4763115	shaggy bark
1-May-20	198	<i>Quercus bicolor</i>	50	1					x	1	642781	4763119	
1-May-20	199	<i>Ulmus americana</i>	40	2					x	1	642786	4763126	
1-May-20	200	<i>Ulmus americana</i>	28						x	1	642787	4763130	
1-May-20	201	<i>Ulmus americana</i>	38	2					x	1	642792	4763128	
1-May-20	202	<i>Quercus sp.</i>	40	1					x	1	642787	4763126	
1-May-20	203	<i>Carya ovata</i>	24						x	1	642785	4763129	

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Table B6: Tree Survey Leaf off Conditions													
					Tree Attributes								
1-May-20	204	<i>Carya ovata</i>	54	1		x			x	1	642784	4763130	
1-May-20	205	<i>Carya ovata</i>	28	2		x			x	1	642784	4763138	broken branches
1-May-20	206	<i>Carya sp.</i>	28	2					x	1	642780	4763142	broken branches
1-May-20	207	<i>Quercus sp.</i>	54	1					x	1	642754	4763137	broken branches
1-May-20	208	<i>Quercus sp.</i>	70	1					x	1	642755	4763139	
1-May-20	209	<i>Quercus sp.</i>	54	1					x	1	642751	4763126	
1-May-20	210	<i>Quercus sp.</i>	52	1					x	1	642747	4763122	high broken branches
1-May-20	211	<i>Quercus sp.</i>	56	1					x	1	642755	4763126	tall canopy, some high broken branches
1-May-20	212	<i>Quercus sp.</i>	54	1					x	1	642757	4763127	tall canopy, some high broken branches
1-May-20	213	<i>Quercus sp.</i>	54	1					x	1	642762	4763125	tall canopy, some high broken branches
1-May-20	214	<i>Quercus sp.</i>	76	1					x	1	642752	4763125	tall canopy, some high broken branches
1-May-20	215	<i>Quercus sp.</i>	24			x			x	1	642748	4763123	
1-May-20	216	<i>Quercus sp.</i>	24						x	1	642750	4763116	
1-May-20	217	<i>Quercus sp.</i>	68	1					x	1	642747	4763112	
1-May-20	218	<i>Quercus sp.</i>	44	1					x	1	642756	4763112	
1-May-20	219	<i>Quercus sp.</i>	58	1					x	1	642756	4763108	
1-May-20	220	<i>Quercus sp.</i>	38	2						2	642754	4763108	
1-May-20	221	<i>Quercus sp.</i>	50	1						1	642741	4763109	high broken branches
1-May-20	222	<i>Acer sacharum</i>	44	2		x				2	642745	4763112	shallow bark fissures, some decay

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Table B6: Tree Survey Leaf off Conditions												
					Tree Attributes							
1-May-20	223	<i>Quercus sp.</i>	38	2					1	642742	4763106	
1-May-20	224	<i>Quercus sp.</i>	60	1					1	642751	4763103	high broken branches
1-May-20	225	<i>Quercus sp.</i>	48	1					1	642751	4763099	
1-May-20	226	<i>Quercus sp.</i>	48	1					1	642748	4763097	
1-May-20	227	<i>Quercus sp.</i>	28						1	642747	4763100	high broken branches
1-May-20	228	<i>Unk</i>	22		x				3	642743	4763103	
1-May-20	229	<i>Acer sp.</i>	14						2	642742	4763104	dead branches
1-May-20	230	<i>Quercus sp.</i>	42	1					1	642741	4763102	
1-May-20	231	<i>Quercus sp.</i>	60	1					1	642742	4763092	high broken branches
1-May-20	232	<i>Quercus sp.</i>	44	1	x				1	642751	4763096	high broken branches
1-May-20	233	<i>unk</i>	22						3	642750	4763090	
1-May-20	234	<i>Ulmus americana</i>	40						1	642744	4763087	
1-May-20	235	<i>Ulmus americana</i>	39						1	642741	4763090	
1-May-20	236	<i>Quercus sp.</i>	54	1					1	642746	4763085	
1-May-20	237	<i>Quercus sp.</i>	54	1					1	642753	4763086	
1-May-20	238	<i>Fagus grandifolia</i>	38		x				2	642757	4763086	lots of holes
1-May-20	239	<i>Quercus sp.</i>	70	1					1	642756	4763080	
1-May-20	240	<i>Quercus sp.</i>	56	1					1	642752	4763081	
1-May-20	241	<i>Quercus sp.</i>	44	2					1	642750	4763076	
1-May-20	242	<i>Ulmus americana</i>	14						1	642754	4763074	
1-May-20	243	<i>Quercus sp.</i>	54	1					1	642751	4763071	high broken branches
1-May-20	244	<i>Quercus sp.</i>	40	2					1	642747	4763079	high broken branches
1-May-20	245	<i>Quercus sp.</i>	46	2					2	642745	4763077	main branch dead

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Table B6: Tree Survey Leaf off Conditions													
				Tree Attributes									
1-May-20	246	<i>Quercus sp.</i>	32		x					2	642744	4763077	lots of decay
1-May-20	247	<i>Quercus sp.</i>	71	1	x					2	642744	4763083	decay and small cavities
1-May-20	248	<i>Quercus bicolor</i>	86	1	x	x				1	642730	4763021	
1-May-20	249	<i>Quercus bicolor</i>	66	1	x	x				1	642735	4763022	
1-May-20	250	<i>Ulmus americana</i>	24							1	642739	4763022	
1-May-20	251	<i>Carya ovata</i>	30			x				1	642744	4763022	
1-May-20	253	<i>Ulmus americana</i>	28							1	642752	4763022	
1-May-20	254	<i>Quercus sp.</i>	36							1	642757	4763022	
1-May-20	256	<i>Carya ovata</i>	28			x				1	642775	4763022	
1-May-20	258	<i>Quercus sp.</i>	48		x	x				1	642777	4763001	
1-May-20	259	<i>Quercus sp.</i>	48		x	x				1	642777	4763003	

*Echolocation Data analysis by Kaleidoscope software Auto-ID Ontario Region.*

**Table B7.** Raw Data results for bat echolocations within the range of SAR bats. Surveys on Subject lands and Aqueduct Park woodlands City of Welland. No- (auto)ID refers to complex overlapping echolocation recordings needing manual review to determine best fit.

Date	Time	Survey Area	Auto-ID	Match-Ratio	N (pulses)	Fc	Sc	Dur	Fmax	Fmin	Fmean	TBC	Fk	Tk	S1	Tc	Qual	overlapping ID options
Jun 17, 2020	21:29:21	Aqueduct Park	NO-ID		140	33.23	40.25	4.93	46.96 63.46*	32.61 38.56*	36.76	106.20	34.46	3.18	309.28	4.47	27.64	SAR bat range manual view
Jun 17, 2020	21:34:31	Aqueduct Park	LASBOR	0.758	66	36.01	31.19	4.78	50.50 62.66*	35.67 40.43*	39.17	223.97	36.96	2.95	410.78	4.38	13.83	SAR bat range manual view
Jun 17, 2020	21:35:20	Aqueduct Park	NO-ID		117	33.12	55.33	4.75	54.23 66.68*	32.71 40.43*	38.58	113.67	34.44	3.28	400.72	4.46	22.98	SAR bat range manual view
Jun 20, 2020	21:43:58	Seasonal Pool	NO-ID		19	44.78	89.9	3.68	73.87	42.02	51.19	129.69	47.50	2.39	603.57	3.28	5.34	SAR bat range
Jun 20, 2020	21:44:06	Seasonal Pool	NO-ID		18	42.65	35.62	3.45	68.56	41.70	49.49	163.64	43.63	2.44	585.56	3.12	6.87	SAR bat range
Jun 20, 2020	21:44:17	Seasonal Pool	NO-ID		23	43.57	118.57	2.97	75.07	41.91	52.48	326.23	47.21	2.00	339.19	2.71	7.63	SAR bat range
Jun 20, 2020	21:44:31	Seasonal Pool	NO-ID		32	41.55	73.49	4.15	62.89	40.66	47.08	175.03	43.79	2.74	329.91	3.69	12.07	SAR bat range
Jun 20, 2020	21:44:40	Seasonal Pool	NO-ID		46	40.79	58.67	4.44	75.33	40.06	49.79	122.89	42.82	3.24	502.45	4.13	12.48	SAR bat range
Jun 20, 2020	21:44:50	Seasonal Pool	NO-ID		54	40.67	58.17	4.41	70.96	40.37	48.57	161.52	42.58	3.15	349.83	4.25	10.18	SAR bat range
Jun 20, 2020	21:45:03	Seasonal Pool	NO-ID		27	39.78	110.82	4.11	71.56	38.89	48.41	105.85	43.26	2.71	567.18	3.89	7.39	SAR bat range
Jun 20, 2020	21:45:15	Seasonal Pool	NO-ID		26	39.67	39.77	4.54	71.86	39.17	47.99	95.52	40.95	3.53	428.96	4.39	7.85	SAR bat range?
Jun 20, 2020	21:45:22	Seasonal Pool	MYOLUC	0.53	30	40.5	69.82	3.77	67.84	39.88	47.78	104.20	42.91	2.55	375.36	3.61	8.34	
Jun 20, 2020	21:45:33	Seasonal Pool	NO-ID		18	41.76	135.58	3.42	72.44	41.03	50.41	143.94	44.82	2.41	561.57	3.15	5.75	SAR bat range LASBOR
Jun 20, 2020	21:46:58	Seasonal Pool	NO-ID		28	41.03	59.8	4.49	73.85	40.46	49.29	114.62	42.84	3.26	442.67	4.16	9.21	SAR bat range

Date	Time	Survey Area	Auto-ID	Match-Ratio	N (pulses)	Fc	Sc	Dur	Fmax	Fmin	Fmean	TBC	Fk	Tk	S1	Tc	Qual	overlapping ID options
Jun 20, 2020	21:47:13	Seasonal Pool	NO-ID		21	40.67	43.95	4.28	73.94	39.94	49.52	109.28	42.10	3.18	539.44	4.00	7.81	SAR bat range
Jun 21, 2020	22:29:55	Seasonal Pool	NO-ID		3	41.03	46.49	3.10	69.06	40.68	47.31	221.17	42.21	2.239	714.98	2.95	0.76	SAR bat range
Jun 21, 2020	22:34:05	Seasonal Pool	LASCIN	0.22	81	31.55	33.7	4.57	42.70 80.07*	31.03 40*	33.86	199.33	32.34	2.46	395.66	3.50	25.08	SAR bat range manual view
Jun 21, 2020	22:29:55	Seasonal pool	NO-ID	0.67	3	41.03	46.49	3.10	69.06	40.68	47.31	221.17	42.21	2.24	714.98	2.95	0.76	SAR bat range

**Table B8. Birds identified to date survey 1**

Date	Route	Approx. Start Time	Species	Status	Observation Type	In study or reference area
May 22 2020	L1	9:23:00 AM	Blue Jay	S5	Auditory & Visual	Study Area
May 22 2020	L1	9:23:00 AM	Tennessee Warbler	S5	Auditory	Study Area
May 22 2020	L1	9:23:00 AM	Red-bellied Woodpecker	S4	Auditory & Visual	Study Area
May 22 2020	L1	9:23:00 AM	Downy Woodpecker	S5	Auditory & Visual	Study Area
May 22 2020	L1	9:23:00 AM	Black-capped Chickadee	S5	Auditory	Study Area
May 22 2020	L1	9:23:00 AM	Common Grackle	S5	Auditory & Visual	Study Area
May 22 2020	L1	9:23:00 AM	American Robin	S5	Auditory & Visual	Study Area
May 22 2020	L2	9:03:00 AM	Red-winged Blackbird	S4	Auditory	Study Area
May 22 2020	L2	9:03:00 AM	Tufted Titmouse	S4	Auditory	Study Area
May 22 2020	L2	9:03:00 AM	Northern Cardinal	S5	Auditory & Visual	Study Area
May 22 2020	L2	9:03:00 AM	Blue Jay	S5	Auditory & Visual	Study Area
May 22 2020	L2	9:03:00 AM	Downy Woodpecker	S5	Auditory	Study Area
May 22 2020	L2	9:03:00 AM	Yellow Warbler	S5	Auditory	Study Area
May 22 2020	L2	9:03:00 AM	House Wren	S5	Auditory	Study Area
May 22 2020	L2	9:03:00 AM	American Robin	S5	Auditory	Study Area
May 22 2020	L2	9:03:00 AM	Warbling Vireo	S5	Auditory	Study Area
May 22 2020	L2	9:03:00 AM	Red-eyed Vireo	S5	Auditory	Study Area
May 22 2020	L3	8:33:00 AM	Northern Cardinal	S5	Auditory & Visual	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	Northern Flicker	S4	Auditory	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	American Crow	S5	Auditory	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	Blue Jay	S5	Auditory & Visual	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	Ring-billed Gull	S5	Auditory	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	Tennessee Warbler	S5	Auditory	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	Nashville Warbler ??	S5	Auditory	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	Brown-headed Cowbird	S4	Auditory	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	Downy Woodpecker	S5	Auditory	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	Black-capped Chickadee	S5	Auditory	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	Common Grackle	S5	Auditory & Visual	Adjacent Woodlot

**Table B8. Birds identified to date survey 1**

Date	Route	Approx. Start Time	Species	Status	Observation Type	In study or reference area
May 22 2020	L3	8:33:00 AM	Northern Parula	S4	Auditory	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	Yellow Warbler	S5	Auditory	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	American Goldfinch	S5	Auditory	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	European Starling	SNA	Auditory	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	American Robin	S5	Auditory & Visual	Adjacent Woodlot
May 22 2020	L3	8:33:00 AM	Mourning Dove	S5	Auditory	Adjacent Woodlot
May 22, 2020	W1	7:21:00 AM	Blue Jay	S5	Auditory & Visual	Woodlawn Park
May 22, 2020	W1	7:21:00 AM	Red-bellied Woodpecker	S4	Auditory	Woodlawn Park
May 22, 2020	W1	7:21:00 AM	American Robin	S5	Auditory	Woodlawn Park
May 22, 2020	W2	7:37:00 AM	Mallard	S5	Visual	Woodlawn Park
May 22, 2020	W2	7:37:00 AM	American Crow	S5	Auditory	Woodlawn Park
May 22, 2020	W2	7:37:00 AM	Downy Woodpecker	S5	Visual	Woodlawn Park
May 22, 2020	W2	8:10:00 AM	Sharp-shinned Hawk	S5	Visual	Woodlawn Park
May 22, 2020	W2	8:10:00 AM	Red-winged Blackbird	S4	Auditory	Woodlawn Park
May 22, 2020	W2	8:10:00 AM	Great Crested Flycatcher	S4	Auditory	Woodlawn Park
May 22, 2020	W2	8:10:00 AM	American Robin	S5	Auditory	Woodlawn Park

**Table B8: Birds identified to date from survey 2**

Date	Route	Approx. Start Time	Species	Status	Observation Type	In study or reference area
17-Jun-20	L1	20:50	Northern Cardinal	S5	Auditory	Study Area
17-Jun-20	L1	20:50	Song Sparrow	S5	Auditory	Study Area
17-Jun-20	L1	20:50	Common Grackle	S5	Auditory	Study Area
17-Jun-20	L1	20:50	American Robin	S5	Auditory	Study Area
17-Jun-20	L3	21:04	Song Sparrow	S5	Auditory	Adjacent Woodlot

**Table B8: Birds identified to date from survey 2**

<b>Date</b>	<b>Route</b>	<b>Approx. Start Time</b>	<b>Species</b>	<b>Status</b>	<b>Observation Type</b>	<b>In study or reference area</b>
17-Jun-20	L3	21:04	Common Grackle	S5	Auditory	Adjacent Woodlot
17-Jun-20	L3	21:04	American Redstart	S5	Auditory	Adjacent Woodlot
17-Jun-20	L3	21:04	American Robin	S5	Auditory	Adjacent Woodlot
17-Jun-20	W1	20:21	Northern Cardinal	S5	Auditory	Woodlawn Park
17-Jun-20	W1	20:21	American Crow	S5	Auditory	Woodlawn Park
17-Jun-20	W1	20:21	Great Crested Flycatcher	S4	Auditory	Woodlawn Park
17-Jun-20	W2	20:23	Great Crested Flycatcher	S4	Auditory	Woodlawn Park
17-Jun-20	W2	20:23	American Robin	S5	Auditory	Woodlawn Park

Table B9. Plant species identified to date						
Date	Species	Status	Group	Observation Type	In Subject Lands or Aqueduct Park	Sample taken
16-Apr-20	May-apple	S5	Plant	Visual	Subject Lands	
17-Apr-20	Dogtooth Violet	S5	Plant	Visual	Subject Lands	
19-May-20	White Trillium	S5	Plant	Visual	Both	photo
19-May-20	Carolina spring beauty	S5	Plant	Visual	Subject Lands	
19-May-20	False Solomon seal	S5	Plant	Visual	Both	photo
19-May-20	Yellow trout lily	S5	Plant	Visual	Subject Lands	
19-May-20	Solomon's Seal	S5	Plant	Visual	Both	photo
22-May-20	Moss		Plant	Visual	Subject Lands	
09-Jun-20	Common Jewelweed	S5	Plant	Visual	Subject Lands	
09-Jun-20	Jack-in-the pulpit	S5	Plant	Visual	Both	photo
09-Jun-20	Grass sp.		Plant	Visual	Subject Lands	
09-Jun-20	Poison Ivy	S5	Plant	Visual	Subject Lands	
21-Jul-20	Large-leaved Aster	S5	Plant	Visual	Both	photo
27-Jul-20	Fall Panicgrass	SE5	Plant	Visual	Subject Lands	
27-Jul-20	Bristly Foxtail Sedge	SE4	Plant	Visual	Subject Lands	
27-Jul-20	Common Jewelweed	S5	Plant	Visual	Subject Lands	
27-Jul-20	Bittersweet nightshade	SE5	Plant	Visual	Subject Lands	photo
27-Jul-20	Canada Honewort	S5	Plant	Visual	Subject Lands	photo
27-Jul-20	Thicket Creeper	S5	Plant	Visual	Subject Lands	photo
27-Jul-20	Virginia Smartweed	S5	Plant	Visual	Both	
27-Jul-20	Tall Rattlesnakeroot	S5	Plant	Visual	Both	photo
27-Jul-20	Hemp Dogbane	S5	Plant	Visual	Both	
27-Jul-20	Jack-in-the pulpit	S5	Plant	Visual	Both	Photo
27-Jul-20	Riverbank Grape	S5	Plant	Visual	Both	
27-Jul-20	Eastern Poison Ivy	S5	Plant	Visual	Both	
27-Jul-20	Large False Solomon's Seal	S5	Plant	Visual	Both	Photo
27-Jul-20	Giant Solomon's Seal	S4	Plant	Visual	Both	Photo

**Table B9. Plant species identified to date**

<b>Date</b>	<b>Species</b>	<b>Status</b>	<b>Group</b>	<b>Observation Type</b>	<b>In Subject Lands or Aqueduct Park</b>	<b>Sample taken</b>
27-Jul-20	Common Milkweed	S5	Plant	Visual	Subject Lands	
27-Jul-20	Alder-leaved Buckthorn	S5	Plant	Visual	Subject Lands	Photo
27-Jul-20	White Trillium	S5	Plant	Visual	Both	Photo
27-Jul-20	Zigzag Goldenrod	S5	Plant	Visual	Subject Lands	
27-Jul-20	Knapweed	SE	Plant	Visual	Subject Lands	Photo
27-Jul-20	Virginia Creeper	S4	Plant	Visual	Subject Lands	
27-Jul-20	Large-leaved Aster	S5	Plant	Visual	Both	Photo
25-Sep-20	Schreber's Aster	S2	Plant	Visual	Both	Yes, Photo
27-Jul-20	Pussy Willow	S5	Shrub	Visual	Subject Lands	
27-Jul-20	Gray Dogwood	S5	Shrub	Visual	Both	
27-Jul-20	Round-leaved Dogwood	S5	Shrub	Visual	Subject Lands	Yes
21-Apr-20	Swamp Pin Oak	S4	Tree	Visual	Subject Lands	
27-Jul-20	Willow sp.		Tree	Visual	Subject Lands	
27-Jul-20	White Elm	S5	Tree	Visual	Both	
27-Jul-20	Northern Red Oak	S5	Tree	Visual	Both	Yes, and photo
27-Jul-20	Swamp White Oak	S4	Tree	Visual	Subject Lands	Yes, and photo
27-Jul-20	Swamp Pin Oak	S4	Tree	Visual	Subject Lands	Yes, and photo
27-Jul-20	Shumard Oak	SC/S3	Tree	Visual	Not confirmed	Yes, and photo
27-Jul-20	Ironwood	S5	Tree	Visual	Subject Lands	Photo
27-Jul-20	Blue-beech	S5	Tree	Visual	Both	
27-Jul-20	American Beech	S4	Tree	Visual	Both	
27-Jul-20	Bitternut Hickory	S5	Tree	Visual	Both	
27-Jul-20	Basswood	S5	Tree	Visual	Both	
27-Jul-20	Catalpa	SE	Tree	Visual	Subject Lands	

