

S A A R



Environmental Limited

Final December 13, 2019

Environmental Impact Assessment for R.H. Bye Construction Ltd.

263512 Southgate Road 26, Egremont Concession 21,

Part Lots 2-4, Southgate Township, County of Grey

RP 16R 6386 Parts 1 and 2, Pt. Part 3

Summary

A 29 lot subdivision is being proposed on a portion of an existing golf course and resort; the Homestead Golf Course and Winter Resort. This is an operating 18 hole golf course with a clubhouse, restaurant and shoreline rental cottages along Wilder Lake.

SAAR conducted seasonal wildlife surveys from April through August of 2018 with follow up in 2019 to assess whether 20.8 hectares of a 50 hectare parcel could support 29 estate residential lots without significant negative impact to natural heritage we documented on and near the site which included Brook Trout nursing habitat, cool water riparian creek support of herptiles, grassland birds and interior forest breeding birds in the southern forest patch off site.

SAAR concluded the parcel size and type of soils provide healthy setback from sensitive ecology we identified, conforming with the Species at Risk Act, Endangered Species Act, Provincial Policy statement (PPS), Planning Act and lower and upper tier Official Plan policy. Stormwater management treatment in particular, was carefully evaluated on site together with GMBLuePlan to design appropriate linear swales adjacent to wetlands, ensuring continued water quality and quantity above pond and creek features. Ponds currently culverted beneath the Homestead Golf Course entry road were provided with twin culverts; a dry and wet culvert to facilitate wildlife passage during all weather events.

Split zoning is invoked for rear lot fabric backing toward wetlands, and an Enhancement Planting Plan ensures that the development conforms to the Provincial Policy Statement (PPS) by maintaining, enhancing and repairing wildlife corridors (PPS S.2.1.2). The property is currently zoned inland lakes and shoreline permitting the proposed shoreline residential land use application.

SAAR audited the site with team engineers and provided detail on preferred outlet locations for stormwater management as well as the type of enhanced treatment above the outlets. This included detail on the type of robust emergent to be planted in linear swales for enhanced attenuation of nutrient. Enhanced treatment will attenuate for eighty percent (80%) of storm event suspended solids. Storm events from the 29 lots, and other portions of the parcel, would have quality and quantity control in the form of two infiltration ponds, one wet pond with two enhanced grass swales; treatment that will be available on site by the completion of the first phase of development.

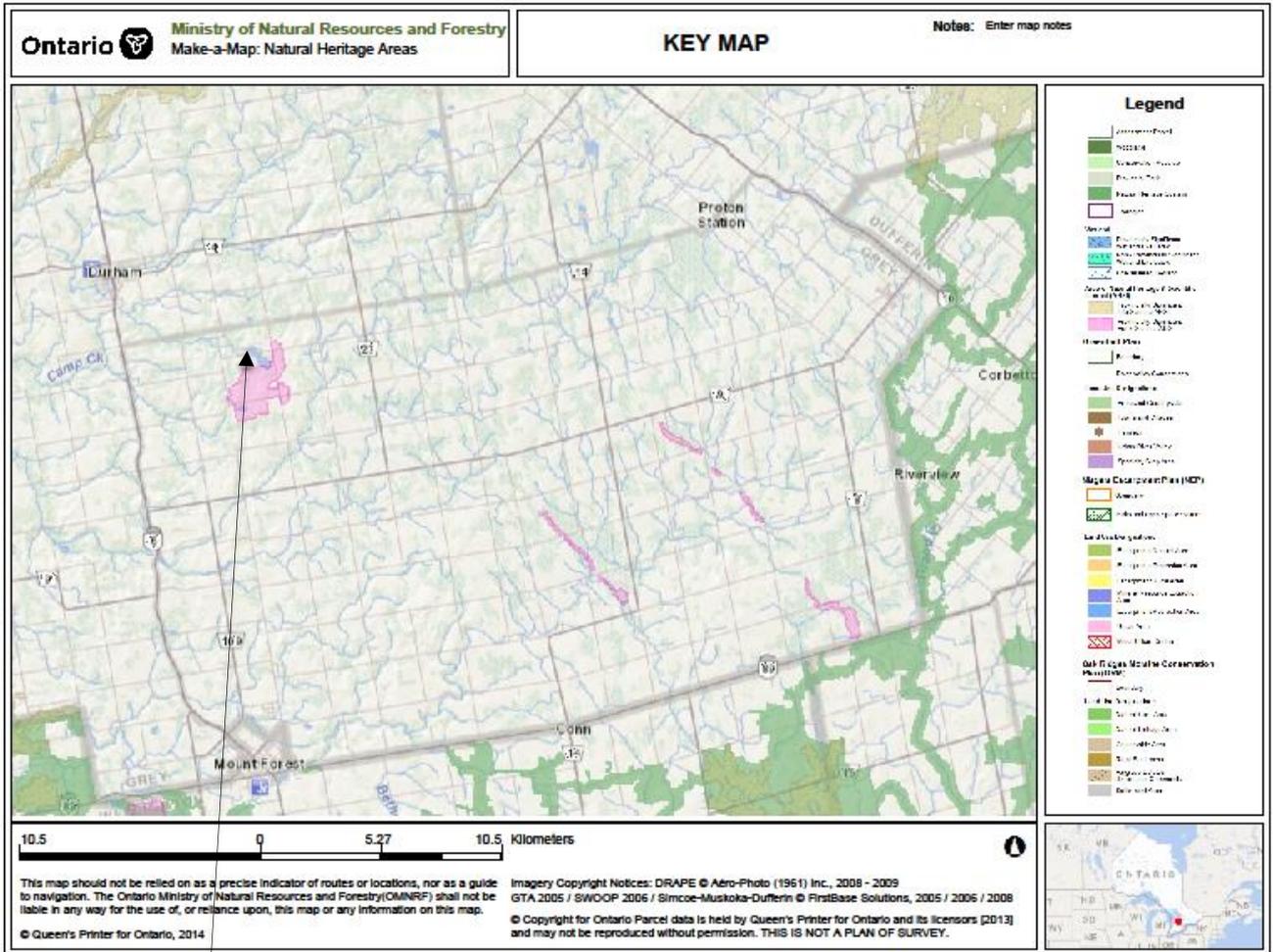


Figure 1: Location

Wilder Lake is located north of Mount Forest, west of Flesherton and southeast of Durham, accessed via Highway 10 to Southgate Road 26 and Homestead Road, just over two hours north of Toronto and an hour south of Owen Sound, Ontario. Southern limits meet an area of kame moraine (pink).

The property meets Wilder Lake to the east, a forest patch to the south and agricultural lands to the west. An outlet of Wilder Lake, Camp Creek, traverses the northern portion of the parcel and is expressed as a few small pond chains along a forested riparian creek feature. The ponds that are “on line”, associated with this surfacewater drainage, support specific ecology that has been provided with tiers of mitigation for conservation. An “off line” small ponded area also falls adjacent to the existing entrance to the golf course, and does support ecology as well but at lower levels; small numbers of spring amphibians calling during dusk wildlife surveys.

EXISTING FEATURES

The site supports an existing golf course and resort known as the Homestead Golf Course and Winter Resort with an 18 hole golf course, clubhouse, outbuildings including a barn and five panabode rental cottages along the shore of Wilder Lake. Wilder Lake flanks the east limits of the parcel, and the Camp Creek inlet from Wilder Lake enters the parcel at the northeast corner, flowing through a chain of small wetland pond features and carrying on westerly past a barn to leave the site, travelling northerly through a cross culvert at Southgate Road 26. The broader landscape is one of farming, rural residential, forest and wetland habitat.

Figure 2 below illustrates the southerly Earth Science ANSI (Area of Natural and Scientific Interest) known as the Saugeen Kame Terraces at the southern parcel limits. These morainal kames are interesting depositional landform features that are not being disturbed for the proposed subdivision of land. Setbacks for grading have been invoked for the southern lot limit in this regard. If the proposal were to consider or require incursion into the geological landform feature, an assessment of regional representation (abundance, rarity) of this feature would be required for municipal review.

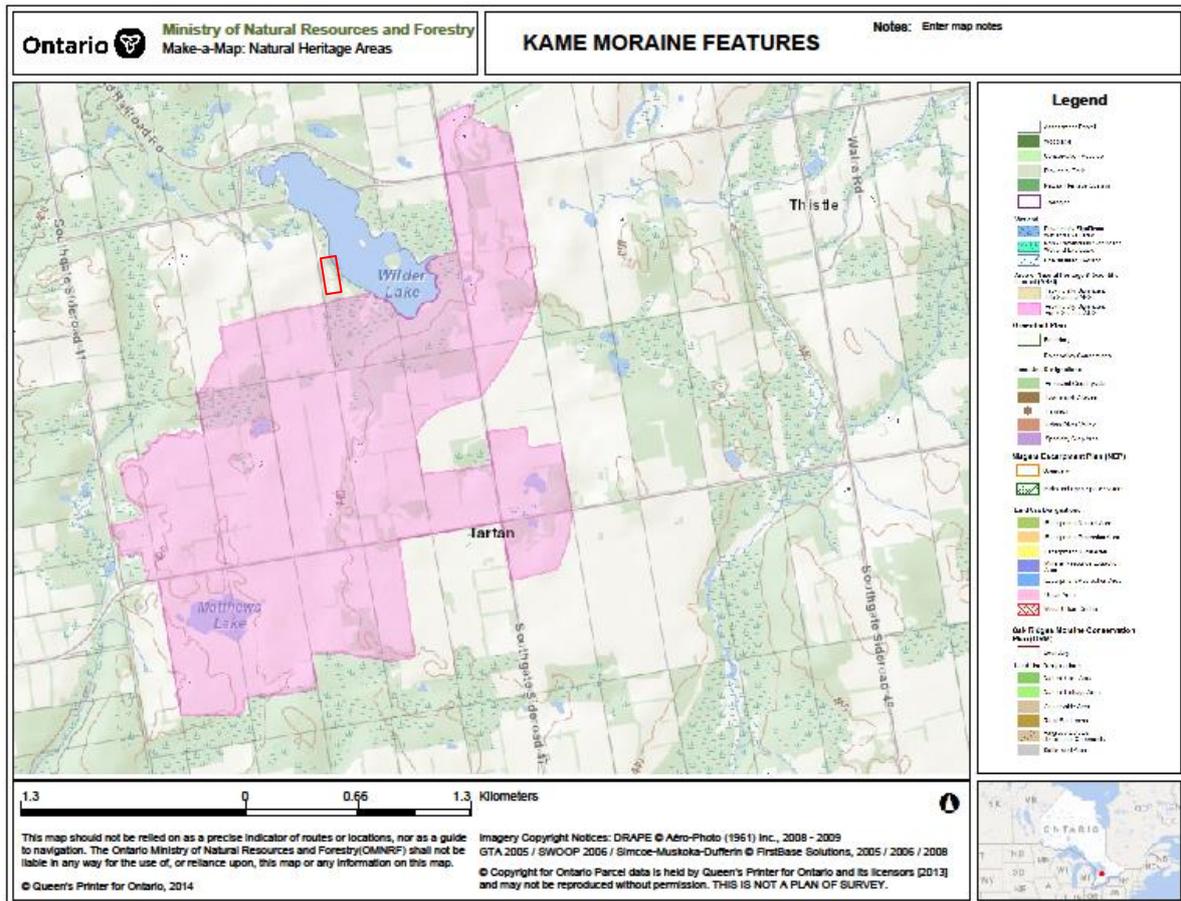


Figure 2: Saugeen Kame Terrace Area of Natural and Scientific Interest south of the study site

The land use proposal does not encroach into the geological feature. There may be potential for shared access over time through exploring joint ventures with adjacent landowners so the educational and recreational value of the ANSI increase with a signed eco-trail.

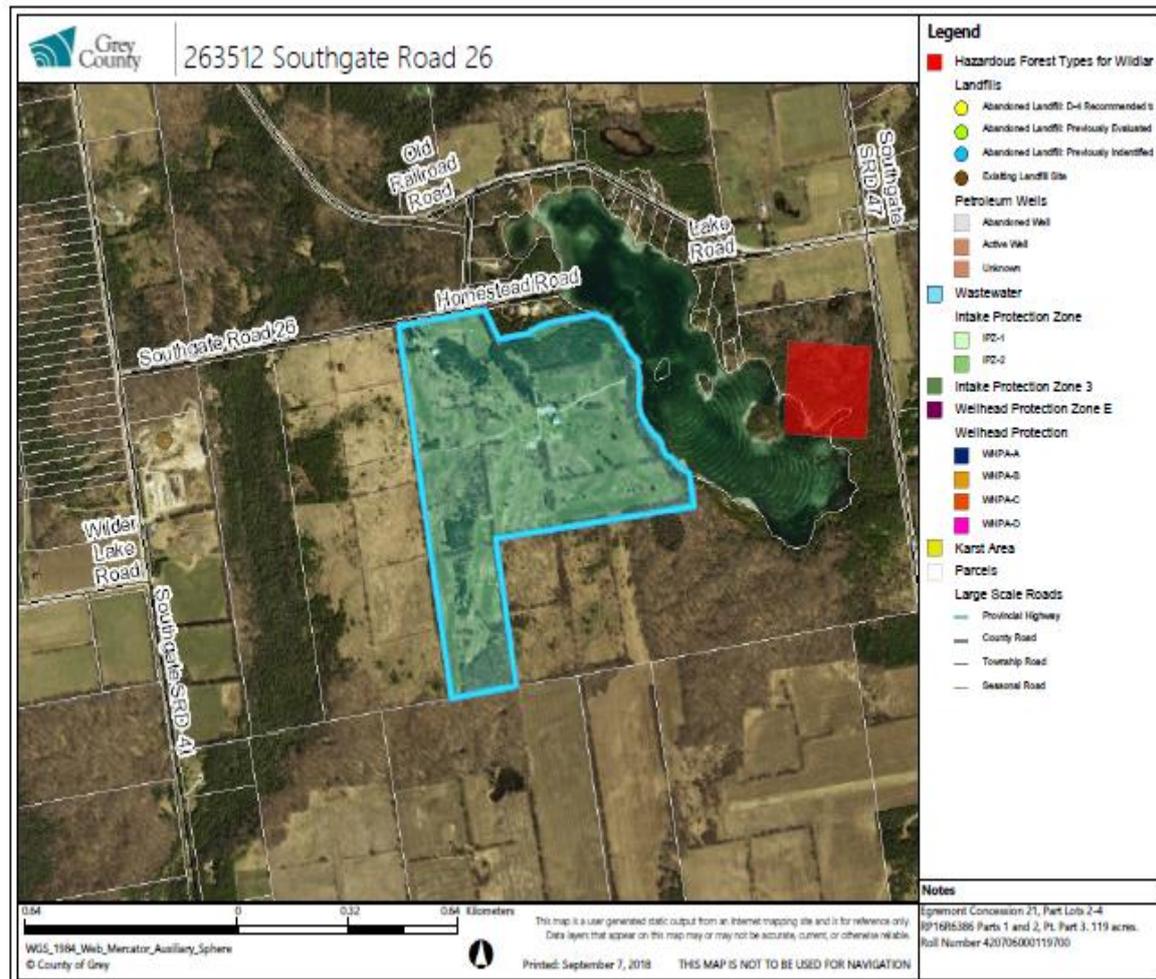


Figure 3: Parcel relative to historical landfill sites (red)

The older landfill strengthens the team resolve in evaluating the effect of stormwater and septic nutrient in a pre and post development scenario for this site. Effective mitigation has been designed during our team reconnaissance and this is detailed in the impact assessment section of the EIA.

