

ENVIRONMENTAL IMPACT STUDY

AUDREY MEADOWS

PROPOSED RURAL SETTLEMENT DEVELOPMENT

PART OF LOTS 17, 18 & 19
CONCESSION 8
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

PREPARED FOR:

AUDREY MEADOWS LIMITED

PREPARED BY:

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1. INTRODUCTION

Stovel and Associates Inc. was retained by Audrey Meadows Ltd. to complete an Environmental Impact Study (EIS) of a proposed rural settlement subdivision in the Township of Puslinch. The lands in question are approximately 14.5 ha in size and are located on Part of Lots 17, 18 and 19, Concession 8. Victoria Road abuts the property on the eastern limits of the site (see Map 1).

As part of the planning approvals process for the proposed development, Audrey Meadows Ltd. is required to apply for an Official Plan Amendment ("OPA") and a Zoning By-law Amendment ("ZBA"). A Plan of Subdivision will be submitted to the County of Wellington at a later date, subject to approval of the OPA and ZBA. Given that the site is located adjacent to significant natural heritage features, an EIS is a required documentation component as described below.

This EIS builds upon the environmental work that was completed in 2004, supplemented by additional environmental data that has been compiled over the past 17 years.

1.1 Purpose

The purpose of this EIS is to identify and describe the natural heritage features located on and *adjacent* to the subject property, and demonstrates that there will be no negative impacts on the natural features or on the ecological functions for which the area is identified.

Adjacent lands are considered to be:

- a) lands within 120 metres of provincially significant wetlands, provincially significant Life Science Areas of Natural and Scientific Interest, significant habitat of endangered and threatened species, fish habitat, significant wildlife habitat, significant valleylands, and significant woodlands;
- b) lands within 50 metres of provincially significant Earth Science Areas of Natural and Scientific Interest; and
- c) lands within 30 metres of all other Core Greenlands and Greenland areas.

Map 2 illustrates the subject property in proximity to Core Greenland and Greenland areas. The adjacent land boundaries for these features have been included on Map 2. The mapping of these features is approximate.

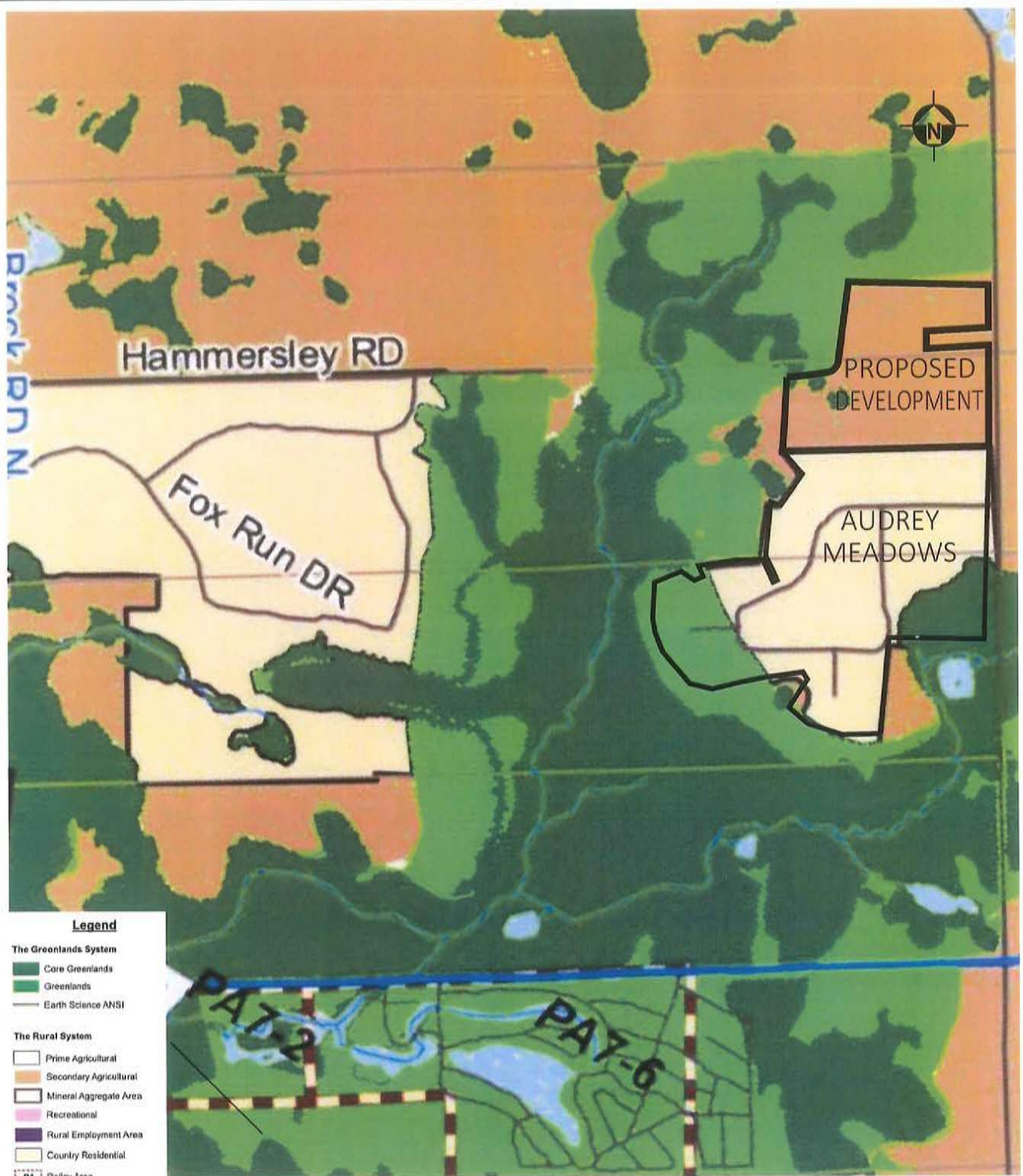
Map 3 illustrates the subject property in proximity to significant natural heritage features, as defined by the Grand River Conservation (GRCA). The adjacent land boundaries for these features are shown on Map 3 and basically reflects the Regulation Limit (yellow shaded area) of the GRCA. The mapping of these natural heritage features is approximate.