**Table B9. Plant species identified to date**

<b>Date</b>	<b>Species</b>	<b>Status</b>	<b>Group</b>	<b>Observation Type</b>	<b>In Subject Lands or Aqueduct Park</b>	<b>Sample taken</b>
27-Jul-20	Black Walnut	S4	Tree	Visual	Adjacent private lands	
27-Jul-20	Norway Maple	SE	Tree	Visual	Both	
27-Jul-20	Sugar Maple	S5	Tree	Visual	Both	
27-Jul-20	Red Maple	S5	Tree	Visual	Both	
27-Jul-20	White Ash	S4	Tree	Visual	Both	
27-Jul-20	Ash (dead)		Tree	Visual		
27-Jul-20	Manitoba Maple	S5	Tree	Visual	Both	
27-Jul-20	White Spruce	S5	Tree	Visual	Both	
27-Jul-20	Eastern White Pine	S5	Tree	Visual	Subject Lands planted	
27-Jul-20	Shagbark Hickory	S5	Tree	Visual	Both	

Table B10. Incidental Wildlife Observations								
Date	Approx. Time	Easting	Northing	Type	Species	Status	Observation Type	In study or reference area
March 19 2020	NA	NA	NA	Amphibian	Western Chorus Frog	S4	Auditory	In
April 14 2020	14:46	642733	4763091	Amphibian	Western Chorus Frog	S4	Auditory	Ref
April 14 2020	14:46	642733	4763091	Amphibian	American Toad	S5	Auditory	Ref
April 14 2020	13:00	642785	4763003	Amphibian	Western Chorus Frog	S4	Auditory	In
Dec 21, 2019				Insect	Emerald Ash borer	SE	Visual	In
Dec 21, 2019				Insect	Gypsy Moth	SE	Visual	In
June 9, 2020	20:57	642718	4763041	Insect	Cercopia Moth	S5	Visual	In
Jan 22, 2020				Mammal	Eastern Gray Squirrel	S5	Visual/tracks	In
Jun 20, 2020	23:27	642784	4763045	Mammal	Virginia opossum	S5	Visual	In
Jun 20, 2020	23:27	642788	4763015	Mammal	Striped Skunk	S5	Visual	In
April 14 2020	14:46	642733	4763091	Bird	Red-winged Black Bird	S4	Auditory/Visual	Jen Park
April 14 2020	14:46	642733	4763091	Bird	Northern Cardinal	S5	Auditory/Visual	Jen Park
April 14 2020	14:46	642733	4763091	Bird	Common Grackle	S5	Auditory/Visual	Jen Park
April 14 2020	14:46	642733	4763091	Bird	Northern Flicker	S4	Auditory/Visual	Jen Park
April 14 2020	14:46	642733	4763091	Bird	Brown-headed Cowbird	S4	Auditory/Visual	Jen Park
April 14 2020	13:00	642787	4762996	Bird	Mallard	S5	Visual	In
April 14 2020	13:05	642785	4763042	Bird	Northern Flicker	S4	Auditory/Visual	In
April 14 2020	13:25	642785	4763042	Bird	White-breasted Nuthatch	S5	Visual	In
April 14 2020	13:10	642780	4763031	Bird	Red-tailed Hawk	S5	Visual	In
April 14 2020	13:25	642771	4763051	Bird	Eastern Phoebe	S5	Visual	In
April 14 2020	13:25	642751	4763051	Bird	Northern Cardinal	S5	Auditory	In
April 14 2020	14:10	642733	4763091	Bird	Yellow-bellied Sapsucker	S5	Auditory/Visual	Jen Park
April 14 2020	14:10	642727	4763087	Bird	Eastern Phoebe	S5	Visual	Jen Park
April 14 2020	14:10	642733	4763091	Bird	American Robin	S5	Auditory/Visual	Jen Park
April 14 2020	14:10	642733	4763091	Bird	Mourning Dove	S5	Auditory/Visual	Jen Park
May 1 2020	14:00	642736	4763091	Bird	Sharp-shinned Hawk	S5	Visual	Jen Park

Table B10. Incidental Wildlife Observations								
Date	Approx. Time	Easting	Northing	Type	Species	Status	Observation Type	In study or reference area
May 19, 2020	12:30	640449	4763599	Bird	Great Crested Flycatcher	S4	Visual	Woodlawn
May 19, 2020	12:30	640468	4763611	Bird	Great Crested Flycatcher	S4	Visual	Woodlawn
May 19, 2020	12:30			Bird	Rose-breasted Grosbeak	S4	Visual	Woodlawn

*Comparison between Subject lands and nearby reference site*

**Table B11.** Summary results from the tree inventory on Subject Lands, where approximately 19 species were identified.

<b>Common Name</b>	<b>Species Name</b>	<b>Number of observations</b>
American beech	<i>Fagus grandifolia</i>	20
American elm	<i>Ulmus americana</i>	37
Ash	<i>Fraxinus sp.</i>	5
Basswood	<i>Tilia americana</i>	1
Blue beech	<i>Carpinus caroliniana</i>	1
Bitternut Hickory	<i>Carya cordiformis</i>	13
Ironwood	<i>Ostrya virginiana</i>	5
Manitoba Maple	<i>Acer negundo</i>	1
Maple	<i>Acer sp.</i>	24
Norway Maple	<i>Acer platanoides</i>	1
Pear	<i>Pyrus sp.</i>	1
Pin Oak	<i>Quercus palustris</i>	17*
Red Maple	<i>Acer rubrum</i>	7
Red Oak	<i>Quercus rubra</i>	85*
Shagbark Hickory	<i>Carya ovata</i>	10
Shumard Oak	<i>Quercus shumardii</i>	Not confirmed
Sugar Maple	<i>Acer saccharum</i>	1
Swamp White Oak	<i>Quercus bicolor</i>	10
White Pine	<i>Pinus strobus</i>	1
Willow	<i>Salix sp.</i>	3

**Table B12.** Summary of species richness based on results from the incidental wildlife and tree survey, on the Subject Lands and the Reference Site.

<b>Location</b>	<b>Taxa</b>	<b>Number of Species Observed</b>
Subject Lands	Amphibians	1
	Birds	21
	Mammals	2
	Insects	3
Reference Site	Amphibians	2
	Birds	12
	Mammals	0

**Table B13.** Summary results from the bird survey conducted on the subject lands and at the reference site, on May 22 and June 17, 2020.

<b>Common Name</b>	<b>Species Name</b>	<b>Number of Encounters</b>	
		<b>Subject Lands</b>	<b>Reference Site</b>
American Crow	<i>Corvus brachyrhynchos</i>	0	2
American Robin	<i>Turdus migratorius</i>	4	3
Blackcapped Chickadee	<i>Poecile atricapillus</i>	1	0
Blue Jay	<i>Cyanocitta cristata</i>	3	1
Common Grackle	<i>Quiscalus quiscula</i>	2	0
Downy Woodpecker	<i>Picoides pubescens</i>	3	1
Eastern Phoebe	<i>Sayornis phoebe</i>	1	0
Great-crested Flycatcher	<i>Myiarchus crinitus</i>	0	4
House Wren	<i>Troglodytes aedon</i>	1	0
Mallard	<i>Anas platyrhynchos</i>	1	1
Mourning Dove	<i>Zenaidura macroura</i>	1	0
Northern Cardinal	<i>Cardinalis cardinalis</i>	3	1
Northern Flicker	<i>Colaptes auratus</i>	1	0
Red-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	0	1

Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	2	1
Red-eyed Vireo	<i>Vireo olivaceus</i>	1	0
Red-winged black bird	<i>Agelaius phoeniceus</i>	1	1
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0	1
Song Sparrow	<i>Melospiza melodia</i>	1	0
Tennessee Warbler	<i>Leiothlypis peregrina</i>	1	0
Tufted Titmouse	<i>Baeolophus bicolor</i>	1	0
Warbling Vireo	<i>Vireo gilvus</i>	1	0
White-breasted Nuthatch	<i>Sitta carolinensis</i>	1	0
Yellow Warbler	<i>Setophaga petechia</i>	1	0

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## Appendix C: Field Notes and Photographs

### Dec 21, 2019

Field Techs: T. Bukovics, H. Hermansen, C. Blott

Notes: Conducted first tree/ snag survey on subject lands only. Some new trees cut along east boundary. Maple, Oak predominantly. One stump has split bark. collected feather. having it looked at to confirm ID. Possible sharp-shinned hawk.



Jan 22, 2020

### April 14, 2020

Winter site conditions on Jan 22, 2020. From left to right first and second photo is Eastern Gray Squirrel tracks and food cache at base of trees. Third photo is taken near vernal pool area. Photographs by A. Yagi

Field Techs: T. Bukovics, C. Blott

Notes: We did a drive by to assess for bird studies and looked at Jennifer Park as a reference site, which is where Eastern Wood Peewee was heard in 2018. Site is bushier and more open, does not have closed canopy older woods so will not use it as a control. Observed Eastern Phoebe feeding.

## **May 1, 2010**

Field Techs: T. Bukovics, H. Hermansen, C. Blott

Notes: May 1, 2020. Field notes. Did a second tree survey to get all trees of large diameter or with cavities etc. in Aqueduct Park. We went further to capture what is also on property adjacent to the north of Aqueduct Park, where there is a constructed, grassed swale that seems to go nowhere, but may have subsurface drainage to ditch running alongside the newly built house that is right up to the edge of the woods. Many people put their yard compost into the park forest. Some neighbors came out to talk with us and submitted photos. gave them My Field App. cards to use. They said there is a neighbor association about this site. And they submitted this spring a 500-signature petition about the re-zoning. Walked on neighbors' property to the north of Aqueduct park and included trees on his property in the survey. Saw a sharp-shinned hawk swoop through Aqueduct park and fly low over the forest.

## **May 19, 2020**

Field Techs: T. Bukovics, C. Blott

Notes: Site visit to Woodlawn Park to assess as a control. Woods are comparable to the subject site with closed canopy of similar aged red oak > maple >> black cherry. Wetland slough formation running through woods provides similar access to water as our site. Not as many snags at Woodlawn Park compared to our site and a lot of old wood chip piles so assuming snags have been removed. Ample cavities available in the old growth. Some woody debris on ground, we lifted 6-8 pieces on both high ground and lower ground and did not see anything. Clay on site and pieces of wood we lifted on higher ground have aerated soil, and pieces of wood on the lower areas are saturated. Visual of great crested flycatcher foraging on ground at an inner edge of a brushy part of woods and within the open ground amongst the old growth oaks & maples. Visual of a female grosbeak foraging amongst the fresh oak leaves high in canopy. Ground cover is representative of native fresh moist ephemeral flowers: trillium, may apple, Maianthemum, trout lily, Carolina beauty etc. Drove by and photographed Niagara college forest and the small piece another block east on Woodlawn. Both these pieces have some older oaks but appear more open and bushy rather than having a closed canopy.

## **May 22, 2020**

Field Techs: T. Bukovics, C. Blott

Notes: conducted first bird survey at Woodlawn Control site and at Lucchetta / Aqueduct Park. Made 10minute recordings at each station. Bored soil cores: one in the driest oak forest and 1 in the pin oak forest. Showed Theresa the other 2 bits of woods along Woodlawn Rd. between Woodlawn and Niagara Sts.

## **June 08, 2020**

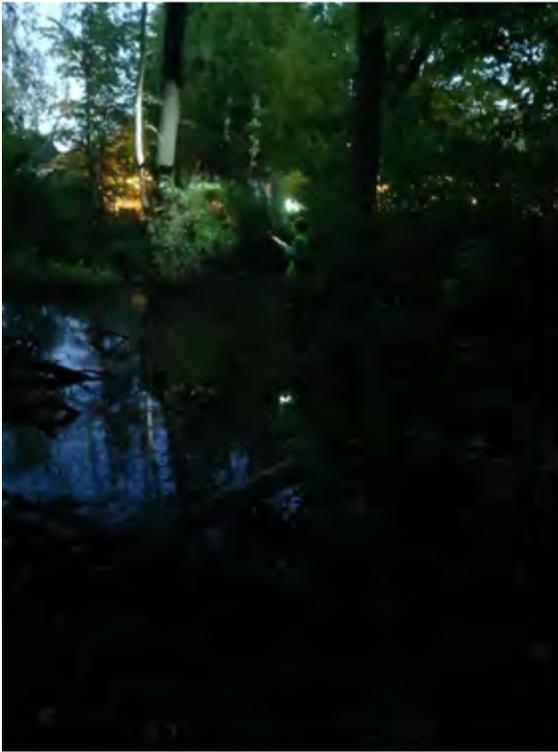
Field Technicians: T. Bukovics, B. Breton

Notes: (Bat Survey 1) This was our first bat survey. T. Bukovics started the survey at the upland forest clearing of Aqueduct Park (north of the study area) whereas B. Breton started the survey at the southwest corner of the woodlot of the study area where the forest edge and manicured lawn meet. It was a warm, clear night. Wind ranged from 0-1 and temperatures started at 20.4C (20:55) and dropped to 15.7C (23:01). We observed a higher diversity and larger number of bat detections at the upland clearing of Aqueduct Park.

## **June 09, 2020**

Field Technicians: A. Yagi, T. Bukovics

Notes: (Bat Survey 2) T. Bukovics started the survey in the same position as survey 1 and A. Yagi was located at the southwest corner of the woodlot at the study area (i.e. same location as B. Breton in survey 1). The weather was warm, and the cloud cover was about 5%. Temperatures started at 23.5C (21:16) and dropped to 22.6C (23:17). Wind stayed around 0-1 the entire 2hr interval. Temperature appeared warmer in forest than at the forest edge. We observed the same trend as survey 1 that there was a higher diversity and more bat detections at clearing in the forest of Aqueduct Park.



Typical bat survey conditions in study area on June 9, 2020. From left to right, Biologist completing echolocation survey for bats at vernal pool area near east side of study area; Tree Canopy just before survey began on June 9, 2020. Photos by A. Yagi.

## **June 17, 2020**

Field Technicians: T. Bukovics, T. Eles

Notes: (Bat Survey 3) Higher diversity and more bat detections at clearing in the forest of Aqueduct Park.

0 % cloud cover, warm humid night. Wind was between 0 to 1 but increased to a 2 at the end of the night. Temperature was 20.8C at 21:15-21:30 and decreased slightly to 19C by the end of the night (22:56). We heard incessant car noise all night. We were informed by a local that bikers were revving their engines at the Walmart Parking lot. We encountered a male Virginia Opossum in the upland clearing area of Aqueduct Park. Big brown bat activity was constant for 2 minutes and all bat activity decreased at 22:25 both at the upland area of Aqueduct Park and around the vernal pool in the study area.

## **June 20, 2020**

Field Technicians: T. Bukovics, T. Eles

Notes: (Bat Survey 4) The entire night, T. Bukovics and T. Eles remained in their locations due to constant bat activity. T. Bukovics was positioned at the vernal pool in the study area and T. Eles was positioned in the upland clearing area of Aqueduct Park where we've been detecting a high diversity of bat species and more bat detections. Multiple bats (large and small sized) were observed swooping over vernal pool. As a result, a roving transect was not used during this survey. T. Bukovics detected MYOLUC (Little Brown Myotis) at the vernal pool on the subject's property. However, there could be more detections needed to check "no identification" prior to MYOLUC recording. Two out of three experts confirmed MYOLUC was detected. Temperature was 23.9C at 21:12-21:15 20.8C-21.5C at 23:37. Wind was a 1 for most of the night.

## **June 21, 2020**

Field Technicians: T. Bukovics, T. Eles

Notes: (Bat Survey 5) We applied the same survey method as survey 4 (sitting in position) to see whether we could successfully detect a SAR bat again. We remained in our locations the entire 2hr duration but did not detect a SAR bat. Temperatures were similar to survey 4, 24.2°C at 21:06 to 22.1C at 23:35; however insect activity and humidity seemed lower. Wind varied between 0 to 2.

## **July 21, 2020**

Field Technician: T. Bukovics

Purpose: To check if unknown woodland aster was blooming. Confirmed large leaved aster present in understory, not White Wood aster.

Walked up and down Aqueduct Park and the study area, searching for White Wood Aster foliage. Only encountered Large-Leaved Aster in the upland area of Aqueduct Park. There was a blanket of basal leaves on the forest floor and the start of flowers forming, which is indicative of Large-Leaved Aster. White Wood Aster is a late fall bloomer whereas Large-Leaved Aster is a late summer, early fall bloomer. Photos and voucher specimens were taken and further confirmed by H. Hermansen.



Woodland Aster pictures taken during Summer 2020. Photos from left to right are unknown aster June 9, 2020 (photo by A. Yagi) and a flowering aster on July 21, 2020 confirmed as Large-leaved Aster (*Eurybia macrophylla*; photos by T. Bukovics).



Found in study area. From left to right, False Solomon Seal, Jack-in-the-box (June 9, 2020; photos by A. Yagi).

**July 27<sup>th</sup> and 28<sup>th</sup>, 2020**

Field Notes by A. Yagi

Purpose: final check to confirm plant ID in study area, status of vernal pool and adjacent lands trees for EIS report. Vernal pool was dry with logs piled within from recent tree removal on adjacent lands. Collected samples of Oak leaves to verify, or not, presence of *Quercus shumardi* (S3/ SC) and other possible SAR forest plant species and took photographs of ground flora and shrubs. Checking ID of a dogwood specimen taken on edge of study area. All other plant species were S4, S5 or SE = exotic species (see Plant list). Drier tolerant plants were found the FOD ELC community and wet tolerant plants including the possible *Q. shumardii* were found in the wetter SWD ELC community and possibly within the City park woodland.





Swamp Pin Oak leaf sample taken near vernal pool area.



*Quercus palustris* (S4) found near vernal pool. Note lateral branching and small pinnate leaf characteristics of Swamp Pin Oak.



---

Large tall Oak trees Aqueduct Park. *Quercus sp.* has a buttressed trunk and large pinnate leaves. ID not confirmed.

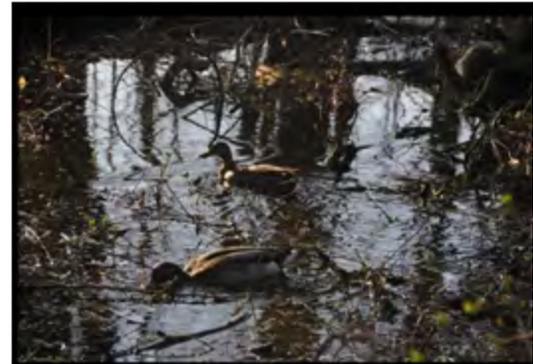


scanned images of possible *Quercus shumardi* (top 2 pics) or hybrids with the more common *Quercus rubra* or *Quercus palustris*



Figure 6 Oak species found in the study area. Top left to right; Oak leaf, Red Oak sapling; large Pin Oak tree; Middle (left to right); Swamp white oak in winter, summer and leaf; Bottom (left to right) Pin or possible Shumard Oak winter and a tree snag near seasonal pool.