DEVELOPMENT DETAIL

The 29 lot subdivision would be completed in two phases with the initial internal road and shoreline lots, followed by phase two completing the looped roadway and interior lots. Existing shoreline rental cabins

would be removed, updating the historical septic systems by constructing new systems for the new shoreland lots further upslope from Wilder Lake.

The existing 18 hole golf course would remain in place. The study team evaluated a number of early iterations of the proposed lot layout, attending the site with stormwater management engineers from GM BluePlan to finalize enhanced treatment locations and storm pond locations within the subdivision.



Figure 2: Site Plan of Estate Residential Subdivision

Key natural heritage features on or within 120m of the proposed subdivision as defined within Section 2.1 of the Provincial Policy Statement (PPS) under the Planning Act:

- Invoke a 50m setback with no night lighting adjacent to the southern off site forest patch for the golf course portion of the lands; to maintain forest supported interior birds including Veery,

Ovenbird, Wood Thrush and the Eastern Wood Pewee documented during our early morning bird song surveys

- Invoke split zones (residential and environmental protection) for northern lots 1-4 adjacent to the creek and pond system
- West central area identified for rare grassland bird foraging should be avoided with grass cutting to take place outside of the May-June peak activity period for this bird
- Travel from the pond system along the riparian creek should be enhanced by providing two culverts; one for aquatic species passage, and one above grade for terrestrial wildlife
- Maintain night sky conditions for wildlife in the off site southern forest by restricting the type of night lighting for lots 15-18 near the southerly off site forest
- Coldwater Brook and Brown Trout nursing habitat in the northerly pickerel weed pond requiring setbacks from nutrient application, restriction on night lighting and barriers to separate winter road de icing (salt, sand) from entry into the watercourse at the creek crossing
- Enhance bat foraging and potential roost habitat adjacent to northeast conifer forest (lot 1) by maintaining deadstanding trees, restricting night lighting, erecting bat boxes and planting White within tree cover for future softwood roost tree value



Figure 3: Wetlands and Drainage

Surfacewaters range from cold to cool water in character, some forested portions maintaining a coldwater fisheries environment of 18 Celcius in mid summer. Seepage zones are evident in the surfacewater creek feature as well as in Wilder Lake. The riparian zone and pickerel weed pond supports coldwater salmonids with both Brook and Brown trout observed.

Note that our field surveys were more detailed immediately adjacent to the proposed rear lot fabric of the estate residential subdivision, and beyond that northwesterly to Homestead Road were reconnaissance transects with four tie in points using GPS.

Anglers were informally surveyed while conducting littoral zone inspections of Wilder Lake and we observed the catch of the day to include Smallmouth Bass, Brown Bullhead, Yellow Perch and incidental catch of Pumpkinseed panfish.

General Wetland Mitigation

- 30m setbacks from surfacewater features and associated wetlands reflected by split zoning on the subdivision plan, marked on the ground by a living fence

- Local wetland plantings within open portions of any water feature

The littoral zone of Wilder Lake and the outlet support a healthy community of odonata (dragon and damselflies) and the aquatic robust emergent vegetation such as Torey three square and Scirpus rubrotinctus should be retained for common to rare travelling odonates important to the fishery as a prey item in various life stages but also to foraging birds.



Figure 4: Catchment basin level photograph illustrating drainage pattern (SVCA Part Tile 471)

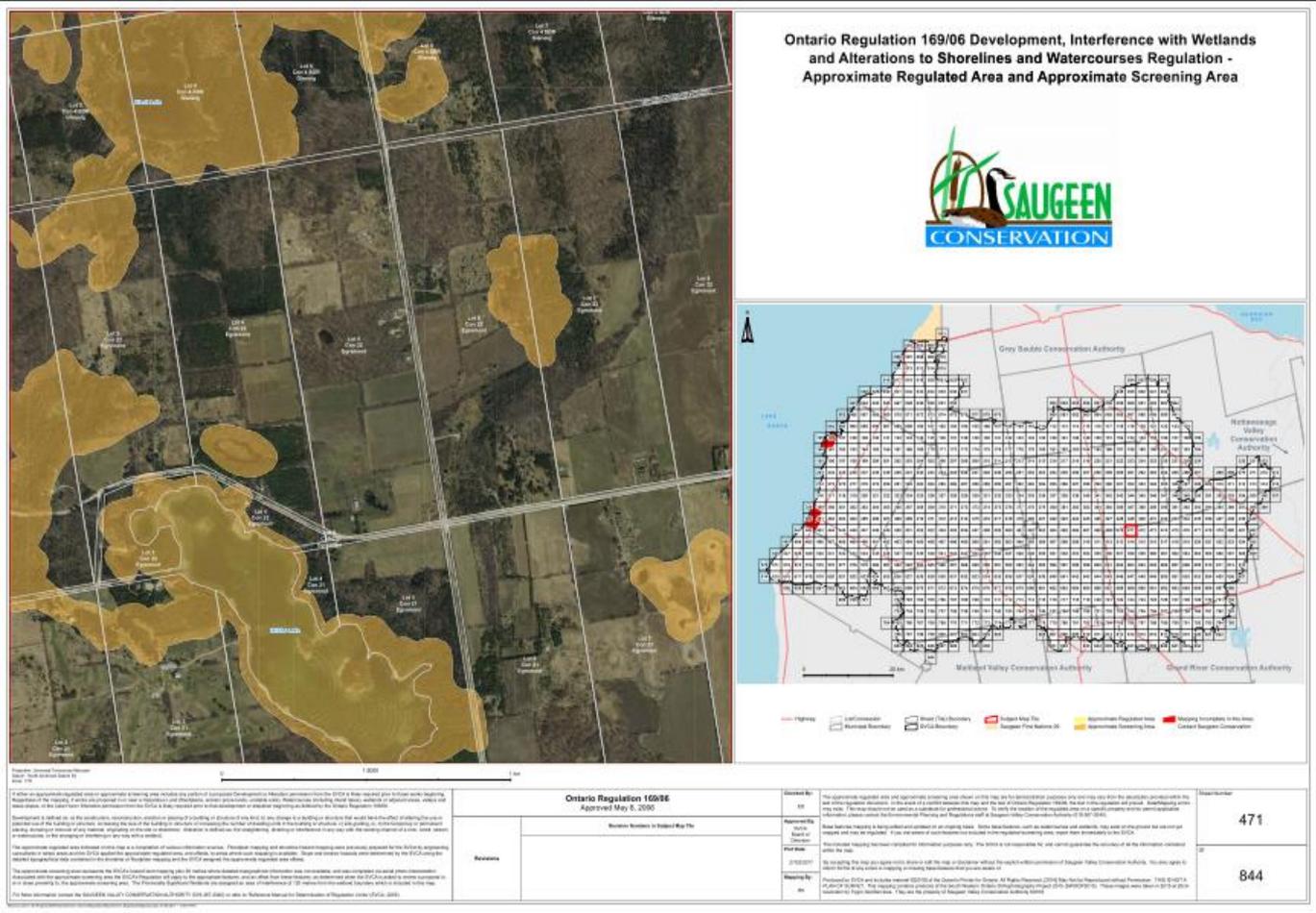


Figure 5: SVCA Approximate Ontario Regulation 169/06 regulated hazard land area

A permit is required from SVCA for the resort residential land use as a portion falls within the regulated approximate area. Liaison was undertaken by the proponent with SVCA for culvert installation, and a joint site inspection was held in the fall of 2018 where helpful natural heritage information was exchanged.



Figure 1. Approximate distribution of Little Brown Myotis and white-nose syndrome (WNS), as of May 2015 (Naughton 2012, COSEWIC 2013, Wilson et al. 2014, CWHC 2015, GNWT 2015a). Some records in Northwest Territories and Nunavut (as shown with a "?") indicate uncertainty in the northern limit of the range. The black dot represents an extralimital record. The WNS polygon (black diagonal) encompasses locations of confirmed *Pseudogymnoascus destructans* presence and where clinical WNS characteristics have been observed.

The federal short-term (12-18 years) objective for both Little Brown Myotis and Northern Myotis populations is to maintain and where feasible increase the population compared to 2015 levels for a self-sustaining, resilient, and redundant population. In not yet affected by WNS, the population objective is to maintain (and where feasible increase) the population compared to its current level.

The below illustration confirms that the study site does not fall within identified critical habitat, but is still suggested to meet population objectives of maintaining or increasing bat levels. Thus we recommend installing bat boxes and provide one option for bat box design in appendices.

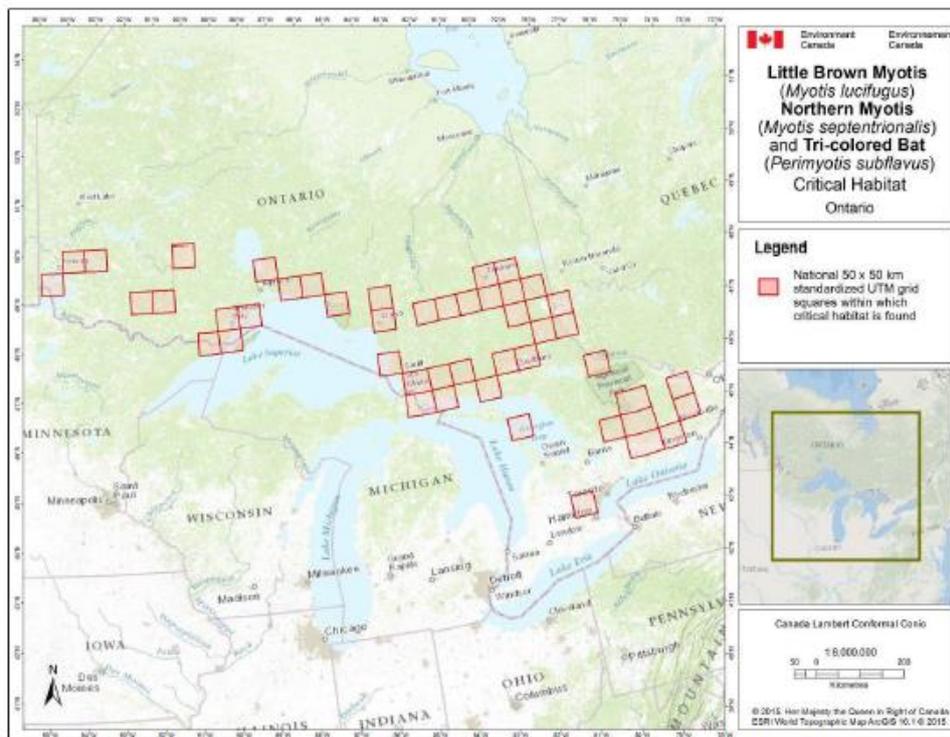


Figure 15. Grid square that contains critical habitat for Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*) in Ontario. Critical habitat for these species occurs within these 50 x 50 km standardized UTM grid squares where the description of critical habitat is met (i.e., hibernacula have been identified). This standardized national grid system indicates the general geographic area containing critical habitat; detailed critical habitat mapping is not shown. Standardized UTM grid squares at the intersection of UTM zones are merged with their adjacent grid squares.

Roost selection is a function of numerous characteristics occurring at a range of spatial scales (Fabianek et al. 2011) including tree species, diameter, height, decay, cavity, sun aspect and other factors (Garroway and Broders 2008, Slough 2009, Poissant et al. 2010, Olson and Barclay 2013). Roost selection may be dependent also on canopy gaps, tree density, water source, etc. (Kalcounis-Rüppell et al. 2005, Garroway and Broders 2008, Henderson and Broders 2008).

At the landscape scale the age of the forest, composition and amount of fragmentation can be operating factors (Henderson and Broders 2008, Fabianek et al. 2011) and as bats also use treed habitat in urban cores, factors like man made structures may be valued by bats such as attics for the Little Brown Myotis roosts.

SAAR reviewed the biology of the species relative to proposed site alteration to assess potential impact. Female bats generally give birth and raise pups in a maternity colony during the spring and summer. Roosts can be abandoned and different roosts may serve different needs in a growing season. Lactating females can consume their body weight in insects (Anthony and Kunz 1977), with peak foraging before sunrise and after dusk (Fenton 1970). Foraging Little Brown Myotis are most often associated with open habitats, such as ponds and roads and open canopy (0-50%) forests (Segers and Broders 2014), but have also been recorded gleaning prey within forests (Ratcliffe and Dawson 2003, Jung et al. 2014) and using vegetation along lake and stream margins (Fenton and Barclay 1980). Little Brown Myotis in Yukon boreal habitat travelled 3.8 ± 0.7 km from their daytime roosts to foraging areas, with females travelling significantly farther than males (Randall et al. 2014). In Quebec, lactating females had home ranges 42% smaller (mean: 17.6 ha) than pregnant females (mean: 30.1 ha) (Henry et al. 2002).

This is in line with what we observed on site, where Big Myotis foraged along forest and pond edges.

Northern Myotis

Northern Myotis roost singly or in small groups and favour tree roosts (under raised bark and in tree cavities and crevices), but they can also be found in anthropogenic structures (e.g., under shingles) (Sasse and Perkins 1996, Foster and Kurta 1999, Caceres and Barclay 2000, Carter and Feldhamer 2005). Northern Myotis' maternity roosts are strongly associated with forest cover, streams, and tree characteristics (e.g., species, height, diameter, age, and decay) (Caceres and Barclay 2000, Broders and Forbes 2004, Broders et al. 2006). Females prefer to roost in tall, large diameter trees in early- to mid-stages of decay (Sasse and Perkins 1996, Caceres and Barclay 2000, Silvis et al. 2015a).

Males generally roost alone under raised bark or within cavities of trees in mid-stages of decay (Broders and Forbes 2004) feeding on moths, beetles, wasps, flies and spiders (Lacki et al. 2009, Dodd et al. 2012, Thomas et al. 2012) that are primarily terrestrial (Broders et al. 2014). This differs from Little Brown and Big Myotis which we observe to feed over water and open edges, gleaning insects by hawking from the sky on wing.

Northern Myotis forage more frequently along and within forests on flying insects but also other (Caceres and Barclay 2000, Ratcliffe and Dawson 2003). A West Virginia field site recorded the Northern Myotis feeding along road corridors in 70-90 year old forests, and the average home range for female Northern Myotis there was 65 ha (Owen et al, 2003 in Federal Government, 2015).

Although potential in the off site southern mixed forest we did not observe the Northern Myotis. SAAR has documented this bat species in Silver Maple swamp extensive older hardwoods elsewhere in southern Ontario, and that habitat type was not presented on or adjacent to this study site.



Figure 6: Dusk and Pre Dawn Peak Foraging Activity Areas for Big Brown Bat

We did observe the Big Myotis on and adjacent to the site. Foraging areas are noted on Figure 6 in yellow and they often overlap with the nearby water feature insect food sources. The red line indicates an area of higher concentration observed with night vision binoculars. Risk factors identified by the Federal Government guideline include intentional harm, recreational or scientific disturbance, industrial disturbance (mining, forestry), toxic pollution (e.g. mercury), light pollution and climate change causing habitat or prey dynamic changes.

Development would not introduce industrial level disturbance, toxic pollution or scientific disturbance, nor is climate change under individual development application control; habitat used by bats however, can be, and is, recommended for retention over the long term for this development. There will be a level of recreational and light pollution risk however this can be mitigated as detailed further.

