Homeowner's Stewardship Brochure

Nickerson Woods

Town of Coburg

September 2020

Michalski Nielsen
ASSOCIATES LIMITED

"The earth will not continue to offer its harvest, except with faithful stewardship."

John Paul II

INTRODUCTION

Welcome to Coburg and your new neighborhood! In addition to having chosen a beautiful community, you have bought a home next to some very special natural features/areas, Midtown Creek and the forested lands which surround it, known as Nickerson Woods. Midtown Creek provides good quality, coldwater fish habitat. Nickerson Woods is home to a number of different types of wildlife, including some which are Species of Concern in Ontario. It is designated as part of the Town's Greenland system and is appropriately considered a Significant Woodland. It also provides Significant Wildlife Habitat values, as well as opportunities for wildlife movement.

Figure 1, which is reproduced from the Environmental Impact Study (EIS) that was prepared in support of this project, shows the Nickerson Woods development in relation to the community of Cobourg: Nickerson Woods is the large area in green to the north of the development, with the blue line within it showing the location of Midtown Creek. **Figure 2**, also reproduced from the EIS, shows the development limits in red, and its relationship to both Nickerson Woods and Midtown Creek (the solid blue line). **Figure 3** shows the development plan.

Considerable care has been taken in the design of this development in order to protect these two important natural features. A substantial focus of the EIS that was submitted in support of planning approvals was on ensuring mitigation measures were in place to protect against adverse impacts on these areas. There was a public process which included input from Ganaraska Conservation, the Town of Coburg and neighbors. The EIS recommendations ensure the required protection of these natural features, the protection of a natural buffer zone adjacent to the creek, and very careful attention to how storm flows are discharged in order to protect against both erosion in the creek and water quality. **Now its your turn**. The decisions you

make as a homeowner will have a bearing on the long-term health of Midtown Creek and Nickerson Woods; it is the intent of this Stewardship brochure to provide you with the information you need to appreciate the values of these features, and to understand that the choices you make are important to preserving them for future generations.

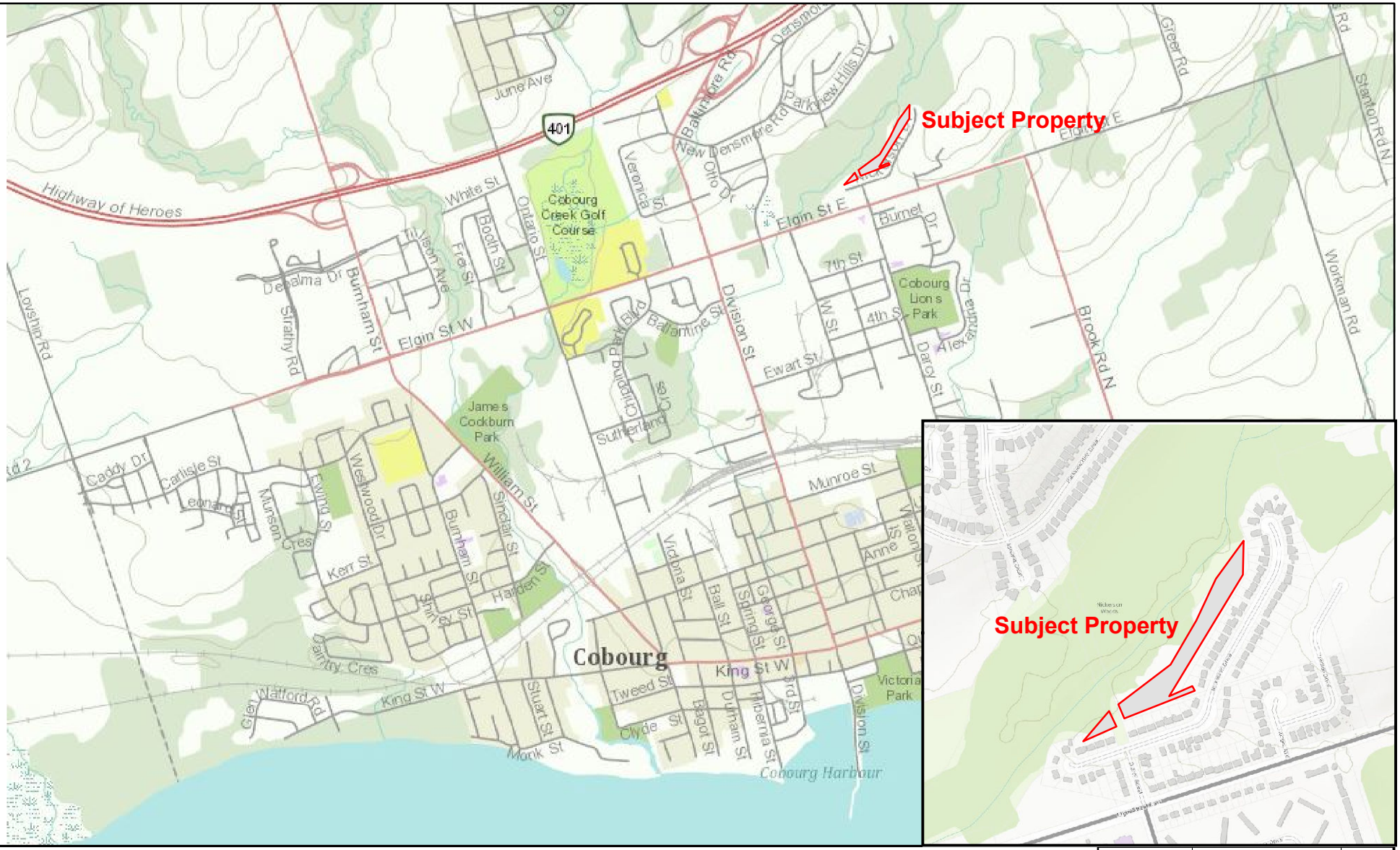


Figure 1. Location Map

Project Name:	LeBlanc Enterprises, Cobourg
Project Number:	1913
Date:	January 2013
Created By:	G.N.
Scale:	N.T.S.

NO.	DATE DD.MM.YY	REVISIONS	BY

Michalski Nielsen Associates Limited

Figure 2 Existing Natural Features

Legend

- 30m Creek Offset
- Midtown Creek
- Fisheries Transects
- Minimum 120m Study Area
- Seeps

Wildlife Units

*Wildlife Units include the ELC polygon * * generally areas where habitat attributes are different*

MNAL ELC

[MEFM1-1] Goldenrod Forb Meadow Type

[FODM7-3] Fresh – Moist Willow Lowland Deciduous Forest Type

[FOCM4-1] Fresh – Moist White Cedar Coniferous Forest Type

[CVR] Urban Residentail/ Culturally Modified

25 12.5 0 25 Meters

Map Source: MNR Draper 2008, Orthorectified

Project Name:	LeBlanc Enterprises, Coburg
Project Number:	1913
Date:	14.01.13
Created By:	G.N/ K.L.F
Scale:	1:2,000

NO.	DATE DD.MM.YY	REVISIONS	BY

Michalski Nielsen Associates Limited

Wet cedar area Tree clearing / encroachement

Wet Meadow Inclusion

FOCM4-1

Unit 3

Unit 2

FODM7-3

Unit 1

Manicured Lawn

Defined woodland edge

Buckthorn, Aspen, Poplar

Scattered Poplar, Apsen, Buckthorn, Manitoba Maple, Willow, cedar and Scots pine
** clearing of understorey

MEFM1-1

Unit 1

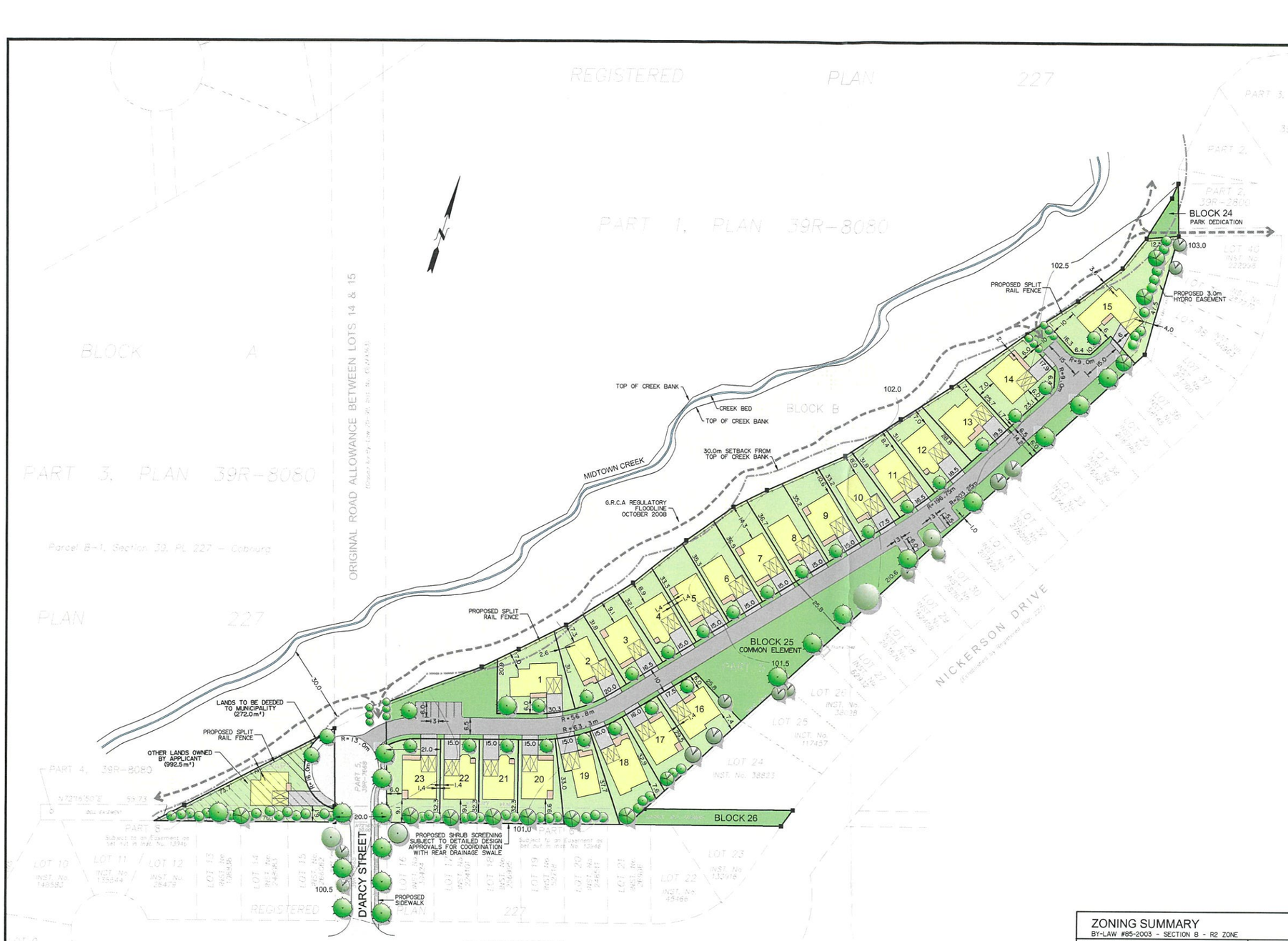
CVR

Scots Pine, Walnut

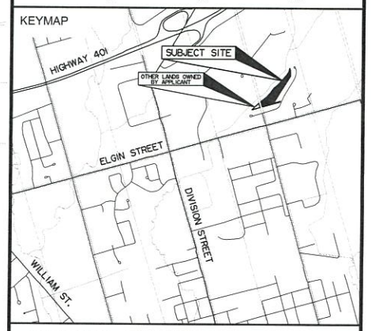
1 2 3 4 5 6 7 8

DEVELOPMENT SITE PLAN
NICKERSON WOODS
LEBLANC ENTERPRISES - 2020910 ONTARIO LTD.
PARTS 5, 6 & 7, PLAN 39R-8760,
PART OF BLOCKS A & B,
REGISTERED PLAN 227,
TOWN OF COBOURG
COUNTY OF NORTHUMBERLAND
SCALE = 1:750 METRIC