*Photos of Wildlife Provided by neighbors*



Mallards using seasonal pool and adjacent lands

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From top left to bottom right, Ground bird nest depression, Robin's nest with eggs; Common Eastern Bumble bee, *Bombus impatiens*, American toad (toadlet life stage)



■ Mallard (S5)



■ Canada Goose (S5)



■ American toad (S5)



■ Possibly  
Common Red soldier beetle (*Rhagonycha fulva.*)



F Top left to right Bluebird (S5), Carolina Wren (S4) and Red-tailed Hawk (S5)

## APPENDIX D - Policies & Regulations

### Summary of Natural heritage Policies and NPCA Regulations governing Development in the Niagara Region

#### **NPCA Regulation Summary**

The Niagara Peninsula Conservation Authority regulation (Ontario 155/06) prohibits development in flood plains, valleylands, hazard lands and “wetlands or other areas where development that could interfere with the hydrologic function of a wetland. This includes areas up to 120 meters of all provincially significant wetlands and wetlands greater than 2 hectares in size, and areas within 30 meters of wetlands less than 2 hectares in size, but not including those where development has been approved pursuant to an application made under the Planning Act or other public planning or regulatory process”.

Email correspondence from NPCA indicates there are no regulatory application or review requirements by their agency (See Agency Correspondence).

#### **Natural Heritage Policies of the Provincial Policy Statement (PPS)**

According to the provincial natural heritage policies, development and site alteration is not permitted in provincially significant wetlands located in ecological zone 7E (i.e., this includes all areas within the Regional Municipality of Niagara). However, development may be permitted in the adjacent lands to a natural heritage feature when “it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.” The PPS (updated 2014) identifies eight natural heritage features and policies and the MNR provides direction to aid in the assessment of significance for Natural Heritage features (Natural Heritage Reference Manual 2010). The eight natural heritage features are, fish habitat, wetlands, coastal wetlands, woodlands, valleylands, Areas of Natural and Scientific Interest (ANSIs) and wildlife habitat.

Not all-natural areas are deemed significant natural heritage features, even with the equitable application of a set of standard rules set out by the province. Some natural features especially in urban areas tend to be isolated and small remnants of habitat used by locally common wildlife. Small natural areas also are more likely to lack the resilience necessary to retain ecological functions that protect the natural feature from diseases, invasive species and environmental stochasticity. These urban natural areas may not meet provincial or regional significance yet may retain local community and ecological values. The Ministry of Municipal Affairs and Housing administers the PPS and has delegated review authority to the Regional Municipality of Niagara (RMON). The RMON has developed criteria to aid in evaluating the “significance” of natural areas.

## **Regional Municipality of Niagara Environmental Policies**

The Regional Municipality of Niagara (RMON) retains the responsibility for provincial development planning review. The RMON environmental policies include criteria for identification and protection of Natural Heritage features such as core natural heritage system, significant wetlands, woodlands, significant wildlife habitat, streams, valley lands and fish habitat.

### **RMON policy definition of the term “significant” (Chapter 15 RMON Policy)**

“a) ... wetlands and Areas of Natural and Scientific Interest, an area identified as significant by the Ministry of Natural Resources using evaluation procedures established by the Ministry, as amended from time to time.

b) ... habitat of threatened and endangered species, the habitat, as approved by the Ministry of Natural Resources, that is necessary for the maintenance, survival and/or recovery of the naturally occurring or reintroduced populations of endangered or threatened species, and where those areas of occurrence are occupied or habitually occupied by the species for all or any part(s) of its life cycle.

c) ... other natural heritage features and areas, ecologically important in terms of features, functions, representation, or amount, and contributing to the quality, diversity, ecological health and integrity of the Core Natural Heritage System.

d) ... a change in the spatial extent of a Core Natural Heritage Component an increase or decrease of over 20% in the area within an Environmental Conservation Area or in the length or area of a surface water feature shown as Fish Habitat”.

\* Email correspondence from RMON indicates the requirement for a “constraints analysis” for determination of woodland significance (See Agency Correspondence).

## **NIAGARA REGION OFFICIAL PLAN POLICY 7.B.1.5 (2014)**

To be identified as significant, a woodland must meet one or more of the following criteria:

- a) Contain threatened or endangered species or species of concern.
- b) In size, be equal to or greater than 2 hectares, if located within or overlapping Urban Area Boundaries; or 4 hectares, if located outside Urban Areas and north of the Niagara Escarpment; or 10 hectares, if located outside Urban Areas and south of the Escarpment.
- c) Contain interior woodland habitat at least 100 meters in from the woodland boundaries.
- d) Contain older growth forest and be 2 hectares or greater in area.
- e) Overlap or contain one or more of the other significant natural heritage features listed in Policies 7.B.1.3 or 7.B.1.4;
- f) Abut or be crossed by a watercourse or water body and be 2 or more hectares in area.

Policy 7.B.1.3 Environmental Protection Areas include provincially significant wetlands; provincially significant Life Science Areas of Natural and Scientific Interest (ANSIs); and significant habitat of threatened and endangered species. In addition, within the Greenbelt Natural Heritage System, Environmental Protection Areas also include wetlands; significant valley lands; significant woodlands; significant wildlife habitat; habitat of species of concern; publicly owned conservation lands; savannahs and tallgrass prairies; and alvars.

Mapping of the significant habitat of threatened and endangered species is not included in the Core Natural Heritage Map although much of this habitat may be found within the Environmental Protection and Environmental Conservation areas shown on the Map. Significant habitat of threatened and endangered species will be identified through the Planning and Development review process. Where such habitat is identified development and site alteration shall be subject to the policies for Environmental Protection Areas.

Policy 7.B.1.4 Environmental Conservation Areas include significant woodlands; significant wildlife habitat; significant habitat of species of concern; regionally significant Life Science ANSIs; other evaluated wetlands; significant valley lands; savannahs and tallgrass prairies; and alvars; and publicly owned conservation lands.

## **NATURAL HERITAGE DEFINITIONS PPS**

Natural heritage features and areas: means features and areas, including significant wetlands, significant coastal wetlands, other coastal wetlands in Ecoregions 5E, 6E and 7E, fish habitat, significant woodlands and significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River), habitat of endangered species and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest, which are important for their environmental and social values as a legacy of the natural landscapes of an area.

Natural heritage system: means a system made up of natural heritage features and areas, and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. These systems can include natural heritage features and areas, federal and provincial parks and conservation reserves, other natural heritage features, lands that have been restored or have the potential to be restored to a natural state, areas that support hydrologic functions, and working landscapes that enable ecological functions to continue. The Province has a recommended approach for identifying natural heritage systems, but municipal approaches that achieve or exceed the same objective may also be used.

Negative impacts: means

in regard to other natural heritage features and areas, degradation that threatens the health and integrity of the natural features or ecological functions for which an area is identified due to single, multiple or successive development or site alteration activities.

Significant: means

in regard to wetlands, coastal wetlands and areas of natural and scientific interest, an area identified as provincially significant by the Ontario Ministry of Natural Resources using evaluation procedures established by the Province, as amended from time to time;

in regard to woodlands, an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. These are to be identified using criteria established by the Ontario Ministry of Natural Resources;

in regard to other features and areas in policy 2.1, ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system;

Criteria for determining significance for the resources identified in sections (c)-(e) are recommended by the Province, but municipal approaches that achieve or exceed the same objective may also be used.

While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation.

Site alteration: means activities, such as grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of a site.

Surface water feature: means water-related features on the earth's surface, including headwaters, rivers, stream channels, inland lakes, seepage areas, recharge/discharge areas, springs, wetlands, and associated riparian lands that can be defined by their soil moisture, soil type, vegetation or topographic characteristics.

Threatened species: means a species that is listed or categorized as a "Threatened Species" on the Ontario Ministry of Natural Resources' official species at risk list, as updated and amended from time to time.

Valleylands: means a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year.

Watershed: means an area that is drained by a river and its tributaries.

Wetlands: means lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants. The four major types of wetlands are swamps, marshes, bogs and fens.

Periodically soaked or wet land being used for agricultural purposes which no longer exhibit wetland characteristics are not considered to be wetlands for the purposes of this definition.

Wildlife habitat: means areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas which are important to migratory or non-migratory species.

Woodlands: means treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products.

Woodlands include treed areas, woodlots or forested areas and vary in their level of significance at the local, regional and provincial levels. Woodlands may be delineated according to the Forestry Act definition or the Province's Ecological Land Classification system definition for "forest."

## Development and infrastructure projects in Ontario and endangered or threatened species

What you need to know if your development or infrastructure project affects a species or habitat that has recently been protected by law and:

- is already approved
- close to being approved, and
- construction will begin soon after approval

---

### The law

Ontario's *Endangered Species Act* protects endangered and threatened species — animals and plants in decline and at risk of disappearing from the province.

If you plan to build a new subdivision or piece of infrastructure that will affect a newly protected species or habitat, **you need either a permit or to follow certain rules.**

These rules depend on:

- when the project was approved
- when work began or work begins
- a project's current status
- the type of project
- when a species was listed as threatened or endangered

### Source law

This is a summary of the provincial laws. You can find a complete set of provincial rules related to this activity in:

- *Endangered Species Act, 2007*
- *Ontario Regulation 242/08 (General)*

### Types of projects

These projects may fall under these rules:

- residential, commercial and industrial development, including subdivisions
- roads, utilities and drainage ditches
- renewable energy facilities such as wind turbines, solar panels and hydro dams
- transit, electricity and waste management projects
- advanced mining exploration, mine production and rehabilitation activities
- activities authorized by a permit under the *Endangered Species Act* before June 30, 2013

### The rules

You must:

- register the activity and the species affected with the Ministry of the Environment, Conservation and Parks:
  - **before** work begins
  - **immediately**, if work has already started
- take steps to minimize effects to a newly protected species or habitat
- create and implement a mitigation plan for each species
- report sightings of rare species (and update registration documents, if necessary)
- monitor and report on the effectiveness of these actions
- prepare an annual report on the plan's effectiveness

## Timing considerations

### If a species became newly protected on or after January 24, 2013

Your project must be approved to a certain stage either before the species was listed or within two years of the new species listing date.

You must also:

- start construction within the following specified timelines:
  - For species listed in 2013:
    - Within 5 years of the date the approval was obtained; or
    - By June 30, 2015, if you reached the final stage of approval before June 30, 2010
- For species listed in 2014:
  - Within 5 years of the date the approval was obtained; or
  - By June 30, 2016 if you reached the final stage of approval before June 30, 2011

If a species was previously listed and its habitat became newly protected on June 30, 2013, or the species is the Massasauga (Great Lakes/St. Lawrence Population).

Your project must be approved to a certain stage and work must begin by June 30, 2015.

**Approval stages** The approvals process depends on the type of project. Approvals are set out in section 23.13 of *Ontario Regulation 242/08 (General)*.

## APPENDIX E - Agency Correspondence

NOTE: Correspondence regarding White Wood Aster ID.  
follows most recent to latest communications.

**Anne Yagi**

---

**From:** Albert Garofalo <albert.garofalo@gmail.com>  
**Sent:** September 28, 2020 11:16 AM  
**To:** Anne Yagi; Theresa Bukovics; C Blott  
**Subject:** Fwd: White Wood Aster

Here is where the WWA is located in Aquaduct Park. The forest is a confirmed habitat for this species at risk documented in the Paul O'Hara's report.

Will send the collection of possible Aster schreberi to Royal Botanical Gardens for confirmation. It looks to me like all three of Ontario's Eurybia species may be present in this original forest.

Albert

----- Forwarded message -----

**From:** Albert Garofalo <[albert.garofalo@gmail.com](mailto:albert.garofalo@gmail.com)>  
**Date:** Mon, Sep 28, 2020 at 11:09 AM  
**Subject:** Re: White Wood Aster  
**To:** Paul O'Hara <[bigblueoak@gmail.com](mailto:bigblueoak@gmail.com)>

Nice,

Thanks Paul!

Albert

On Mon, Sep 28, 2020 at 8:48 AM Paul O'Hara <[bigblueoak@gmail.com](mailto:bigblueoak@gmail.com)> wrote:

Hey Al,

Here is the record in my Excel file that I submitted to the MNRF in 2018.

Cheers,  
Paul

UTM: 642764 4763112

16	Eurybia divaricata	Paul G. O'Hara and Albert Garofalo	30-Sep-18	Niagara	Aqueduct Park, Welland (small public park on Aqueduct Street south of Hilda Street)	public	YES - New site
----	-----------------------	--	-----------	---------	--	--------	-------------------

On Fri, Sep 25, 2020 at 2:40 PM Albert Garofalo <[albert.garofalo@gmail.com](mailto:albert.garofalo@gmail.com)> wrote:

Hey Paul,

I just forwarded you the chain of emails regarding WWA in Aquaduct Park Welland.

Do you have UTM's for the plants we observed there?

Or photos?

Couldn't find any there today. Much be too parched...

Thanks,

Albert

## Anne Yagi

---

**From:** NHIC-Requests (MNRF) <nhicrequests@ontario.ca>  
**Sent:** September 23, 2020 1:54 PM  
**To:** Anne Yagi  
**Cc:** NHIC-Requests (MNRF)  
**Subject:** RE: Wood Aster

Hi Anne,

One of our botanists reviewed your photos he said “I only see plants of Large-leaved Aster (*Eurybia macrophylla*) in the images. The ray florets are pinkish (vs. white), the involucre are too wide, and the leaves look too shallowly serrate.” He also noted that the plants looked stress and features that one would normally want to see in detail to ID the species are somewhat hard to see in your photos.

Please let us know if there is anything else we can help you with.

Best regards,  
Martina

### Martina Furrer

Biodiversity Information Biologist  
Natural Heritage Information Centre  
Ministry of Natural Resources and Forestry  
[martina.furrer@ontario.ca](mailto:martina.furrer@ontario.ca) | **\*New number\* 705-761-7517**

---

**From:** Anne Yagi <anne.yagi@8trees.ca>  
**Sent:** September 20, 2020 10:40 AM  
**To:** NHIC-Requests (MNRF) <nhicrequests@ontario.ca>  
**Subject:** FW: Wood Aster

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hello NHIC

We are completing an EIS for woodlands adjacent to Aqueduct Park in Welland Ontario. The White Wood Aster (WWA) is listed as present in Aqueduct Park. We have attached images of the asters blooming now. Could you take a look and see if they are the White Wood aster or other woodland aster species. Or whether you require additional information to verify.

This has implications in the development area and the ESA permit for WWA recovery buffer distances.

Thank you

Regards,  
**Anne Yagi, M.Sc., EP, CERP**  
**President**



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**From:** Theresa Bukovics

**Sent:** September 19, 2020 3:47 PM

**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>

**Cc:** C Blott <[cblott6@gmail.com](mailto:cblott6@gmail.com)>; Katharine Yagi <[katharine.yagi@8trees.ca](mailto:katharine.yagi@8trees.ca)>

**Subject:** Re: Wood Aster

Hi Anne,

The florets are yellow and purple but the rays are white. There is a possibility there could be two asters on Aqueduct Park, white wood and large-leaved. I've made a table comparing and contrasting their botanical features.

I was going to pop by today to see if more asters were in bloom. I'll send that document around soon.

T.

(905) 341-1330

[tbukovics@gmail.com](mailto:tbukovics@gmail.com)

[www.8trees.ca](http://www.8trees.ca)

On Sat, Sep 19, 2020 at 12:37 PM Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)> wrote:

The Ontario government web site indicates flowers may be white or purplish with red to red centres. Are you concerned these are not White Wood Aster?

Regards,

**Anne Yagi, M.Sc., EP, CERP**

**President**



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**From:** Theresa Bukovics  
**Sent:** September 14, 2020 1:32 PM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Cc:** C Blott <[cblott6@gmail.com](mailto:cblott6@gmail.com)>; Katharine Yagi <[katharine.yagi@8trees.ca](mailto:katharine.yagi@8trees.ca)>  
**Subject:** Wood Aster

Photo taken From Aqueduct Park  
642754//4763088

Note: NHIC and MNRF correspondence regarding Oak ID

**Anne Yagi**

---

**From:** Oldham, Michael (MNRF) <michael.oldham@ontario.ca>  
**Sent:** August 13, 2020 8:13 AM  
**To:** Brinker, Sam (MNRF); NHIC-Requests (MNRF); Anne Yagi  
**Subject:** Re: Shumard Oak Samples  
**Attachments:** Morsink & Pratt 1984\_Shumard Oak, Quercus shumardii, in Essex County, Ontario.pdf; Waldron et al 1987\_Shumard Oak, Quercus shumardii, in Canada.pdf

Hi Anne,

Sam Brinker and I have reviewed your photos and neither of us feels confident making a conclusive identification based on them.

As you know, oaks in the Red Oak group can be challenging to identify particularly with frequent hybridization occurring. While the leaves are suggestive of Shumard Oak the scan doesn't show terminal buds and the specimen doesn't have mature acorns for measurements (the acorns look small for Shumard Oak but may be immature). A Red Oak X Pin Oak hybrid is possible or Shumard X Pin.

The presence of Shumard Oak in Niagara Region is somewhat controversial with some experts accepting it for the region and others not convinced it occurs there.

Attached are a couple of articles about Shumard Oak and its hybrids in Ontario, in case you haven't seen them.

Cheers,

Mike

\*\*\*\*\*  
**Michael J. Oldham**  
Provincial Botanist  
Ontario Natural Heritage Information Centre (NHIC)  
Ministry of Natural Resources and Forestry  
300 Water Street, 2nd Floor, North Tower  
P.O. Box 7000 Peterborough, Ontario K9J 3C7, Canada  
[michael.oldham@ontario.ca](mailto:michael.oldham@ontario.ca)  
NHIC requests: [NHICrequests@ontario.ca](mailto:NHICrequests@ontario.ca)  
NHIC web page: <https://www.ontario.ca/page/natural-heritage-information-centre>

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**From:** Anne Yagi <anne.yagi@8trees.ca>  
**Sent:** August 12, 2020 9:29 AM  
**To:** NHIC-Requests (MNRF) <nhicrequests@ontario.ca>  
**Subject:** Shumard Oak Samples

I have collected Oak samples and require a provincial expert's opinion as to whether they are Shumard Oak or hybrids from the Red oak family.

The site is in Welland ONT, where there are super-canopy, buttressed oaks that are present in a FODM9-2 and SWDM1-3 ELC community. Pin Oak and Red Oak are present, and I am uncertain whether Shumard Oak or hybrids are present. I have samples.

## Anne Yagi

---

**From:** Drabick, Ron (MNRF) <ron.drabick@ontario.ca>  
**Sent:** August 24, 2020 10:37 AM  
**To:** Anne Yagi  
**Subject:** RE: Pin Oak vs Shumard  
**Attachments:** Oak Fieldguide 2015.pdf

Hi Anne

I have reviewed the photos especially the last ones you sent and from what I can tell you have pin and red oak on the site, it appears that none of the specimens are Shumard. I have attached a fairly good booklet from the USDA Forestry Service on a comparison of oaks, it has a good description comparison of the red/pin and Shumard.

Ron

Ron Drabick  
IRM Technical Specialist  
Aylmer District  
Ministry of Natural Resources and Forestry  
548-388-8434  
[ron.drabick@ontario.ca](mailto:ron.drabick@ontario.ca)

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**From:** Anne Yagi <anne.yagi@8trees.ca>  
**Sent:** August 24, 2020 8:25 AM  
**To:** Drabick, Ron (MNRF) <ron.drabick@ontario.ca>  
**Subject:** RE: Pin Oak vs Shumard

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

This is the latest scans. They are from more than one oak tree. Pin Oak and Red Oak are on site.

Thanks for taking a look.

Regards,  
Anne Yagi, M.Sc., EP, CERP  
President



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# The following is MECP acknowledgement of suitability of our Bat Survey Methods

## Anne Yagi

---

**From:** Brothers, Brianne (MECP) <Brianne.Brothers@ontario.ca>  
**Sent:** February 10, 2021 10:07 AM  
**To:** Katharine Yagi; Anne Yagi  
**Cc:** Williams, Daniel (MECP); Davy, Christina (MNRF)  
**Subject:** FW: Welland - Lucchetta Builders - Species at Risk

Hi Katharine,

I had just sent it to Anne originally, but please see below for your records.