Predators

Bats in small part are subject to occasional incidental catch by predators including feral and domestic cats. For the Homestead parcel this is projected to be a low level risk since the barn structures are not active (no barn cats), and a proportion of future homeowners may have domestic pets. Maintaining cats on property can be stressed in homeowner manuals specific to the local natural heritage elements.

Mitigation

Future uses of the barn will not include livestock and horses that would have necessitated barn cats for rodent control. Thus no cats are planned for the barn structure on site and no mitigation is required.

Tree Clearing Effects

Tree clearing can reduce reproductive success for bats, reduce their home range size, alter the average size of colony and decrease site fidelity (Brigham and Fenton 1986, Neilson and Fenton 1994, Borkin et al. 2011, Chaverri and Kunz 2011). Little Brown Myotis may abandon roosts after being excluded from an area (Neilson and Fenton 1994). Bats may use another tree for roosting if a previous roost tree is removed outside the breeding season (Silvis et al. 2015b). For Northern Myotis roosting in Kentucky, the number of roosts, roost site characteristics, and overall space used did not change after single highly-used roosts and 24% of secondary roosts were experimentally removed prior to roosting (Silvis et al. 2015b). However, the distances bats moved between sequential roosts doubled within areas where secondary roosts were removed (Silvis et al. 2015b). Nevertheless, Silvis et al. (2015b) noted that tolerance limits of roost loss may be influenced by local forest conditions and the social / behavioral characteristics of the species using the roost.

Destruction, Degradation, or Conversion of Foraging Habitat

Harvest rates associated with forestry practices are highest in Quebec, British Columbia, and Ontario. Rates were relatively stable in Canada from the 1980s to 2008 (Masek et al. 2011), but have declined since 2008 (NFD 2014). Habitat loss and change also includes wetland loss; approximately 70% within settled areas, with draining for agriculture accounting for the majority (85%) of habitat conversion (Haak 2008). Bats seem to avoid large clear cuts (Henderson and Broders 2008), but use the forest edge (Krusic et al. 1996, Grindal and Brigham 1998).

Forest edges can shelter bats from predators and from wind, and also concentrate flying insects to prey upon (Swystun et al. 2001, Henderson and Broders 2008). Little Brown Myotis, Northern Myotis, and Tri-colored Bat are all associated with forests or trees for at least some portion of their annual cycles so could all be affected by forest fragmentation, degradation and loss depending on their association with insect prey and other factors (Grindal and Brigham 1999, Swystun et al. 2001, Henderson et al. 2008, Ethier and Fahrig 2011, Segers and Broders 2014, Pauli et al. 2015).

Tree clearing that shapes a narrow forest edge can benefit some of the bat species that feed on insects along these edges, but reduce habitat of Northern Myotis (Broders and Forbes 2004, Broders et al. 2006, Segers and Broders 2014). Wetlands and areas around waterbodies (e.g., riparian areas and forest edges) are important foraging habitat for Little Brown Myotis, Northern Myotis and Tri-colored Bat. Activities that degrade or remove wetlands have the potential to have negative impacts to foraging habitat availability and quality. Wetland loss in southern Ontario, where all three species occur, has been extensive and continues (additional losses of 3.5% between 1982 and 2002) (Federal Provincial and Territorial Governments of Canada 2015 SARA Report).

Roads can act as barriers to bats by the change in habitat (Abbott et al. 2012, Bennett and Zurcher 2013, Kitzes and Merenlender 2014, Abbott et al. 2015) as bats are less likely to fly across a road with vehicular traffic activity and noise (Bennett and Zurcher 2013). Traffic noise may also impact flight and foraging by disturbing echolocation and hearing (Abbott et al. 2015).

The site is predominantly an existing golf course with a road and trail system that has been in use for decades. The risk to bats through habitat change is met by constraining the valued forest patches, and the risk of vehicle noise – related to vehicle density – is constrained by the low number of cars (29) driving at different times, to different lots, across the open meadow habitat. The chance of overlapping activity is the early morning and early evening (pre dawn, pre dusk) time when bats forage along tree and water, or tree and meadow edge, and can be bothered by headlights rather than noise (pers. observ). The chance of this event is low and more a single car event (e.g. 4 a.m. arrival/departure home) for pre dawn feeding periods. Pre dusk summer evenings are more common for car activity (e.g. 7 p.m. arrival/departure home).

Mitigation

Lighting can be mitigated at two tiers.

Firstly, general subdivision lighting can be limited to downward directed hooded lights which limit light pollution at the forest edge. Second, the lower level tier of mitigation targeting disturbance of vehicle headlights for cars entering driveways has been considered. Lots fronting onto identified bat foraging forest edges (lots 1-5, 12B,14-18) mitigation recommends orienting driveways at right angles to the forest edge; similar to positioning culvert crossing of creeks at right angles to creeks to limit lengths of disturbance; this limits the swath of light disturbance to driveway and garage entry vs. panning the forest edge.

Stationary lights around garages for instance, will initially attract insects, and thus foraging bats like the Little Brown Myotis hawking the insects from the air, but this benefit can be short lived, akin to ‘fishing out’ a lake as lights continue to attract more insects. Northern Myotis fly slower within forest cover and not likely foragers near a light source requiring nimble flight (Naughton 2012). The 2015 federal guideline noted the lack of research on the topic of light pollution for insects and bats and called for

further study in the future. Thus our overall response mitigation discourages bright night lighting, recommends hooded light fixtures to direct required safety light downward. In this manner the night sky can be maintained for other nocturnal and crepuscular forest wildlife as well as bats.

Forest Habitat Diversity

General habitat guidelines provided by the Federal reporting include maintaining diversity of forest type and ages to provide a range of roost and nursery sites, and to maintain the integrity of aquatic and shoreline habitat. We reflect this mitigation through design opportunity on this site because the subdivision can be built on existing disturbed golf course area not foraged by bats.

Key foraging habitat along the pond system and the shoreland of Wilder Lake is identified further to our field surveys for constraint. Mitigation includes a limit on the 'viewslot' for tree limbing/clearing at shore to attain views of the lake.

Provincial Policy Statement

The natural heritage policies under the Planning Act Provincial Policy Statement (PPS, 2014) cover nine general categories as outlined below:

- *Natural Heritage Systems;*
- *Fish Habitat;*
- *Habitats of Endangered and Threatened Species;*
- *Significant Areas of Natural and Scientific Interest (ANSI);*
- *Significant Wetlands;*
- *Significant Coastal Wetlands;*
- *Significant Wildlife Habitat;*
- *Significant Woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River); and,*
- *Significant Valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River).*

The study site supports fish habitat and portions of tree cover considered “significant” due to support of significant wildlife habitat. This is detailed within the EIA.

PPS S.2.1.8: Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

The estate residential 29 lots can meet the goal of the natural heritage policies within the Provincial Policy Statement (PPS) by first using the principle mitigative tool of design and placement outside of any sensitive areas. Second, the most recent emphasis in the 2014 PPS on wildlife corridors is also met through enhancement plantings and eco-passage construction to facilitate corridor movement for wetland wildlife such as the Snapping Turtle from the open water pond feature across the Homestead Golf entrance road into the thicket and treed swamp water feature. This conforms with PPS S. 2.1.2.

Site Description

The site supports a portion of Wilder Lake shoreline, a small chain of wetland ponds, inland grassed open areas under golf course land use, planted thickets and surrounding forests of deciduous, coniferous and mixed tree cover. The golf course on site will remain in the post construction environment. The golf course manicured and mowed greens and fairways are flanked by pockets of planted conifers including Scots and White Pine. Specific areas of the active course that may have potential for wildlife – such as exposed sands for potential egg laying use by the Species of Concern Snapping turtle – are detailed within the EIA.

Historic signs of agrarian use and past settlement include lilacs, perennials and weedy species such as Cow Vetch, Common Plantain, Curly Dock, Coltsfoot, White Clover, Dandelion, Mint, Canada Thistle, grasses including Poa and Phleum as well as some Wheat. Open meadow and Hawthorne thicket birds near the clubhouse include the American Phoebe, Eastern Kingbird, Chipping Sparrow, Gray Catbird and the Great-crested Flycatcher that was observed in spring. A portion of adjacent open fields also support a measure of rare ground nesting bird grassland habitat for the Bobolink.

Landscape View

The landscape is a mosaic of fallow pasture, wetland and upland mixed forest, with adjacent lands residential development, cottaging, farming and small business. Since the historical land uses of the

regional have been dominated by agriculture there is an inactive barn and outbuilding also on site, and a barn on westerly adjacent land and similarly outward from the Homestead Road.

Site Inspections

DATE	SURVEY TYPE	TIME / DURATION	WEATHER CONDITIONS*
April 23	Migration and Early Herptiles	Dusk for AMWO Till midnight for Whip-poor-will	6 Celcius at 7pm, Part cloud Beaufort 2 WF, CH
May 14	EMR I Herptile Evening Chorus to 500m	9pm-12 Dusk - midnight	8 Celcius at 9pm Beaufort 1 CH, SP
June 15	BB Survey Bobolink I	6 am-8am	10 Celcius at 6 a.m. Slight cloud Beaufort 1
July 19	Bobolink II Survey Pond and Littoral Zone Survey Clubtail Netting	8-9am 10am-2pm	22 Celcius, Sun Beaufort 2 South Forest REV BOBO SW Field
August 13	SAR Surveys Including EMR IV	4 hours	28 Celcius, Sun Beaufort 2
September Barn Swallow Outbuilding Inspections	Swallow Nest Evidence Check	2 hours	Celcius Beaufort

Results

The following sections describe the survey results. Abundance indices for amphibians did not meet Significant Wildlife Habitat Guideline levels for “significance” in the roadside cattail wetland however

enhancement plantings between the wetland and farm hedgerow could bolster breeding numbers by assisting in shelter across the lands.

Survey Methodology

- Spring Herpetofaunal Surveys (2)
- Spring Nightjar Moonlit Survey
- Summer Breeding Bird Early Morning Chorus (2 inspections in June, 15 days apart as per CWS Standards)
- Grassland Bird Nesting Survey
- Dusk and Pre dawn Bat Survey
- Dragon and Damselfly Inspections

Bird survey results are summarized in the Appendices with key findings in the EIA report.

Conservation status species included the Bobolink, Veery, Ovenbird, Wood Thrush, Eastern Wood Pewee and adjacent land Barn Swallow. Subsequent lower level searches were conducted during the breeding season to confirm/negate the presence of any active nests for these species.

The only species with questionable findings was the Bobolink, as we did not locate a ground nest but did confirm presence of both male and female Bobolink in one westcentral section of the site. As such, the precautionary principle of planning prevailed and we suggested a breeding timeslot restriction on removing lawn in that location during the month of June.

Grassland Bird Survey

As indicated above, the Bobolink area of activity should be provided with a breeding timeslot restriction on manicuring the grass height during June. There was no nest activity in May and June of 2018 but numerous (4) sightings of male and female Bobolink.

Provincial management prescriptions for the habitat of Bobolink are illustrated below.