0 25 50 75m



KEYMAP



LAND USE - LEGEND
- WITHIN THE PROPERTY BOUNDARY

LAND USE	AREA(m²)	AREA%	UNITS
BLOCKS 1-23 - FREEHOLD SINGLE DETACHED LOTS (15.0m MIN. FRONTAGE) & PRIVATE LANDSCAPED AREA ALL DWELLINGS HAVE FRONT PORCHES & ATTACHED DOUBLE GARAGES	13321.6	66.9	23
BLOCK 25 - COMMON ELEMENT (PROPOSED ROAD, 12 VISITOR PARKING SPACES, STORM WATER AND PRIVATE AMENITY AREA	6121.6	30.7	
BLOCK 24 - TO BE DEDICATED TO THE MUNICIPALITY BLOCK 26 - EXISTING BELL EASEMENT	472.9	2.4	
SITE TOTAL	19916.1m²	100.0%	23
OTHER LANDS OWNED BY APPLICANT - FREEHOLD SINGLE DETACHED LOT	992.5m²	N/A	1
LANDS TO BE DEEDED TO MUNICIPALITY FOR TURNAROUND	272.0m²		

NOTE: BUILDING FOOTPRINTS SHOWN ARE BASED ON FLOOR PLANS FROM LEBLANC ENTERPRISES AND ARE SUBJECT TO CHANGE. LOTS 1, 13-16 AND "OTHER LANDS" WILL HAVE CUSTOM HOME DESIGNS.

LEGEND

EXISTING DECIDUOUS TREES (ON OR ADJOINING SUBDIVISION) - TO BE PRESERVED AS PER REPORT PREPARED BY CRESSMAN TREE MAINTENANCE & LANDSCAPING LTD. SEPTEMBER 17, 2013 (UPDATED FEBRUARY 13, 2018)

EXISTING CONIFEROUS TREES (ON OR ADJOINING SUBDIVISION) - TO BE PRESERVED AS PER REPORT PREPARED BY CRESSMAN TREE MAINTENANCE & LANDSCAPING LTD. SEPTEMBER 17, 2013 (UPDATED FEBRUARY 13, 2018)

PROPOSED DECIDUOUS TREE

PROPOSED CONIFEROUS TREE

PROPOSED SHRUB SCREENING

PROPOSED SPLIT RAIL FENCE

NOTE: PROPOSED PLANTINGS AND SPLIT RAIL FENCE PER PLANTING PLAN PREPARED BY BASTERFIELD AND ASSOCIATES LANDSCAPE ARCHITECTS (MAY 2014)

LEGEND
- MUNICIPAL LANDS

UNOPENED MUNICIPAL ROAD ALLOWANCE TO BE UPGRADED AND CONSTRUCTED TO MUNICIPAL STANDARDS

MUNICIPALLY OWNED OPEN SPACE LAND AND VEGETATIVE BUFFER ADJACENT TO MIDTOWN CREEK

POTENTIAL BARK CHIP TRAIL

30.0m SETBACK FROM SURVEYED TOP OF BANK OF MIDTOWN CREEK

ZONING SUMMARY
BY-LAW #85-2003 - SECTION 8 - R2 ZONE

DWELLING TYPE	SINGLE DETACHED DWELLING	
ZONE PROVISION	R2 ZONE	PROPOSED
MINIMUM LOT AREA - WITH SANITARY SEWER	465.0m²	485.0m²
MINIMUM LOT FRONTAGE - WITH SANITARY SEWER	15.0m	15.0m
MAXIMUM LOT COVERAGE	40%	40%
MINIMUM FLOOR AREA	80.0m²	180.0m²
FRONT YARD SETBACK	6.0m	6.0m
REAR YARD SETBACK	7.0m	7.0m
INTERIOR SIDE YARD SETBACK - 1 STOREY	1.0m	1.4m
EXTERIOR SIDE YARD SETBACK	6.0m	6.0m
MINIMUM LANDSCAPED OPEN SPACE	30%	50%
MAXIMUM BUILDING HEIGHT	2 STOREY	1 STOREY
SETBACK FROM EC ZONE	3.0m	3.0m

NOTE: MINIMUM LANDSCAPED OPEN SPACE AND MAXIMUM LOT COVERAGE BASED ON LOT 21, 485.2m² AND 193.8m² BUILDING FOOTPRINT.

5	SUBMITTED TO MUNICIPALITY FOR APPROVAL DWELLINGS UPDATED & 3.0m HYDRO EASEMENT LOCATED ON LOT 15	MARCH 12/18	R.F.A.
4	LOT 1 AND COMMON ELEMENT REVISED FOR DWM STORAGE	JAN. 16/18	R.F.A.
3	REVISIONS FOR OPEN HOUSE PRESENTATION	APRIL 2015	R.F.A.
2	REVISED D'ARCY STREET CUL-DE-SAC PER MUNICIPAL COMMENTS	MARCH 19/15	R.F.A.
1	SUBMISSION FOR APPROVAL	FEB. 12/14	R.F.A.

DRAWN BY: L.B. | CHECKED BY: R.F.A. | DATE: FEBRUARY 12, 2014 | SCALE: 1:750

METRIC NOTE: DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTE: BOUNDARY SURVEY, CONTOURS AND DETAILED TOPOGRAPHIC DATA, INCLUDING CREEK BED AND TOP OF BANK, PREPARED BY IVAN B. WALLACE, ONTARIO LAND SURVEYOR LTD. (AUGUST 20, 2013)

DECEMBER 22, 2015

JOB No. 317-NICK-SP

RFA PLANNING CONSULTANT INC
211 Dundas Street East, Suite 202,
Belleville, Ontario, K8N 1E2

THE HISTORY OF THE LANDS YOU ARE ON

Did you know that your property was once on the bottom of a lake? During the retreat of the Wisconsinan glacier, some 10,000 years ago, these lands sat on the bottom of Lake Iroquois, a post-glacial lake that was much larger than present day Lake Ontario.

After the glaciers retreated, these lands were occupied by our First Nations, becoming the home of the Ojibwe/Chippewa people.

European settlement resulted in the clearing of much of the naturally forested areas around Cobourg, first for timber, then for agriculture. Settlement of this area began in the late 1700's, continuing into the early 1800's.

In the years following European Settlement, it would appear that your development was part of a large farm. However, the low lying woods which border Midtown Creek would not have been easy to farm, except for grazing livestock, so appear to have ultimately been left to return to a forested condition.

The urbanization of the lands surrounding your development began several decades ago, with the lands comprising this development being a remnant parcel within the secondary plan area. Before development of this property commenced, the lands consisted of both lawn that was maintained by neighboring property owners, old field vegetation, and early successional woodlands. Some of the successional woodland bordered the protected Midtown Creek/Nickerson Woods natural area.

VIEWS OF THE DEVELOPMENT PARCEL
FROM 2013

OVERVIEW OF NICKERSON WOODS

Vegetation Composition

As illustrated in **Figure 2**, vegetation communities within adjacent portions of Nickerson Woods fall into two different community classifications. The lands in closest proximity to your development consist of a fresh-moist willow lowland deciduous forest type (FODM7-3). Although this woodland contains some wetland species, its overall vegetation composition is not indicative of a treed swamp, but rather a moist soil regime, with imperfect drainage. Manitoba Maple, Hybrid Willow, Buckthorn and Green Ash comprise the majority of the treed canopy. Ostrich Fern is abundant within the understorey, particularly closer to the creek.

Further away from the development, to the northwest, is another type of forest, a fresh-moist cedar coniferous forest type (FOCM4-1). Cedar makes up about 60% of the treed cover in this community. The understory includes Yellow Birch, Green Ash and Black Ash. Groundcover is suppressed by the dense cedar cover but where present is dominated by a variety of ferns. Like the adjacent deciduous forest, overall vegetation community composition is not indicative of a treed swamp, but rather generally of a moist soil regime with imperfect drainage. That said, a small wet meadow inclusion was mapped in the northeast portion of this community, as illustrated on **Figure 2**.

For those of you who are interested in more detail on the various types of vegetation which were identified on the field surveys completed as part of the EIS for this project, a plant list is included in **Appendix A**. This list, which included vegetation within the old field, manicured lawn and successional treed areas which have now been developed, inlcuded 154 different vascular plant species. Please note that this list is only based on two visits during the summer, and did nto include an exhaustive evaluation of lands further removed from the development, so those of you with a botanical interest may discover many additional species in this woodland. Of the 154 plant species that were identified, 54 are considered introduced species, typical of urban fringe areas where resiential development occurs; a large number of those species were found withn the previously disturbed lands that have now been developed, or otherwise around the edges of the woodlands comprising Nickerson Woods.

Red Fox[1]

White-tailed Deer[2]

Yellow Warbler[3]

Hairy Woodpecker[4]

Photo Sources:

1 forum.americanexpedition.us/red-fox-facts-

2 .hww.ca/en/wildlife/mammals/white-tailed-deer

3 .allaboutbirds.org/guide/Yellow_Warbler/

4 .allaboutbirds.org/guide/HairyWoodpecker

Northern Cardinal[5]

Northern Mockingbird[6]

Red-headed Woodpecker[7]

Photo Sources:

5 .bing.com/images/northerncardinal

6 audubon.org/field-guide/bird/northern-mockingbird#

7 .bing.com/images/red-headedwoodpecker

Wildlife Resources

A complete list of wildlife identified over the course of the EIS is included in **Appendix B**. again, it must be noted that this list was compiled based on two site visits only one of which included a dawn breeding bird survey. As a resident to this area, we hope that you will have the chance to identify many additional species.