Mapping from the Ministry of Natural Resources and Forestry (MNRF) closely follows the mapping of wetlands and streams from the GRCA. The only exception is that the two small wetland pockets south of the Hydro corridor are mapped as "Unevaluated Wetlands" by the MNRF.

1.2 Study Objectives

The objectives of this study are as follows:

- a) a description of the proposal, including a statement of purpose;
- b) a description of the existing land use on the subject lands and adjacent lands, as well as the relevant land use regulations;
- c) an identification of proposed land uses and activities and potential environmental impacts;
- d) a delineation of any environmental constraint area on a site plan;



Legend

The Greenlands System

- Core Greenlands
- Greenlands
- Earth Science ANSI

The Rural System

- Prime Agricultural
- Secondary Agricultural
- Mineral Aggregate Area
- Recreational
- Rural Employment Area
- Country Residential
- PA Policy Area

The Urban System

- H Hamlet Area
- U.C. Urban Centre

0 270 540 800 METRES

SOURCE: COUNTY OF WELLINGTON - A-7 LAND USE SCHEDULE FOR TOWNSHIP OF PUSLINCH

PREPARED FOR:

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PREPARED BY:



PROPOSED DEVELOPMENT

**MAP
2**

JUNE 21, 2021 FILE: 23-01

- e) a description of the terrestrial and aquatic resources, natural and built landforms, surface and groundwater and other significant environmental features or functions on the site;
- f) a statement of the relative environmental and ecological significance of the natural features and functions affected by the proposal;
- g) a consideration of the potential to maintain, restore or where possible, improve the long-term ecological function and biodiversity of natural heritage systems;
- h) requirements to be addressed in Plans and/or Development Agreements;
- i) a statement that there are no negative impacts on provincially significant greenland features and functions and a description of the means by which negative environmental impacts will be mitigated in other greenland areas.
- j) a consideration of the potential for enhancement of environmental features or functions through site design alternatives; and
- k) a proposal for monitoring, where needed.

This EIS does not present an assessment of the impact on groundwater resources and in particular existing private wells and municipal supply wells in the area or an assessment of the impact on groundwater resources and in particular existing private wells and municipal supply wells in the area. These considerations are examined in other related reports, including the Functional Servicing and Stormwater Management Report (Triton Engineering, 2021).

1.3 Methods

This assessment was completed in conjunction with the following reports and plans:

- Functional Servicing and Stormwater Management Report. Audrey Meadows. Triton Engineering Limited. June 2021.
- Audrey Meadows: Paris and Galt Moraine Assessment. Groundwater Science Corp. June, 2021.
- Audrey Meadows: 2019-2020 Groundwater and Surface Water Monitoring Report. HCS.
- Concept Development Plan. Audrey Meadows. Triton Engineering Limited. June 2021.