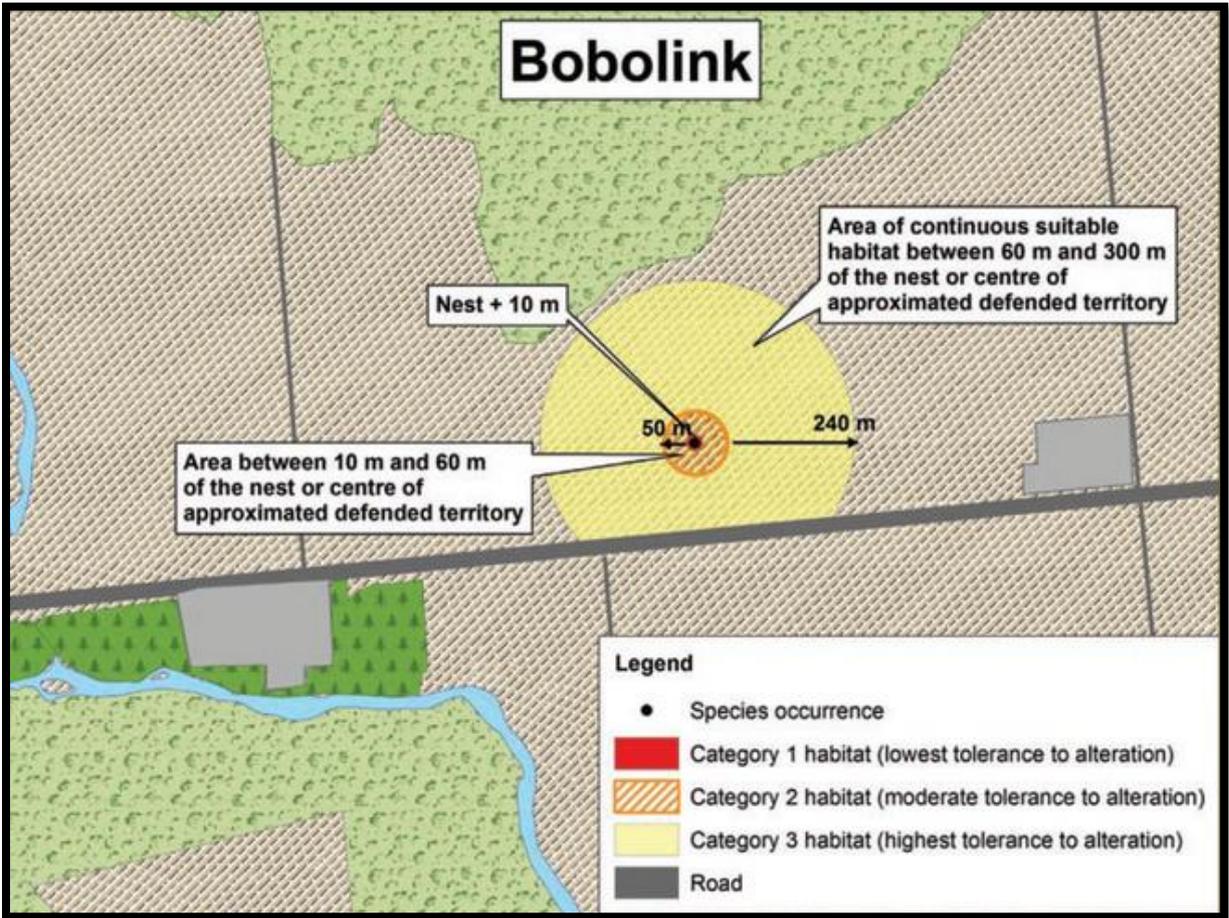


Figure 7: MNRF General Habitat for Bobolink Conservation Prescription Example

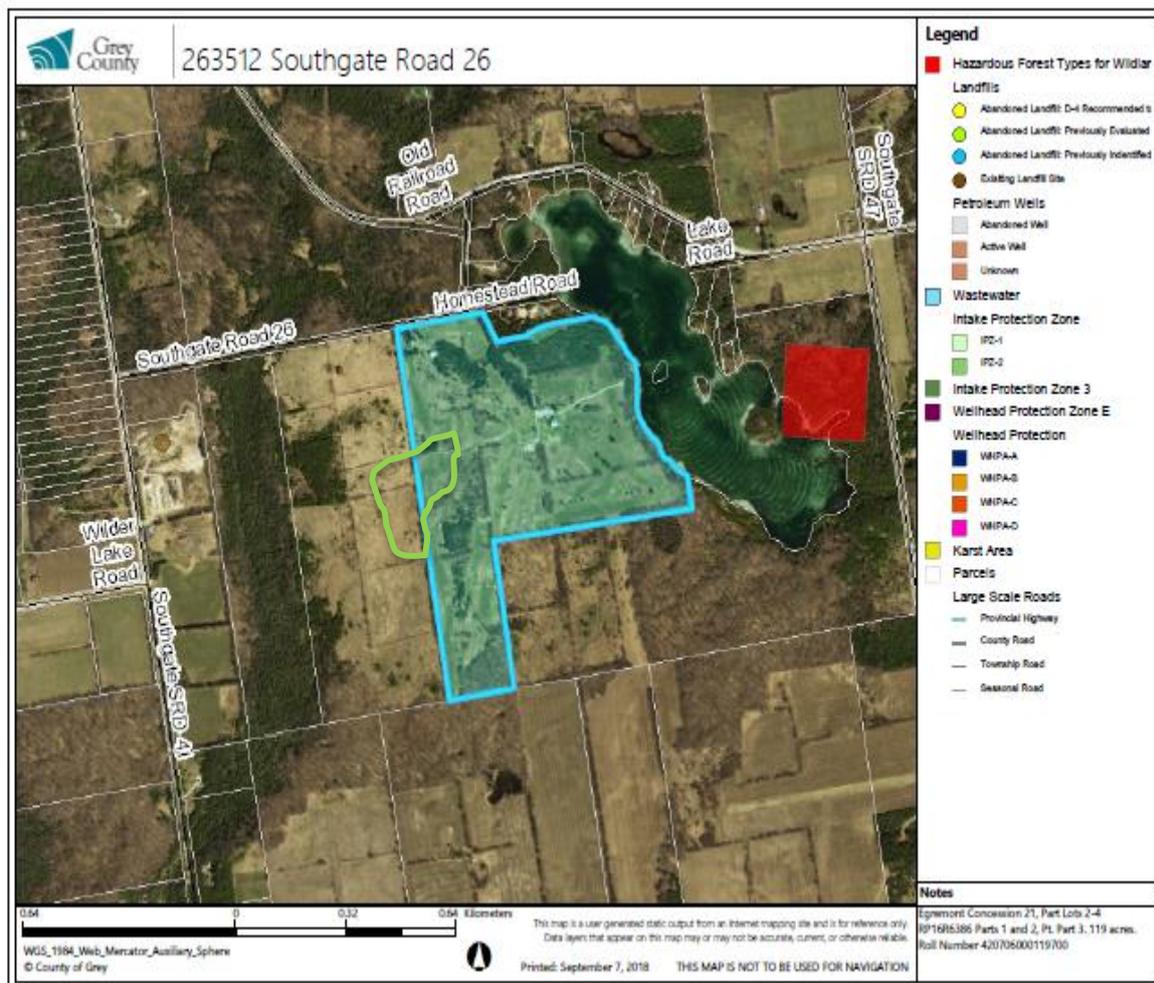


Figure 8: Green area of peak Bobolink activity noted in May and June 2018

Note that Bobolink were also observed during roadside and broader reconnaissance on adjacent farmlands as well as the Barn Swallows discussed below.

Barn Swallow Survey

Barn Swallows were observed in flight during all early morning bird chorus inspections. The barn would be a potential nesting habitat site if future livestock were sheltered, as manure piles and warmth of animals can create suitable conditions for the swallows.

Currently the barn is not operational. The barn and outbuildings were also inspected and no bats or barn swallows were found.

Life Cycle Requirements

Birds glean insects such as flies, beetles, bugs, bees, wasps and flying ants from the air usually within 600m of their nests, often 10m from open areas, lower in cold weather over water features where warmer water supports more flying insects (COSEWIC, 2011 in: Ontario Recovery Strategy Series, 2014). The Barn Swallow has been designated as threatened in Canada by COSEWIC (Committee on the Status of Endangered Wildlife in Canada). The swallows defend a small territory around 8 square metres from nest or less, which makes sense given their colonial nesting habit where nests are often placed close to each other. Young fledge after 19-24 days and the adults can have a later second brood.

The Ontario Recovery Strategy recommends that until key knowledge gaps are addressed, habitat for Barn Swallow in Ontario be defined narrowly as follows:

1. Nests (including unused nests) on natural or human-created nest sites during the current breeding season (between May 1 and August 31) plus the area within 1.5 m of the nest and the openings the birds use to access nests in enclosed situations;
2. All used nests at any nest site that has been occupied by Barn Swallows within the previous three breeding seasons (Ontario Recovery Strategy Series, 2014).

The estate residential land use being proposed would not change the current use of the barn structure for tools and not live animals. IF future uses changed to include livestock or pleasure horses for instance to be used by future residents of the subdivision then it is likely that colonization by Barn and or Cliff Swallows would then occur, due to the introduction of horse manure and the key foodstuff of flies for the bird.

This use would of course be in conformity with all lower and upper tier environmental policy goals as it brings a listed conservation species onto the site for long term conservation and viewing pleasure.

IF the barn and/or associated outbuildings are later scheduled for demolition, additional follow up Barn Swallow surveys would be mandated to confirm presence or absence of nests as vegetation can change over time. There is no construction proposed on or adjacent to this area. The modified management area of 500 metres measured from their observed flights does fall within the top northeast area of the study site, as illustrated below, however no special mitigation is reasonably foreseen as the current land use of golfing continues there.

All potential structures on site that could house the rare bird were inspected (see photo diary) and no active or abandoned nest structures were found.

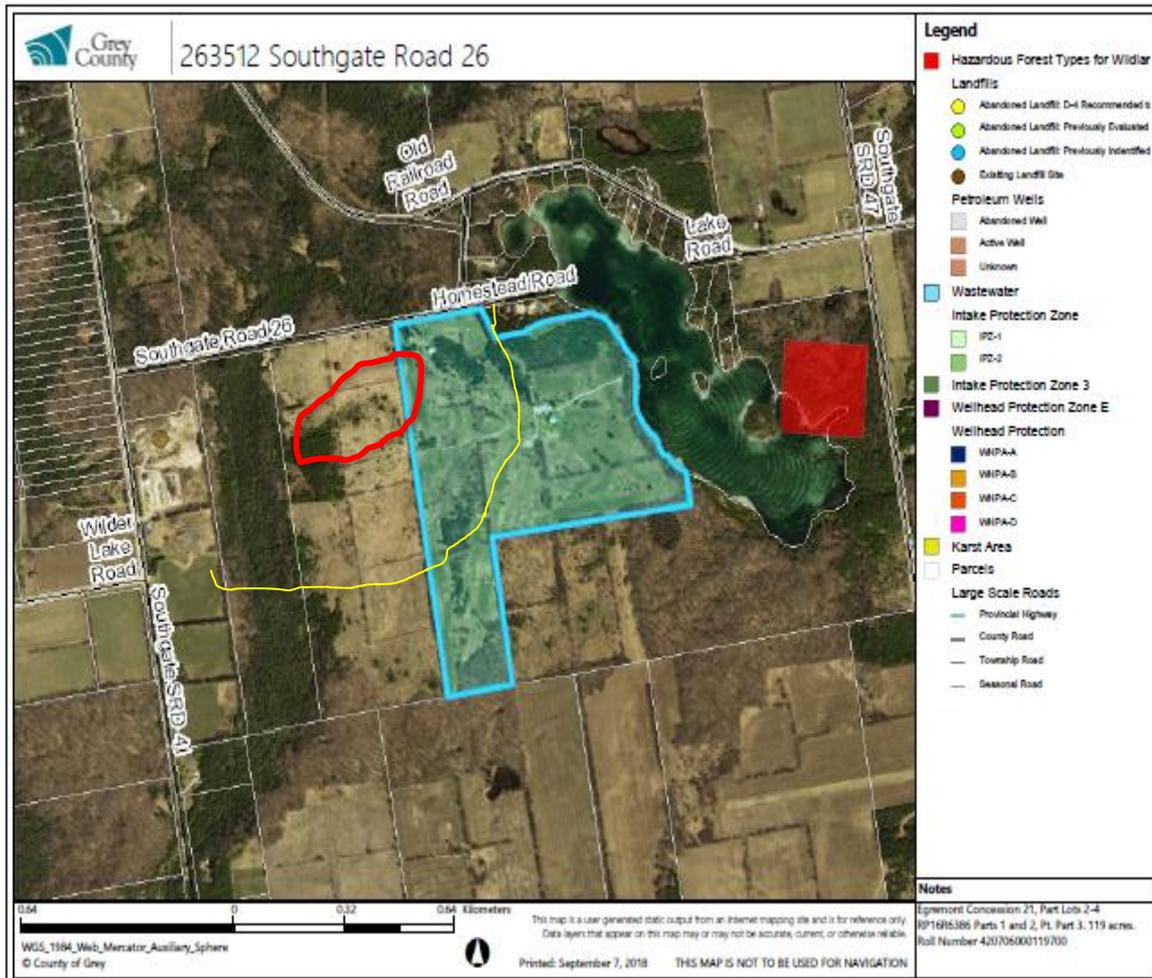


Figure 9: Area of Barn Swallow flights in red, with 500m offset shown in yellow.

The following color plates confirm the absence of Species at Risk (SAR) that were potential inhabitants of vacant buildings such as the Chimney Swift and the Barn Swallow.



Color Plates 1 and 2: Barn inspection



Color Plate 2: Barn exterior



Color Plates 3 and 4: Outbuildings



Color Plate 4: Exterior Eave Inspection

The rare Little Myotis bat for instance can readily fit under loose eave and soffit trim, thus the search was thorough to ensure no colony was present.



Color Plate 5: Interior inspection of attics

Fauna Results

Mammal observations include:

- Red Squirrel
- White-tailed deer
- Eastern Chipmunk
- Striped Skunk
- Woodchuck
- Porcupine

Herpetofauna Results

Dusk breeding chorus inspections confirmed the following amphibian breeders:

- Western Chorus Frog
- Spring Peeper and Tree Frog
- Wood Frog

Herptile surveys included dusk taped calls and metal roofing 1m2 blocks left on site for 2 days for snake species.

Vegetation Communities

The parcel supports a mixture of existing manicured golf greens, trails and a road system leading to both the clubhouse and restaurant, as well as the shoreland rental cottages.

The main vegetation types surrounding this altered habitat are coniferous and mixed forest as well as wet land habitats that ring a small connected chain of inland ponds. The ponds receive their water from a Wilder Lake inlet.

Detail on the vegetation communities and a color photographic diary follow.



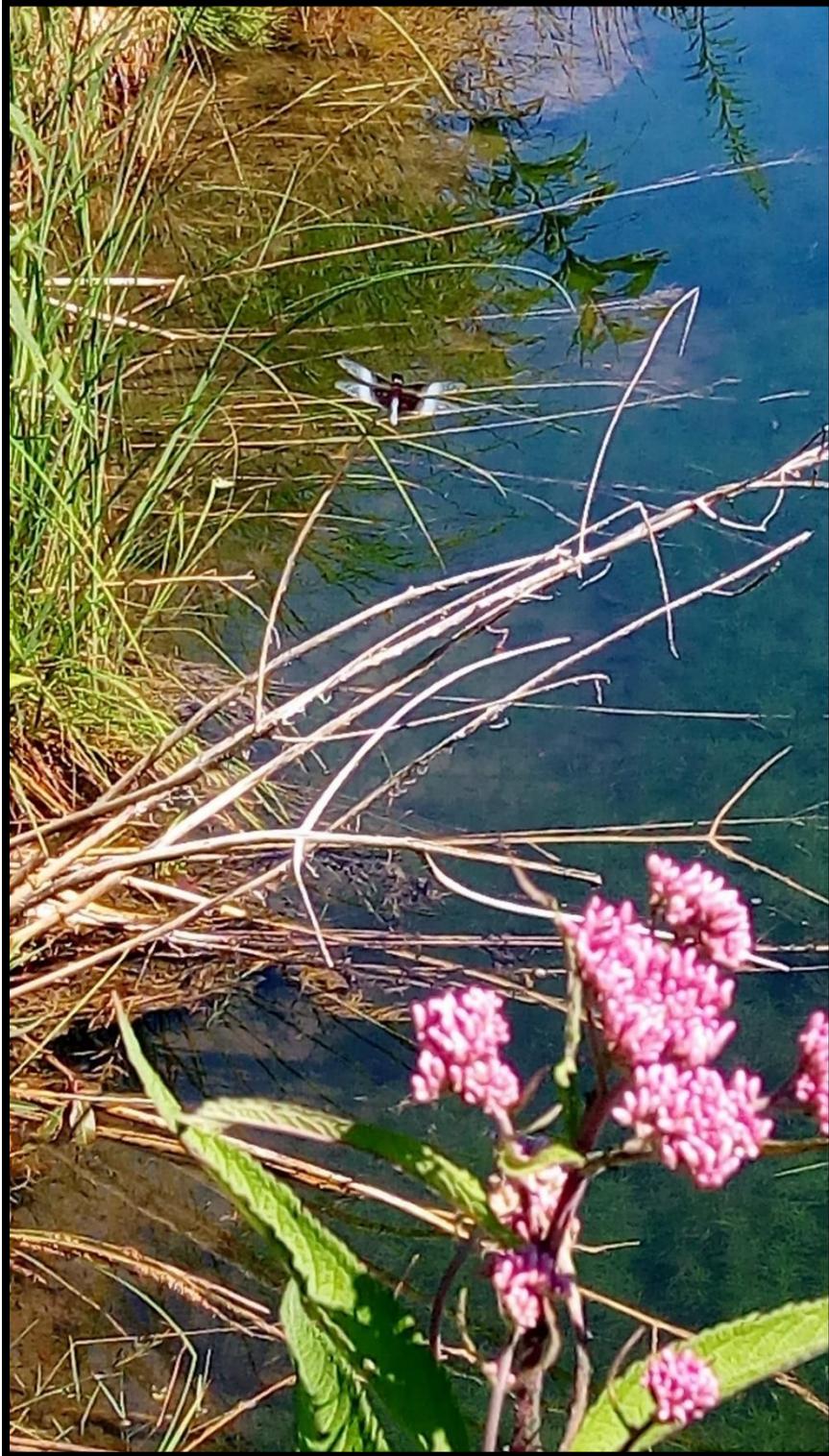
Color Plate 6: Red squirrel activity at golf course margins near the clubhouse

Littoral Zone

The nearshore submerged vegetation included Coontail and Eurasiall Milfoil, with floating aquatic pondweeds and robust emergents. Pondweeds included *Potamogeton natans*, Bulhead Lily and emergent such as Torrey-three square and *Scirpus rubrotinctus* (MAS2-6 elements along Wildler Lake). The immediate shoreline vegetation requires retention as it supported a rare odonate, *Aeshnae* travelling from shoreline feeding forays between Wilder Lake and the inland riparian pond chain.



Color Plate 7: Submergent Eurasian Milfoil and floating pondweeds (*Potamogeton natans*).



Color Plate 8: *Libellula pulchella* Twelve-spotted Skimmer amidst *Eupatorium maculatum* Joe-pye-weed



Color Plate 9: Salmonids included Brook Trout and a few Brown Trout



Color Plate 10: Hagen's Bluet *Enallagma hageni* in Pond X

The open pond and riparian connection to the north Pickerel Weed pond support a mosaic of ELC types: OAO Open Water, SAS1-1 Pondweed, SAS1-4 Water Milfoil and SAF1-1 Bullhead Lily (ELC Map).

The southerly open pond flows into the northern salmonid nursery which is a relatively small (30m²) area of dense Pickerel Weed (SAM1-1). Many of the cyprinid size salmonids and some young Wood frog can be seen below.