The woodlands adjacent to your property provide habitat for a variety of **mammals**, including Grey Squirrel, Eastern Cottontail, Striped Skunk, Racoon, Woodchuck, Red Fox and White-tailed Deer, as well as smaller mammals such as Deer Mouse. Several potential den locations for species such as skunk and fox were seen within the interior of Nickerson Woods. The Midtown Creek/Nickerson Woods corridor provides good opportunities for mammal movement.

Birds which were observed within the previously disturbed landscape of the development included American Robin, Blue Jay, Song Sparrow, American Goldfinch, European Starling, Yellow Warbler, Hairy Woodpecker, Northern Cardinal, Northern Mocking Bird, Black-capped Chickadee and Pileated Woodpecker. While all of these species were either seen or heard from the development area itself, a number of those would be reliant on the adjacent woodlands. One bird species that was recorded specific to the woodland itself was Eastern Wood Pewee, which is designated as being of Special Concern both provincially and federally. Those adjacent woodlands also showed evidence of cavity nesting, possibly by owls.

Dedicated surveys were not undertaken for **amphibians** and **reptiles**, however species which were observed include Dekay's Brown Snake and Eastern Garter Snake, with other expected species including American Toad, Grey Tree Frogs and Wood Frogs.

Potential for Species of Conservation Concern

The EIS included a Species at Risk review; for those who are interested, a tabular summary of that review is included in **Appendix C**. Species of particular relevance to this area include:

- **Butternut**, a tree which has been designated as endangered in Ontario because of its decline due to a fungal disease, butternut canker. While not observed during EIS surveys, it may still be found within this area;

- **Little Brown Myotis**, **Tri-coloured Bat** and **Northern Myotis**, three species of bats which have been quite recently designated as endangered in Ontario. Recent and rapid declines of these species have been attributed to a fungal disease, white-nose syndrome, which has accounted for at least 90% mortality rates. These species use trees with loose bark, crevices and cavities for summer roosting and maternity habitat, with Nickerson Woods containing many trees providing suitable habitat opportunities. The presence of adjacent urban development, together with the low-lying forests, provide good sources of insects and foraging opportunities, increasing the likelihood of their presence;

- **Eastern Hog-nosed Snake** is a Threatened species. While its potential to occur int his area is considered low, it is a habitat generalist, so cannot be completely discounted;

- **Snapping Turtle** are of Special Concern. Its potential to occur in this area is considered fairly low, as habitat opportunities for both nesting and basking are quite limited. As it is also a habitat generalist, and will use areas such as manicured lawns for nesting, its presence cannot be fully discounted;

- **Wood Pewee**, a Special Concern bird, were heard in the adjacent woodlands. This woodland bird species prefers quite extensive areas of woodland cover as its habitat;

- **Wood Thrush**, another woodland bird species, could also be present in this area;

- **Red-headed Woodpecker**, a Special Concern species, have been confirmed in the broader area. It prefers large woodland areas as habitat, with Nickerson Woods being of sufficient size to support this species;
- **Canada Warbler**, also a Special Concern species, has been confirmed in the

broader area. It is an interior forest species, preferring moist woodlands near riparian habitats, so could be found within Nickerson Woods; and

- **Monarch Butterfly** is found in open, meadow areas. It requires milkweed, so may often be found wherever that plant is present. It has the potential to be found in more open areas adjacent to Nickerson Woods.

All of these species were properly considered in the planning of this development.

Butternut[1]

Little Brown Myotis[2]

Tri-coloured Bat[3]

Northern Myotis[4]

Eastern Hog-nosed Snake[5]

Snapping Turtle[6]

Wood Thrush[7]

Eastern Wood-Pewee[8]

Red Headed Woodpecker[9]

Canada Warbler[10]

Monarch Butterfly[11]

Photo Sources:

1. ontario.ca/page/butternut
2. nwtspeciesatrisk.ca/content/little-brown-myotis#
3. wustl.edu/files/pages/imce/mnh
4. bing.com/images/search?q=northern+myotis
5. species.canada.ca
6 bing.com/images/search?q=snapping+turtle
7 ontario.ca/page/wood-thrush
8. allaboutbirds.org/guide/Eastern_Wood-Pewee/id
9. animalspot.net/ Red-Headed-Woodpecker.jpg
10. allaboutbirds.org/guide/Canada_Warbler/
11. monarch-butterfly.com/

Potential for Significant Wildlife Habitat

The EIS also included consideration of candidate Significant Wildlife Habitat, as described in the Province's Significant wildlife Habitat Technical guide and Ecoregion Criteria Schedules which have been prepared in support of the Provincial Policy Statement. Significant Wildlife Habitat are those areas which are important to meet specific habitat requirements of various guilds of wildlife species. Within vicinity of this development, they included the following attributes:

- Specialized Habitat for Wildlife – seeps and springs: seeps were found within Nickerson Woods; and

- Special Concern and Rare wildlife Species: Nickerson Woods provides known or potential habitat for a variety of Special Concern bird species.

Again, these attributes were properly considered in the planning of this development.

Overview of Midtown Creek

Midtown Creek is a coldwater stream which supports both Brook Trout and Rainbow Trout over portions of it, as well as a number of smaller forage fish species, including for example, White Sucker, Creek Chub and Blacknose Dace. Brook Trout have an affinity for small watercourses with abundant groundwater supply and cold, clear, very clean water. They are the only self-sustaining and native salmonoid species within this management zone of the Ministry of Natural Resources and Forestry, and are therefore a management priority. Unfortunately, summer water temperatures within the reach of creek adjacent to your development appear to be generally higher than those which are well-suited for this species. Cooler water temperatures are found upstream of the property, which may provide the necessary refugia to help support Brook Trout habitat during periods of higher temperatures.

Midtown Creek shows evidence of receiving uncontrolled, or poorly controlled, storm flows from areas of older upstream development, quite possibly including the Highway 401 corridor (modern day stormwater quantity facilities are designed to maintain pre- to post-development flows during periods of high runoff, but this is often not the case for older areas of development). The good news is that the stress and damage that these storm flows are causing in Midtown Creek has been recognized, with flood control criteria having been developed for this watercourse in order to ensure future development helps to reduce these issues, rather than add to the problem; this was an important step in protecting and enhancing the fisheries values of this creek over the long-term.

How Does the Design of this Development Protect the Midtown Creek and Nickerson Woods Natural Area?

The design of this development included a number of important considerations to protect Midtown Creek and its fisheries values over the long-term. These measures are also important to the protection of Nickerson Woods and its wildlife values, including its potential to support Species at Risk and to provide Significant Wildlife Habitat. This has included:

- the preservation of a 30 m natural buffer between the creek and your home, which is to be retained as natural/naturalized woodland;
- the restoration of portions of this buffer area that had been previously cleared/disturbed;
- stormwater management measures to make sure flows released after storm events are actually lower following development than they were prior to development; and
- stormwater management measures to ensure treated stormwater is of very good quality before entering the creek, including attention to its temperature.

The 30 m natural buffer was delineated prior to any construction, with sediment and erosion fencing, installed both to protect the quality of runoff during construction and to define the limits of such construction. A further 3 m grading limit was then staked off within rear yard areas to protect the trees within the buffer. An arborist was consulted as part of this process to make sure these measures were sufficient to protect more mature trees along the buffer edge.

Previously cleared, disturbed areas within the buffer were planted with native trees that are appropriate to this setting, with a forest restoration seed mixture then broadcast over this area. While these restored areas will take some time to mature into forested communities, we have given nature a “helping hand” in speeding up natural succession processes.

Once construction was completed, a decorative fence was installed to replace the temporary construction fencing, providing a permanent demarcation of rear yard/side yard limits.

Stormwater from this development is being managed for both water quantity and water quality. The quantity control measures involve storage in large, underground chambers. These chambers outlet this water to Midtown Creek, just as runoff from these lands prior to development flowed to the creek. However, in recognition that there are existing erosion concerns on this watercourse, this development addresses flood control criteria which requires that new development over-controls runoff after storm events, ensuring that the rate of release of treated stormwater is actually lower than it was prior to these lands being developed; while all of the treated stormwater eventually gets to the creek, the outlet design of the storage chambers ensures this occurs slowly.

Runoff from roads, driveways and other hard surfaces generally carries more suspended soil particles and other pollutants than does runoff form natural areas. To address this, stormwater from this development goes through a series of water quality treatment measures which are collectively designed to capture at least 80% of suspended soil and other particulate matter, and associated pollutants. This series of measures is referred to as a treatment train and includes: the design of individual lots, such as how they are graded to slow the rate of runoff and encourage natural filtration; conveyance controls, such as open ditches to slow and filter runoff, storm drains with shield insets and sumps to capture debris and encourage settlement, and an oil/grit separator to remove suspended solids; and end-of-pipe stormwater facilities, which in this instance involve two storage chambers which include infiltration layers to encourage further settlement of particulate matter and the recharge of a portion of the stormwater runoff into the ground. Collectively these measures ensure an “Enhanced” level of water quality treatment, which is the Province’s highest design standard. Importantly, in addition to addressing the desired removal of particulate matter and other pollutants, this stormwater design also has beneficial influences on the temperature of the stormwater outletting to Midtown Creek, an important consideration given that this creek supports a coldwater fishery (while traditional stormwater management ponds allow stormwater to warm

up before it is released, the infiltration chambers being used as part of this treatment system encourage a portion of stormwater to flow into the shallow groundwater system, from where it will slowly enter the creek as cold groundwater, while reducing the temperature of that portion of the stormwater which is not able to recharge into the ground).

WHAT CAN YOU DO, AS A HOMEOWNER, TO HELP PROTECT MIDTOWN CREEK AND NICKERSON WOODS?

"What's the use of a fine house if you haven't got a tolerable planet to put it on."

Henry David Thoreau

So here is where you get to play your part. Every resident in this development has a role to play in helping ensure Nickerson Woods and Midtown Creek remain healthy, and provide abundant fisheries and wildlife benefits, over the long-term.