Thanks!

Brianne

---

**From:** Brothers, Brianne (MECP)  
**Sent:** January 29, 2021 5:06 PM  
**To:** Anne Yagi <anne.yagi@8trees.ca>  
**Subject:** RE: Welland - Lucchetta Builders - Species at Risk

Hi Anne,

Thank you for the email and the details below. I agree with your methods below as they relate to the property at 368 Aquaduct and 155 Gadsby Ave, in Welland, ON. You were able to confirm the presence of a SAR bat at the site, therefore indicating that the methods used were successful.

That being said, the methods used did not follow the standard guidelines recommended by MECP. Therefore, if you were to use these methods in the future and present to MECP that there were no SAR bats at a site, we would not be able to confirm/agree with absence based on these methods. Just something to note in the future. I imagine that updated survey protocols will be created in the near future, and they may incorporate everything you have below, but at this time I have to rely on the current recommendations within our survey protocols.

Based on the information you have provided below, and the information provided in the EIS, if tree removals can take place outside the active SAR bat window from April 1 – September 30, there will be no further ESA requirements at this time. Can you please confirm if this timing is suitable? I understand that you have recommended this timing to your client, but I would like to have confirmation on this, if possible.

Thanks for all your work on this file.

Have a great weekend,

Brianne

**Brianne Brothers**  
A/Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
(905)-321-5736 | [Brianne.brothers@ontario.ca](mailto:Brianne.brothers@ontario.ca)

---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>

**Sent:** January 21, 2021 2:54 PM

**To:** Brothers, Brianne (MECP) <[Brianne.Brothers@ontario.ca](mailto:Brianne.Brothers@ontario.ca)>

**Cc:** Williams, Daniel (MECP) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>; Davy, Christina (MNRF) <[Christina.Davy@ontario.ca](mailto:Christina.Davy@ontario.ca)>; Katharine Yagi <[katharine.yagi@8trees.ca](mailto:katharine.yagi@8trees.ca)>

**Subject:** RE: Welland - Lucchetta Builders - Species at Risk

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hi Brianne

Thank you for responding to my inquiry.

However, I need to make sure the language used here is clear and concise for the planning process. I am not sure whether you have any experience conducting bat echolocation surveys or are you just reviewing our methods against email correspondence which can be confusing because some of our correspondence was over the phone and you have repeated most of Michelle's early comments and have not progressed on the concepts we presented in our case?

I have copied Christina Davy who is a provincial bat expert, and Katharine Yagi who is our research scientist in case they want to chime in on this discussion.

This is our case

1. All echolocation studies use similar technology to detect and record bat echolocations **including the modern technology we used here**. We provided documentation (literature and hardware) for this new technology and methods following Michelle Karam's first email and they were provided to Daniel - they should be in our file. The only difference in our methods is that we operate the technology ourselves to optimize the AUTO-ID function of the unit. Stationary units have fixed range limits of 15-20m.
2. All echolocation studies **cannot estimate the actual number of bats**- no matter how long they are turned on.
3. Echolocation studies can only conclude **species detection vs not detected** because absolute "absence" is not possible to determine in science, especially when habitat is suitable and populations are in decline. **We have both suitable habitat and a population in decline.**
4. The five-hour sampling window in the provincial protocol- **dilutes the sample**- by drawing in bats from other roosting areas beyond the sample area. This is an especially important control aspect for our study which is a small woodlot (<1.0 ha) in total size. The optimum time for bat activity (which is the first 2 hours after dusk) was surveyed each night until we auto-detected Little Brown Myotis on June 20th.
5. The provincial protocol indicates once 1 positive detection occurs the study can cease. That is what we did, except we added one extra night to be certain. We had a positive auto-detection for Little Brown Myotis on June 20<sup>th</sup> 2020 and 21<sup>st</sup> in the same area.

**Therefore our overall conclusion, confirms our methods were suitable for detecting SAR bats at this site during the maternity roosting season. This is irrefutable evidence- see attached.**

On a side note- the province should be open to alternative methods because technology and science improves over time (See Michelle Karam's original EMail April 20220). Further, the province should understand that controls are needed such as the timing of surveys, especially for small old-growth urban woodlands. Realistically our method only applies to these small woodlands that are walkable at night.

In addition, we pre-tested our method against a borrowed stationary unit and found no difference in bat species detection, albeit at an alternate test location. We have also detected SAR bats at other sites in Niagara Region using this same technology and methods. So the province will be seeing more of this method used in the future. I have

offered the data to the province for their records but NHIC did not have the capacity to store the wave files at this time.

Finally, since SAR bats were detected, we ceased collecting data and we recommended to our client - habitat protection of large oak trees snags and vernal pool area where the bats were detected (See EIS for the analysis details). This resulted in a loss of development area as there is no automatic protection for woodlands < 2ha in size.

We also recommended that any vegetation clearing that will occur in fall/winter to avoid maternity roosting season.

Regarding bat boxes- We were awaiting MECP comments on the need for additional bat boxes, because we protected most of the good habitat in our EIS analysis- natural habitat is better right? If we were to install bat boxes- I recommend the BC- bat condo design (four chamber nursery) on a pole near the Slough clearing- over single bat boxes. But our analysis indicates there will remain suitable habitat for bats and white wood Aster (WWA) recovery at this site- so the need of boxes is not justified. If our method did "not detect" SAR bats when habitat is suitable- that does not mean they are not present. In that case I would recommend adding Bat Nursery Boxes as compensation for lost trees.

Please respond to this Email track, confirming we have met the needs of the ESA for protecting SAR bats and WWA at this site.

Thank you

Regards,  
**Anne Yagi, M.Sc., EP, CERP**  
President



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**From:** Brothers, Brianne (MECP)  
**Sent:** January 21, 2021 12:21 PM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Cc:** Williams, Daniel (MECP) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>  
**Subject:** Welland - Lucchetta Builders - Species at Risk

Hello Anne,

Thank you for the email. My apologies for any delays you have experienced. I have taken a look at the information you have provided, and I have the following comments for your review:

### SAR Bats

- SAR bat acoustic surveys were completed from June 8 – June 21 for approximately two (2) hours, for a total of five (5) surveys as it was determined that a SAR bat was identified.
  - MECP suggests that surveys begin after dusk and continue for five (5) hours.
- The device used to undertake the survey was a Wildlife Acoustic' Echo Metre Touch 2 Pro, equipped with a SMM-U2 ultrasonic microphone.
- Myotis sp. was detected at the site on June 20, 2020, at 9:45 PM.
- Michelle Karam stated on April 23, 2020 that the recommended devices used for SAR bat acoustics include the following:
  - broadband bat detectors with condenser microphones
  - Acoustic monitoring systems should allow the observer to determine the signal to noise ratio of the recorded signals (e.g., from oscillograms or time-amplitude displays)
  - Microphones should be positioned to maximize bat detection
- Michelle indicated that there is the potential to include other devices as technology progresses, but that evidence would need to demonstrate that the hours of collection will be equal to what a stationary detector will record, as the survey period was three (3) hours shorter than the recommended guidelines. After reviewing the articles provided, I am not sure the evidence is strong enough to support this conclusion.
- MECP notes that a positive SAR bat identification was made, but that the survey methodologies and equipment used would not be suitable for confirming absence of SAR bats, or estimating quantity.
- The total amount of woodland to be removed for the project is 0.81 ha.
- Please confirm if removals will take place outside the active bat window from April 1 – September 30<sup>th</sup>.
- The Final EIS mentions the use of bat boxes, can you please confirm if there are plans to install bat boxes on the site?

### White Wood Aster

- A 2018 observation of White Wood Aster occurs adjacent to the project site, and not within the project limits.
- Based on the information provided, there are no further Endangered Species Act requirements for this species for this project.

Should you have any further questions, do not hesitate to contact me.

Kind regards,

Brianne

#### **Brianne Brothers**

A/Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
(905)-321-5736 | [Brianne.brothers@ontario.ca](mailto:Brianne.brothers@ontario.ca)

---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>

**Sent:** January 20, 2021 9:26 AM

**To:** Williams, Daniel (MECP) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>; Heeney, Paul (MECP) <[Paul.Heeney@ontario.ca](mailto:Paul.Heeney@ontario.ca)>; Karam, Michelle (MECP) <[Michelle.Karam@ontario.ca](mailto:Michelle.Karam@ontario.ca)>; Species at Risk (MECP) <[SAROntario@ontario.ca](mailto:SAROntario@ontario.ca)>

**Cc:** Walter Lucchetta <[lucchettabuilders@gmail.com](mailto:lucchettabuilders@gmail.com)>; Joe Tomaino <[jtomaino66@gmail.com](mailto:jtomaino66@gmail.com)>; Rachelle Larocque <[rachelle.larocque@welland.ca](mailto:rachelle.larocque@welland.ca)>

**Subject:** IMPORTANT:RE: Myotis Detected in EIS study area Aqueduct and Gadsby Welland

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hello Daniel

I hope all is well with you and your family.

The planning agencies would like an email confirmation that the methods we used that positively detected the presence of Little Brown Myotis Myotis lucifugus during the maternity roosting season at Aqueduct and Gadsby in Welland were suitable. Since we were able to quickly detect the presence of SAR bats, the methods we employed were suitable for this site, as we discussed on the phone which was followed by requests for the ESA data-gathering forms and background information that we have provided. However, the agencies would like an Email from MECP to confirm.

We also did not find White Wood Aster Eurybia divaricate despite several searches during the flowering period.

Please respond by replying via this email. We sent the data gathering files to you months ago and have not heard whether you agree with the mitigation and analysis we completed to protect maternity roosting habitat and other SAR within the woods. Will there be any further correspondence or is the province satisfied with our approach?

Can we conclude that the ESA process is now complete?

Regards,

Anne Yagi, M.Sc., EP, CERP

President



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**From:** Anne Yagi

**Sent:** August 4, 2020 9:09 AM

**To:** Williams, Daniel (MNRF) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>

**Subject:** RE: Myotis Detected in EIS study area

Hello Daniel

I would like to send you additional wave files for the site. I found the recordings very complex. The Auto ID fn is some cases determined Big Brown Bat but with a low accuracy or the Auto-ID function could not identify to species. I also thought I saw the Tri-colored bat signature "hockey stick" patterns within Myotis or Big bat pattern.

Attached is one of those complex files. Let me know if you receive.

How can I transfer large files to you?

Regards,

**Anne Yagi, M.Sc., EP, CERP**

President



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**From:** Williams, Daniel (MNRF)

**Sent:** July 29, 2020 10:26 AM

**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>

**Subject:** RE: Myotis Detected in EIS study area

Hi Anne,

Thanks for your call today, following up on our conversation, if you could provide me with a completed Information Gathering Form and Avoidance Alternatives Form, I can begin reviewing these to determine if a permit will be necessary for this project.

Dan

**Daniel Williams**

Management Biologist, Permissions and Compliance Section

Species at Risk Branch

Ministry of the Environment, Conservation and Parks

Peterborough, ON K9J 3C7

Phone: 705-755-5650; 705-761-5683 (cell)

**Please Note:** As part of providing accessible customer service, please let me know if you have any accommodation needs or require communication supports or alternate formats.

---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>

**Sent:** July 24, 2020 2:57 PM

**To:** Williams, Daniel (MNRF) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>

**Subject:** RE: Myotis Detected in EIS study area

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ok

Regards,  
**Anne Yagi, M.Sc., EP, CERP**  
President



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**From:** Williams, Daniel (MNRF)  
**Sent:** July 24, 2020 2:34 PM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

Works for me, I'll block out the time in my calendar. When you're available give me a call at 705-761-5683.

Thanks,  
Dan

**Daniel Williams**  
Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
Peterborough, ON K9J 3C7  
Phone: 705-755-5650; 705-761-5683 (cell)

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---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Sent:** July 24, 2020 2:31 PM  
**To:** Williams, Daniel (MNRF) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

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Sure how about 10 am Wednesday.

Regards,  
Anne Yagi, M.Sc., EP, CERP  
President



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**From:** Williams, Daniel (MNRF)  
**Sent:** July 24, 2020 2:14 PM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** FW: Myotis Detected in EIS study area

Hi Anne,

Do you have time for a quick chat next week? Tuesday after 10AM, all day Wednesday, and Thursday after 12PM are currently open for me.

Dan

**Daniel Williams**  
Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
Peterborough, ON K9J 3C7  
Phone: 705-755-5650; 705-761-5683 (cell)

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---

**From:** Williams, Daniel (MNRF)  
**Sent:** July 14, 2020 12:04 PM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

Great, thanks Anne. I'll review these and try to get back to you next week with a response.

Dan

**Daniel Williams**

Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
Peterborough, ON K9J 3C7  
Phone: 705-755-5650; 705-761-5683 (cell)

**Please Note:** As part of providing accessible customer service, please let me know if you have any accommodation needs or require communication supports or alternate formats.

---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Sent:** July 14, 2020 11:47 AM  
**To:** Williams, Daniel (MNRF) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Here are 3 articles.

Regards,

**Anne Yagi, M.Sc., EP, CERP**  
**President**



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**From:** Williams, Daniel (MNRF)  
**Sent:** July 14, 2020 9:07 AM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

Sounds good, feel free to give me a call at 705-761-5683 at 10 when you are available.

Dan

**Daniel Williams**

Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
Peterborough, ON K9J 3C7  
Phone: 705-755-5650; 705-761-5683 (cell)

**Please Note:** As part of providing accessible customer service, please let me know if you have any accommodation needs or require communication supports or alternate formats.

---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Sent:** July 14, 2020 9:04 AM  
**To:** Williams, Daniel (MNRF) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Lifesize is an App download. Let's talk over the phone.

Regards,  
**Anne Yagi, M.Sc., EP, CERP**  
**President**



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**From:** Williams, Daniel (MNRF)  
**Sent:** July 9, 2020 10:16 AM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

Hi Anne,

10AM on Tuesday works for me; we should be able to use Lifesize as long as it doesn't require a software download/install. Otherwise Skype/MS Teams are options available to me, or over the phone.

Dan

**Daniel Williams**

Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
Peterborough, ON K9J 3C7  
Phone: 705-755-5650; 705-761-5683 (cell)

**Please Note:** As part of providing accessible customer service, please let me know if you have any accommodation needs or require communication supports or alternate formats.

---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Sent:** July 8, 2020 11:59 PM  
**To:** Williams, Daniel (MNRF) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hi Daniel

I look forward to discussing this project with you. I am available Tuesday AM. How about 10am for discussion. Would you prefer a Lifesize meeting, free online video chat, so we can share data screens?  
Let me know and I can set this up.

Regards,  
**Anne Yagi, M.Sc., EP, CERP**  
President



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**From:** Williams, Daniel (MNRF)  
**Sent:** July 7, 2020 1:04 PM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

Hi Anne,

I have been assigned to takeover this file in Michelle Karam's absence. I am available to discuss this project more next week if there is a time that works well for you. I am currently available most days with the exception of Monday and Thursday before 12PM.

Dan

**Daniel Williams**

Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
Peterborough, ON K9J 3C7  
Phone: 705-755-5650; 705-761-5683 (cell)

**Please Note:** As part of providing accessible customer service, please let me know if you have any accommodation needs or require communication supports or alternate formats.

---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>

**Sent:** July 2, 2020 4:18 PM

**To:** Species at Risk (MECP) <[SAROntario@ontario.ca](mailto:SAROntario@ontario.ca)>

**Cc:** Heeney, Paul (MECP) <[Paul.Heeney@ontario.ca](mailto:Paul.Heeney@ontario.ca)>; Karam, Michelle (MECP) <[Michelle.Karam@ontario.ca](mailto:Michelle.Karam@ontario.ca)>

**Subject:** FW: Myotis Detected in EIS study area

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Hello

Is anyone out there in the MECP world?

I would like to speak to someone regarding out bat survey data for an EIS in Welland Ontario. Aqueduct X Gadsby wooded area near Aqueduct park.

Thank you

Regards,

Anne Yagi, M.Sc., EP, CERP

President



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**From:** Anne Yagi  
**Sent:** June 28, 2020 11:15 AM  
**To:** Heeney, Paul (MECP) <[Paul.Heeney@ontario.ca](mailto:Paul.Heeney@ontario.ca)>  
**Cc:** Karam, Michelle (MECP) <[Michelle.Karam@ontario.ca](mailto:Michelle.Karam@ontario.ca)>  
**Subject:** Myotis Detected in EIS study area

Hello Paul  
I hope you are well.

Our bat survey method detected, what we suspect is a Myotis sp. On June 20, 2020. Within the proposed development area at 9:45 pm.  
We have discontinued our surveys at this site.  
Please have someone contact me about the next steps asap.

Thank you  
Regards,  
**Anne Yagi, EP, MSc**  
**President**



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## Anne Yagi

---

**From:** Anne Yagi  
**Sent:** August 8, 2020 8:01 AM  
**To:** Theresa Bukovics  
**Subject:** RE: Please review the Bat files Below

Yes , and we can't eliminate to SAR bat group.

Regards,  
Anne Yagi, M.Sc., EP, CERP  
President



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**From:** Theresa Bukovics  
**Sent:** August 7, 2020 6:27 PM  
**To:** Anne Yagi <anne.yagi@8trees.ca>  
**Subject:** Re: Please review the Bat files Below

Hi Anne,

This is what Heather Fotherby said:

My thoughts:

- EPTFUS\_20200621\_212707\_EPTFUS LASBOR: I agree, this is two bats, EPFU and LABO
- LASCIN\_20200621\_223405\_LASCIN LASBOR: This one is a bit tricky. Definitely two bats, one of which is a LACI. I am not confident in calling the higher frequency bat a LABO because it is making some interesting calls (likely social or is just trying to avoid speaking at the same time as the LACI). I would keep the classification of the second bat general and just place it in a 40 kHz species grouping (potential LABO or any of the SAR bats).

- LASNOC\_20200621\_223423: Again, a bit of a tricky one. The high frequency bat looks like it might be in a feeding buzz and I am never comfortable ID'ing a recording of a feeding buzz. I would ID this as part of a 40 kHz species grouping. I agree with the LANO classification for the second bat.
- MYOSOD\_20200621\_222955: Without any obvious tails, I'm not comfortable calling this a myotis species. The calls are not jumpy either though, which you would sometimes expect to see from a LABO. I would again ID this as part of a 40 kHz species grouping. Also, note, Indiana Bat is not known from Ontario, as far as I am aware. I'm not sure what your settings are for your auto-classification, however, if you're able to remove MYSO from the auto-classification, I would recommend this.
- NoID\_20200621\_213332: I would ID this as a LABO - note, the end of its call is likely a feeding buzz.
- NYCHUM\_20200621\_221827: This is a nice LABO call :)

It's nice to see that Heather and I came to almost similar IDs.

Cheers,  
Theresa Bukovics, MSc.  
Habitat Stewardship Biologist



(905) 341-1330  
[tbukovics@gmail.com](mailto:tbukovics@gmail.com)  
[www.8trees.ca](http://www.8trees.ca)

On Wed, Aug 5, 2020 at 1:31 AM Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)> wrote:

Thanks

Regards,

**Anne Yagi, M.Sc., EP, CERP**

**President**



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**From:** Theresa Bukovics  
**Sent:** August 4, 2020 9:59 PM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** Re: Please review the Bat files Below

Hi Anne,

EPTFUS\_20200621\_212707.wav Looks like EPTFUS LASBOR

LASCIN\_20200621\_223405.wav Looks like LASCIN LASBOR

LASNOC\_20200621\_223423.wav Looks like LASNOC LASBOR

MYOSOD\_20200621\_222955.wav Looks like LASBOR

NoID\_20200621\_213332.wav Looks like LASBOR or MYOLUC

NYCHUM\_20200621\_221827.wav Looks like LASBOR

I sent these wav files to Heather Fotherby for her opinion.

T.