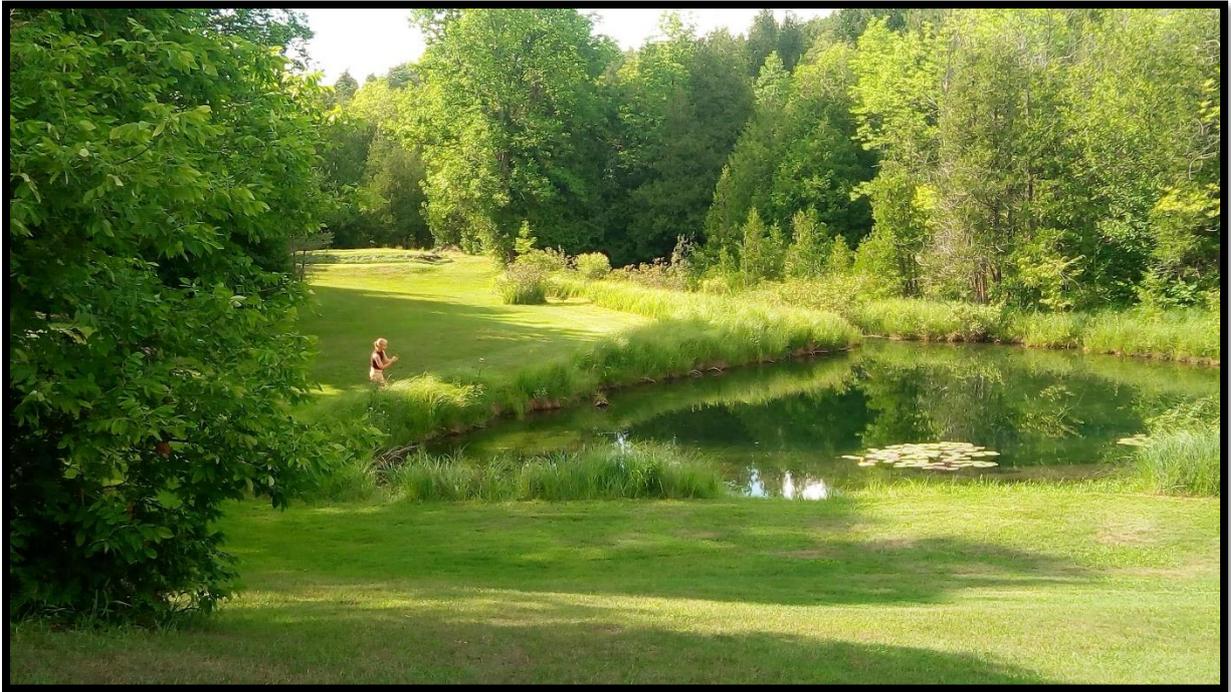


Color Plate 11: *Pontederia cordata*

All the existing in pond vegetation, pond margin plant cover and bank vegetation is important for the fishery. Natural mortality of eggs can occur during winter months if water depths plummet below a metre, and the northerly pool provides 1m depths during summer conditions. Second to water is an ample food source, then suitable conditions for their winter habitat after fall spawning. These piscivores eat insects, including nymph stages of dragonflies attached to vegetation, worms, crayfish, zooplankton, fish including their own species. The creek offers excellent riffle and gravel material for female fish to dig the “redds”, the nests for depositing eggs late September through November. Incubation occurs over part of the winter months and the highest mortality is in the first few months for young of the year (YOY). So it is important to contain any road de-icing material for the main entrance from entry into the pond and creek system.



Color Plate 12: Riffle habitat for salmonids along riparian corridor of pond system



Color Plate 13: Odonate surveys along southern open pond. Pond lined with narrow-leaved cattail and *Leerzia*.

Wilder Lakeshore FOM5, Backshore FOD5

The shoreline aquatic zone benefits from the canopy shade from white cedar, white birch, white ash, black cherry with a grassy understory of *Leerzia* and *Danthonia* supporting courting Monarch in September. Forbs included Boneset, Nightshade, Common Milkweed and Daisy Fleabane.

The shore is predominantly White Cedar with scattered clusters of Red-osier Dogwood and Reed Canary Grass grading into a more deciduous inland fringe of sugar maple-red oak-white birch-black cherry-scots pine and trembling aspen. Conifer does come into the upland deciduous FOD5 but at less than the 25% coverage required in the ecological land classification (ELC) criteria for naming vegetation communities.

Rental cottages are situated within 20m of the shoreland and these will be removed.



Color Plate 14: Shoreline cottage rental road



Color Plate 15: Wilder Lake shoreline viewed from north property limits looking south



Color Plate 16: Torrey Three-square robust emergent with young Brook Trout at Wilder Lake shoreline



Color Plate 17: Wilder Lake shoreline with historical area of dock with campfire and recreational use

Upland Shoreland Deciduous Forest FOD5

Adjacent inland forest cover is FOD5 dominated by deciduous tree species including sugar maple, basswood, black cherry, Large-tooth Aspen, American elm, white ash, balsam poplar but with less than a quarter of conifer mixtures as well, including white cedar, white pine and scots pine. Shrub layers in the understory are comprised of Elderberry, Viburnum acerifolium, Red-osier Dogwood and Silky Dogwood with Chokecherry. Wild Grape is present throughout the site but also here with Equisetum, Orange Hawkweed, Solomon's Seal, Twisted Stalk, Goldenrod, Spotted Knapweed, Wild Carrot and Wood Violet.

Inland Hedgerows FOM6-1

These patches are remnants from agrarian land uses historically, and because they were left as hedgerows the nearby conifer component may have succeeded in to join hardwoods through wind and animal dispersal of cone material. Trees include hardwoods like sugar maple, basswood, white ash and black cherry and a smaller component of conifer (<25%) from white cedar, planted and/or seeded scots pine. Hemlock are very few but this ELC typing is the closest match to the combination of remnant native trees and cultural trees like the Scots Pine.

Cultural Thickets CUT

The golf course design has retained elements of conifer throughout. These pockets are Scots Pine and some white Pine. Some grade into a mixture of white ash and black cherry with specimen Sugar Maple and Norway Maple trees, as well as remnant older Apple trees. Agrarian weeds are prevalent below these tree groupings and include Daisy Fleabane, New England Aster, Spotted Knapweed, Orange Hawkweed, Common Milkweed patches and Goldenrod. Some portions of the golf course edges also support Sumac Cultural Thicket elements (CUT1-1) that have succeeded at edges of rough.

Laneway to Golf Clubhouse

This is tree lined with sugar maple, basswood, white ash, black walnut and scots pine. Shrub layers include Elderberry, Red-osier Dogwood and Alternate-leaved Dogwood with Vitus, Chokecherry and Wild Lily of the Valley.

Specimen rare butternut are located in this vicinity and will be retained moving forward. Road widening of the laneway will be required for future uses and alternate routes may be discussed with the proponent and agencies.

Pond Chain

Pond (South) Mosaic of SAS1-1 Pondweed, SAS1-4 Water Milfoil, SAF1-1 Bulhead Lily Floating and Submergent Vegetation Communities

The open pond referred to as the south pond is ringed by Joe-pye-weed, Touch-me-nots, *Scirpus rubrotinctus*, *Leerzia*, Marsh Fern and Shining Willow. The aquatics include floating Yellow Bull-head Lily, pondweed (*Potamogeton natans*) and Eurasian Milfoil submergent vegetation. Species support and biodiversity is high. In particular some rare dragon and damselfly species breed, emerge, feed and live in this tall vegetated border of the pond. They in turn are preyed upon by the adjacent bat community that resides in dead standing trees of the coniferous forest patch.

Pond (North) Dominant SAM1-1 Pickerel weed, with SAM1-4 Pondweed Emergent and Floating Vegetation Communities

A large colony of Ebony Jewelwing (*Calopteryx maculate*) damselflies with striking black velvet wings are supported at pond Y and use this pond with the westerly riparian creek zone to breed, feed and live. The Species of Concern Monarch butterfly uses pond Y but moreso Pond X. The pond is flanked by Shining Willow, Tag Alder and wetland Water horehound, Boneset, Joe-pye-weed and Touch-me-not. The vegetation suggests early succession for this pond habitat although the drainage channel shows signs of long term permanence along the downstream rocky creekbank and toe of slope.

The pond is a fully vegetated Pickerelweed habitat which provides shade for the fish nursery. Hundreds of young of the year (YOY) Brook trout, with some Browns, were observed here.

The SWH is in places located on immediately adjacent lands within 120m of the lot lines with respective setback distances established for conservation of the species or habitat that extend into this current parcel under land use application for subdivision. As such the features and functions have been identified, setback, and mitigated.

Adjacent lands ecology meeting the SWH criteria in MNRF EcoRegion Guidelines is:

1. Forest interior breeding birds in the southern immediate off site woodland
2. Barn swallow 500m radius setback from a northwesterly adjacent lands barn
3. Fish nursing, amphibian and odonate breeding grounds in the northeast pond chain
4. Snapping turtle feeding and migration along the northeast pond chain drainage system
5. Threatened Conservation Status Butternut tree specimens

Maintaining and Enhancing the Riparian Wildlife Corridor

The 2014 provincial policy statement speaks to maintaining, restoring and where possible improving the connecting links between natural areas:

2.1.2 The diversity and connectivity of natural features in an area, and the long-term *ecological function* and biodiversity of *natural heritage systems*, should be maintained, restored or, where possible, improved, recognizing linkages between and among *natural heritage features and areas, surface water features and ground water features*.

The proposed estate residential draft plan application conforms to current policy through the recommended setbacks for natural heritage features and functions but also through an Enhancement Planting Plan to bolster wildlife movement across the site from one piece of the natural heritage system to another (the cores, corridors and links between them).

This allows wildlife to move more safely across the landscape, screened from predators under a vegetated canopy sized to shelter specific species (from sedge shrub and tree layers). The key location

for enhancement is the drainage system of the Wilder Lake inlet and associated pond system for conveyance along the riparian corridor for wildlife including the Species of Concern Snapping Turtle, amphibians, salamanders, odonates and avifauna.

Facilitating wildlife movement across this area includes installing a daylight culvert at the creek crossing. This can be in the form of an oversized culvert twice the volume of the current three foot culvert to facilitate travel by herptiles. Final design and detail for the crossing will be aided by discussion with reviewers.

Airborne wildlife corridors across the site include avian species and insects such as the Monarch butterfly Species at Risk. Monarchs breed in open areas of the site, and also congregate in the fall to stage before migration. This site function for the Monarch feature will continue as the future uses include persistence of the golf course which provides the open area weedy and farm species edges for nectar and breeding; Common Milkweed, Beebalm, New England Aster, Joe-pye-weed, Boneset, Daisy Fleabane and others. Forest on and near the site will also remain to support their breeding activities which require some tree cover when the coupling pair of Monarchs fly into the forest edge and require tree branches.

Impact Assessment

As part of an Environmental Impact Assessment, an impact assessment must be completed to determine the potential for negative impacts to significant natural features or their ecological functions on or within 120 m of the Site. Mitigation here involved some refinement of the original draft plan to accommodate for split zoning and specific site ecology setbacks, and general best management practices to guide the construction as well as post construction phase of the development given the proximity to the water features of Wilder Lake and the pond chain inlet at the north quadrat of the site.

Potential impact to natural heritage can be both direct, from actual removal of habitat, to indirect such as the effect of heavy machinery noise or persistent intense lighting of the forest, impacting on nocturnal and crepuscular forest wildlife.

Direct Loss

The potential for direct loss of natural heritage has been limited initially by careful design and siting of the proposed 29 lots in existing clearings.

Potential effects of the estate residential use could include the introduction of weedy and invasive plant species into nearby forests, forest bird losses through domestic pets, noise and night lighting impacts on night wildlife (crepuscular and nocturnal) such as the owls, salamanders and others.

Stormwater Effects

Subdivision land use can increase overland input of rain events due to the creation of impervious surfaces which include a paved subdivision road layout, driveways and rooftops.

The direction of storm water, pre and post, has been reviewed, as well as the proposed location to route storm events in the post construction environment.

Generally the pattern of surface water drainage pre development mimics the post development plan, with additional flow being directed into a prior depression of land that had supported a historical rail line parallel to the Wilder Lake shore.

The swale conducts peak events presently. Spring inspections for herpetofaunal events confirmed no amphibian or salamander breeding pools; wetted channel time was brief and insufficient to sustain standing water for incubation of amphibian or salamander eggs.

Suitable vegetation including some robust emergent *Scirpus cyperinus* which would be species that SAAR would recommend installing if it was a denuded toe of slope, for nutrient attenuation.

The 2019 SAAR and GMBluePlan site inspections helped inform the final stormwater management pond areas, types of enhancement treatment, and the detail for the enhancement treatment train. Our final review of the 2019 GMBluePlan report confirms that:

- The 20.8ha part of Wilder Lake Resort and Golf Course will be developed into a 29 lot subdivision in two phases. By the end of Phase 1, all the storm quality and quantity controls will be in place. These include two infiltration ponds, one wet pond with five enhanced grass swales.
- Total post development peak flows discharging from the subdivision lands to each of the four outlets selected would be attenuated to less than or equal to the total existing pre subdivision condition peak flow rates
- Enhanced levels of water quality treatment with eighty percent total suspended solids removal are being provided for the storm runoff draining from the subdivision before discharge off site
- The 29 lot subdivision will have two infiltration ponds, one wet pond with five enhanced grass swale roadside ditches to collectively provide storm quality and quantity control for the site

Given the proximity to a relatively shallow lake known as Wilder Lake, the fact that the site benefits from naturally permeable sandy gravel soils with good attenuation properties, and that the full suite of stormwater quantity and quality controls will be in place by the end of the first phase of development, bodes well for the environmental health of Wilder Lake from a nutrient perspective.

Significant Woodland Potential Value Analysis

Southerly forest that meets the southern lot limits supports conservation status forest interior nesting birds including the Ovenbird, Wood Thrush, Veery and Eastern Wood Pewee. Their development setbacks fall onto the subject property area of active golf course.

The golf course land use would continue in the post construction subdivision environment, thus no tree clearing, night lighting or persistence of humans in a daily residential sense will take place along this forested edge, protecting the birds further from impacts such as domestic cats preying on ground nesting forest birds (e.g. the Ovenbird).

We have reviewed the life cycle requirements of currently listed conservation status birds documented by our team here, the Eastern Wood Pewee and Wood Thrush, and concluded that mitigation including separation distance from the southerly forest can maintain the Species of Concern interior forest nesting bird in the post construction environment.

The Eastern Wood Pewee, in particular, was researched regarding the flexibility of this birds forest use relative to forest openings as we noted the bird calling in a number of adjacent southerly forest lands locations.

Eastern Wood Pewee (EWPW)

SAAR recorded the male EWPW during early morning bird chorus with 120m adjacent lands in the southern forest close to natural forest openings beside the golf course. It is considered a “Species of Special Concern” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as it did not meet criteria for population decline to raise status to Threatened; for instance the EWPW does not have a small restricted total population (See below range). NatureServe ranked the EWPW as ‘globally secure’ (G5) and the IUCN Red List respectively ‘Least concern’.



Range of the Eastern Wood Pewee (COSEWIC 2012).

COSEWIC describe the Eastern Wood Pewee (EWPW) as a most common and widespread songbird of North American eastern forests, resilient to many kinds of habitat change similar to other birds that forage on flying insects; a mobile food source.

The EWPW decline is not understood but COSEWIC noted it may be linked to loss or degradation of wintering habitat in South America (COSEWIC, 2012). COSEWIC notes the EWPW occupies the mid

canopy at forest clearings and edges of hardwoods in summer more than mixed forests where canopy layers are absent or sparse.