1. **Protect the natural/naturalized buffer along rear yards**

If your home backs onto the Midtown Creek/Nickerson Woods corridor, the single most important thing you can do is to help preserve the natural and naturalized wooded buffer. This buffer is very important to the health of both the creek and wooded areas, including through its role in:

- providing shade to the creek, which helps to maintain colder stream temperatures which are vital to species like Brook Trout and Rainbow Trout;
- filtering runoff from your rear yard area;
- adding to the health of Nickerson Woods by increasing it size and diversity of wildlife habitat;
- screening more sensitive wildlife uses within Nickerson Woods from noise and light associated with this development.

A fence has been established along the limits of your rear yard area to delineate this buffer. **It is very important that this fence remain the limit of all your backyard activities.** It may be tempting to try and enhance your backyard by extending uses such as gardens, landscape features, or mowed into this protection zone, however that will impair all of the above-described functions of the buffer. Further, it may encourage neighbors to do the same, further harming Midtown Creek and Nickerson Woods.

2. Consider how your yard and garden can contribute to local wildlife benefits

A garden full of native plants can attract birds, butterflies and other wildlife to your yard. This is true for all homeowners, including those whose properties are not immediately adjacent to the natural buffer along the Midtown Creek/Nickerson Woods corridor. Conversely, the use of non-native and potentially invasive plant species can result in the aggressive spread of plants that will out-compete native plant species and result in the loss of habitat and food sources for wildlife. The choices you make for your garden are therefore very important.

The basic requirements of a garden intended to attract wildlife are food, water, shelter, and space. With a little bit of planning, everyone can have a small part of nature in their own backyard.

Steps to a Backyard Wildlife Garden.

A. Prepare Yard Plan

a) Map your yard to scale.

b) Locate your house, garage, patio and any other structures.

c) Locate any powerlines, pipes and underground cables.

d) Plot any existing trees or plants.

e) Sketch in the desired route of paths.

Figure 4 provides a sample plan for a backyard wildlife garden.

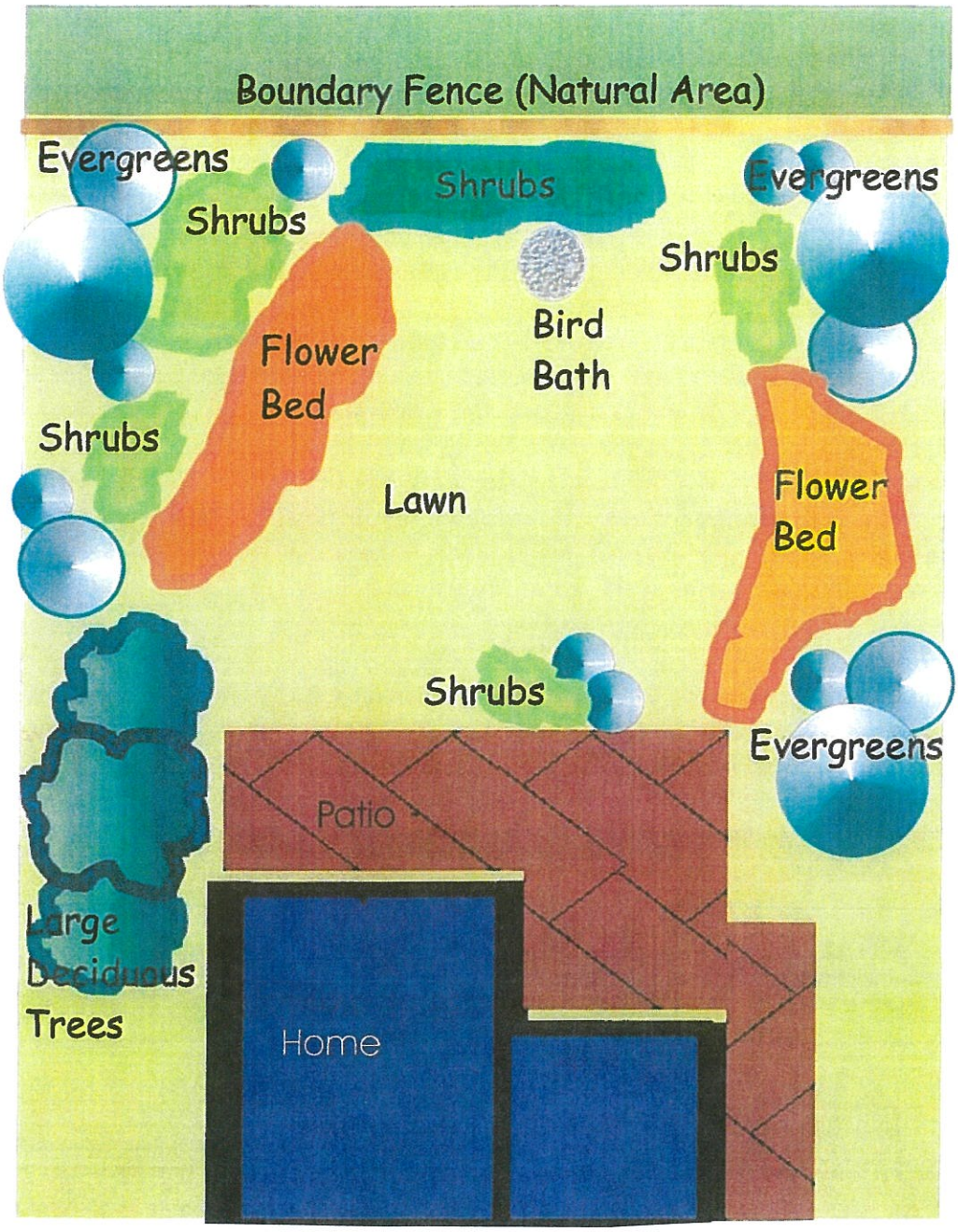


Figure 4. Sample plan of backyard wildlife garden.

B. Select Your Plants

Make a list of plants species that you would like in your garden. Include as many native species as possible, and try to avoid aggressive non-native species. Local nurseries that specialize in native plants or a botanist can be a tremendous help in selecting the best types of plants for your garden. Remember to select a variety of plants (trees, shrubs, herbaceous plants) that range in size, form, rate of growth, tolerance to pollution, light requirements, flowering times, colours, and food and cover for wildlife. Try to include both deciduous trees such as sugar maples and some coniferous evergreens. Remember that the greater the diversity of vegetation in your yard, the more wildlife you will attract. **Table 1** contains some species recommended for this area that are both pleasing aesthetically and have wildlife appeal, while **Table 2** lists plants that should be avoided. Additional references are provided at the end of the Stewardship Brochure. Your local library may also be a good source of information.

Table 1. Native trees, shrubs and ground covers that will benefit both your garden appearance and encourage and support the local wildlife.

	Flower/Fruit	Location	Wildlife Habitat
Deciduous Trees			
* yellow birch		fs	
* white birch		fs	
* beech	beech nuts/fall	fs	squirrels
* bur oak	nuts	fs	squirrels
* red oak	nuts/red leaves	fs	squirrels
* red maple		fs	
* sugar maple		fs	
* silver maple		fs	
* dogwood	white spring	fs/ps	
* choke cherry	white/fruit	fs	birds
* mountain ash	white/orange berries	fs	birds
Coniferous Trees			
* eastern white	evergreen	fs/ps	birds
* red pine	evergreen	fs/ps	birds

	Flower/Fruit	Location	Wildlife Habitat
* eastern hemlock	evergreen	fs/ps	birds
* eastern red cedar	evergreen	ps	birds
Shrubs			
* saskatoon berry	may/fall colour	fs/ps	birds
* native flowering	spring flower	fs/ps	birds
* highbush	fall berries	fs/ps	birds
* nannyberry	fall berries	fs/ps	
* serviceberries	fall berries	fs/moist soil	birds
* staghorn sumac	good fall colour	sun	birds
sargent juniper	yellow/spring	fs/ps	
gold coast juniper	none	fs	birds
globe blue spruce	none	fs	
winter honeysuckle	pink and white	fs/ps	
goldflame	pink or yellow	fs/ps	humming birds
smoke bush	pink/purple	fs	
flowering current	white/berries	fs/ps	humming
flowering quince	pink/fruit	fs/ps	humming birds
azaleas	various	fs/ps	humming birds
lilac	white/purple	fs/ps	humming birds/butter
Ground Cover			
* cone flower	purple	fs	birds/butterflies
* columbine	various colours	fs/ps	humming birds
* blackeyed susan	yellow and black	fs	birds
* coreopsis	various	fs	birds
* wild ginger	good foliage	ps	
* trillium	white/burgundy	ps/fsd	
* blue cohosh	blue foliage	ps/fsd	
* Solomon's seal	white	ps/fsd	
* wild leek	good foliage	ps/fsd	
wild grape	fruit	ps	song birds
partridge berry	fruit	ps/acidic	birds
virginia creeper	good fall colour	ps/acidic	
garden phlox	various colours	fs/ps	humming birds

	Flower/Fruit	Location	Wildlife Habitat
hollyhock	various colours	fs	humming birds
coral bells	red foliage/white or	fs/ps	humming birds
sweet William	various colours	fs/ps	humming birds
chives	purple/white	fs	humming birds
snap dragons	various colours	fs	humming birds
geraniums	various colours	fs	humming birds

*** indicates native species**

Table 2. Plants that should be avoided.

Norway Maple (all varieties and cultivars): Norway maples are extremely robust and invasive in Southern Ontario and have out competed many native maples and oaks in woodlands.

Scotch Pine: A common species in Christmas tree plantations. It has started to invade woodlands in Ontario and should be avoided. Good naturally occurring alternatives are white or red pines.

Black Locust: A fragrant tree containing white flowers in the spring. This tree can rapidly invade open areas and old fields.

European White Birch: A common street tree that has begun to displace native birch in Ontario's wetlands.

Buckthorn: Commonly known as tall hedge, buckthorn is a tall thorny shrub with purple berries. This shrub is extremely invasive and is now part of removal programs in some regions.

Tartarian Honeysuckle: Avoid this honeysuckle as it is very invasive. A good alternative that will attract humming birds is the goldflame honeysuckle.

Purple Loosestrife: This plant is one of the most commonly known invasive plant. It is part of a nation wide eradication program as it can completely choke out a wetland. Take caution when planting wildflower mixes as many of them contain purple loosestrife (*Lythrum salicaria*).

Periwinkle: This a very shade tolerant ground cover that has begun to invade woodlands. It has gained popularity as a ground cover in gardens, but should be avoided in areas adjacent to buffer zones and open areas.

C. Yard Layout

Once you have a list of plants, you can start adding them to your plan. Deciduous trees planted on the south side of your home will provide shade in summer, yet allow lots of light in the winter months. Next to the deciduous trees, several species of shrubs can be planted. Avoid planting large growing trees near existing structures as the roots can damage foundations and patios. Plant several small evergreens in a clump, or a larger evergreen together with two smaller ones. Use these arrangements around the edges of your property and locate flower beds in between, or in front of tree/shrub groupings. Small scale plans for each flower bed will allow you to develop each bed based on plant height, flowering time, colours and light requirements. Birdhouses and birdbaths located close to large trees will attract nesting species to your garden. Be sure to clean your birdhouses in the fall or early spring so that birds will return each year.