Theresa Bukovics, MSc.  
Habitat Stewardship Biologist



(905) 341-1330  
[tbukovics@gmail.com](mailto:tbukovics@gmail.com)  
[www.8trees.ca](http://www.8trees.ca)

On Tue, Aug 4, 2020 at 8:50 AM Theresa Bukovics <[tbukovics@gmail.com](mailto:tbukovics@gmail.com)> wrote:

I'm out in the bog today, but will take a look at these later tonight and get back to you. Thanks for keeping me in the loop.

T.

Sent from my iPhone

On Aug 4, 2020, at 12:09 AM, Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)> wrote:

EPTFUS\_20200621\_212707.wav

LASCIN\_20200621\_223405.wav

LASNOC\_20200621\_223423.wav

MYOSOD\_20200621\_222955.wav

NoID\_20200621\_213332.wav

NYCHUM\_20200621\_221827.wav

These are from Lucchetta vernal pool area June 21<sup>st</sup>. Segments of these wave files have SAR bat ID values. MYOLUC and PERSUB possibly MYOSEP. When we have many bats in the area the app may not be able to distinguish individuals and overlapping calls and may record all of them and assign a best fit. I have been reviewing files for the pool area and need to make a case in the EIS to protect the Seasonal pool/ SWD area and associated large trees.

Maybe we need to have Heather Fotherby take a look at them too.

Regards,

**Anne Yagi, M.Sc., EP, CERP**

**President**

## Anne Yagi

---

**From:** Williams, Daniel (MNRF) <Daniel.Williams2@ontario.ca>  
**Sent:** August 4, 2020 9:29 AM  
**To:** Anne Yagi  
**Subject:** RE: Myotis Detected in EIS study area

Hi Anne,

I received the attached file, I'll reach out and see if the individual in my section is able to **review the wave files**; you may also wish to consider contacting MNRF's Natural Heritage Information Centre (nhicrequests@ontario.ca), they would likely be interested in having the occurrence data.

Files larger than 10MB can be transferred to me through a file sharing service such as dropbox.

Thanks,  
Dan

### Daniel Williams

Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
Peterborough, ON K9J 3C7  
Phone: 705-755-5650; 705-761-5683 (cell)

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---

**From:** Anne Yagi <anne.yagi@8trees.ca>  
**Sent:** August 4, 2020 9:09 AM  
**To:** Williams, Daniel (MNRF) <Daniel.Williams2@ontario.ca>  
**Subject:** RE: Myotis Detected in EIS study area

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hello Daniel

I would like to send you additional wave files for the site. I found the recordings very complex. The Auto ID fn is some cases determined Big Brown Bat but with a low accuracy or the Auto-ID function could not identify to species. I also thought I saw the Tri-colored bat signature "hockey stick" patterns within Myotis or Big bat pattern.

Attached is one of those complex files. Let me know if you receive.

How can I transfer large files to you?

Regards,

**Anne Yagi, M.Sc., EP, CERP**  
**President**



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---

**From:** Williams, Daniel (MNRF)  
**Sent:** July 29, 2020 10:26 AM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

Hi Anne,

Thanks for your call today, following up on our conversation, if you could provide me with a **completed Information Gathering Form and Avoidance Alternatives Form**, I can begin reviewing these to determine if a permit will be necessary for this project.

Dan

**Daniel Williams**  
Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
Peterborough, ON K9J 3C7  
Phone: 705-755-5650; 705-761-5683 (cell)

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---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Sent:** July 24, 2020 2:57 PM  
**To:** Williams, Daniel (MNRF) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

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ok

Regards,  
**Anne Yagi, M.Sc., EP, CERP**  
President



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---

**From:** Williams, Daniel (MNRF)  
**Sent:** July 24, 2020 2:34 PM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

Works for me, I'll block out the time in my calendar. When you're available give me a call at 705-761-5683.

Thanks,  
Dan

**Daniel Williams**  
Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
Peterborough, ON K9J 3C7  
Phone: 705-755-5650; 705-761-5683 (cell)

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---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Sent:** July 24, 2020 2:31 PM  
**To:** Williams, Daniel (MNRF) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

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Sure how about 10 am Wednesday.

Regards,  
**Anne Yagi, M.Sc., EP, CERP**  
President



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**From:** Williams, Daniel (MNRF)  
**Sent:** July 24, 2020 2:14 PM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** FW: Myotis Detected in EIS study area

Hi Anne,

Do you have time for a quick chat next week? Tuesday after 10AM, all day Wednesday, and Thursday after 12PM are currently open for me.

Dan

**Daniel Williams**

Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
Peterborough, ON K9J 3C7  
Phone: 705-755-5650; 705-761-5683 (cell)

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---

**From:** Williams, Daniel (MNRF)  
**Sent:** July 14, 2020 12:04 PM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

Great, thanks Anne. I'll review these and try to get back to you next week with a response.

Dan

**Daniel Williams**

Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
Peterborough, ON K9J 3C7

Phone: 705-755-5650; 705-761-5683 (cell)

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---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Sent:** July 14, 2020 11:47 AM  
**To:** Williams, Daniel (MNRF) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

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Here are 3 articles.

Regards,  
Anne Yagi, M.Sc., EP, CERP  
President



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---

**From:** Williams, Daniel (MNRF)  
**Sent:** July 14, 2020 9:07 AM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

Sounds good, feel free to give me a call at 705-761-5683 at 10 when you are available.

Dan

**Daniel Williams**

Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
Peterborough, ON K9J 3C7  
Phone: 705-755-5650; 705-761-5683 (cell)

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---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Sent:** July 14, 2020 9:04 AM  
**To:** Williams, Daniel (MNRF) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

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Lifesize is an App download. Let's talk over the phone.

Regards,  
Anne Yagi, M.Sc., EP, CERP  
President



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**From:** Williams, Daniel (MNRF)  
**Sent:** July 9, 2020 10:16 AM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

Hi Anne,

10AM on Tuesday works for me; we should be able to use Lifesize as long as it doesn't require a software download/install. Otherwise Skype/MS Teams are options available to me, or over the phone.

Dan

**Daniel Williams**  
Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks  
Peterborough, ON K9J 3C7  
Phone: 705-755-5650; 705-761-5683 (cell)

**Please Note:** As part of providing accessible customer service, please let me know if you have any accommodation needs or require communication supports or alternate formats.

---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Sent:** July 8, 2020 11:59 PM  
**To:** Williams, Daniel (MNRF) <[Daniel.Williams2@ontario.ca](mailto:Daniel.Williams2@ontario.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hi Daniel

I look forward to discussing this project with you. I am available Tuesday AM. How about 10am for discussion. Would you prefer a Lifesize meeting, free online video chat, so we can share data screens?  
Let me know and I can set this up.

Regards,  
Anne Yagi, M.Sc., EP, CERP  
President



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**From:** Williams, Daniel (MNRF)  
**Sent:** July 7, 2020 1:04 PM  
**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Subject:** RE: Myotis Detected in EIS study area

Hi Anne,

I have been assigned to takeover this file in **Michelle Karam's absence**. I am available to discuss this project more next week if there is a time that works well for you. I am currently available most days with the exception of Monday and Thursday before 12PM.

Dan  
Daniel Williams  
Management Biologist, Permissions and Compliance Section  
Species at Risk Branch  
Ministry of the Environment, Conservation and Parks

Peterborough, ON K9J 3C7  
Phone: 705-755-5650; 705-761-5683 (cell)

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---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>  
**Sent:** July 2, 2020 4:18 PM  
**To:** Species at Risk (MECP) <[SAROntario@ontario.ca](mailto:SAROntario@ontario.ca)>  
**Cc:** Heeney, Paul (MECP) <[Paul.Heeney@ontario.ca](mailto:Paul.Heeney@ontario.ca)>; Karam, Michelle (MECP) <[Michelle.Karam@ontario.ca](mailto:Michelle.Karam@ontario.ca)>  
**Subject:** FW: Myotis Detected in EIS study area

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Hello  
Is anyone out there in the MECP world?

I would like to speak to someone regarding out bat survey data for an EIS in Welland Ontario. Aqueduct X Gadsby wooded area near Aqueduct park.

Thank you

Regards,  
**Anne Yagi, M.Sc., EP, CERP**  
President



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**From:** Anne Yagi  
**Sent:** June 28, 2020 11:15 AM  
**To:** Heeney, Paul (MECP) <[Paul.Heeney@ontario.ca](mailto:Paul.Heeney@ontario.ca)>  
**Cc:** Karam, Michelle (MECP) <[Michelle.Karam@ontario.ca](mailto:Michelle.Karam@ontario.ca)>  
**Subject:** Myotis Detected in EIS study area

Hello Paul  
I hope you are well.

Our bat survey method detected, what we suspect is a Myotis sp. On June 20, 2020. Within the proposed development area at 9:45 pm.

We have discontinued our surveys at this site.

Please have someone contact me about the next steps asap.

Thank you

Regards,

**Anne Yagi, EP, MSc**

**President**



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## Anne Yagi

---

**From:** Karam, Michelle (MECP) <Michelle.Karam@ontario.ca>  
**Sent:** April 23, 2020 11:27 AM  
**To:** Anne Yagi; Heeney, Paul (MECP)  
**Cc:** Whittard, Jennifer; Walter Lucchetta; Frank Ierfino  
**Subject:** RE: Proposed Bat Occurrence Sample Method for small development Projects  
**Attachments:** BatReportingFormMECP\_Acoustic\_2019.xlsx

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Hi Anne,

To date, for wooded areas we usually only accept the stationary broadband detectors with microphone :

- Acoustic monitoring should use broadband bat detectors (these may be automated systems in conjunction with computer software analysis packages or manual devices) with condenser microphones.
- Acoustic monitoring systems should allow the observer to determine the signal to noise ratio of the recorded signals (e.g., from oscillograms or time-amplitude displays). These systems provide information about signal strength and increase the quality and accuracy of the data being analyzed. Zero-crossing acoustic detectors are typically not recommended due to their limitations to obtain appropriate information.
- Microphones should be positioned to maximize bat detection (e.g., microphone(s) situated away from nearby obstacles to allow for maximum range of detection, microphone(s) angled slightly away from the prevailing wind to minimize wind noise).

The data collected would also need to suitably fill out all of the information in the attached excel template (both tabs).

There are many things to consider here. I have used this technology in the past but it was for very specific applications for bats that were already confirmed to be hibernating in the cave, in a condensed areas, flying low and in close proximity (e.g. exiting a cave) and it was not for an impact or development of any kind. For bats flying higher, in a roosting situation and more sparse I am not sure if this would be appropriate. Then there is the question of the type of data collected and the way in which it is analysed.

As more technology comes out we are open to considering but we would need to be provided studies to show that this technology is as acceptable and produce the same level of data as the stationary detector. If you can demonstrate that the hours of collection will be equal to what a stationary detector will record (I notice you have listed 2 hours per night which is lower than a stationary detector), and I did not see the frequency – usually we ask for 10 night (with appropriate weather – as has been discussed before).

I hope this is helpful. If you can produce some published literature which can speak to the comparison we would be more than happy to look at this. As of tomorrow I will be off on maternity leave, so please contact [sarontario@ontario.ca](mailto:sarontario@ontario.ca).

Many thanks,

*Michelle Karam*

Management Biologist

Permissions and Compliance, Species at Risk Branch  
Ministry of Environment, Conservation and Parks  
(905) 321-5736 phone

(905) 562-1154 fax  
[michelle.karam@ontario.ca](mailto:michelle.karam@ontario.ca)

---

**From:** Anne Yagi <anne.yagi@8trees.ca>  
**Sent:** April 21, 2020 1:59 PM  
**To:** Karam, Michelle (MECP) <Michelle.Karam@ontario.ca>; Heeney, Paul (MECP) <Paul.Heeney@ontario.ca>  
**Cc:** Whittard, Jennifer <Jennifer.Whittard@niagararegion.ca>; Walter Lucchetta <lucchettabuilders@gmail.com>; Frank Ierfino <ierfinofrank@gmail.com>  
**Subject:** RE: Proposed Bat Occurrence Sample Method for small development Projects

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Hi Michelle

I hope you and your family are well.

You may not have access to documents we have sent in on this subject in February, so I am attaching them here. (attached).

From your Email, we completed step 1, confirmed potential maternity roosting trees are present for SAR bats (see Preliminary Screening). We confirmed in step 2, a loss of all potential roosts because proposed development will remove all trees (Scoped EIS). Since the development site is within the range of all SAR bats and habitat is potentially suitable, I am requesting whether additional surveys are needed? And if surveys are needed, I have sent a methodology for consideration for this small wooded area in the previous email and I have the methods copied below.

#### **Proposed sampling methods**

We propose to conduct, repeat walking transects (roving survey) through the sample area (< 1 ha) over a 1 hr. to 2hr sample period (sampling events are randomly selected from dusk to dawn) during evenings in June. All sample events will occur within the appropriate air temperatures and under no wind or rain conditions). The field biologist will be able to adapt to changing weather conditions, by moving into more protected areas to record bat acoustics, should weather conditions change during the sample event. Bat acoustics are recorded automatically and manually while viewing the live stream from Wildlife Acoustic Echo meter Pro software and hardware devices.

<https://www.wildlifeacoustics.com/products/echo-meter-touch-2-pro-ios>

Sampling within suitable habitat, we expect to identify common bat species readily. Rare species, by definition, are more challenging to detect because their abundances are low. The probability of detecting a rare species is multiplied by the probability of the sampler also being present, the weather conditions remaining appropriate and the technical equipment is working. Therefore, we also want to improve the likelihood of detecting rare bat species by experimentally testing flying insect attractants (i.e. lights added) midway along the transects.

I look forward to hearing back from you. However, as we are getting closer to the sampling time frame in June, and if we do not hear back from the province, we will continue with this sample design, because we do not want to lose the June sampling season. We will also report our findings back to the province upon completion.

Regards,  
Anne Yagi, EP  
President

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**From:** Karam, Michelle (MECP)

**Sent:** April 21, 2020 9:23 AM

**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>; Heeney, Paul (MECP) <[Paul.Heeney@ontario.ca](mailto:Paul.Heeney@ontario.ca)>

**Cc:** Whittard, Jennifer <[Jennifer.Whittard@niagararegion.ca](mailto:Jennifer.Whittard@niagararegion.ca)>; Walter Lucchetta <[lucchettabuilders@gmail.com](mailto:lucchettabuilders@gmail.com)>; Frank Ierfino <[ierfinofrank@gmail.com](mailto:ierfinofrank@gmail.com)>

**Subject:** RE: Proposed Bat Occurrence Sample Method for small development Projects

Hi Anne,

For SAR bats, MECP first recommend that you look at the site as a desktop exercise and what is available as potential SAR bat habitat (ELC mapping for tree maternity roosting, buildings, rock features for hibernacula or MYLE roosting, wet features that could be foraging habitat etc.). Based on the SAR bats in range of the site (in this area it would be all SAR bats) and what their habitat is you can determine if there is potential for SAR bat habitat. If the answer is no, then you should be able to determine there will be no impacts to SAR bats (like with other SAR species). If the answer is yes – map and overlay the footprint proposed impact, send this with project details to [sarontario@ontario.ca](mailto:sarontario@ontario.ca) and MECP can advise if there may be an impact that would contravene ESA, or if they may have mitigation and avoidance measures that could be followed.

Many thanks,

*Michelle Karam*

Management Biologist

Permissions and Compliance, Species at Risk Branch

Ministry of Environment, Conservation and Parks

(905) 321-5736 phone

(905) 562-1154 fax

[michelle.karam@ontario.ca](mailto:michelle.karam@ontario.ca)

---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>

**Sent:** April 17, 2020 9:51 PM

**To:** Heeney, Paul (MECP) <[Paul.Heeney@ontario.ca](mailto:Paul.Heeney@ontario.ca)>

**Cc:** Whittard, Jennifer <[Jennifer.Whittard@niagararegion.ca](mailto:Jennifer.Whittard@niagararegion.ca)>; Walter Lucchetta <[lucchettabuilders@gmail.com](mailto:lucchettabuilders@gmail.com)>; Frank Ierfino <[ierfinofrank@gmail.com](mailto:ierfinofrank@gmail.com)>

**Subject:** Proposed Bat Occurrence Sample Method for small development Projects

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Hello Paul

I have been trying to get a dialogue started regarding a 12 unit housing development in a small wooded area in Welland Ontario. I previously submitted a request for ESA screening to MECP in February. The Landowner cannot afford a high tech bat acoustic survey, and I want to propose an alternative sampling design. The main issue I have with the current protocol is the high cost to the landowner and potential for noise and wind interference that goes unrealized until after the events are recorded and sample dates are missed.

I am proposing a revised sample method to detect bat species presence within small wooded areas (<2ha).

We propose to conduct, repeat walking transects (roving survey) through the sample area over a 1 hr. to 2hr sample period (randomly selected from dusk to dawn) during evenings in June. All sample events will occur within the appropriate air temperatures and under no wind or rain conditions). The field biologist will be able to adapt to changing weather conditions, by moving into more protected areas should weather conditions change. Bat acoustics are recorded automatically and manually while viewing the live stream from Wildlife Acoustic Echo meter Pro software and hardware devices. <https://www.wildlifeacoustics.com/products/echo-meter-touch-2-pro-ios>

Sampling within suitable habitat, we expect to identify common bat species readily. Rare species, by definition, are more challenging to detect because their abundances are low. The probability of detecting a rare species is multiplied by the probability of the sampler also being present, the weather conditions remaining appropriate and the technical equipment is working. Therefore, we also want to improve the likelihood of detecting rare bat species by experimentally testing flying insect attractants (i.e. lights added) midway along the transects.

As we are getting closer to the sampling time frame in June, and If we do not hear from the province, we will continue with this sample design. We will also report our findings back to the province upon completion.

Please contact me if you have any further questions.

Regards,  
Anne Yagi, EP  
President



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### Environmental Impact Study (EIS) Requirements

Proponent: Lucchetta Builders Inc. Date: JAN 22/2020 File # \_\_\_\_\_

Property Address: 368 Aguedwet x 155 Gadsby Ave Municipality: welland

Type of Application: \_\_\_\_\_ Completed by: A. Boudens

Is the subject site **located within an Urban or Rural area?**

<input checked="" type="checkbox"/> Urban Area	<input type="checkbox"/> Rural Area	<input type="checkbox"/> Hamlet
Details:		

Is the subject site **identified in the Provincial Natural Heritage System?**

<input checked="" type="checkbox"/> No	<input type="checkbox"/> Places to Grow Act	<input type="checkbox"/> Greenbelt Plan	<input type="checkbox"/> NEC
Details ( <i>Designations</i> ):			

Is the subject site **located within an identified Agricultural Area?**

<input checked="" type="checkbox"/> No	<input type="checkbox"/> Good General Agricultural Area	<input type="checkbox"/> Unique Agriculture Area
Details:		

Is the subject site **regulated by another agency?**

<input type="checkbox"/> No	<input type="checkbox"/> NPCA	<input checked="" type="checkbox"/> MECP <i>Potential</i>	<input type="checkbox"/> MNRF	<input type="checkbox"/> NEC	<input type="checkbox"/> Other Please Specify:
Details:					

Was a Site Visit Conducted?

Yes      Date: JAN 22/2020  
 No      Staff Member: A. Boudens + L. Karlewicz  
Details: met with walter lucchetta and 8 trees staff.