The adjacent southerly forest beyond the golf course clearings does support healthy deciduous tree species that the bird can use, evidenced by the singing males we recorded. This bird colonizes new habitats in spring – is not site tenacious or true to prior year nest sites – and arrives in late May advertising through bird song and behavior to attract a mate.

Interestingly, forest trails have been studied to have a sheltering effect from the bird predators of edges that prey on the EWPW.

Potential effects on EWPW can be:

- Consistent loud noise or excess forest cover could affect the ability of the male EWPW to be heard singing or seen, potentially affecting securing a mate, courting and breeding. This would again be true later if the pair or different pair attempted a second brood
- Removing or degrading surfacewater input to wetlands such that wetland hydro-period mimicked drought conditions; this would affect insect clutches produced off the wet land and limit one part of their food base. Other insects COSEWIC reports the bird is known to hawk from the air include species from Diptera, Homoptera, Lepidoptera, Hymenoptera, Coleoptera, Orthoptera, Plecoptera and Ephemeroptera
- Removing substantial amounts of mixed forest with no shrub canopy layers and some forest openings; one field study in southern Ontario noted territories for the bird averaged 1.76ha +- 0.24ha for 26 pairs in deciduous forest, and 27 pair in pine plantation (Falconer, 2010)
- Clearing some forest increases the existing forest edge effects. The EWPW is not prone to predation from the edge invaders such as the Brown-headed Cowbird and this potential effect is not a substantial risk for this insectivore; i.e. it is breeding in natural openings within the forest that exert edge effects and support observed predators already; Raccoon, American Crow, Red Squirrel, American Blue Jay, Brown-headed Cowbird.

No clearing of forest is proposed for the deciduous patch or hedgerows leading to it.

MITIGATION

- In Canada, EWPW nests and eggs are protected under the *Migratory Birds Convention Act*. A biologist must inspect the site before construction to confirm presence/absence of an active nest, a standard BMP
- COSEWIC research summaries also recommend selection cuts to create small openings in forest canopy. This is intuitive since openings and linear openings in particular offer insects a flight path, and their predators, be they birds or bats, a runway to capture them. Natural openings are present and can be increased to balance the ecology of forest, forest edge, open meadow species such as the Bobolink

We have reviewed thesis material that contemplated quite well the conundrum of increased tourism within forests and the effects on forest bird species, taking this as a worst case scenario of people, many people, being in the forest and not just getting into and out of vehicles. The study is an interesting one as many focus on short term effects of land use – dispersal further into the woodland – but as the study points out, isn't always linked to nest survival or fecundity.

Red-eyed Vireo nested close to and away from trails surveyed, with many nests parasitized by Brown-headed Cowbirds closest to trails with reduced numbers of young produced in those locations, with productivity improving by 65m distances from wide trails.

The sample size of two potential forest nests against potential of dispersal into the larger forest is not considered a significant negative impact but rather a potential effect. The Eastern Wood Pewee was observed near natural forest openings within 120m of the golf course greens. The level of residential development and large lot adjacent to this habitat is not expected to negatively impact on future nest success of the EWPW in the forest.

Conclusions

We can confirm the existing and proposed land use can conform to the environmental policies of MNRF, Natural Heritage Section 2.1 of the Provincial Policy Statement and the Ontario Planning Act.

Mitigation

With mitigation, the estate residential land use can be sustained without significant negative impact to key natural heritage features and functions as it can be situated on open lands previously disturbed by the golf course use. Mitigation is summarized below:

- IF the April 1-August 15 timing window for breeding birds cannot be achieved during construction schedules, the proponent requires a biologist on site at least three days before heavy machinery to ensure no destruction of bird nests or young in compliance with the Migratory Bird and Game Act

- Timing window of May-June to restrict heavy equipment noise at the pond chain *
- Timing window for adjacent southerly forest Eastern Wood Pewee May-June, hole 12
- Maintain dead standing softwoods throughout forest patches for bat roosts
- Restrict outdoor lighting to downward directed hooded lights to minimize light pollution and disruption of nocturnal and crepuscular wildlife
- Limit shoreline tree clearing to hazard trees and establishing “viewslots” by openings in the forest vs. tree removal (opening maximums typically 8m width X 2m height)
 - Pond chain functions are diverse and include rare species support (dragon and damselflies, avifauna) and significant wildlife habitat (nursing area for trout, breeding amphibians and Snapping Turtle).

Mitigation is summarized in a final table found at the end of the environmental report.

Seasonal concentrations of animals were documented on and 120m from site including:

- Forest breeding birds including Eastern Wood Pewee, Wood Thrush, Veery, Ovenbird
- Grassland bird foraging, for Bobolink and Vesper Sparrow
- Amphibian breeding events in the wetland, predominantly abundant Spring Peeper*

To clarify the location of the above seasonal concentrations on and off the site, we confirm that forest breeders such as the Pewee, Veery, Ovenbird and Wood Thrush were calling in the south forest off site, but adjacent to the site. Their SWH 50m zone of concern extends into the site.

Grassland birds including Bobolink and Vesper Sparrow were observed in July on site, on the west portion of the subject property. Breeding evidence via a ground nest was not observed.

Impact Assessment

As part of an Environmental Impact Study, an impact assessment must be completed to determine the potential for negative impacts to significant natural features or their ecological functions on or within 120 m of the Site. In addition, suggestions for preventative, mitigative or remedial measures must also be provided. Environmental effects can be direct, where impacts are immediately incurred as a result of Site preparation or construction, such as vegetation removal, the loss of habitat, or erosion.

Alternatively, environmental effects that are not immediately detected or occur adjacent to the development may be considered indirect impacts. Long term effects on surface drainage, introduction of invasive species, and increasing anthropogenic pressures from pets, noise, and light are just a few examples.

An example of a direct impact is would be the removal of Significant Wildlife Habitat. Examples of indirect impacts include invoking changes to moisture regimes that can alter vegetation communities.

Changes in surfacewater drainage over time can affect aquatic and semi-aquatic species trekking to water features for annual concentrated breeding. Anthropogenic effects, including colonization by invasive species and encroachment into the surrounding natural habitat, are more likely effects of residential uses however these changes to the landscape are already evident here in the prior farmed landscape.

Natural Heritage System Mitigation

Wildlife corridor gaps in the hedgerow for small mammals, herptiles and birds can be strengthened through enhancement plantings.

Enhancement Plantings

With enhancement plantings the potential for positive impact is likely, bolstering the width of wildlife corridor hedgerows and habitat for Species of Concern such as the observed Monarch Butterfly. Plantings can be installed after the construction phase.

Butterfly nectaring forbs include Joe-pye-weed, Beebalm, New England Aster and Common or Swamp Milkweed to bolster the biodiversity of Monarch as well as other butterfly species. Other species that can conceivably benefit from wider hedgerow features on the site include herptiles after they congregate in the wetland to breed, and Wild Turkey observed in the ANSI and north hedgerow.

Shrub Species for cover and forage at 50 stems per species:

Wild Raisin

Serviceberry

Elderberry

Blackberry

Wildlife movement across the site and in particular between Wilder Lake and pond chains is bolstered at edges by broadcasting seed mix from the Co-op for butterflies on the site including the Monarch. A 10 kg bag of the following seeds is recommended:

Beebalm

Joe-pye-weed

New England Aster

Common Milkweed IF not immediately adjacent to continued farming practices as it is considered a noxious weed under the Noxious Weed Act due to ill effects on grazing cattle.

Figure 10: Environmental Constraint Zones and Recommended Enhancement Planting

The observed area of Bobolink foraging is outlined by a red circle, and is not affected by proposed locations of development, nor the timing of heavy machinery during construction of the internal road and the phasing of each lot; partially due to the healthy separation distance for noise, dust, and human presence. The birds are presently conditioned to remnant farm activities and the presence of golfers, that will continue for the foreseeable future.

The candidate areas for enhancement plantings include any of the riparian limits of the Camp Creek tributary and associated pond chain on the north portion of the parcel.

Species to benefit from the enhancement plantings include butterflies, odonates, moths for nectar plants, and small to large mammals including avifauna for shrub strengthening of the overland wildlife corridors.

Specific Areas

A safe travel route can be planted at a shrub level from golf course hole # 12 to the forest edge as it in particular offers optimal habitat for Snapping turtle nesting. The exposed sandy banks there did not offer evidence of recent failed nest attempts this is an area within travel distance of the ponds for this turtle to breed.

Significant Wildlife Benefitting From Signage and/or Planting

Eastern Wood Pewee

The Eastern Wood Pewee is listed as a COSEWIC species of special concern. This bird is breeding in the off site southern deciduous forest. The provincial 50m setbacks recommended in the Significant

Wildlife Habitat Guideline for Eco Regions do fall onto the study site in some instances and are provided with a timing window to limit tree heavy machinery between May and June.

Veery

Veery prefer habitat with running water, moist substrate, and high understory cover (Bertin, 1977). Mitigation is as above.

Snapping Turtle

The Snapping Turtle is listed as a Schedule 1 COSEWIC and SARA species of special concern. Snapping Turtles are relatively long-lived animals whose life may exceed 47yrs (Congdon et al., 1987). Snapping Turtle nests are usually within 183m of the nearest permanent aquatic habitat, with nesting season beginning late May or early June (Congdon et al., 1987). Hatchlings emerge from the nest from late August to early October (Congdon et al., 1987).

This species makes use of the littoral zone of Wilder Lake and the pond chain.

Enhancement plantings on terrestrial portions of the drainage system here can assist in sheltered travel if this or other turtle species traverse the lands in the future.

In particular, the golf course hole # 12 exposed banks should be retained long term as they offer optimal turtle nest habitat. There was no evidence of failed nests but this is an area within travel distance of the ponds for this turtle to breed.

Grassland Bird Habitat Assessment

SAAR also assessed the potential of open meadow to perform as habitat for threatened species and nest habitat for grassland birds including Bobolink since we observed these species within the 10km block. Grassland was assessed and cross referenced to refereed scientific journal field experiments to assist with practical mitigation detail for the grass height and time of mowing.

Our review of the General Habitat of Bobolink (MNR, 2018) provided land use descriptions which allow one to conclude that the proposed resort residential land use is compatible since living on the parcel (in the proposed areas) would not result in:

- *Development activities that result in significant fragmentation or removal of large tracts of suitable grasslands.*

- *Indiscriminate application of pesticides within habitat*

The proposed 29 estate residential homes would not be constructed on or immediately adjacent to the General Habitat of the Bobolink.

Given that the uses are also compatible by MNRF definitions, not fragmenting general habitat or employing large quantities of pesticide, we find it reasonable to suggest the following:

1. Residential vs. farming use will use less or no pesticide
2. Residential vs. farming use with adherence to mitigation will result in greater chances of natural heritage system grow back; vegetation succession of wildlife hedgerow links to core and corridor area, and
3. Enhancement plantings will bolster ANSI values and connectivity, which is lacking on portions of this agrarian landscape

The Homestead Golf Course has an existing nutrient management program which is not heavy in use and application of phosphorus and nitrogen. (Check)

Pre and Post Development Water Quality and Quantity

Storm water events on the pre and post development site received careful attention due to the location of development beside a shallow lake feature. It is our understanding from discussions and visual observation of the site soils and landform that the native sand and gravel soils promote infiltration of rain events vs. a clay or silty site. Our review of the proposed development in particular focused on any potential impact to the thermal regime of the wetland habitats as well as water quality and quantity entering the connected pond systems.

The furthest northerly pond supports the largest quantity of young of the year Brook Trout, and lesser Brown Trout in a healthy nursery. The furthest southerly on line pond also supports older trout.

Thermal regime is important and indeed why the ponds continue to provide this ecological function of coldwater regime during spring which supports the fish nursery and feeding ground ecological features.

The groundwater flow regime and surfacewater creeks contributing water to Pond 1 and 2 will continue to contribute the necessary pre development flows.

The westerly Pond 3 is not linked to trout ponds. It exhibits considerable seasonal fluctuation (1.10m, pers. observ.) and may contribute water - similar to existing conditions - into the trout pond system during peak spring freshet and snow melt.

After development, during spring flow conditions, if the pond reaches the elevation of the overflow culvert, the depth is anticipated at approximately one metre. These conditions have already been observed to occur during rain events in the past. If this were to occur in single events, the water quality

would not be significantly impacted as the trout ponds receive stormwater events during this time. The event, if it contributed waters in the spring, would not overlap the fall spawning of Brook trout. Given the high infiltration capacity of the native soils, and the elevation difference across the site, the Camp Creek Tributary baseflows, water quality and the thermal regime are supported by groundwater which is not altered by the proposed works.

The trout may spawn near shore on Wilder Lake and/or along the gravel back riffle areas of the inlets to the ponds on site. Excellent substrate is available for this egg deposition including a range of clean gravel down to pea gravel size and super-oxygenated waters at the riffle zones.

Significant depression of oxygen levels and/or related thermal regime, for instance due to sedimentation, is not reasonably anticipated through the proposed stormwater design. Changes in the preferred pH (6.5-8) are also not projected.

The trout ponds are groundwater dominated, thus coupled with the fact that spring spillover from Pond 3 will have no storage time, groundwater (4-8 C) will not be impacted.

Setback areas from the wetland features are recommended for native plantings for nutrient attenuation function as well as wildlife direct value for shading pond features to maintain cold and coolwater temperatures and provide a sheltered riparian corridor for species meandering the pond edges.

Shrub layers are recommended for the southerly Pond with tree strata for the upland open terrain of the off line Pond 3 situated and grading into a higher elevation.

All level bases of proposed stormwater roadside swales will be grass seeded with mixtures also of native sedges and rushes with known performance to attenuate phosphorus and nitrogen further; here *Scirpus rubrotinctus* and *Juncus effusus* are recommended and can be mowed for general site maintenance. The robust plants withstand a wide range of water regime from saturation to periods of drought.

Mitigation



To conform with the Provincial Policy Statement policy 2.1.8 and all natural heritage components of PPS Section 2.1, mitigation measures for this application should include the following list.

Note that the standard BMP (Best Management Practice) of containing sediment at each building envelope is assisted at this site by topography and land use history; there is no overland flow of water along the proposed shoreline lots into Wilder Lake due to a raised break in sloping topography. This ditching is a past artifact of an old railway bed that existed in conjunction with mining the limestone from portions of Wilder Lake. Thus, more rigorous perimeter control is required along the pond chain for rear lot topography around lots 1-4 that do not benefit from the lakeshore railway bed.

- Secure filter cloth around the perimeter of the work area to limit sediment to building envelope areas
- Limit grading at lots 5 through 12 due to elevation grade toward Wilder Lake
- Bolster long term wildlife corridor links by planting gaps in the existing hedgerows between the ponds, and south forest patch to existing inland hedgerows consistent with the policies of the PPS Section 2.1.2 below
- No tree or shrub with a bird nest is permitted to be removed between April 1 and August 15 of any year. Migratory Birds Convention Act, 1994 and/or Regulations under that Act compliance requires a field check by the biologist a few days before tree removal if trees are to be cleared between May 1 and July 31.
- Restrict construction days to 7am - 7pm avoiding noise impact at night
- Plant native vegetation vs. exotic species around homes

2.1.2 The diversity and connectivity of natural features in an area, and the long-term *ecological function* and biodiversity of *natural heritage systems*, should be maintained, restored or, where possible, improved, recognizing linkages between and among *natural heritage features and areas*, *surface water features* and *ground water features*.