To reduce the numbers of those pesky summer insects, try locating a bat house on your lot. A single bat will consume thousands of insects nightly. Bat houses need to be located four metres to five metres above the ground and in a sunny location (south facing side of house or tree). Painting a bat house black will also help increase the temperature inside the home. Be patient with the bats; they may take a long time to select a new home!

And don’t forget about butterflies, and particularly their needs during their early stages of life, when specific host plants are required on which to munch. When choosing plants, make certain blooming will occur throughout the season so that a nectar source is always available. Flowers need to be planted in groups of varying heights; this will attract a variety of species. Also, choose a sheltered but unshaded area for planting. The butterfly gardener will need to plant not only the showy nectar sources, but larval host plants as well. Some of the former are Butterfly Milkweed, New England Aster, Black-eyed Susan, Blazing Star, Joe-pye Weed, Culver’s Root, Wild Columbine, and Cardinal Flower. The latter include Butterfly Milkweed (for monarch butterflies), poplars, ash, elm and willow (for Mourning Cloak), Tulip Trees (for Tiger Swallowtail), Golden Alexander (for Eastern Black Swallowtail), and violets (for Fritillaries). Remember, if you want butterflies, forget about using chemicals.

Some of the plants noted above (Cardinal Flower and Wild Columbine) also attract Hummingbirds, which is clearly a bonus.

3. Yard Maintenance

The application of fertilizers and pesticides (herbicides, insecticides, fungicides) to lawns and gardens can significantly impact wetlands, possibly killing native plants and animals. Lawn and garden chemicals can easily reach the sensitive woodlands and coldwater stream in run-off, particularly if applied immediately before an intense rainfall. Alternatives such as compost application, leaving lawn clippings on your lawn, and relying on biological controls are strongly encouraged. If chemical application is necessary, please use it sparingly and appropriately, and always follow the manufacturer's directions, or consult a licensed professional.

Remember that you are not to disturb any natural vegetation located within the protected buffer area.

4. Composting/yard waste

Composting household and garden wastes provides a good source of natural fertilizer and mulch for lawns and gardens. If you are using a compost bin, it must be located on your own property. **Never** locate bins or dump yard wastes in the protected buffer area; the addition of extra organic matter can smother and destroy native vegetation. To avoid attracting unwanted visitors (coyotes, racoons, skunks, etc.), do not compost meats and oils. Always add a layer of leaves/yard trimmings over food wastes, and turn your compost pile regularly. Compost is ready for use when it resembles coarse rich earth. If you do have unwanted visitors, bins can be lined with 16 gauge metal mesh.

5. Domestic pets

If left to roam freely, dogs and cats can kill a substantial number of animals and disturb nesting and rearing of young. To avoid this possibility, dogs should be kenneled or kept in fenced yards and walked on leash. Cats should not be left to roam freely since they are natural predators on birds and small mammals. There are important nesting birds in the area, so help protect the local wildlife by controlling your pets.

6. Noise and lighting

Unusual noise and lighting conditions that occur in housing areas can have negative impacts on wildlife. These can be reduced with a few simple measures. Planting trees and shrubs at the back of your property can help reduce the noise and light that reaches wildlife habitat. The installation of sensor lights can minimize the duration of light exposure, and can be switched off when not required. Lower wattage lights and lighting with downward directing hoods is also preferrable: subtle garden lighting that highlights trees and shrubs is much better than more intense lighting.

7. Construction of patios and decks

If you plan on building a patio or deck, consider designs which permit rainwater to soak through and into the ground, thereby contributing to ground water recharge.

8. Longer scale construction activities such as pool installation

If you are planning a larger scale construction project requiring more substantial earthworks, such as the installation of a inground pool, please make sure you and your contractor employ good construction best management practices. This includes the installation of sediment fence around the downgradient portion of the work area, ensuring the bottom of the fence is properly trenched into the ground, completing the earthworks as quickly as possible, regrading disturbed areas and seeding or sodding as soon as can be practically achieved after the completion of earthworks, and maintaining the sediment fence in good working order until the previously disturbed areas have fully stabilized.

9. Household garbage

One of the great pleasures of living next door to a natural area is occasional encounters with local wildlife. These can become more frequent and even a nuisance if wildlife learn to acquire food from humans or their activities. To avoid the development of nuisance animals, keep your household garbage in animal proof containers. By keeping garbage containers in a garage or using a locking garbage bin, you will provide garbage security. Additionally, you should not feed the local wildlife, including squirrels, racoons, skunks, ducks and geese. Human food does not provide appropriate nutrition for wild animals, and feeding causes acclimation to humans, often resulting in nuisance behaviors.

10. Managing car wash and swimming pool water

Soaps, motor oils, solvents, paint thinners, algicides, and common pool chemicals can be highly toxic to terrestrial vegetation, and fish and stream invertebrates. Remember, care should be taken when using these products so that they do not pollute the environment. Try washing your car with just water, or take it to the local car wash. If you change your car's oil or fluids, recycle them by taking them to one of the gas stations in your area that accepts them, or to the local landfill. Lots having swimming pools should not be drained in a manner that will allow water to run into the forested or buffer areas; for such lots, the pool water should be gradually directed to the street in front of the house, from where it will discharge to the stormwater management system for your neighbourhood.

Please remember, everything that drains from your yard or into the stormwater catch basins will end up in a stream that supports sensitive, coldwater fish species that could be imperiled by any pollutants.

CONCLUDING REMARKS

We hope you have enjoyed the information that is included in this stewardship brochure. We also hope you enjoy your new neighborhood and the beautiful natural areas that it back onto. A selection of references which you may find additionally useful to your environmental stewardship efforts are provided in this brochure.

"When one tugs on a single thing in nature, he finds it attached to the rest of the world."

John Muir

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APPENDIX A – VASCULAR PLANT LIST

Appendix A. Vascular plant list of Cobourg Site. Compiled from site visit observations on July 10 and 30 2013.

Common Name	*Scientific Name*	Family	Grank2	Srank3	Tracked by NHIC	Native Status	COSSARO/ COSEWIC/ ESA Regulated
Trees							
Manitobe Maple	*Acer negundo*	ACERACEAE	G5	S5	N	I	
Silver Maple	*Acer saccharinum*	ACERACEAE	*G5*	*S5*	N	N	
Sugar Maple	*Acer saccharum* ssp. *saccharum*	ACERACEAE	G5	S5	N	N	
Yellow Birch	*Betula alleghaniensis*	BETULACEAE	G5	S5	N	N	
Black Ash	*Fraxinus nigra*	OLEACEAE	G5	S5	N	N	
Green Ash	*Fraxinus pennsylvanica*	OLEACEAE	G5	S5	N	N	
Black Walnut	*Juglans nigra*	JUGLANDACEAE	G5	S4	N	N	
Common Apple	*Malus pumila*	ROSACEAE	G5	SNA	N	I	
White Spruce	*Picea glauca*	PINACEAE	G5	S5	N	N	
Scotch Pine	*Pinus sylvestris*	PINACEAE	G?	SNA	N	I	
Balsam Poplar	*Populus balsamifera ssp balsamifera*	SALICACEAE	G5T?	S5	N	N	
Black Locust	*Robinia pseudo-acacia*	FABACEAE	G5	SNA	N	I	
White Willow	*Salix alba*	SALICACEAE	G5	se4	N	I	
Hybrid Willow	*Salix X sepulcralis*	SALICACEAE	HYB	se2	N	I	
European Mountain-ash	*Sorbus aucuparia*	ROSACEAE	G5	se4	N	I	
Northern White Cedar	*Thuja occidentalis*	CUPRESSACEAE	G5	S5	N	N	
Basswood	*Tilia americana*	TILACEAE	G5	S5	N	N	
American Elm	*Ulmus americana*	ULMACEAE	G5	S5	N	N	
Shrubs and vines							
Japanese Barberry	*Berberis thunbergii*	BERBERIDACEAE	G?	SNA	N	I	
Climbing Bittersweet	*Celastrus scandens*	CELASTRACEAE	G5	S5	N	N	
Virginia Virgin-bower	*Clematis virginiana*	RANUNCULACEAE	G5	S5	N	N	
Alternate-leaf Dogwood	*Cornus alternifolia*	CORNACEAE	G5	S5	N	N	
Red-osier Dogwood	*Cornus stolonifera*	CORNACEAE	G5	S5	N	N	

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Common Name	*Scientific Name*	Family	Grank2	Srank3	Tracked by NHIC	Native Status	COSSARO/ COSEWIC/ ESA Regulated
Tartarian Honeysuckle	*Lonicera tatarica*	CAPRIFOLIACEAE	GNR	SNA	N	N	
Bell's Honeysuckle	*Lonicera x bella*	CAPRIFOLIACEAE	HYB	se2	N	I	
Thicket Creeper	*Parthenocissus inserta*	VITACEAE	G5	S5	N	N	
Philadelphia Mock-orange	*Philadelphus coronarius*	HYDRANGEACEAE	G?	SNA	N	I	
Choke cherry	*Prunus virginiana ssp. virginiana*	ROSACEAE	G5T?	S5	N	N	
Buckthorn	*Rhamnus cathartica*	RHAMNACEAE	G?	SNA	N	I	
Western Poison Ivy	*Rhus radicans ssp. rydbergii*	ANACARDIACEAE	G5T	S5	N	N	
Staghorn Sumac	*Rhus typhina*	ANACARDIACEAE	G5	S5	N	N	
Wild Black Currant	*Ribes americanum*	GROSSULARIACEAE	G5	S5	N	N	
Northern Red Currant	*Ribes rubrum*	GROSSULARIACEAE	G4G5	SNA	N	I	
Rambler Rose	*Rosa multiflora*	ROSACEAE	G?	se4	N	I	
Wild Red Raspberry	*Rubus idaeus* ssp. *melanolasius*	ROSACEAE	G5T	S5	N	N	
Black Raspberry	*Rubus occidentalis*	ROSACEAE	G5	S5	N	N	
Bebb's Willow	*Salix bebbiana*	SALICACEAE	G5	S5	N	N	
Pussy Willow	*Salix discolour*	SAILCACEAE	G5	S5	N	N	
Heart-leaved Willow	*Salix eriocephala*	SALICACEAE	G5	S5	N	N	
Slender Willow	*Salix petiolaris*	SAILCACEAE	G5	S5	N	N	
Common Elderberry	*Sambucus canadensis*	CAPRIFOLIACEAE	G5	S5	N	N	
Common Elderberry	*Sambucus canadensis*	CAPRIFOLIACEAE	G5	S5	N	N	
Narrow-leaved Meadow-sweet	*Spiraea alba*	ROSACEAE	G5	S5	N	N	
Japanese Yew	*Taxus cuspidata*	TAXACEAE	?	?	N	I	
Guelder-rose Viburnum	*Viburnum opulus*	CAPRIFOLIACEAE	G5	se4	N	I	
Riverbank Grape	*Vitis riparia*	VITACEAE	G5	S5	N	N	
Herbacous Plants							
Common Yarrow	*Achillea millefolium* ssp. *lanulosa*	ASTERACEAE	G5	S5	N	N	