Ecological Land Classification (ELC) Vegetation Communities identified on Mapping:

<u>FOD</u>
------------

**Natural Heritage features identified or likely to exist:**

**Environmental Protection Area (EPA)**

	Feature	Located <b>On</b> and/or <b>Adjacent</b> Subject Property	Details
<input type="checkbox"/>	Provincially Significant Wetland (PSW)	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input type="checkbox"/> Both	Name:
<input type="checkbox"/>	Provincially Significant Life Science Area of Natural and Scientific Interest (ANSI)	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input type="checkbox"/> Both	Name:
<input checked="" type="checkbox"/>	Significant Habitat of Threatened or Endangered Species	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input checked="" type="checkbox"/> Both <i>Potential</i>	Species:
<input type="checkbox"/>	Key Natural Heritage features within the Greenbelt Natural Heritage System	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input type="checkbox"/> Both	Feature:

**Environmental Conservation Area (ECA)**

	Feature	Located <b>On</b> and/or <b>Adjacent</b> Subject Property	Details
<input checked="" type="checkbox"/>	Significant Woodlands <i>Potential</i>	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input checked="" type="checkbox"/> Both	Criteria: <input checked="" type="checkbox"/> Significant Wildlife Habitat <input type="checkbox"/> ANSI <input type="checkbox"/> Other <input type="checkbox"/> Environmentally Sensitive Area <input type="checkbox"/> Interior Habitat <input checked="" type="checkbox"/> Old Growth <input checked="" type="checkbox"/> Rare Species <input type="checkbox"/> Size: <input type="checkbox"/> Water <input type="checkbox"/> Wetland
<input checked="" type="checkbox"/>	Significant Wildlife Habitat	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input checked="" type="checkbox"/> Both	Details: <i>Potential</i>
<input checked="" type="checkbox"/>	Significant Habitat of Species of Concern	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input checked="" type="checkbox"/> Both	Species: <i>Potential</i>
<input type="checkbox"/>	Significant Valleylands	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input type="checkbox"/> Both	Details:
<input type="checkbox"/>	Other Evaluated Wetland (Non-Provincially Significant)	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input type="checkbox"/> Both	Name:

<input type="checkbox"/>	Regionally Significant Life Science ANSI	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input type="checkbox"/> Both	Name:
<input type="checkbox"/>	Publicly Owned Conservation Lands	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input type="checkbox"/> Both	Details:
<input type="checkbox"/>	<input type="checkbox"/> Savannah <input type="checkbox"/> Tallgrass Prairie <input type="checkbox"/> Alvar <input type="checkbox"/> Dune	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input type="checkbox"/> Both	Details:
<input type="checkbox"/>	Regional Local Amendment	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input type="checkbox"/> Both	Details:

**Fish Habitat**

	Feature	Located <b>On</b> and/or <b>Adjacent</b> Subject Property	Details
<input type="checkbox"/>	Fish Habitat <input type="checkbox"/> Reach (Watercourse) <input type="checkbox"/> Area (Pond/Lake)	<input type="checkbox"/> On <input type="checkbox"/> Adjacent <input type="checkbox"/> Both	Fish Habitat Classification: (identified by MNRF) <input type="checkbox"/> 1: Critical <input type="checkbox"/> 2: Important <input type="checkbox"/> 3: Marginal Details:

**Candidate Significant Wildlife Habitat (Study must determine presence/absence)**

Seasonal Concentration Areas of Animals:

<input type="checkbox"/> Waterfowl Stopover and Staging Areas (Terrestrial and Aquatic)	<input type="checkbox"/> Colonially Nesting Bird Breeding Habitat (Bank and Cliff/ Tree/ Shrub/ Ground)	<input type="checkbox"/> Reptile Hibernacula
<input type="checkbox"/> Shorebird Migratory Stopover Area	<input type="checkbox"/> Turtle Wintering Area	<input type="checkbox"/> Deer Winter Congregation Area
<input type="checkbox"/> Raptor Wintering Area	<input type="checkbox"/> Bat Hibernacula	<input type="checkbox"/> Deer Yarding Area
<input type="checkbox"/> Landbird Migratory Stopover Area	<input checked="" type="checkbox"/> Bat Maternity Colonies	
<input type="checkbox"/> Migratory Butterfly Stopover Area	<input type="checkbox"/> Bat Migratory Stopover Area	

Rare Vegetation Communities:

<input type="checkbox"/> Cliff and Talus Slope	<input type="checkbox"/> Old Growth Forest	<input type="checkbox"/> Other
<input type="checkbox"/> Sand Barren	<input type="checkbox"/> Savannah	
<input type="checkbox"/> Alvar	<input type="checkbox"/> Tallgrass Prairie	

Specialized Habitat for Wildlife:

<input type="checkbox"/> Waterfowl Nesting Area	<input type="checkbox"/> Woodland Raptor Nesting Habitat	<input type="checkbox"/> Seeps and Springs
<input type="checkbox"/> Bald Eagle and Osprey Nesting, Foraging, Perching Habitat	<input type="checkbox"/> Turtle Nesting Areas	<input type="checkbox"/> Amphibian Breeding Habitat – Woodland and Wetland

Habitat for Species of Conservation Concern (Not including Endangered or Threatened Species)

<input type="checkbox"/> Marsh Bird Breeding Habitat	<input type="checkbox"/> Shrub/Early Successional Bird Breeding Habitat	<input checked="" type="checkbox"/> Special Concern and Rare Wildlife Species
<input type="checkbox"/> Open Country Bird Breeding Habitat	<input type="checkbox"/> Terrestrial Crayfish	<input type="checkbox"/>

Animal Movement Corridors

<input type="checkbox"/> Amphibian Movement Corridors	<input type="checkbox"/> Bat Migratory Stopover Area	<input type="checkbox"/> Deer Movement Corridors
---	--	--

Has the property been identified as a Groundwater Protection Area (HVA)?

- Yes
- No

Details: \_\_\_\_\_

**Additional Comments/Details:**

Aerial Map:



## Required Field Surveys

(Any relevant information gathered from existing studies conducted within the last 5 years should be discussed to determine whether they are suitable to replace some of the requirements below)

	Field Surveys	General Timing Window	Protocol	Notes
<input checked="" type="checkbox"/>	Ecological Land Classification (ELC) mapping, including soils	Spring to Fall (i.e., generally May to October)	Ecological Land Classification for Southern Ontario (Lee et al., 1998)	Undertake ecological land classification down to eco-element (vegetation type).
<input checked="" type="checkbox"/>	Botanical Inventory (floral species list)	<input checked="" type="checkbox"/> Single Season <input type="checkbox"/> Two Season (Spring/Summer and Fall) <input type="checkbox"/> Three Season (Spring/Summer/Fall) <input type="checkbox"/> Other	Systematic searches	Must be completed for each ELC community, with particular attention to presence/absence and habitat for rare (local and S1-S3) species and SAR. <i>Please screen for White Wood Aster.</i>
<input checked="" type="checkbox"/>	Breeding Birds	<ul style="list-style-type: none"> <li>Between May 24<sup>th</sup> and July 10<sup>th</sup>;</li> <li>Two surveys spaced 10 days apart;</li> <li>Anytime between dawn and 5 hours after dawn.</li> </ul>	Ontario Breeding Bird Atlas – Guide for Participants (2001)	<ul style="list-style-type: none"> <li>Counts should <i>not</i> be done if it is raining, there is thick fog, or if winds are greater than 19km/hr;</li> <li>If unseasonably warm or cold conditions are encountered in the spring, survey dates may need to be adjusted.</li> </ul>

<input type="checkbox"/>	<p>Amphibians: Frogs and Toads</p>	<p>Three rounds of surveys between the following dates at least 15 days apart:</p> <ul style="list-style-type: none"> <li>➤ April 15<sup>th</sup> – April 30<sup>th</sup> (when night-time air temp exceeds 5°C)</li> <li>➤ May 15<sup>th</sup> – May 30<sup>th</sup> (when night-time air temp exceeds 10°C)</li> <li>➤ June 15<sup>th</sup> – June 30<sup>th</sup> (when night-time air temp exceeds 17°C)</li> </ul>	<p>Marsh Monitoring Program Participant’s Handbook for Surveying Amphibians (Environment Canada, 2008)</p>	<ul style="list-style-type: none"> <li>• Dates provided as a guideline, as air temperature and lack of wind are the most important variables;</li> <li>• If unseasonably warm or cold conditions are encountered in the spring, survey dates may need to be adjusted;</li> <li>• Favourable conditions consist of nights that are damp, foggy or have light rain falling. Persistent or heavy rainfall and nights with strong winds are to be avoided;</li> <li>• Surveys can begin half hour after sunset and end before midnight;</li> <li>• Each station is surveyed for three minutes;</li> <li>• Additional amphibian breeding habitat surveys may be required based on the results of the calling surveys.</li> </ul>
<input checked="" type="checkbox"/>	<p>Bats</p>	<p>Spring, Fall or Winter (i.e., both leaf-off and leaf-on periods)</p>	<p>Criteria from the <i>Significant Wildlife Technical Guide (MNRF 2000)</i> in conjunction with methods outlined by MNRF Guelph District (<i>Recommended Approach for Surveying Buildings and Survey method for SAR Bats within Treed Habitats – Please contact MECP for protocols and field data sheets</i>)</p>	<ul style="list-style-type: none"> <li>• Surveys to identify potentially suitable habitat should be completed prior to June;</li> <li>• If suitable maternity roost habitat is identified, separate acoustic surveys in the month of June may be recommended by MECP;</li> <li>• Please contact the MECP for protocols, field data sheets, and guidance.</li> </ul>

<input type="checkbox"/>	Deer	Variable depending on survey effort	<ul style="list-style-type: none"> <li>• Some information pertaining to the habitat specification of winter deer yards is available in the <i>Forest Management Guidelines for the Provisions of White-tailed Deer Habitat</i>;</li> <li>• More information pertaining to protocols that can be used to monitor deer populations is available in the <i>Wildlife Monitoring Programs and Inventory Techniques for Ontario</i>.</li> </ul>	<ul style="list-style-type: none"> <li>• Correspondence with the MNRF is required in order to confirm survey protocols and details on the evaluation of winter deer yards;</li> <li>• To confirm the presence of deer migration corridors, transects can be completed in order to evaluate the use of habitat in relation to a study area.</li> </ul>
<input type="checkbox"/>	Meander Belt Study	Variable	Meander Belt Width Delineation Protocol (Toronto and Region Conservation Authority, Revised 2004)	
<input type="checkbox"/>	Migratory Bird Survey	Spring Surveys (March to May) and Fall Surveys (August to October)	Bird and Bird Habitats: Guidelines for Wind Power Projects (MNRF, 2011)	

<input type="checkbox"/>	Fisheries Assessment	<input type="checkbox"/> Headwater Drainage Features Assessment	Evaluation, Classification and Management of Headwater Drainage Features Guidelines (CVC & TRCA, 2013)	<ul style="list-style-type: none"> <li>Habitat assessments follow the methods outlined in the OSAP Protocol;</li> <li>Aquatic habitat characterization should identify potential baseflow sources, barriers to fish migration and general habitat quality;</li> <li>Physical stream measurements should be identified (width, height, length);</li> <li>Identify any evidence of upwelling or groundwater concentration (may require a late fall/early winter site visit);</li> <li>Fisheries inventories should be completed in the spring to ensure any fish usage of intermittent or ephemeral systems is identified. Inventories of permanent features may occur throughout the spring and summer. Habitat assessments and detailed habitat mapping should be completed during snow/ice free conditions;</li> <li>Surveys should be completed within spring and fall, as these seasons capture the most diverse community assemblages.</li> </ul>
		<input type="checkbox"/> Habitat Characterization	Ontario Stream Assessment Protocol – <i>Version 10.0</i> (Ontario, 2017); Environmental Guide for Fish and Fish Habitat (MTO, 2009)	
		<input type="checkbox"/> Fisheries Assessment	Ontario Stream Assessment Protocol – <i>Version 10.0</i> (Ontario, 2017)	
<input type="checkbox"/>	Raptor Nests	Between March 23 <sup>rd</sup> and April 23 <sup>rd</sup> , prior to “leaf out”	Forest Raptors & Their Nests in Central Ontario: A guide to Stick Nests & Their Users (Ontario, 1998)	<ul style="list-style-type: none"> <li>Surveys should consist of a thorough investigation of potentially suitable habitat searching for active or inactive stick nests and evidence of raptor activity.</li> </ul>
<input checked="" type="checkbox"/>	Species at Risk Screening	Variable	<input type="checkbox"/> DFO <input checked="" type="checkbox"/> MECP	<ul style="list-style-type: none"> <li>Contact applicable agencies for survey requirements. All agency correspondence must be included in the EIS.</li> </ul>

<input type="checkbox"/>	Marsh Birds	<ul style="list-style-type: none"> <li>• Between May 20<sup>th</sup> and July 5<sup>th</sup>;</li> <li>• Two surveys spaced 10 days apart;</li> <li>• Morning or Evening, must remain consistent for both visits;</li> <li>• Morning surveys can begin 30 min before sunrise and end no later than 10 am; Evening surveys can begin no earlier than 4 hours before sunset and must be completed by dark.</li> </ul>	Marsh Monitoring Participant's Handbook for Surveying Marsh Birds (Environment Canada, 2008)	<ul style="list-style-type: none"> <li>• Each station is surveyed for 15 minutes;</li> <li>• Surveys should be undertaken in weather that is favourable for surveying birds: <i>good visibility, warm temperatures (at least 16°C), no precipitation and little or no wind.</i></li> </ul>
<input type="checkbox"/>	Water Balance	Variable	Wetland Water Balance Monitoring Protocol (Toronto and Region Conservation Authority, 2016)	
<input type="checkbox"/>	Wetland Evaluation	Variable	Ontario Wetland Evaluation System - Southern Manual (Ontario, 2013)	Any proposed refinements to Provincially Significant Wetland boundaries require approval from the MNRF. Please include all correspondence as an appendix in the EIS.
<input type="checkbox"/>	Wildlife Movement Survey (e.g. Road Mortality)	Variable	Environmental Guide for Mitigating Road Impacts to Wildlife (MTO, 2017)	

<input type="checkbox"/>	<p>Salamanders</p>	<p>Early Spring – between late-March to mid-April, immediately following snow melt and/or the first spring rains</p>	<p>Wildlife Monitoring Programs and Inventory Techniques for Ontario</p>	<p>Surveys can consist of one or more of the following three techniques:</p> <ul style="list-style-type: none"> <li>• Visual Surveys completed in the evenings during the period specified. A visual inspection of the habitat, including carefully overturning and replacing potential cover can be included as part of this survey. Egg mass surveys can also be completed during daylight hours;</li> <li>• Fine mesh dipnets can be used to catch amphibians. Capture occurs by sweeping or churning the water. <i>Correspondence with the MNRF/MECP prior to survey commencement recommended as permits may be required;</i></li> <li>• Pitfall or funnel traps, often in association with drift fences, are the most common way of trapping terrestrial amphibians. Traps should be checked daily, before noon to minimize mortality. <i>Correspondence with the MNRF/MECP prior to survey commencement recommended as permits may be required.</i></li> </ul>
<input type="checkbox"/>	<p>Tree Saving Plan <i>only required if woodland determined to be significant</i></p>	<p>Variable</p>	<p>Section 1.36 of the Niagara Region's Tree and Forest Conservation By-law (By-law No. 30-2008)</p>	<ul style="list-style-type: none"> <li>• All requirements listed in the identified protocol must be included for a Tree Saving Plan to be deemed complete.</li> </ul>

<input type="checkbox"/>	Snakes	<ul style="list-style-type: none"> <li>• Spring, Summer and Fall;</li> <li>• most likely to be observed under cover objects in the morning after cool evenings when they seek out their area and try and maintain their body temperatures.</li> </ul>	<ul style="list-style-type: none"> <li>• Survey Protocol for Ontario's Species at Risk Snakes (MNRF, 2016) and/or Milksnake Protocol (MNRF, 2013) is recommended for species that are not at risk;</li> <li>• Wildlife Monitoring Programs and Inventory Techniques for Ontario.</li> </ul>	<ul style="list-style-type: none"> <li>• Visual surveys should be completed by overturning all objects that provide cover (i.e., large branches, logs, rocks, etc.). Objects should be returned, to the extent possible, to their original positions;</li> <li>• Roadside surveys can also be used;</li> <li>• Artificial cover boards can be installed recognizing that it takes time for the boards to be used as habitat;</li> <li>• Contact the MECP for protocols related to SAR snakes.</li> </ul>
<input type="checkbox"/>	Turtles	<ul style="list-style-type: none"> <li>• Early Spring</li> <li>• Between 8 am and 5 pm on sunny days when the air temperature is at least 10 °C;</li> <li>• Between 8 am and 5 pm on partially cloudy or overcast days when air temperatures are greater than 15 °C, and greater than water temperatures</li> </ul>	<ul style="list-style-type: none"> <li>• Wildlife Monitoring Programs and Inventory Techniques for Ontario (MNRF, 1997)</li> <li>• Occurrence Survey Protocol for Blanding's Turtle in Ontario (MNRF, 2013)</li> </ul>	<ul style="list-style-type: none"> <li>• Visual surveys of ponds or wetlands;</li> <li>• Searching for basking turtles is the most effective method of confirming presence of turtles within suitable habitat;</li> <li>• In open water wetlands, surveys can be completed from the shoreline using binoculars to scan the perimeter of the shoreline and potential basking sites;</li> <li>• Basking surveys should be surveyed from the sunlit side as this is the side that turtles are most likely to be located;</li> <li>• In wetlands that lack large pools of open water, surveys should consist of using evenly spaced transects or aerial surveys to cover all areas of the wetland; and</li> <li>• Surveying roads with sandy and gravelly shoulders near wetlands during the late May to early July nesting season may also be undertaken.</li> </ul>

## What must be included in an EIS?

The EIS should focus on the significant natural heritage features and/or hydrological features and functions for which the area was designated, and any additional natural heritage or hydrological features identified on site. It should identify, describe and delineate these features and their ecological and hydrological functions in order to avoid impacts to them. However, it should also address the site's setting in the broader landscape and its role in, and linkages to, broader natural heritage and hydrologic systems. It should assess any unavoidable impacts of the proposed development, indicating the magnitude and implications of those impacts, recommend mitigation measures to reduce negative impacts, identify opportunities for restoration or enhancement of natural heritage features which may also help offset negative impacts, recommend further study, monitoring, and provide recommendations on proceeding with the proposed development, including conditions to be attached to any approvals.

The key components of an EIS include:

- A biophysical and/or hydrologic inventory and analysis, including a description and analysis of the aquatic and terrestrial settings, as well as hydrological conditions such as surface and groundwater features and functions;
- A description of the ecological and hydrological functions served and required by the natural heritage features and/or hydrologic features;
- A description of the linkages between and among natural features and areas, surface water features and ground water features both on the site and in the surrounding area;
- A description of the proposed undertaking;
- Identification of constraints and opportunities;
- Mapping;
- Identification and analysis of potential direct, indirect and cumulative impacts from the proposed activities on the ecological and/or hydrological functions identified;
- The development of appropriate development modifications, recommendations, mitigation measures and enhancement opportunities;
- An assessment of the significance of the cumulative net environmental impacts expected over the long term after these measures have been implemented;
- The recommendation and description of monitoring needs and programs; and
- Recommendations regarding possible residual impacts, including recommendations for proceeding with the development as proposed or modified.

## Steps involved in the environmental impact study process:

Step 1: Determining EIS Requirements

1.1 Initial Screening to Determine if an EIS is Required, or if EIS Requirement can be Waived

1.2 Pre-consultation and Scoping (**This EIS Scoping Checklist satisfies this step**)

Step 2: Terms of Reference (**Next Step!**)

Step 3: Constraints Analysis

Step 4: Ecological Impact Assessment

Step 5: Recommendations and Conclusion

Please refer to the Niagara Region's Environmental Impact Study Guidelines for a detailed description of each step.

## Anne Yagi

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**From:** Whittard, Jennifer <Jennifer.Whittard@niagararegion.ca>  
**Sent:** June 8, 2020 5:52 PM  
**To:** Anne Yagi  
**Cc:** Frank Ierfino; Walter Lucchetta; Lampman, Cara  
**Subject:** RE: Preliminary Environmental Review Comments - Aqueduct & Gadsby, Welland

Hi Anne,

Further to our discussion today, we've reviewed your proposed bat sampling methodology and MECP's April 23, 2020 response. While we appreciate the costs associated with stationary acoustic monitoring, we've not yet received confirmation from the MECP that your proposed protocol is adequate. As such, we are concerned that moving forward without an MECP-approved protocol may be premature, as we'll not be able to sign-off on an alternative methodology and its findings without MECP approval. Therefore, in the absence of confirmation from the MECP, we continue to recommend following approved survey protocols as per our previous EIS scoping checklist. If MECP does not approve, traditional survey requirements may result in additional delays to the project.