PPS S.2.1.8: Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

Conclusions

With adherence to mitigation and refinement of lot fabric (split zoning) for lots 1-5 we find the proposed estate residential development can be sustained by natural heritage with no negative impact, consistent with PPS S. 2.1.

Mitigation for the significant wildlife habitat of Bobolink coupled with the Enhancement Planting Plan ensures that the post construction environment of the subdivision and golf course provides a strengthened Natural Heritage System with the net gain biological diversity and wildlife connectivity guided by the PPS.

Nutrient management on the site is paramount given the proximity of the shallow marly Wilder Lake resource. As such, SAAR is satisfied with the decisions reached on site which helped inform the final stormwater management location for storm ponds within the subdivision.

Namely, as reported on earlier within the EIA, the 20.8 hectare residential subdivision at 263512 Southgate Road 26 in the Township of Southgate will have all storm quality and quantity ready to serve the entire subdivision needs (Phase 1 and Phase II) at the end of Phase I. This is a conservative measure and a precautionary one that SAAR feels suits the nutrient management of the site given the nearby Wilder Lake shallow waterbody. It is also prudent and tailored to the parcels existing character of open land golf course; treed areas are limited to around pond and creek systems, the Wilder Lake shoreland, hedgerows and the southern forest that falls off site.

SAAR is thus pleased to note that the total post subdivision peak flows that will leave the subdivision via the four proposed outlets, as well as the property as a whole, will be attenuated to less than, or equal to, the total existing conditions of peak flow rates. This is largely due to the fact that the site benefits from soils with good infiltration rates; permeable sand and gravel, and that an enhanced level of water quality treatment will be applied to this site.

The enhanced treatment removes eighty percent of the total suspended solids from storm events by settling them before entry into aquatic systems such as the pond chain on the site with support ecology.

SAAR finds the level of storm control for the subdivision that in part arises from good stewardship during proponent meetings on site with the stormwater engineer and ecologist, reflects a healthy use of outlet locations, enhanced treatment and selected planting prescriptions for the toe of slope overland drainage ditches to control for nutrient on site.

The main entrance to the subdivision crosses a nearby pond and creek system which supports winter incubating Brook Trout. Winter de-icing (sand, salt) requires containment before entry into the system. A combination of banking and rugged salt tolerant vegetation has been recommended.

Impact Statement

This report has been prepared by SAAR Environmental Limited.

The assessment represents the conditions at the subject property only at the time of the assessment, and is based on the information referenced and contained in the report. The conclusions presented herein respecting current conditions represent the best judgment of the assessors based on current environmental standards.

SAAR finds with adherence to our recommended mitigation that the residential land use meets policy tests of no negative impact. In particular we find the proposal to be consistent with Section 2.1 Natural Heritage policies of the Provincial Policy Statement.

Report prepared by:

A handwritten signature in black ink that reads "Linda-Liisa Sober". The signature is written in a cursive, flowing style.

Linda-Liisa Sober, H.B.Sc.
Senior Ecologist
SAAR Environmental Limited

EIA Mitigation Measures	Required or Recommended?	Implementing Tool
Comply with all setback zones from identified ecology on Map 2., namely Bobolink west quadrat with no mow during May-June, setback from Wilder Lake and Camp Creek Tributary (for Tributary and pond system see Split Zone recommendation)	Required	Site Plan Control (SPC) Subdivision Agreement
Perimeter control for all lots, all Phases. Secure filter cloth around the construction zones consistent with the Fisheries Act to limit stormwater runoff of sediment on site that could enter Camp Creek Tributary and/or Wilder Lake	Required	SPC
Entrance crossing of Camp Creek Tributary close to wintering pond for incubating Brook Trout eggs requires roadside vegetation barrier to limit winter road de-icing compound entry into watercourse. Preferred road surface treatment to date is sand vs. salt at this 10m length of roadway and culvert	Required	SPC
Direct rainwater that sheds off impervious roof and driveway surface roadside swales for infiltration and cleansing before entry into the four outlets. Robust emergent will be in particular required before discharge to off line pond to adsorb nutrient from overland flows	Required	SPC
Control for non-native flora entry to the site as a good best management practice: using local source infill if/as required, stabilize septic with native flora	Required	SPC
Establish a split zone (EP and Residential) for Lots 1-4 consistent with PPS goals of maintaining biodiversity of the observed riparian values in the Camp Creek Tributary : Big Brown Bat, Brook trout, herptiles and odonates	Required	SPC/Zoning By-Law (ZBL)
For compliance with the Migratory Birds Convention Act obtain clearance from a biologist of no nesting birds before clearing from May 1-July 31. This is coupled with Night Sky Lighting for subdivision lots adjacent to forest (Lots 1-4, lots 16-20)*	Required MBCA Lighting recommended	MBCA for birds Subdivision Agreement
Barn setback (MDS) reflected by limit of the subdivision plan	Required	Site Plan Boundary
Twin culverts for pond life travel below access road, one dry and one wet. The wet culvert conveys aquatic wildlife while the dry culvert can be accessed by terrestrial and semi-terrestrial wildlife including potential SAR such as the Snapping turtle	Recommended. Installed, SVCA Permit.	Subdivision Agreement
Restrict construction to 7am - 7pm to mitigate for noise effects on adjacent wildlife consistent with PPS goals	Recommended	SPC Subdivision Agreement

<p>Bolster the vegetation screening northerly Pond to shade Brook Trout from car headlights at access road</p> <p>Limit tree clearing to view slots and narrow pathways for lots fronting Wilder Lake.</p> <p>For lots adjacent to forest, align driveways at right angles to forest to reduce headlight glare</p>	<p>Recommended</p> <p>Recommended</p> <p>Recommended</p>	<p>SPC</p> <p>SPC</p> <p>SPC</p>
<p>Nutrient attenuation swales to be planted with robust emergent at toe of slope in roadside ditches leading to off line pond outlet</p>	<p>Recommended</p>	<p>Subdivision Agreement</p>
<p>Provide a landowner education brochure as stand alone educational material or complementary to a potential future eco-trail system that provides information on both natural and cultural heritage on and near the subdivision</p> <p>e.g.</p> <p>Southerly Earth Science feature</p> <p>History of marl extraction in Wilder Lake</p> <p>Fishery including rearing ponds of Brook Trout</p> <p>Species at Risk</p> <p>Species of Interest including Big Brown Bat, Dragon and Damselflies, Snapping Turtle, Bobolink</p>	<p>Recommended</p>	<p>Voluntary Option</p>

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Appendix A

SPECIES LISTS

Latin Name	Common Name	Location for Conservation
Equisetaceae	Horsetail Family	
Equisetum arvense	Field Horsetail	
Dennstaedtiaceae	Bracken Family	
Pteridium aquilinum	Bracken Fern	
Dryopteridaceae	Wood Fern Family	
D. intermedia	Evergreen Wood Fern	
Onoclea sensibilis	Sensitive Fern	
Thelypteridaceae	Marsh Fern	
Thelypteris palustris	Marsh Fern	
Cupressaceae	Cypress Family	
Thuja occidentalis	White Cedar	
Pinaceae	Pine Family	
Abies balsamea	Balsam fir	
Picea glauca	White Spruce	
Picea abies	Norway Spruce	

<i>Pinus strobus</i>	White Pine	
<i>Pinus sylvestris</i>	Scots Pine	
Poaceae	Grass Family	
<i>Agrostis gigantea</i> +	Redtop	
<i>Agrostis stolonifera</i> +	Creeping Bent Grass	
<i>Dactylis glomerata</i> +	Orchard Grass	
<i>Danthonia spicata</i>	Poverty Oat Grass	
<i>Phalaris arundinaceae</i>	Reed Canary Grass	
<i>Poa compressa</i>	Canada Blue Grass	
<i>Poa pratensis</i>	Kentucky Bluegrass	
<i>Glyceria striata</i>	Fowl Manna Grass	
<i>Lolium arundinaceum</i>	Kentucky Fescue + exotics for golf course	
<i>Phleum pratense</i>	Timothy	
<i>Leersia oryzoides</i>	Cutgrass	
Cyperaceae	Sedge Family	
<i>Carex gracillima</i>	Graceful Sedge	
<i>Carex brunnescens</i>	Brownish Sedge	
<i>Carex flava</i>	Yellow Sedge	
<i>Carex michauxiana</i>	Michauxs Sedge	
<i>Carex flava</i>	Yellow Sedge	
<i>Carex lacustris</i>	Lake Sedge	
<i>Carex vulpinoidea</i>	Fox Sedge	
<i>Carex stipata</i>	Prickley Sedge	
<i>Carex retrorsa</i>	Retrorse Sedge	
<i>Scirpus rubrotinctus</i>	Panicled Bulrush	

Scirpus atrovirens	Woolgrass	
Juncus effusus	Soft Rush	
Bromus inermis	Smooth Brome	
Eleocharis erythropoda	Bald Spikerush	
Lemnaceae	Lemna minor	
Sparganeaceae	Sparganium eurycarpum	
Nymphaeaceae	Water Lily Family	
Nuphar variagata	Yellow Pond Lily	
Potamogeton natans	Pondweed	
Pontederiaceae	Water Hyacinth Family	
Pondetera cordata	Pickerelweed	
Haloregaceae	Milfoil Family	
Myriophyllum sibiricum	Eurasian Milfoil	
Juncaceae	Rush Family	
J effusus	Common Rush	
J. tenuis	Poverty Rush	
Liliaceae	Lily Family	
Hemerocallis fulva+	Orange Day Lily	
Polygonatum odoratum	Solomon's Seal	
Streptopus amplexifolius	Twisted-Stalk	
Mainthemum canadensis	Wild Lily of the Valley	
Violaceae	Violet Family	
Viola sororia	Wood Violet	
Salicaceae	Willow Family	
Populus balsamifera L.	Balsam Poplar, Balm of Gilead	

Populus grandidentata	Large Toothed Aspen	
P. tremuloides	Trembling Aspen	
Salix discolor	Pussy Willow	
Salix bebbiana	Bebb's Willow	
Salix lucida	Shining Willow	
Betulaceae	Birch Family	
Alnus incana	Speckled Alder	
B. papyrifera	White Birch	
Ostrya virginiana	Ironwood	
Fagaceae	Beech Family	
Quercus rubra	Red Oak	
Ulmaceae	Elm Family	
Ulmus americana L.	White Elm	
Juglandaceae	Walnut Family	
Juglans cinerea	*Hybrid White Walnut	*Shoreland, not being disturbed
Juglans nigra	Black Walnut	
Polygonaceae	Buckwheat Family	
Rumex crispus	Curly Dock	
Ranunculaceae	Crowfoot Family	
Ranunculus acris L.	Tall Buttercup	
Rosaceae	Rose Family	
Aronia melanocarpa	Chokeberry	
Fragaria virginiana	Common Strawberry	
Prunus pensylvanica	Pincherry	

Spirea alba	Narrow-leaved Meadowsweet	
Prunus serotina	Black Cherry	
Prunus virginiana	Chokecherry	
Rosa acicularis	Prickly Wild Rose	
R. strigosus	Wild Red Raspberry	
Frageria virginiana	Virginia Strawberry	
Potentilla simplex	Cinquefoil	
P. anserina	Silverweed	
Malus pumila	Common Apple	
Crataegus sp	Hawthorn shrubs	
Apiaceae	Umbellifer Family	
Daucus carota	Wild Carrot	
Leguminosae	Bean Family	
Lotus corniculatus+	Birds-foot Trefoil	
Melilotus alba+	White Sweet Clover	
Trifolium pretense+	Red Clover	
Vicia cracca L.+	Cow vetch	
Cucurbitaceae	Gourd Family	
Echinocystis lobata	Wild Cucumber	
Anacardiaceae	Cashew Family	
Rhus radicans	Poison ivy	
R. typhina	Staghorn Sumac	
Aceraceae	Maple Family	
Acer saccharum	Sugar Maple	

Rhamnaceae	Buckthorn Family	
Rhamnus cathartica	Common Buckthorn	
R. alnifolia	Alderleaf Buckthorn	
Adoxaceae	Elderberry Family	
Sambucus nigra	Elderberry	
Rubiaceae	Madder Family	
Galium palustre	Marsh Bedstraw	
Typhaceae	Cattail Family	
Typha angustifolia	Narrow-leaved Cattail	
Vitaceae	Grape Family	
Vitus riparia	Frost Grape	
Tiliaceae	Linden Family	
Tilia Americana	Basswood	
Araliaceae	Ginseng Family	
Aralia nudicalis	Wild sarsaparilla	
Aralia racemosa	Spikenard	
Cornaceae	Dogwood Family	
Cornus sericea	Red-osier Dogwood	
C. amomum	Silky Dogwood	
C. alternifolia	Alternate-leaved Dogwood	
Oleaceae	Olive Family	
Fraxinus Americana	White Ash	
F. pennsylvanica	Green Ash	
Asclepiadaceae	Milkweed Family	
Asclepias syriaca	Common Milkweed	

Boraginaceae	Borage Family	
Myosotis arvensis+	Forget-me-not	
Lamiaceae	Mint Family	
L. uniflorus Michx.	Northern Bugleweed	
Mentha arvensis L.	Wild Mint	
Lycopus americanus	Water Horehound	
Monarda fistulosa	Wild Bergamot	
Prunella vulgaris L.	Heal's All	
Satureja vulgaris	Dogmint	
Solanaceae	Nightshade Family	
Solanum dulcamara L.	Climbing Nightshade	
Scrophulariaceae	Figwort Family	
Linaria vulgaris	Butter and Eggs	
Verbascum Thapsus	Common Mullein	
Veronia officinalis+	Common Speedwell	
Plantaginaceae	Plantain Family	
Plantago lanceolata	English Plantain	
Plantago major	Common Plantain	
Caprifoliaceae	Honeysuckle Family	
Viburnum lentago	Nannyberry	
V. acerifolium	Maple-leaf Viburnum	
Balsaminaceae	Touch-me-not Family	
Impatiens capensis	Spotted Touch-me-not	
Asteraceae	Aster Family	
Achillea millefolium	Yarrow	

<i>Ambrosia artemisiifolia</i>	Common Ragweed	
<i>Anaphalis margaritaceae</i>	Pearly Everlasting	
<i>Arctium minus</i>	Common Burdock	
<i>Aster macrophyllus</i>	Large Leaved Aster	
<i>Aster novae-angliae</i>	New England Aster	
<i>Chrysanthemum leucanthemum</i> +	Oxeye Daisy	
<i>Cichorium intybis</i> +	Chickory	
<i>Cirsium arvense</i>	Canada Thistle	
<i>Erigeron annuus</i>	Annual Daisy Fleabane	
<i>Centuaurea stoebe</i>	Spotted Knapweed	
<i>Hieracium aurantiacum</i>	Orange Hawkweed	
<i>H. caespitosum</i>	Yellow Hawkweed	
<i>Senecio aureus</i> L.	Golden Ragwort	
<i>S. canadensis</i>	Canada Goldenrod	
<i>S. hispida</i>	Hairy Goldenrod	
<i>S. nemoralis</i>	Grey stemmed Goldenrod	
<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	
<i>Taraxacum officinale</i>	Dandelion	
<i>Tussilago farfara</i>	Coltsfoot	
<i>Eupatorium maculatum</i>	Spotted Joe Pye Weed	