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Common Name	*Scientific Name*	Family	Grank2	Srank3	Tracked by NHIC	Native Status	COSSARO/ COSEWIC/ ESA Regulated
Red Baneberry	*Actaea rubra*	RANUNCULACEAE	*G5*	*S5*	N	N	
Carpet Bugle	*Ajuga reptans*	LAMIACEAE	*GNR*	*SNA*	N	I	
Garlic Mustard	*Alliaria petiolata*	BRASSICACEAE	*GNR*	*SNA*	N	I	
Annual Ragweed	*Ambrosia artemisiifolia*	ASTERACEAE	*G5*	*S5*	N	N	
Hog-peanut	*Amphicarpaea bracteata*	FABACEAE	*G5*	*S5*	N	N	
Wild Sarsaparilla	*Aralia nudicaulis*	ARALIACEAE	*G5*	*S5*	N	N	
Greater Burdock	*Arctium lappa*	ASTERACEAE	*GNR*	*SNA*	N	I	
Jack-in-the-pulpit	*Arisaema triphyllum ssp triphyllum*	ARACEAE	*G5*	*S5*	N	N	
Common Milkweed	*Asclepias syriaca*	ASCLEPIADACEAE	G5	S5	N	N	
Lady-fern	*Athyrium filix-femina var angustum*	DRYOPTERIDACEAE	G5T5	S5	N	N	
Russian Atriplex	*Atriplex heterosperma*	CHENOPODIACEAE	G5	se4	N	I	
False Nettle	*Boehmeria cylindrica*	URTICACEAE	G5	S5	N	N	
Smooth Brome	*Bromus inermis ssp inermis*	POACEAE	G4G5T?	SNA	N	I	
Creeping Bellflower	*Campanula rapunculoides*	CAMPANULACEAE	G?	SNA	N	I	
Woodland sedge	*Carex blanda*	CYPERACEAE	G5?	S5	N	N	
Graceful sedge	*Carex gracillima*	CYPERACEAE	G5	S5	N	N	
Meadow sedge	*Carex granularis*	CYPERACEAE	G5	S5	N	N	
Longstalk sedge	*Carex pedunculata*	CYPERACEAE	G5	S5	N	N	
Climbing Bittersweet	*Celastrus scandens*	CELASTRACEAE	G5	S5	N	N	
Common Mouse-ear Chickwee	*Cerastium fontanum*	CARYOPHYLLACEAE	G?	SNA	N	I	
Turtlehead	*Chelone glabra*	SCROPHULARIACEAE	G5	S5	N	N	
Greater Celandine	*Chelidonium majus*	PAPAVERACEAE	G?	SNA	N	I	
Small Enchanter's Nightshade	*Circaea alpina*	ONAGRACEAE	G5	S5	N	N	
Enchanter's Nightshade	*Circaea lutetiana ssp canadensis*	ONAGRACEAE	G5T5	S5	N	N	
Canada Thistle	*Cirsium arvense*	ASTERACEAE	G?	SNA	N	I	
Fleabane	*Conyza canadensis*	ASTERACEAE	G5	S5	N	N	

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Common Name	*Scientific Name*	Family	Grank2	Srank3	Tracked by NHIC	Native Status	COSSARO/ COSEWIC/ ESA Regulated
Large-flowered Coreopsis	*Coreopsis grandiflora*	ASTERACEAE	G5	se3?	N	I	
European Swallow-wort	*Cynanchum rossicum*	ASCLEPIADACEAE	G?	SNA	N	I	
Bulblet Fern	*Cystopteris bulbifera*	DRYOPTERIDACEAE	G5	S5	N	N	
Orchard Grass	*Dactylis glomerata*	POACEAE	G?	SNA	N	I	
Queen Anne's Lace	*Daucus carota*	APIACEAE	G?	SNA	N	I	
Spinulose Wood Fern	*Dryopteris carthusiana*	DRYOPTERIDACEAE	G5	S5	N	N	
Wild Mock-cucumber	*Echinocystis lobata*	CUCURBITACEAE	G5	S5	N	N	
Quack Grass	*Elymus repens*	POACEAE	G?	SNA	N	I	
Eastern Helleborine	*Epipactis helleborine*	ORCHIDACEAE	G?	SNA	N	I	
Field Horsetail	*Equisetum arvense*	EQUISETACEAE	G5	S5	N	N	
White-top Fleabane	*Erigeron annuus*	ASTERACEAE	G5	S5	N	N	
Daisy Fleabane	*Erigeron strigosus*	ASTERACEAE	G5	S5	N	N	
Wormseed Mustard	*Erysimum cheiranthoides ssp cheiranthoi*	BRASSICACEAE	G5	SNA	N	I	
Spotted Joe-pye Weed	*Eupatorium maculatum ssp maculatum*	ASTERACEAE	G5T5	S5	N	N	
Large-leaved Aster	*Eurybia macrophylla*	ASTERACEAE	G5	S5	N	N	
Meadow Fescue	*Festuca pratensis*	POACEAE	G5	SNA	N	I	
Virginia Strawberry	*Fragaria virginiana ssp virginiana*	ROSACEAE	G5T?	SU	N	N	
Marsh Bedstraw	*Galium palustre*	RUBIACEAE	G5	S5	N	N	
Sweet-scent Bedstraw	*Galium triflorum*	RUBIACEAE	G5	S5	N	N	
Herb-robert	*Geranium robertianum*	GERANIACEAE	G5	SNA	N	I	
White Avens	*Geum canadense*	ROSACEAE	G5	S5	N	N	
Clover-root	*Geum urbanum*	ROSACEAE	G5	se2	N	I	
Ground Ivy	*Glechoma hederacea*	LAMIACEAE	G?	SNA	N	I	
American Manna Grass	*Glyceria grandis*	POACEAE	G5	S4S5	N	N	
Fowl Manna Grass	*Glyceria striata*	POACEAE	G5	S5	N	N	
Common Sunflower	*Helianthus annuus ssp. annuus*	ASTERACEAE	G5T	se4	N	I	

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Common Name	*Scientific Name*	Family	Grank2	Srank3	Tracked by NHIC	Native Status	COSSARO/ COSEWIC/ ESA Regulated
Orange Daylily	*Hemerocallis fulva*	LILIACEAE	G?	SNA	N	I	
Dame's Rocket	*Hesperis matronalis*	BRASSICACEAE	G4G5	SNA	N	I	
St. John's-wort	*Hypericum perforatum*	CLUSIACEAE	G?	SNA	N	I	
Spotted Jewel-weed	*Impatiens capensis*	BALSAMINACEAE	G5	S5	N	N	
Yellow Iris	*Iris pseudacorus*	IRIDACEAE	G?	se3	N	I	
Dudley's Rush	*Juncus dudleyi*	JUNCACEAE	G5	S5	N	N	
Slender Rush	*Juncus tenuis*	JUNCACEAE	G5	S5	N	N	
Wood Nettle	*Laportea canadensis*	URTICACEAE	G5	S5	N	N	
Great Blue Lobelia	*Lobelia siphilitica*	CAMPANULACEAE	G5	S5	N	N	
Bird's-foot Trefoil	*Lotus corniculatus*	FABACEAE	G?	SNA	N	I	
Starflower False Solomon's sea	*Maianthemum stellatum*	LILIACEAE	G5	S5	N	N	
Ostrich Fern	*Matteuccia struthiopteris var pensylvanic*	DRYOPTERIDACEAE	G5	S5	N	N	
Small Forget-me-not	*Myosotis laxa*	BORAGINACEAE	G5	S5	N	N	
True Forget-me-not	*Myosotis scorpioides*	BORAGINACEAE	G?	se4	N	I	
Catnip	*Nepeta cataria*	LAMIACEAE	G?	SNA	N	I	
Sensitive Fern	*Onoclea sensibilis*	DRYOPTERIDACEAE	G5	S5	N	N	
Upright Yellow Wood Sorrel	*Oxalis stricta*	OXALIDACEAE	G5	S5	N	N	
Foxglove beard-tongue	*Penstemon digitalis*	SCROPHULARIACEAE	G5	S4S5	N	N	
Canada Clearweed	*Pilea pumila*	URTICACEAE	G5	S5	N	N	
Kentucky Bluegrass	*Poa pratensis ssp pratensis*	POACEAE	G5T	S5	N	N	
self-heal	*Prunella vulgaris ssp lanceolata*	LAMIACEAE	G5T?	S5	N	N	
Tall Buttercup	*Ranunculus acris*	RANUNCULACEAE	G5	SNA	N	I	
Yellow Water-crowfoot	*Ranunculus flabellaris*	RANUNCULACEAE	G5	S4?	N	N	
Black-eyed Susan	*Rudbeckia hirta*	ASTERACEAE	G5	S5	N	N	
Curly Dock	*Rumex crispus*	POLYGONACEAE	G?	SNA	N	I	
Bebb's Willow	*Salix bebbiana*	SALICACEAE	G5	S5	N	N	