Regarding the other survey requirements, based on the information submitted to date, Regional Environmental Planning staff are not yet able to determine if the wooded area onsite meets our criteria for significance. As such, an EIS scoping checklist was prepared to identify the studies that need to be completed. The following is a summary of the other requested studies:

- Ecological Land Classification – This was previously completed and the Scoped Environmental Impact Study (dated January 20, 2020) identified that the wooded area is classified FOD-9 (fresh-moist oak-maple-hickory vegetation community).
- Botanical Inventory (single season) – Please ensure that you also screen for White Wood Aster and include your findings in the final report.
- Breeding Birds – One of the significant woodland criteria identified in Regional Official Plan (ROP) policy 7.B.1.5 requires an assessment to determine if “threatened or endangered or species of concern” are contained in the woodland. There is no way to conclusively make a determination with regards to this criterion until such time that birds have been adequately studied. As such, the Region requested the completion of a breeding bird survey following *Ontario Breeding Bird Atlas- Guide for Participants (2001)* survey protocol.
- Tree Saving Plan – As noted in the EIS Scoping Checklist, a Tree Saving Plan will be required if the woodland is determined to meet the Region's significance criteria identified in ROP policy 7.B.1.5.

One of the criterion identified in ROP policy 7.B.1.5 requires an assessment of Significant Wildlife Habitat potential on the subject lands. Previously provided was a screening table that we ask be filled out and included in your final report. We will specifically be looking to ensure an assessment of Old Growth Forest and Bat Maternity Colonies has been sufficiently completed.

My apologies for the delay and please feel free to reach out to me directly if you have any questions. I will be available until at least the end of the month, after which Cara Lampman (copied) will be your primary contact here at the Region.

Thanks,

Jen

**Jennifer Whittard, BES, MPlan, PMP**

Environmental Planning Consultant  
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**From:** Anne Yagi <anne.yagi@8trees.ca>  
**Sent:** Wednesday, April 15, 2020 9:43 PM  
**To:** Whittard, Jennifer <Jennifer.Whittard@niagararegion.ca>  
**Cc:** Frank Ierfino <ierfinofrank@gmail.com>; Walter Lucchetta <lucchettabuilders@gmail.com>  
**Subject:** RE: Preliminary Environmental Review Comments - Aqueduct & Gadsby, Welland

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Hello Jennifer

Could you please call me to discuss the Terms of Reference for the above EIS?

We (myself and my client) are not in complete agreement with the list of studies requested by the Region, and they are expensive to conduct. The costs to conduct a 10 to 15 day acoustic bat survey is in the neighborhood of \$10,000 and the number of cavity trees is 5-10. We have also not confirmed with the province the need or rationale for acoustic bat surveys in this small urban woodlot. Given the declining number of endangered bats is entirely due to White Nose Syndrome and not due to cavity tree loss, the likelihood of detecting them is low, even though the habitat may be suitable for seasonal use.

In addition, my client had a pre-screening meeting with all agencies before my involvement. At that meeting, direction was given that included

- a) Contact NPCA for a site visit to confirm no significant species/screening
- b) Region requested an environmental constraints analysis
- c) No EIS was required

The landowner has completed both a) and b) requirements in the document entitled "Scoped EIS for Aqueduct and Gadsby, Welland."

In light of the above rationale, we are prepared to complete the following field studies on the subject lands.

- 1. Winter tree survey, species, size, condition, presence of cavities
- 2. ELC mapping
- 3. Impact analysis and mitigation
- 4. Seasonally appropriate observations of flora and fauna from spring and summer. This would provide one full season.

Please contact me to discuss further

Regards,  
**Anne Yagi, EP**  
**President**

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**From:** Whittard, Jennifer

**Sent:** April 6, 2020 5:14 PM

**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>

**Cc:** [devserv@welland.ca](mailto:devserv@welland.ca); [ierfinofrank@gmail.com](mailto:ierfinofrank@gmail.com); [lucchettabuilders@gmail.com](mailto:lucchettabuilders@gmail.com); Boudens, Adam <[Adam.Boudens@niagararegion.ca](mailto:Adam.Boudens@niagararegion.ca)>; Busnello, Pat <[pat.busnello@niagararegion.ca](mailto:pat.busnello@niagararegion.ca)>; Earl, Lindsay <[lindsay.earl@niagararegion.ca](mailto:lindsay.earl@niagararegion.ca)>; Rachele Larocque <[rachele.larocque@welland.ca](mailto:rachele.larocque@welland.ca)>; Karlewicz, Lori <[Lori.Karlewicz@niagararegion.ca](mailto:Lori.Karlewicz@niagararegion.ca)>

**Subject:** Preliminary Environmental Review Comments - Aqueduct & Gadsby, Welland

Hi Anne,

Regional Environmental Planning staff have completed a preliminary review of the Scoped Environmental Impact Study (EIS) prepared by 8 Trees Incorporated (dated January 20, 2020) for the proposed development at 368 Aqueduct Street and 155 Gadsby Avenue in Welland. As previously discussed, staff find the report to be insufficient for the following key reasons:

- No field surveys were completed;
- Site visits were only conducted during November 2019, which is not sufficient to determine the significance of natural heritage features; and
- The EIS indicates that a few older trees with cavities were present that may have ecological value to wildlife at certain times of the year (pg.17). Wildlife surveys are therefore required to complete the assessment.

Staff attended a site visit with the applicant and 8 Trees Incorporated on January 22, 2020. At that meeting, Regional Environmental Planning staff identified the additional field surveys required and provided an EIS Scoping Checklist which outlines the Region's requirements (attached for ease of reference). To reiterate, the following information should be included in the updated EIS:

1. The methodology and results of the field surveys identified in the Scoping Checklist. Required surveys include a single season vegetation survey, Ecological Land Classification (ELC), a breeding bird survey, bat survey, and a Tree Saving Plan (if applicable);
2. A comprehensive screening for Species at Risk and an assessment of Significant Wildlife Habitat (see attached screening table template);
3. A detailed analysis of the criteria identified in Regional Official Plan policy 7.B.1.5, to determine if the wooded area meets criteria to be designated Significant Woodland;
4. A map that illustrates the limits of all natural heritage constraints on and adjacent to the subject property. The conceptual development site plan should be incorporated to show the extent of proposed impacts;
5. An impact analysis and recommended mitigation measures, if applicable; and
6. All agency correspondence and field survey data sheets.

There is no need to submit a Terms of Reference (TOR) given we've already reviewed the draft EIS. Please just include all relevant agency correspondence as an appendix in the EIS. The EIS should

follow the report format outlined in the Region's EIS Guidelines (January 2018), specifically the subheadings under Steps 3-5.

Please let us know if you have any questions.

Thanks,  
Jen

**Jennifer Whittard, BES, MPlan, PMP**  
Manager, Environmental Planning  
Planning and Development Services, Niagara Region  
Phone: 905-980-6000 ext. 3430 Toll-free: 1-800-263-7215  
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Following pages are correspondence with NPCA.

## Anne Yagi

---

**From:** Cara Lampman <clampman@npca.ca>  
**Sent:** January 14, 2020 2:03 PM  
**To:** Anne Yagi; Boudens, Adam; devserv@welland.ca  
**Cc:** Frank Ierfino; Walter Lucchetta; David Deluce  
**Subject:** RE: Lucchetta Builders Inc. Development Aqueduct X Gadsby Rds. City of Welland.

Hi Anne,

Thank you for providing the NPCA with that information.

Based on your assessments it is appropriate to conclude that the wetland feature identified on site:

- a) does not meet OWES criteria as wetland due to its small size
- b) does not meet the Conservation Authorities Act definition of a wetland as it has no connection to a surface watercourse

Based on the above, the NPCA is satisfied that the subject parcel does not contain any NPCA Regulated Features. As such, the NPCA requires no circulation of the applications and/or supporting studies.

I trust this information to be satisfactory, do not hesitate to contact me with any further questions or concerns.

### Cara Lampman

#### Senior Watershed Planner

Niagara Peninsula Conservation Authority (NPCA)  
250 Thorold Road West, 3<sup>rd</sup> Floor | Welland, ON L3C 3W2  
Tel: 905-788-3135 | extension 272  
[clampman@npca.ca](mailto:clampman@npca.ca)  
[www.npca.ca](http://www.npca.ca)

You can access the NPCA mapping tool here:

<http://camaps.maps.arcgis.com/apps/webappviewer/index.html?id=c7555050c8f24a7cbc829395557a7988>

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**From:** Anne Yagi <anne.yagi@8trees.ca>  
**Sent:** January 14, 2020 1:21 PM  
**To:** Cara Lampman <clampman@npca.ca>; Boudens, Adam <Adam.Boudens@niagararegion.ca>; devserv@welland.ca  
**Cc:** Frank Ierfino <ierfinofrank@gmail.com>; Walter Lucchetta <lucchettabuilders@gmail.com>; David Deluce <ddeluce@npca.ca>  
**Subject:** RE: Lucchetta Builders Inc. Development Aqueduct X Gadsby Rds. City of Welland.

### Hi Cara

My answers to your questions are in bold font.

Wetland Definition, under the Conservation Authorities Act:

means land that

- a) is seasonally or permanently covered by shallow water or has a water table close to or at its surface, **Yes , the vernal pool is seasonal water**
- b) directly contributes to the hydrological function of a watershed through connection with a surface watercourse, **No, this woodlot is not connected to a surface watercourse**
- c) has hydric soils, the formation of which has been caused by the presence of abundant water, and d) has vegetation dominated by hydrophytic plants or water tolerant plants, the dominance of which has been

favoured by the presence of abundant water, **Yes, hydric soils and water tolerant trees are present, Pin oak, willow and elm**

- d) but does not include periodically soaked or wet land that is used for agricultural purposes and no longer exhibits a wetland characteristic referred to in clause c) or d). **Yes, the woodlot is not agricultural lands.**

Let me know if you have any further questions or concerns.

Regards,  
**Anne Yagi, EP**  
**President**



[www.8trees.ca](http://www.8trees.ca)

Ph: 905-892-1760

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**From:** Cara Lampman

**Sent:** January 14, 2020 10:46 AM

**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>; Boudens, Adam <[Adam.Boudens@niagararegion.ca](mailto:Adam.Boudens@niagararegion.ca)>; [devserv@welland.ca](mailto:devserv@welland.ca)

**Cc:** Frank Ierfino <[ierfinofrank@gmail.com](mailto:ierfinofrank@gmail.com)>; Walter Lucchetta <[lucchettabuilders@gmail.com](mailto:lucchettabuilders@gmail.com)>; David Deluce <[ddeluce@npca.ca](mailto:ddeluce@npca.ca)>

**Subject:** RE: Lucchetta Builders Inc. Development Aqueduct X Gadsby Rds. City of Welland.

Hi Anne,

Thank you for the updated information.

Can you please comment on whether or not that wetland on site meets the Conservation Authorities Act definition?

**Wetland, under the Conservation Authorities Act:** means land that a) is seasonally or permanently covered by shallow water or has a water table close to or at its surface, b) directly contributes to the hydrological function of a watershed through connection with a surface watercourse, c) has hydric soils, the formation of which has been caused by the presence of abundant water, and d) has vegetation dominated by hydrophytic plants or water tolerant plants, the dominance of which has been favoured by the presence of abundant water, but does not include periodically soaked or wet land that is used for agricultural purposes and no longer exhibits a wetland characteristic referred to in clause c) or d).

**Cara Lampman**

**Senior Watershed Planner**

Niagara Peninsula Conservation Authority (NPCA)

250 Thorold Road West, 3<sup>rd</sup> Floor | Welland, ON L3C 3W2

Tel: 905-788-3135 | extension 272

[clampman@npca.ca](mailto:clampman@npca.ca)

[www.npca.ca](http://www.npca.ca)

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<http://camaps.maps.arcgis.com/apps/webappviewer/index.html?id=c7555050c8f24a7cbc829395557a7988>

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**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>

**Sent:** January 13, 2020 1:53 PM

**To:** Cara Lampman <[clampman@npca.ca](mailto:clampman@npca.ca)>; Boudens, Adam <[Adam.Boudens@niagararegion.ca](mailto:Adam.Boudens@niagararegion.ca)>; [devserv@welland.ca](mailto:devserv@welland.ca)

**Cc:** Frank Ierfino <[ierfinofrank@gmail.com](mailto:ierfinofrank@gmail.com)>; Walter Lucchetta <[lucchettabuilders@gmail.com](mailto:lucchettabuilders@gmail.com)>; David Deluce <[ddeluce@npca.ca](mailto:ddeluce@npca.ca)>

**Subject:** RE: Lucchetta Builders Inc. Development Aqueduct X Gadsby Rds. City of Welland.

Hello Cara

The Ontario Wetland evaluation system (OWES) does not apply to small-sized wetlands i.e. wetland under 0.5 ha, unless there is some biological uniqueness (containing a special feature, or rare species).

And  
The Ecological Land Classification system also provides and minimum size limit of 0.5 ha. for vegetation communities.

I have provided measurements using air photo interpretation that the vernal pool and associated trees is < 0.1 ha and therefore is too small to evaluate under OWES or define as a separate swamp community under ELC.

Therefore I classified the entire remaining woodland (<1 ha) as ELC FOD-9 which is a transitional (between upland and wetland) woodland community common in site region 7E.

These woodland types may exhibit areas of standing water such as small vernal pools which may also be associated with water-tolerant plant species.

If there is no minimum size criteria for applying NPCA regulations and the development encompasses this area without a setback, then yes there would be a regulated wetland area on the subject lands.

However *8.1.2.3 (a) and (c) does not apply because of small size. Only (b) applies as there is no development set back- which is to be determined by the NPCA.*

Please contact me if you have any further questions

Regards,  
**Anne Yagi, EP**  
President



[www.8trees.ca](http://www.8trees.ca)  
Ph: 905-892-1760

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**From:** Cara Lampman

**Sent:** January 13, 2020 11:50 AM

**To:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>; Boudens, Adam <[Adam.Boudens@niagararegion.ca](mailto:Adam.Boudens@niagararegion.ca)>; [devserv@welland.ca](mailto:devserv@welland.ca)

**Cc:** Frank Ierfino <[ierfinofrank@gmail.com](mailto:ierfinofrank@gmail.com)>; Walter Lucchetta <[lucchettabuilders@gmail.com](mailto:lucchettabuilders@gmail.com)>; David Deluce <[ddeluce@npca.ca](mailto:ddeluce@npca.ca)>

**Subject:** RE: Lucchetta Builders Inc. Development Aqueduct X Gadsby Rds City of Welland.

Good morning Anne,

Thank you for forwarding the NPCA the attached information.

NPCA Mapping and background data does not indicate that the parcel is impacted by any NPCA Regulated Features. As such, the NPCA did not require the completion of any assessments. However, based on a

preliminary review of the attached document it appears that a vernal pool has been identified based on your field work to date.

Can you provide some comments relating to the vernal pool and any other unevaluated wetland areas on the parcel? Can you confirm whether or not the parcel contains an NPCA Regulated Wetland? Please refer to NPCA Policy Section 8.1.2.3.

#### *8.1.2.3 Unevaluated Wetlands*

Some wetlands within the watershed have not been evaluated and delineated under the OWES. In those instances, the following policies apply:

- a) Prior to development or site alteration on a property with an unevaluated wetland, a wetland evaluation shall be required prior to completion of an EIS if required, or the approval process, and approved by the MNRF.
- b) Exceptions to (a) may be considered in cases where an appropriate natural buffer (as determined by the NPCA) is proposed between the NPCA staked wetland boundary and all site alteration and development (including grading), or small scale non-permanent development (such as small backyard sheds not requiring planning approval) which in the opinion of NPCA will have no negative impact on the ecological and hydrologic function of the wetland. These cases will only be considered for small-scale development through the work permit process, or through some minor variances where an appropriate buffer is maintained.
- c) Areas identified through natural areas inventories, EIS's or similar as Ecological Land Classification MAM, MAS, MAX, SWD, SWT, SWX, SAS, SAF, OAO, OAW, or other potential wetland indicator classifications shall identify the area as a potential unevaluated wetland subject to these policies.

Thank you.

#### **Cara Lampman**

##### **Senior Watershed Planner**

Niagara Peninsula Conservation Authority (NPCA)  
250 Thorold Road West, 3<sup>rd</sup> Floor | Welland, ON L3C 3W2  
Tel: 905-788-3135 | extension 272

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[www.npca.ca](http://www.npca.ca)

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<http://camaps.maps.arcgis.com/apps/webappviewer/index.html?id=c7555050c8f24a7cbc829395557a7988>

---

**From:** Anne Yagi <[anne.yagi@8trees.ca](mailto:anne.yagi@8trees.ca)>

**Sent:** January 13, 2020 11:00 AM

**To:** Boudens, Adam <[Adam.Boudens@niagararegion.ca](mailto:Adam.Boudens@niagararegion.ca)>; Cara Lampman <[clampman@npca.ca](mailto:clampman@npca.ca)>; [devserv@welland.ca](mailto:devserv@welland.ca)

**Cc:** Frank Ierfino <[ierfinofrank@gmail.com](mailto:ierfinofrank@gmail.com)>; Walter Lucchetta <[lucchettabuilders@gmail.com](mailto:lucchettabuilders@gmail.com)>

**Subject:** Lucchetta Builders Inc. Development Aqueduct X Gadsby Rds City of Welland.

Hello Adam and Cara

Please find attached a constraints analysis and Scoped EIS for a 12 unit condominium development in the City of Welland.

I want to schedule an on-site meeting with you and someone from the City of Welland at your convenience.

Please respond with your availability this month.

Please contact me if you have any further questions or concerns regarding the EIS or site meeting.

Thank you

Regards,  
**Anne Yagi, EP**  
President



[www.8trees.ca](http://www.8trees.ca)

Ph: 905-892-1760

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# Pre-consultation Meeting Form

City of Welland  
Region of Niagara  
Niagara Peninsula Conservation Authority

Persons intending to make an application for a proposed development are required to consult with planning staff prior to submitting an application. A pre-consultation meeting will identify what is required to be submitted for a complete application and will provide the opportunity to discuss:

- the nature of the application;
- development and planning issues;
- fees;
- the need for information and/or reports to be submitted with the application;
- the planning approval process;
- other matters, as determined.

Pre-Consultation Meeting Date: NOVEMBER 7, 2019

Site Address: 155 GADSBY AVE + 368 AQUEDUCT Approximate Land Area (metric): 6345m<sup>2</sup>

Site Legal Description: PT LT 239 ; PT 2 59R-13090

## Owner Contact Information:

Name of Owner: LUCCHETTA BUILDERS INC  
Phone Number: \_\_\_\_\_ Email: \_\_\_\_\_

Principal Contact: WALTER LUCCHETTA + FRANK IERFINDO + LUCAS LUCCHETTA  
Phone Number: \_\_\_\_\_ Email: frankierfindo@gmail.com  
lucas.lucchetto@colliers.com

## Application Type:

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Regional Official Plan Amendment         | <input checked="" type="checkbox"/> Draft Plan of Condominium | <input checked="" type="checkbox"/> Zoning By-law |
| <input checked="" type="checkbox"/> Local Official Plan Amendment | <input type="checkbox"/> Vacant Land & Common Element         | <input type="checkbox"/> Other                    |
| <input type="checkbox"/> Draft Plan of Subdivision                | <input type="checkbox"/> Conversion                           |   |
| <input checked="" type="checkbox"/> Consent (Land Severance)      | <input type="checkbox"/> Other                                |   |
| <input checked="" type="checkbox"/> Site Plan Approval            | <input type="checkbox"/> Minor Variance                       |   |

Local Municipal Contact: Rachelle Larocque Phone: 905-735-1700 x2310 Email: rachelle.larocque@welland.ca

1. Brief description of proposed development:

LOOKING TO DEVELOP THE SITE WITH A 12 UNIT PLAN OF  
CONDOMINIUM FRONTING ONTO AQUEDUCT STREET + A SINGLE LOT FRONTING  
ONTO GADSBY AVE.