+ Naturalized

R and THR Ontario Rare and Threatened Conservation Status

Common Name	Scientific Name	Rank	COSEWIC	MNR	1	2	3	4	5	6	7	8	9	10
Mudpuppy	<i>Necturus maculosus</i>	G5S4	NAR	NIAC										
Red-spotted Newt	<i>Notophthalmus viridescens viridescens</i>	G5S5												
Blue-spotted Salamander	<i>Ambystoma laterale</i>	G5S4												
Spotted Salamander	<i>Ambystoma maculatum</i>	G5S4												
Four-toed Salamander	<i>Hemidactylium scutatum</i>	G5S4	NAR	NIAC										
Northern Redback Salamander	<i>Plethodon cinereus</i>	G5S5			x									
Eastern American Toad	<i>Bufo americanus americanus</i>	G5S5			x									
Tetraploid Gray Treefrog	<i>Hyla versicolor</i>	G5S5			x									
Northern Spring Peeper	<i>Pseudacris crucifer crucifer</i>	G5S5			x									
Wood Frog	<i>Rana sylvatica</i>	G5S5			x									
Northern Leopard Frog	<i>Rana pipiens</i>	G5S5	NAR	NIAC	x									
Green Frog	<i>Rana clamitans melanota</i>	G5S5												

Mink Frog	<i>Rana septentrionalis</i>	G5S5																	
Bullfrog	<i>Rana catesbeiana</i>	G5S4																	
Common Snapping Turtle	<i>Chelydra serpentina serpentina</i>	G5S5																	
Common Musk Turtle	<i>Sternotherus odoratus</i>	G5S4																	
Midland Painted Turtle	<i>Chrysemys picta marginata</i>	G5S5																	
Common Map Turtle	<i>Graptemys geographica</i>	G5S4																	
Blanding's Turtle	<i>Emydoidea blandingii</i>	G4S3																	
Wood Turtle	<i>Clemmys insculpta</i>	G4S2	SC	VUL															
Spotted Turtle	<i>Clemmys guttata</i>	G5S3	SC	VUL															
Eastern Garter Snake	<i>Thamnophis sirtalis sirtalis</i>	G5S5								x									
Northern Water Snake	<i>Nerodia sipedon sipedon</i>	G5S5																	
Northern Redbelly Snake	<i>Storeria occipitomaculata occipitomaculata</i>	G5S5								x									
Brown Snake	<i>Storeria dekayi</i>	G5S5																	
Smooth Green Snake	<i>Liochlorophis vernalis</i>	G5S4																	
Northern Ringneck Snake	<i>Diadophis punctatus edwardsi</i>	G5S4																	
Eastern Hognose Snake	<i>Heterodon platirhinos</i>	G5S3	THR	THR															

Eastern Milk Snake	Lampropeltris triangulum triangulum	G5S4																	
totals								0	0	0	0	0	0	0	0	0	0	0	0

Species at Risk (Nationally and/or Provincially) are noted in bold. G = Global rank, S = Provincial rank, THR = Threatened, SC = Special Concern, NAR = Not At Risk, VUL = Vulnerable, NIAC = Not In Any Category

Appendix B: Mammal List

Family	Species	Scientific Name	Status	1	2	3	4	5	6	7	8	9	10
Insectivora	Black-backed Shrew	Sorex arcticus	G5S5										
	Common Shrew	Sorex cinerus	G5S5										
	Smoky Shrew	Sorex fumeus	G5S5										
	Pygmy Shrew	Sorex hoyi	G5S4										
	Water Shrew	Sorex palustris	G5S5										
	Northern Short-tailed Shrew	Blarina brevicauda	G5S5										
	Hairy-tailed Mole	Parascalops breweri	G5S4										
	Star-nosed Mole	Condylura cristata	G5S5	x									
Chiroptera	Little Brown Bat	Myotis lucifuga	G5S5										
	Northern Long-eared Bat	Myotis septentrionalis	G4S3										
	Silver-haired Bat	Lasionycteris noctivagans	G5S4										
	Big Brown Bat	Eptesicus fuscus	G5S5	x									
	Eastern Red Bat	Lasiurus borealis	G5S4										

	Hoary Bat	Lasiurus cinereus	G5S4															
Lagomorpha	Snowshoe Hare	Lepus americanus	G5S5	x														
Rodentia	Least Chipmunk	Tamias minimus	G5S5															
	Eastern Chipmunk	Tamias striatus	G5S5	x														
	Woodchuck	Marmota monax	G5S5	x														
	Gray Squirrel (Black Phase)	Sciurus carolinensis	G5S5															
	Red Squirrel	Tamiasciurus hudsonicus	G5S5	x														
	Northern Flying Squirrel	Glaucomys sabrinus	G5S5															
	Beaver	Castor canadensis	G5S5															
	Deer Mouse	Peromyscus maniculatus	G5S5															
	Southern Red-backed Vole	Clethrionomys gapperi	G5S5															
	Heather Vole	Phenacomys intermedius	G5S4															
	Rock Vole	Microtus chrotorrhinus	G4S3															
	Meadow Vole	Microtus pennsylvanicus	G5S5	x														
	Muskrat	Ondatra zibethicus	G5S5															
	Southern Bog Lemming	Synaptomys cooperi	G5S4															
	Norway Rat	Rattus norvegicus	G5SE															

	House Mouse	Mus musculus	G5SE																
	Meadow Jumping Mouse	Zapus hudsonius	G5S5	x															
	Woodland Jumping Mouse	Napaeozapus insignis	G5S5																
	Porcupine	Erethizon dorsatum	G5S5	x															
Carnivora	Coyote	Canis latrans	G5S5	x															
	Eastern Wolf	Canis lupus	G4S4																
	Red Fox	Vulpes vulpes	G5S5																
	Black Bear	Ursus americanus	G5S5																
	Raccoon	Procyon lotor	G5S5	x															
	Marten	Martes americana	G5S5																
	Fisher	Martes pennanti	G5S5																
	Ermine	Mustela erminea	G5S5																
	Long-tailed Weasel	Mustela frenata	G5S4																
	Least Weasel	Mustela nivalis	G5SU																
	Mink	Mustela vison	G5S5	x															
	Striped Skunk	Mephitis mephitis	G5S5	x															
	River Otter	Lontra canadensis	G5S5																
	Canada Lynx	Lynx canadensis	G5S5																

	Bobcat	Lynx rufus	G5S4											
	White-tailed Deer	Odocoileus virginianus	G5S5											
	Moose	Alces alces	G5S5											

Appendix C: Fish List

Family Name	Species	Common Name	Rank
Salmonidae	Salvelinus fontinalis	Brook Trout	G5S5
Catostomidae	Catostomus commersoni	Common White Sucker	G5S5
Cyprinidae	Phoxinus eos	Northern Redbelly Dace	G5S5
Umbridae	Umbra limi	Central Mudminnow	G5S5
Gasterosteidae	Culaea inconstans	Brook Stickleback	G5S5
erranidae	Micropterus salmoides	Largemouth Bass	G5S5
Serranidae	Ambloplites rupestris	Rock Bass	G5S5
Serranidae	Micropterus dolomieu	Smallmouth Bass	G5S5
Esocidae	Esox lucius	Northern Pike	G5S5

(Source: Scott, W.B. 1967. Freshwater Fishes of Eastern Canada)

Central Mudminnow in municipal drain beside wetland (May), dry ditch in June.

Wilder Lake angler diaries: Smallmouth Bass, Brown Bullhead, Yellow Perch, Pumpkinseed

BIRDS

All birds recorded during both June surveys are noted below as likely breeders on or near site

Migrant birds are denoted with “M”. Adjacent lands sightings are “ADJ” with direction.

American Robin

American Goldfinch

Purple Finch

American Woodcock ADJ (W) M

Baltimore Oriole

Eastern Kingbird

Ruby-throated Hummingbird

Common Grackle

American Crow

American Phoebe

Black-capped Chickadee

Northern Flicker

Rose-breasted Grosbeak

American Redstart B ADJ S

Common Yellowthroat

Chestnut-sided Warbler B ADJ S

Red-eyed Vireo B ADJ S

Killdeer

Ring-billed Gull

Gray Catbird

Mourning Dove

Chipping Sparrow

Barn Swallow Occasional flight on and off site, no nest structures

Bobolink FORAGING ADJ LAND WEST

Great-crested Flycatcher POND X SPRING MIGRANT

BATS

Big Brown Bat

ODONATES (Dragonflies and damselflies)

Calopteryx maculata Ebony Jewelwing

Enallagma hageni Hagen's Bluet

E. erbiium Marsh Bluet

Hetaerina Americana American Rubyspot (I.D. on wing)

Lestes disjunctus Common Spreadwing

Amphiagrion saucium Eastern Red Damsel

Libellula pulchella Twelve-spotted Skimmer

Anax junius Green Darner

Appendix B

GRASSLAND BIRDS

Field research indicates site tenacity; use of hay fields 8+ years with annual cuts, and lesser preference lightly grazed pasture, fallow field, old field and young hayfield (Bollinger and Gavin, 1992; Bollinger, 1995), old abandoned field (cultural meadow) with less use of grain fields (Martin 1971, Bollinger et al. 1990, Van Damme 1999, Dechant et al. 2001, Norment et al. 2010).

The study site fallow fields have areas of early succession shrub incursion including Hawthorn, and tree saplings such as Trembling Aspen. With Leatherwood and Dogwood shrubs.

Bobolinks don't appear to select row crops such as corn and soybean (Sample 1989, Jobin et al. 1996) but have in southwestern Ontario (Norfolk, Chatham-Kent, Essex, Durham) nested in fields **larger than 50 hectares** with winter wheat and rye (D. Martin and J. Holdsworth, pers. comms. 2011, J. McCracken, pers. obs. 2012, Sober, pers. Obs. 2014 North Wellington County).

Mean territory size ranges from 0.4ha - 2ha (Wiens 1969, Martin 1971, Wittenberger 1978, Bollinger and Gavin 1992, Lavallée 1998). Nests are built on the ground usually at the base of tall forbs (Martin and Gavin 1995). In the uncut hayfields of Ontario and Quebec nest success rates are 43% (Frei 2009).

During the breeding season, adults feed on 57% insects and 43% seeds (Martin and Gavin 1995). Bobolinks nest primarily in hayfields and pastures (Bollinger and Gavin 1992, Bollinger 1995, Martin and Gavin 1995, Jobin et al. 1996, Cadman et al. 2007). These habitats are typically dominated by *Phleum pratense*, *Poa pratensis*, and *Trifolium* spp (Dale et al. 1997, VanDamme 1999, Frei 2009).

Microhabitat preferences best matched in regularly maintained hayfields that are not cut early in the season and grasslands (McCracken et al. 2013).

Phleum is present on site with greater Poverty Grass (*Danthonia spicata*) amidst shrub incursion. We have observed nest success on other sites that are grazed by cattle but low intensity with less than 50 head of cattle (Sober, pers. Observ.), grazing that maintains grass at 10-30 cm (Risser et al. 1981, Jones and Vickery 1997).

The study site does not support cattle and grass falls into two general categories: 1) fallow fields with shrub incursion at ecotones out-competing grass area, and 2) cut grass with no cover. Bobolinks tend to nest in patches of denser and taller herbaceous vegetation (Martin 1971, Schneider 1998) than Eastern Meadowlarks (Sample 1989, McCoy 1996).

For Bobolinks, microhabitat preferences are best matched in regularly maintained hayfields and grasslands. If not maintained, Bobolinks may decline significantly due to accumulation of litter and shrub encroachment (Johnson 1997). The species responds positively to properly-timed mowing and burning, with abundance peaking one to three years after disturbance (Bollinger and Gavin 1992, Johnson 1997, Madden et al. 1999).

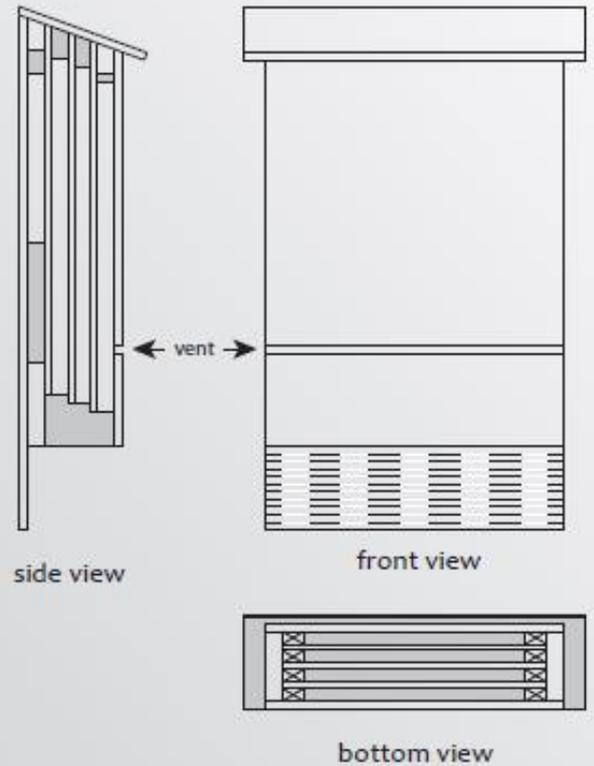
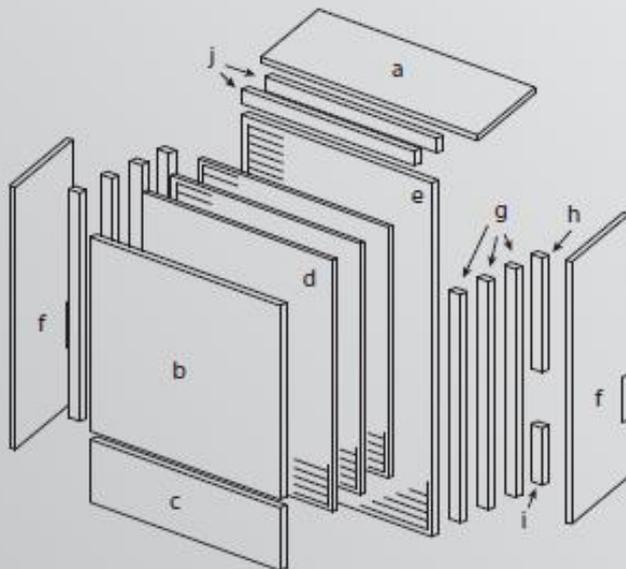
The study site is not subject to active cut and/or burning prescription across the parcel for purposes of intensive farming or grassland management. Thus, portions have succeeded into woodier growth and shrub cover. The Bobolink area can be respected with a no maintenance timing window restriction so the bird continues to forage.

Appendix C

BAT BOX DESIGN OPTION FOR NORTH QUADRAT (LOTS 1-4)

Four-chamber Bat Nursery

This house will accommodate a larger colony of bats or act as a nursery for mother bats and their offspring.



Materials

¼ sheet of ½" plywood (outdoor grade)
 ¼ sheet of ¾" plywood (outdoor grade)
 1" x 6" x 8" board
 exterior-grade screws, 1½"
 exterior-grade screws, 1¼"
 exterior-grade screws, 1"
 latex caulk
 water-based, exterior-grade primer
 water-based, exterior-grade paint/stain
 black asphalt shingles
 roofing nails, 7/8"

Assembly

1. Cut the plywood and board according to the directions on the opposite page. All dimensions are in inches.
2. Roughen the interior surfaces (b,d,e) by cutting shallow, horizontal grooves approximately ½-¾" apart.
3. Apply caulking and screw the side pieces (f) to the uppermost sides of the backboard (a), using 1½" screws.
4. Using 1" screws, attach the 5" (i) and 10" (h) spacers to the backboard as seen in the side view on the opposite page. Do not block the vents in the side pieces (f).