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Common Name	*Scientific Name*	Family	Grank2	Srank3	Tracked by NHIC	Native Status	COSSARO/ COSEWIC/ ESA Regulated
Cottongrass Bulrush	*Scirpus cyperinus*	CYPERACEAE	G5	S5	N	N	
Small-fruit Bulrush	*Scirpus microcarpus*	CYPERACEAE	G5	S5	N	N	
Live Forever	*Sedum telephium ssp. fabaria*	CRASSULACEAE	G?T?	se2	N	I	
Green Bristle Grass	*Setaria viridis*	POACEAE	G?	SNA	N	N	
Hemlock Water-parsnip	*Sium suave*	APIACEAE	G5	S5	N	N	
Climbing Nightshade	*Solanum dulcamara*	SOLANACEAE	G?	SNA	N	N	
Black Nightshade	*Solanum nigrum*	SOLANACEAE	G?	SNA	N	N	
Tall Goldenrod	*Solidago altissima var altissima*	ASTERACEAE	G?	S5	N	N	
Canada Goldenrod	*Solidago canadensis*	ASTERACEAE	G5	S5	N	N	
Smooth Goldenrod	*Solidago gigantea*	ASTERACEAE	G5	S5	N	N	
Rough Goldenrod	*Solidago rugosa ssp rugosa*	ASTERACEAE	G5T?	S5	N	N	
Field Sowthistle	*Sonchus arvensis ssp arvensis*	ASTERACEAE	G?T?	SNA	N	N	
Panicled Aster	*Symphyotrichum lanceolatus ssp lanceol*	ASTERACEAE	G5T?	S5	N	N	
Calico Aster	*Symphyotrichum lateriflorus var lateriflo*	ASTERACEAE	G5T5	S5	N	N	
New England Aster	*Symphyotrichum novae-angliae*	ASTERACEAE	G5	S5	N	N	
Purple-stemmed Aster	*Symphytrichum puniceum var puniceum*	ASTERACEAE	G5T?	S5	N	N	
Common Dandelion	*Taraxacum officinale*	ASTERACEAE	G5	SNA	N	N	
Tall Meadowrue	*Thalictrum pubescens*	RANUNCULACEAE	G5	S5	N	N	
Marsh Fern	*Thelypteris palustris var pubescens*	THELYPTERIDACEAE	G5T?	S5	N	N	
Meadow Goat's-beard	*Tragopogon pratensis ssp pratensis*	ASTERACEAE	G?T?	SNA	N	I	
Red Clover	*Trifolium pratense*	FABACEAE	G?	SNA	N	I	
Slender Stinging Nettle	*Urtica dioica ssp gracilis*	URTICACEAE	G5T?	S5	N	N	
Common Mullein	*Verbascum thapsus*	SCROPHULARIACEAE	G?	SNA	N	I	
Common Speedwell	*Veronica officinalis*	SCROPHULARIACEAE	G5	SNA	N	I	
Thyme-leaved Speedwell	*Veronica serpyllifolia ssp serpyllifolia*	SCROPHULARIACEAE	G?T?	SNA	N	I	
Tufted Vetch	*Vicia cracca*	FABACEAE	G?	SNA	N	I	

Appendix A. Vascular plant list of Cobourg Site. Compiled from site visit observations on July 10 and 30 2013.

Common Name	*Scientific Name*	Family	Grank2	Srank3	Tracked by NHIC	Native Status	COSSARO/ COSEWIC/ ESA Regulated
American Bog Violet	*Viola conspersa*	VIOLACEAE	G5	S5	N	N	
Downy Yellow Violet	*Viola pubescens*	VIOLACEAE	G5	S5	N	N	
Woolly Blue Violet	*Viola sororia*	VIOLACEAE	G5	S5	N	N	
Three Colored Violet	*Viola tricolor*	VIOLACEAE	G?	se2	N	N	

APPENDIX B – WILDLIFE IDENTIFIED IN VICINITY OF THE PROPERTY

Appendix B. Wildlife observed within the property and adjacent lands (within 120 m), July 10 and 30, 2013.

Common Name	Scientific Name	Family	GRANK [1]	SRANK[2]	Federal[3] / Provinical[4] Status / ESA 2007[5]	MNR Area Sensitive[6]	Conservation Piorities[7]	Breeding level ** *highest level recored* [8]	Unit 1	Unit 2	Unit 3
American Crow	*Corvus brachyrhynchos*	CORVIDAE	G5	S5B,SZN				H	x		
American Goldfinch	*Carduelis tristis*	FRINGILLIDAE	G5	S5B,SZN			L3	NU	x		
American Redstart	*Setophaga ruticilla*	PARULIDAE	G5	S5B,SZN		X	L2	DD		x	
American Robin	*Turdus migratorius*	TURDIDAE	G5	S5B,SZN				FY	x		
Black-capped Chicadee	*Poecile atricapillus*	PARIDAE	G5	S5B,SZN			L4	P	x	x	x
Blue Jay**	*Cyanocitta cristata*	CORVIDAE	G5	S5				H	x	x	
Common Grackle	*Quiscalus quiscula*	ICTERIDAE	G5	S5B,SZN				H	x	x	
Hairy Woodpecker	*PicodiesVillosus*	PICIDAE	G5	S5		X		DD		x	
Eastern Wood-pewee	*Contopus virens*	TYRANNIDAE	G5	S5B,SZN				T		x	
European Starling	*Sturnus vulgaris*	STURNIDAE	G5	SE				P	x		
Field Sparrow	*Spizella pusilla*	EMBERIZIDAE	G5	S5B,SZN			L3	P	x		
Killdeer	*Charadrius vociferus*	CHARADRIIDAE	G5	S5B,SZN				T	x		
Mourning Dove	*Zenaida macroura*	COLUMBIDAE	G5	S5B,SZN				S	x		
Northern Mocking Bird	*Mimus polyglottos*	MIMIDAE	G5	S4B,SZN			L1	P	x		
Northern Cadinal	*Cardinalis cardinalis*	CARDINALIDAE	G5	S5				H	x	x	
Pileated Woodpecker	*Dryocopus pileatus*	PICIDAE	G5	S4S5		X	L2	H	x		x
Song Sparrow	*Melospiza melodia*	EMBERIZIDAE	G5	S5B,SZN				H	x		
Tree Swallow	*Tachycineta bicolor*	HIRUNDINIDAE	G5	S5B,SZN				H	x		
Yellow Warbler	*Dendroica petechia*	PARULIDAE	G5	S5B,SZN				S		x	

Common Name	Scientific Name	Family	GRANK[1]	SRANK[2]	Federal[3] / Provinical[4] Status / ESA 2007[5]	MNR Area Sensitive[6]	NHIC Tracked	Comments
Raccoon	*Procyon lotor*	PROCYONIDAE	G5	S5			N	FWCA (F) ***
White-tailed Deer	*Odocoileus virginianus*	CERVIDAE	G5	S5			N	FWCA (G) ***
Red Fox	*Vulpes vulpes*	CANIDAE	G5	S5			N	FWCA (F) ***
Eastern Gartersnake	*Thamnophis sirtalis sirtalis*	COLUBRIDAE	G5T?	S5			N	
Dekay's Brownsnake	*Storeria dekayi*	COLUBRIDAE	G5	S5	NAR		Y	

Legend

[1]G-Rank (global)
Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.
G1 Extremely rare - usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G2 Very rare - usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.
G3 Rare to uncommon - usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
G4 Common - usually more than 100 occurrences; usually not susceptible to immediate threats.
G5 Very common - demonstrably secure under present conditions.

[2]S-Ranks (provincial)
Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global

Appendix B. Wildlife observed within the property and adjacent lands (within 120 m), July 10 and 30, 2013.

ranks, but consider only those factors within the political boundaries of Ontario.
S1 Critically Imperiled - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2 Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3 Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4 Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5 Secure - Common, widespread, and abundant in the nation or state/province.
S#S# Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
SAN Non-breeding accidental.
SE Exotic - not believed to be a native component of Ontario's fauna.
SZN Non-breeding migrants/vagrants.
SZB Breeding migrants/vagrants.

[3]COSEWIC (Committee on the Status of Endangered Wildlife in Canada)
(Federal Status from COSEWIC 2013)
EXT Extinct - A species that no longer exists.
EXP Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.
END Endangered - A species facing imminent extirpation or extinction.
THR Threatened - A species likely to become endangered if limiting factors are not reversed.
SC Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
NAR Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.
DD Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

* - Species on Schedule 1 of Species At Risk Act (SARA)
COSEWIC- anticipated assessments for 2012 thu 2013 . Candidate list of wildlife species that it considers at risk of extinction or extirpation nationally. Species on the candidate lists are ranked into three priority groups and each wildlife species should receive a COSEWIC assessment. Group 1 (High) contains wildlife species of highest priority for assessment by COSEWIC, and includes wildlife species suspected to be extirpated from Canada. Groups 2 (Med) and 3 (Low) contain wildlife species that are of intermediate and lower priority for COSEWIC assessment, respectively.

[4, 5] OMNR (Ontario Ministry of Natural Resources and Endangred Species Act 2007)
(Provincial Status from MNR 2013)
The provincial review process is implemented by the MNR's Committee on the Status of Species at Risk in Ontario (COSSARO).
EXT Extinct - A species that no longer exists anywhere.
EXP Extirpated - A species that no longer exists in the wild in Ontario but still occurs elsewhere.
END Endangered - A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's Endangered Species Act (ESA).
THR Threatened - A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.
SC Special Concern (formerly Vulnerable) - A species with characteristics that make it sensitive to human activities or natural events.
NAR Not at Risk - A species that has been evaluated and found to be not at risk.
DD Data Deficient (formerly Indeterminate) - A species for which there is insufficient information for a provincial status recommendation.
* - Species on Schedule 1/2/3 of Endangered Species Act (ESA), Endangered Species Act, 2007 S.O. 2007, CHAPTER 6. Consolidation Period: From June 30, 2008 to October, 2013.

[5] MNR Significant Wildlife Habitat Technical Guide Area Sensitive Species
Area Sensitivity is defined as species requiring large areas of suitable habitat in order to sustain population numbers
From: Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, 151pp. + appendices.

[6]Conservation Priorities for the Birds of Southern Ontario
http://www.bsc-eoc.org/conservation/conservmain.html

[7] Ontario Breeding Bird Evidence Codes
Observed
X Species observed in its breeding season (no breeding evidence).
Possible
H Species observed in its breeding season in suitable nesting habitat.
S Singing male(s) present, or breeding calls heard, in suitable nesting habitat in breeding season.
Probable
P Pair observed in suitable nesting habitat in nesting season.
T Permanent territory presumed through registration of territorial behavior (song, etc.) on at least two days, a week or more apart, at the same place.
D Courtship or display, including interaction between a male and a female or two males, including courtship feeding or copulation.
V Visiting probable nest site
A Agitated behavior or anxiety calls of an adult.
B Brood Patch on adult female or cloacal protuberance on adult male.
N Nest-building or excavation of nest hole.
Confirmed
DD Distraction display or injury feigning.
NU Used nest or egg shells found (occupied or laid within the period of the survey).
FY Recently fledged young (nidicolous species) or downy young (nidifugous species), including incapable of sustained flight.
AE Adult leaving or entering nest sites in circumstances indicating occupied nest.
FS Adult carrying fecal sac.
CF Adult carrying food for young.
NE Nest containing eggs.
NY Nest with young seen or heard.