2. Check All Applicable:  Brownfield  Greenfield  Built-up  Local CIP Area

3. Development Charges: Regional  Local  By-law 2014-75 NCDSB

4. Existing Regional Policy Plan Designation: URBAN AREA

Conformity with Regional Policy Plan land use designations and policies? : yes  no  unknown

If 'No', what is the nature of the amendment needed? \_\_\_\_\_

5. Existing Local Official Plan Designation: LOW DENSITY RESIDENTIAL + PARKS, OPEN SPACE & RECREATION

Conformity with Official Plan land use designations and policies?  Yes  No

If 'No', what is the nature of the amendment needed? WILL NEED TO REDESIGNATE THE PORTION OF THE PROPERTY DESIGNATED OPEN SPACE TO RESIDENTIAL

6. Existing Zoning: RL1 & O1

Conformity with existing zoning?:  Yes  No

If 'No', what is the proposed zoning: REZONE O1 AREA TO RESIDENTIAL

7. Is Site Plan approval required?  Yes  No

8. Fees Required at time of Submission of the Application

Application	Local Planning Department	Region of Niagara	Niagara Peninsula Conservation Authority	Other Fees
Regional Policy Plan Amendment				
Local Official Plan Amendment	\$ 4,958.00	\$ 5075		
Zoning By-law Amendment		\$ 1270		
Plan of subdivision				
Plan of Condominium	\$ 7,130.00	\$ 5075 BASE +	\$ 1120/ha	
Consent				
Site Plan Control or Amendment	\$ 2,331.00			
Other		\$ 610 SWM		
Other		\$ 1100 EIS		
<b>TOTAL</b>				

2019 FEES WILL INCREASE JANUARY 1, 2020 \* 2019 FEES subject to change

Notes on Fees:

- Notwithstanding the fees noted above, all fees are payable based upon the rate in the fee schedule by-law in effect on the date the application is received.
- Further fees may be required at a later date as per the fee schedule by-law.
- Separate cheques shall be made payable to the appropriate agency.

9. Additional Agencies to be contacted:

HYDRO  PIPELINES  MTO  OTHER \_\_\_\_\_

10. Additional Comments:

- CONTACT NPCA TO HAVE AN ON-SITE VISIT TO CONFIRM NO SIGNIFICANT SPECIES / SCREENING
- REGION WOULD LIKE AN ENVIRONMENTAL CONSTRAINTS ANALYSIS
- WILL NEED TO PROVIDE HAMMER-HEAD OR TURNAROUND FOR FIRE & WASTE COLLECTION - MAY NEED WASTE COLLECTION PADS
- IDENTIFY CLOSEST HYDRANT & CONFIRM WATER SUPPLY FOR FIRE FIGHTING PURPOSES
- STORMWATER MANAGEMENT WILL BE REQUIRED
- SITE SERVICING THROUGH BUILDING PERMIT
- DC'S APPLICABLE AT BUILDING PERMIT
- PARKLAND CASH-IN-LIEU AT TIME OF BUILDING PERMIT @ 5% VALUE OF LANDS DAY BEFORE BUILDING PERMIT ISSUED
- GEOTECHNICAL
- FENCING ALONG NORTHERN PROPERTY LINE ON PRIVATE PROPERTY
- FULL ENGINEERING SUBMISSION AT SITE PLAN
- STREET LIGHT @ NEW ENTRANCE ON AQUEDUCT AS PER CITY STANDARDS
- SERVICING BRIEF @ TIME OF SUBMISSION

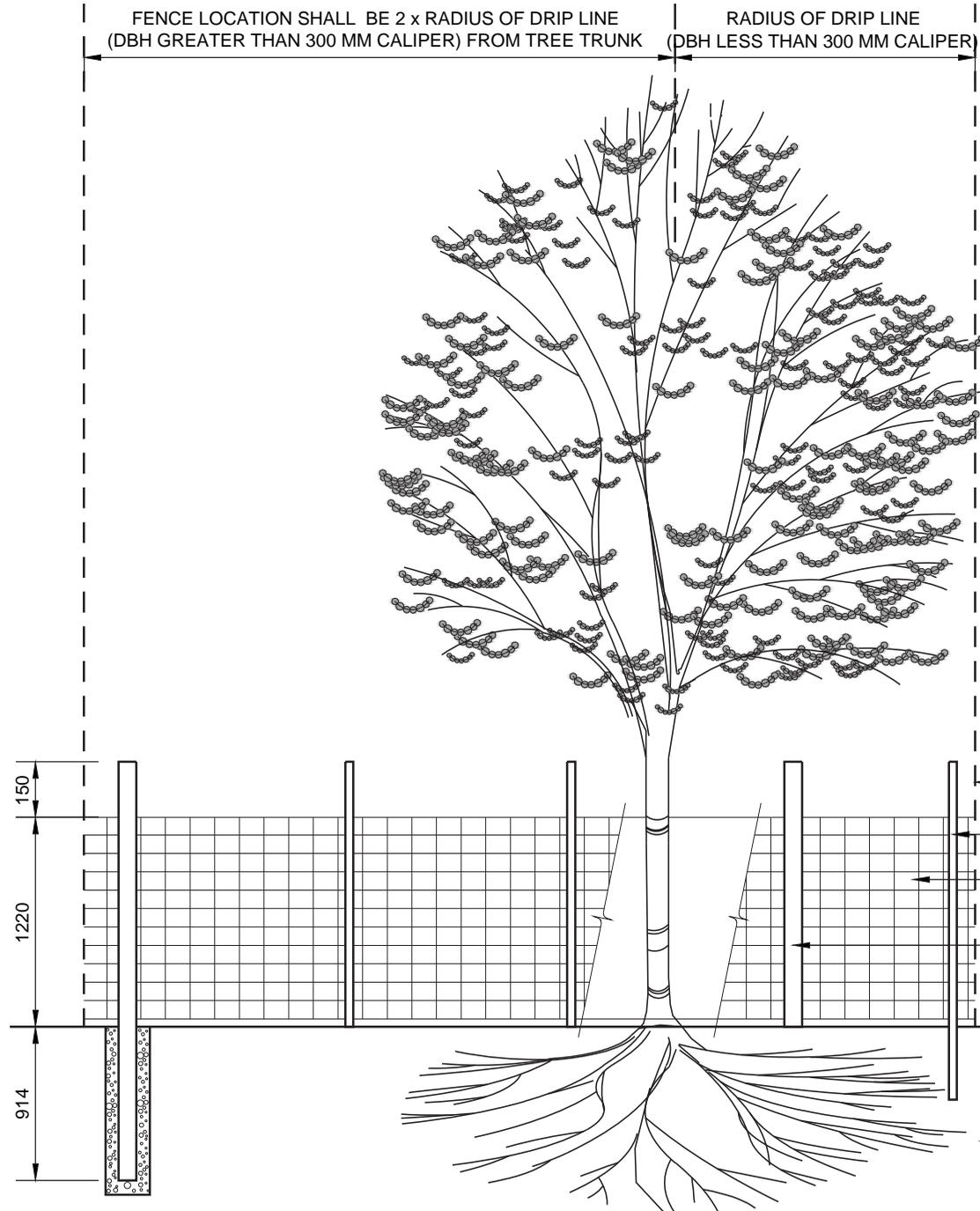
11. Site Visit: \_\_\_\_\_

12. Incentive Programs:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

13. Required Information and Studies to be submitted with the Application(s). Studies identified with an asterisk\* will likely require a peer review at the cost of the developer.

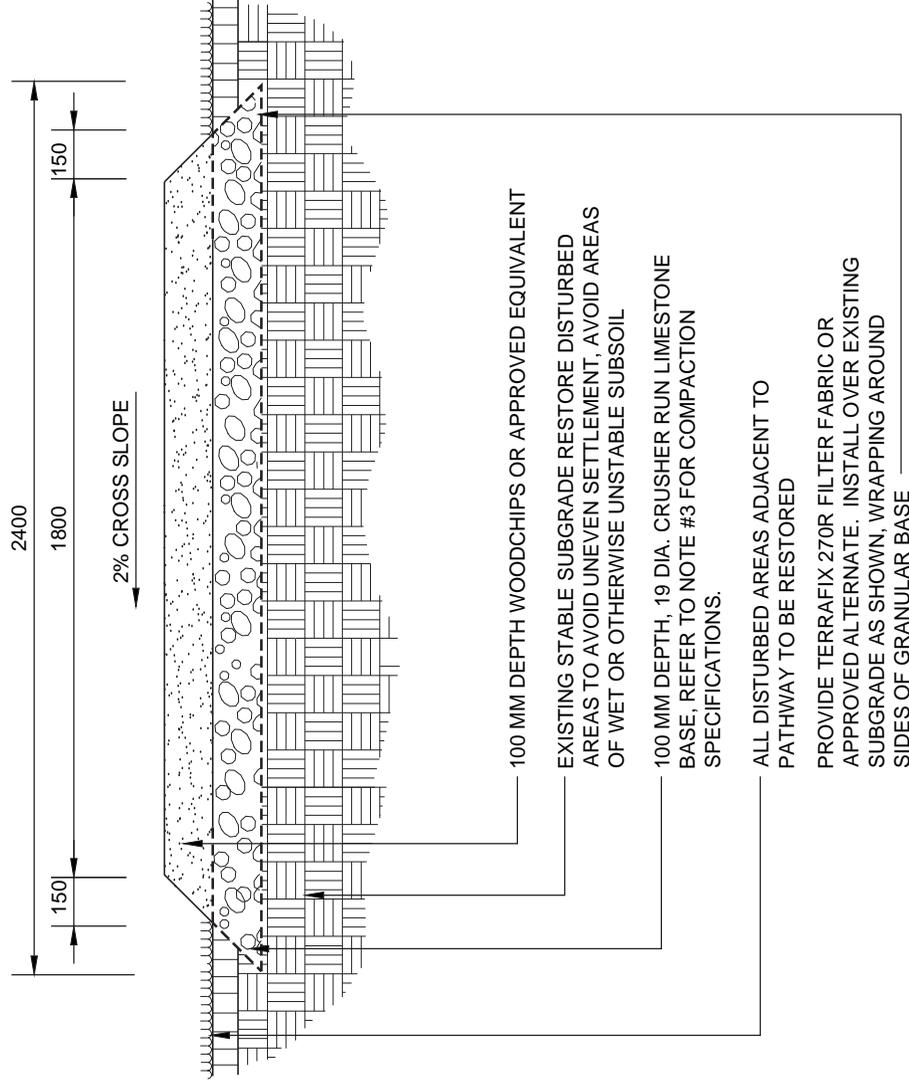
Local	Region	NPCA	Reports, Studies, Plans (See Notes for additional details)	No. of Copies		Notes
				Elect Digital	Paper	
✓	✓		Planning Justification Report			
✓	✓		Conceptual Site Plan, Subdivision Plan			
			Draft Regional Policy Plan Amendment			
✓			Draft Local Official Plan Amendment			
			Land Use/Market Needs*			
			Urban Design/Landscape Plans			
			Archaeology Assessment			
			Cultural Heritage Impact Assessment*			
			Environmental Impact Study			
			Environmental Planning Study/ Sub-Watershed Study			
			Tree Inventory Preservation Plan			
			Floodplain and Hazard Lands Boundary Plan			
✓			Geotechnical			
			Environmental Site Assessment			
			Air Quality/Noise & Vibration Study*			
			Agricultural Impact Assessment			
			Farm Operation and Ownership			
			Minimum Distance Separation I & II			
			Mineral Aggregate Resources			
✓			Municipal Servicing Study			
			Phasing Plan			
			Sensitive Land Use Report			
			Slope Stability Report			
✓	✓		Stormwater Management Plan			
			Transportation Impact Study/Parking Impact Analysis			
			Hydrogeological Study and Private Servicing Plans*			
			Soil report			
			Financial Impact Assessment*			
			Shadow Analysis			
			Risk Management Study			
			Gas Well Study/Gas Migration Study			
			Wind Study*			
			Other*			

## APPENDIX F- Construction Mitigation Example



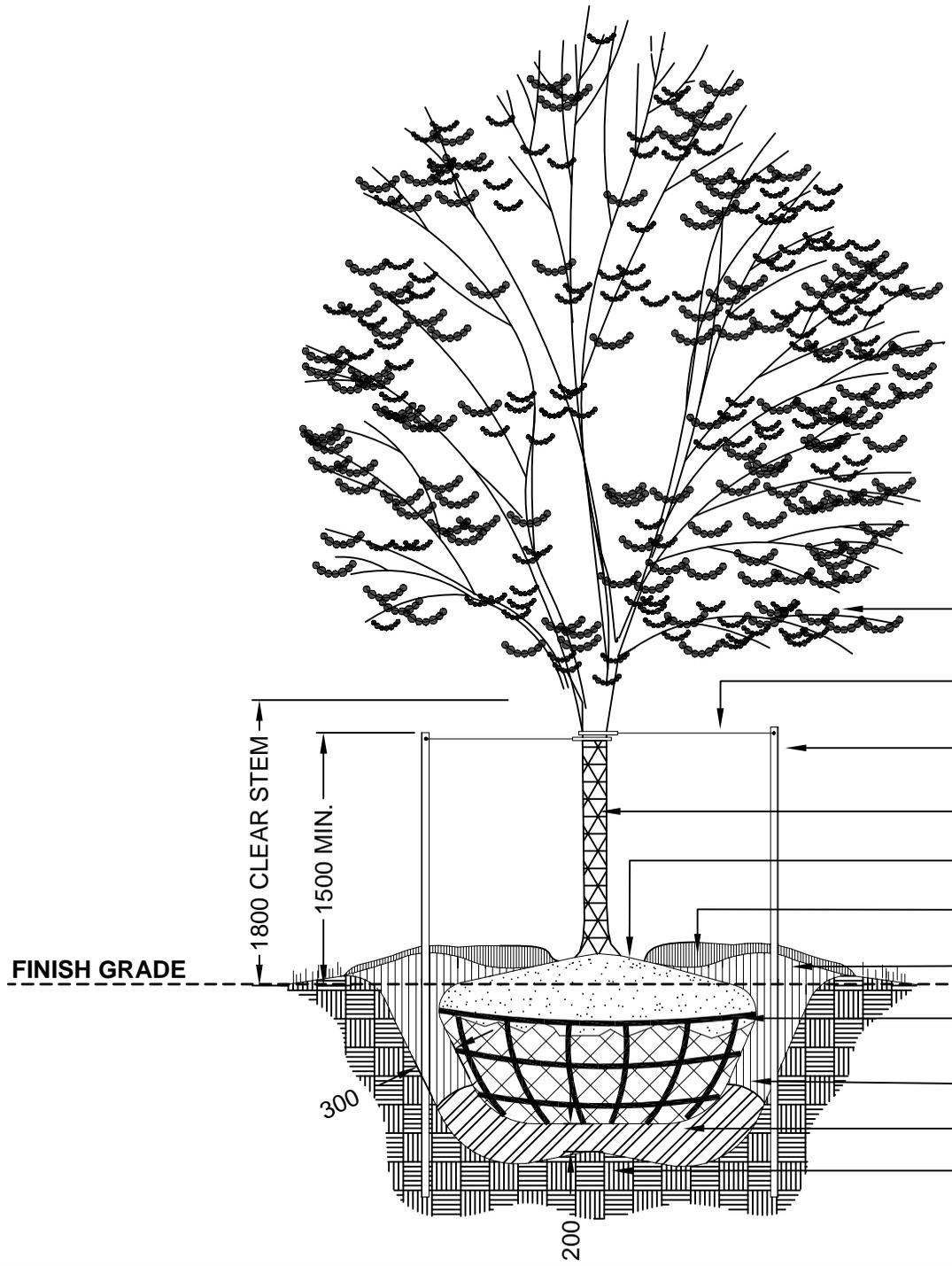
**NOTES:**

1. EXISTING TREES SHALL BE PROPERLY PROTECTED WITH TEMPORARY FENCING AS PER THE APPROVED LANDSCAPE PLAN UNTIL PRELIMINARY ACCEPTANCE.
2. MAINTAIN EXISTING GRADE WITHIN FENCING LINE OF ALL TREES TO BE PRESERVED.
3. THE AREA WITHIN THE PROTECTED FENCING SHALL REMAIN UNDISTURBED AND FREE OF DEBRIS, BUILDING MATERIALS AND EQUIPMENT.
4. PRUNE DEAD WOOD ONLY UNLESS DIRECTED OTHERWISE BY THE CITY. DO NOT PRUNE LEADERS.
5. WATERING AND FERTILIZING PROGRAM SHALL BE MAINTAINED TO THE SATISFACTION OF THE CITY.  
THE COST OF REPLACING DEAD AND SEVERELY DAMAGED
6. TREES, AS DETERMINED BY THE CITY, SHALL BE BORNE BY THE DEVELOPER AND/OR GENERAL CONTRACTOR. THE SPECIES AND SIZE(S) MUST BE APPROVED BY THE CITY.
7. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.



**NOTES:**

1. LAYOUT MUST BE APPROVED BY THE CITY PRIOR TO EXCAVATION IN SODDED AREAS. ARRANGE FOR INSPECTION OF EXCAVATION PRIOR TO PLACEMENT OF AGGREGATE.
2. DO NOT EXCAVATE FOR GRANULAR BASE IN WOODLOTS; PROVIDE MINIMAL GRADING ONLY, PRIOR TO PLACING FILTER FABRIC.
3. COMPACT GRANULAR BASE AND LIMESTONE SCREENINGS TO 85% S.P.D (MIN). AREA USING A DUAL DRUM WALK-BEHIND COMPACTOR (MIN).
4. ENSURE THAT PATHWAY GRADES AND CROSS SLOPE MEET AND MATCH NATURAL DRAINAGE PATTERNS.
5. GALVANIZED CSP CULVERTS TO BE INSTALLED IN ALL LOW AREAS, AS PER LAYOUT AND GRADING PLAN(S), REFER TO DETAIL L510 FOR DETAILS.
6. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.



**NOTES:**

1. SEE SPECIFICATIONS FOR TOPSOIL REQUIREMENTS.
2. THE TREE PIT IS TO HAVE A 300MM CLEAR PERIMETER BETWEEN ROOTBALL AND SCARIFIED EDGE.
3. REMOVE TREE WRAP PRIOR TO INSPECTION BY CITY OF BRAMPTON REPRESENTATIVE.
4. CALIPER TO BE MEASURED 1400 MM (1.4 M) ABOVE FINISH GRADE.
5. THE USE OF AUGERS OR TREE SPADES FOR EXCAVATING TREE PITS IS NOT PERMITTED.
6. SCARIFY SUBGRADE OF PLANTING PIT TO PROPER DEPTH.
7. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.

- PRUNE ONLY DEAD OR DAMAGED BRANCHES IN ACCORDANCE WITH PROPER HORTICULTURAL PRACTICES. DO NOT PRUNE LEADER.
- TREE TIE MATERIAL. (SEE SPECIFICATIONS)
- TWO 50 MM DIA. WOOD STAKES, IMMEDIATELY AFTER PLANTING . DRIVEN BESIDE AND BELOW ROOT BALL INTO EXISTING UNDISTURBED SOIL.
- TRUNK RODENT PROTECTION.
- PLANT TREES 100 MM HIGHER THAN FINISH GRADE.
- 100 MM DEPTH MULCH AS PER SPECIFICATION, 75 MM AWAY FROM AROUND PLANT TRUNK
- PROVIDE 150 MM HIGH SAUCER RIM.
- CUT AND REMOVE TOP RING OF WIRE BASKET AND TOP THIRD OF BURLAP FROM ROOT BALL . REMOVE ALL TIES FROM PLANT.
- TOPSOIL. (SEE SPECIFICATIONS)
- COMPACTED TOPSOIL UNDER & BESIDE ROOT BALL TO PREVENT SOIL SETTLEMENT.
- EXISTING UNDISTURBED SOIL.

DECIDUOUS TREE PLANTING



**L910**

N T S

JANUARY 2018

PLANTING - SERIES 000