Those marked with ** include species regulated under the Fish and Wildlife Conservation Act (FWCA) Protected - FWCA(P) Game Bird or Mammal - FWCA(G) Furbearer - FWCA(F)
Species are reguated under the Federal Migratory Birds Convention Act (1994) - (MBCA) excludes raptor species and Rock Dove, American Crow, Brown-headed Cowbird, Common Grackle, House Sparrow, Red-winged Blackbird and European Starling

APPENDIX C – SPECIES AT RISK HAVING POTENTIAL HABITAT IN VICINITY OF DEVELOPMENT

Appendix C. Species of Conservation Concern, LeBlanc Enterprises Property and Adjacent Lands – Town of Cobourg.

Species	**Federal** Committee on the Status of Endangered Wildlife in Canada (COSEWIC) [A]	**Provincial** Species At Risk in Ontario (SARO) [B]	Species and Habitat Implications ESA 2007 [C]	Habitat Overview [D]	Site Relevance (Subject Property)
Mammals					
Little Brown Myotis (also known as little brown bat) and **Northern Myotis** (also known as northern long-eared bat	N/A	END	Afforded species and general habitat protection.	Summer - buildings, towers, hollow trees, beneath the loose bark of trees, in crevices of cliffs, and beneath bridges as day roosts, commonly use caves as night roosts. Winter- move into caves and abandoned mines (*Kurta, Allen. 1995. Mammals of the Great Lakes Region. University of Michigan Press. 376 pp.*).	• Potential to occur (foraging). • Surrounding features (valleyland with deciduous trees) provide most suitable habitat opportunities. • Roosting trees are not present within the proposed development area, but likely occur elsewhere. • No anticipated impacts.
Turtles					
Snapping Turtle *(Chelydra serpentina)*	SC	SC	N/A	Marsh, swamp, fen (poor fen), shallow waters in lakes or along streams, open areas of sand and gravel.	• Low potential to occur along creek corridor. • Basking and natural nesting opportunities are extremely limited • Basking and natural nesting opportunities • Species is known to occur in a variety of habitats (ditches etc..), therefore potential presence cannot be discounted within the adjacent Midtown Creek/Nickerson Woods Corridor • No anticipated impacts.

Species	**Federal** Committee on the Status of Endangered Wildlife in Canada (COSEWIC) [A]	**Provincial** Species At Risk in Ontario (SARO) [B]	Species and Habitat Implications ESA 2007 [C]	Habitat Overview [D]	Site Relevance (Subject Property)
Snakes					
Hog-nosed snake *(Heterodon platirhinos)*	THR	THR	Afforded species and general habitat protection.	Prefers habitats with sandy, well-drained soil and open vegetative cover such as open woods, fields and brush-land. Often relies on driftwood or other groundcover in beach and dune habitats.	• Likely the restricted record identified in background review. • Low potential to occur within subject property. • Will use brush piles and anthropogenic structures. Areas of exposed sands or gravels not present. • No anticipated impacts.
Milksnake (Lampropeltis triangulum)	SC	SC	N/A	Inhabits a wide variety of habitats including fields, rocky hillsides and forests. Proximity to water, basking locations are important microhabitat features. Will use brush piles and anthropogenic structures debris, and rock cuts/ shorelines as habitat during the active season.	• Because species utilizes a wide variety of habitat types, its presence cannot be discounted. • If present likely associated with open meadow and forest edge communities. • Impacts are expected to be low.
Birds					
Canada Warbler *(Wilsonia Canadensis)*	THR	SC	N/A	"*Utilizes a wide range of habitats both deciduous and coniferous usually wet habitat types. Prefers low lying areas with well-developed understorey i.e. cedar woods or alder swamps. Nests on ground or near ground concealed by dense shrub and understorey vegetation. Utilizes mossy logs, roots along stream banks or hummocks* " (MNR(c), 2009; Cadman, 2005)	• Development area (meadow, cultural area) not suitable habitat, but may occur as a vagrant. • Potential within Nickerson Woods.. • Impacts expected to be low.

Species	**Federal** Committee on the Status of Endangered Wildlife in Canada (COSEWIC) [A]	**Provincial** Species At Risk in Ontario (SARO) [B]	Species and Habitat Implications ESA 2007 [C]	Habitat Overview [D]	Site Relevance (Subject Property)
Red-headed Woodpecker (*Melanerpes erythrocephalus)*	THR	SC		Open woodland and woodland edges, known to occur along urban fringe environments (parklands, golf courses etc.) and riparian forest; Important component is existence of large, dead, weathered trees or live trees with large dead branches	• Potential to occur in adjacent Nickerson Woods, and anywhere along the forested edge of the entire valleyland. • Suitable habitats consist of the deciduous woodlands within the valleyland where mature trees are present. • Impacts are expected to be low.
Wood Thrush *(Hylocichla mustelina)*	THR	Under assessment COSSARO	N/A	"*Undisturbed moist mature deciduous or mixed forest with deciduous sapling growth"; also occurs near "pond or swamp; hardwood forest edges*" Significant Wildlife Habitat Guide (MNR 2000), Appendix G.	• Potential to occur in adjacent Nickerson Woods. • Suitable habitats consist of the deciduous woodlands occurring outside of the subject property. May occur as a vagrant. • Impacts are expected to be low.
Eastern Wood-pewee *(Contopus virens)*	SC	Under assessment COSSARO	N/A	"*Open, deciduous, mixed or coniferous forest; predominated by oak with little understorey; forest clearings, edges; farm woodlots, parks.*" Significant Wildlife Habitat Guide (MNR 2000), Appendix G.	• Recorded within adjacent Nickerson Woods, within the 120 m study area. • Suitable habitats consist of the deciduous woodlands which are outside of the subject property. • Impacts are expected to be low.
Vegetation					
Butternut *(Juglans cinerea)*	END	END	Afforded species and general habitat protection.	Defining habitat is challenging due to the variety of habitats which can be suitable for this species. Occur in both lowland and upland habitats with open or partial sun (they are intolerant of shade), with well drained soils. Butternuts do not do well in	• Not observed within the subject property or within 120 m of it, but could occur elsewhere within the adjacent Nickerson Woods corridor.

Species	**Federal** Committee on the Status of Endangered Wildlife in Canada (COSEWIC) [A]	**Provincial** Species At Risk in Ontario (SARO) [B]	Species and Habitat Implications ESA 2007 [C]	Habitat Overview [D]	Site Relevance (Subject Property)
				persistently wet conditions (i.e., wetlands or swamps) or in enclosed woodlands (COSEWIC 2003, Poisson and Ursic 2013). Range is a limiting factor in Muskoka region.	• Suitable habitat is present within the subject property. • Surveys just prior to tree removals are recommended, particularly if the property remains vacant for a period.
Other					
Monarch Butterfly *(Danaus plexippus)*	SC	SC	N/A	Typically associated with meadow habitats and successional fields where the presence of milkweed (an important food source) is available.	• Potential to occur. • Habitat is suitable within the subject property where the host plant was observed (meadows). • Temporary displacement will occur because of the proposed development, however there are opportunities to restore and enhance habitat on site. • With mitigation, impacts are expected to be low.
Swamp Darner (*Epiaeschna heros*) provincially ranked as S2S3	N/A	N/A	N/A	Most often found near moist woodlands and can occur along pathways and treed edges. Associated with water, moist environments but range can occur at distances from these environments. riparian corridors, rotting logs preferred (http://www.njodes.com/Speciesaccts/darners/darn-swam.asp)	• Potential to occur. • Habitat is suitable along the northern edge of the property, but habitat primarily associated with adjacent Nickerson Woods and the associated riparian corridor. • Impacts are expected to be low.

Species	**Federal** Committee on the Status of Endangered Wildlife in Canada (COSEWIC) [A]	**Provincial** Species At Risk in Ontario (SARO) [B]	Species and Habitat Implications ESA 2007 [C]	Habitat Overview [D]	Site Relevance (Subject Property)

NOTE: Additional species were identified through the background review but were not considered to have appropriate habitat attributes present on or within the vicinity of the subject property which was confirmed through MNAL field investigations.
These species include:

- **king rail,**
- **bobolink,**
- **meadowlark,**
- **barn swallow, and**
- **eastern ribbon snake**

Species designated as Endangered, Threatened, or Special Concern with the potential to occur on the subject property. Federal Status indicated is from the Species at Risk Registry website (http://www.sararegstry.gc.ca) and the Provincial Status indicated is from the Species at Risk in Ontario list maintained by the Ontario Ministry of Natural Resources (http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/276722.html)

[A] COSEWIC (Committee on the Status of Endangered Wildlife in Canada) (federal status from COSEWIC 2010)

EXT [Extinct] A species that no longer exists., **EXP** [Extirpated] A species no longer existing in the wild in Canada, but occurring elsewhere., **END** [Endangered] A species facing imminent extirpation or extinction., **THR** [Threatened] A species likely to become endangered if limiting factors are not reversed. **SC** Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats., **NAR** Not At Risk A species that has been evaluated and found to be not at risk of extinction given the current circumstances.**DD** [Data Deficient] (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

[B] OMNR (Ontario Ministry of Natural Resources)(provincial status from MNR June 2008) The provincial review process is implemented by the MNR's Committee on the Status of Species at Risk in Ontario (COSSARO). Endangered Species Act Regulation OMNR S.O. 2007, Chapter 6. Schedules 1 thru 5.

EXT [Extinct] A species that no longer exists anywhere. **EXP** [Extirpated] A species that no longer exists in the wild in Ontario but still occurs elsewhere. **END** [Endangered] A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's Endangered Species Act (ESA). **THR** [Threatened] A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed. **SC** [Special Concern] (formerly Vulnerable) - A species with characteristics that make it sensitive to human activities or natural events. **NAR** [Not at Risk] A species that has been evaluated and found to be not at risk. **DD** [Data Deficient] (formerly Indeterminate) - A species for which there is insufficient information for a provincial status recommendation.

[c] MNR SAR website http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_WHTS_RSK_MY_AREA_EN.html

[D] Habitat Sources: Several sources including: Cadman, M.D. [et.al]. 2007 Atlas of the Breeding Birds of Ontario; COSEWIC status reports http://www.cosewic.gc.ca/eng/sct5/index_e.cfm; Species at Risk Habitat Tool. V.3.; the MNR. 2000. Significant Wildlife Habitat Technical Guide. Appendix G. and MNR SAR fact Sheets. http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/288994.html. Oldham, M.J., and S.R. Brinker. 2009. Rare Vascular Plants of Ontario, Fourth Edition. Natural Heritage Information Centre, Ontario Ministry of Natural Resources. Peterborough, Ontario. 188 pp. and MICHIGAN FLORA ONLINE. A. A. Reznicek, E. G. Voss, & B. S. Walters. February 2011. University of Michigan. Web. 8-12-2013. http://michiganflora.net/acknowledgments.aspx.