As well, reporting for the existing Audrey Meadows subdivision was also considered, including the following documents:

- Preliminary Stormwater Management Report. Audrey Meadows. Triton Engineering Limited. November, 2004.
- Preliminary Hydrogeological Assessment. Audrey Meadows. Naylor Engineering Associates Ltd. November, 2004.
- Geotechnical Investigation. Audrey Meadows. Naylor Engineering Associates Ltd. October, 2004.
- Environmental Impact Assessment. Audrey Meadows. Stovel and Associates Inc. 2004.

Field studies on the site and adjacent areas included: botanical inventories, wildlife inventories, and vegetation community mapping. These were completed by Lincoln Environmental in May and June 2021. Data and mapping from prior inventories completed by Gray Owl Environmental Inc. (2004-2014) were also integrated into this report.

The lands in question are primarily disturbed and/or used for agricultural purposes. The current crop is small grains but the property has been cultivated for common field crop production over the past two decades. There are no natural or semi-natural vegetation communities located within the area proposed to be developed.

Therefore, the field investigations and vegetation community mapping component of the study concentrated mainly on natural heritage features located on adjacent lands west and north of the proposed development area. Vegetation communities adjacent to the site were described using the Ecological Land Classification

System. Vegetation community boundaries were established on an aerial photo-mosaic base map and field checked.

During the course of this study task, it was noted that the background aerial photography did not provide an accurate depiction of the two easternmost wetland communities. Revised mapping is presented in this report.

The wetland limits and driplines of the adjacent deciduous forests were flagged and surveyed (where possible). Due to full leaf cover within and closely adjacent to the woodland systems, the Global Positioning Satellite ("GPS") unit was not able to accurately pick up locational attributes of all features. However, the wetland communities closely adjacent to the proposed development, i.e. SWT2-5 and SWT3-2, were surveyed accurately.

2. DESCRIPTION OF THE ENVIRONMENT

2.1 Terrain Setting

2.1.1 Geology and Soils

The subject property is located within the physiographic region of Southern Ontario known as the Horseshoe Moraine). The physiographic region of the Horseshoe Moraines consists of 2 major glacial features, those being the Paris and Galt moraines. Together they form a belt 6 to 8 km wide extending through Puslinch Township from north to southwest. The Paris Moraine is situated to the north and west of the Galt Moraine; both are composed primarily of sandy Wentworth Till. The Paris Moraine was formed at the margin of the Ontario ice lobe as it retreated into the Lake Ontario basin and the Galt Moraine was deposited during a minor readvancement of the margin (Chapman and Putnam, 1984).

The region is composed of irregular hills and ridges with small, enclosed basins (e.g. kettles) and some broad spillway terraces. The dominant soil material is a coarse textured till, referred to as Wentworth Till, with interbeds of sand, silt and sand and gravel. Peat and muck occur in low-lying areas between hills.

The geology of the area consists of late Wisconsinan glacial deposits overlying dolostone of the Guelph Formation of the Silurian age. The soil cover over the bedrock is generally in excess of 20 to 40 m.

A detailed description of the subsoil conditions associated with Part of Lots 18 and 19 was provided in the Geotechnical Investigation, conducted by Naylor Engineering Associates Ltd. Generally, Naylor found that the majority of the native deposits on the site consisted of glacial till, sand, silt and sand and gravel. The glacial till was typically encountered in the higher topographic area at the northeast, and typically caps silt and sand deposits. Deposits of sand were encountered beneath the glacial till at the northeast and near the ground surface through the south half of the property.

Two small sand borrows were identified in the western portion of the south, immediately south of the Hydro corridor. It appears that sand/silty sand had been extracted and used for construction activities presumably for the Hydro line or as part of farming activities.

2.1.2 Hydrology and Hydrogeology

Mill Creek is the primary watercourse in the local area. Mill Creek is a mid-reach tributary of the Grand River. The total drainage area of the Mill Creek Subwatershed is approximately 104 km².

Mill Creek is located south of the subject property and flows in a westward trending pattern, toward County Road 34 and County Road 46 (Brock Road). Mill Creek is a permanently flowing coldwater stream with known Brook Trout habitat. A tributary of Mill Creek is located west of the subject property. Both branches of Mill Creek flow through forested wetlands in the local area.



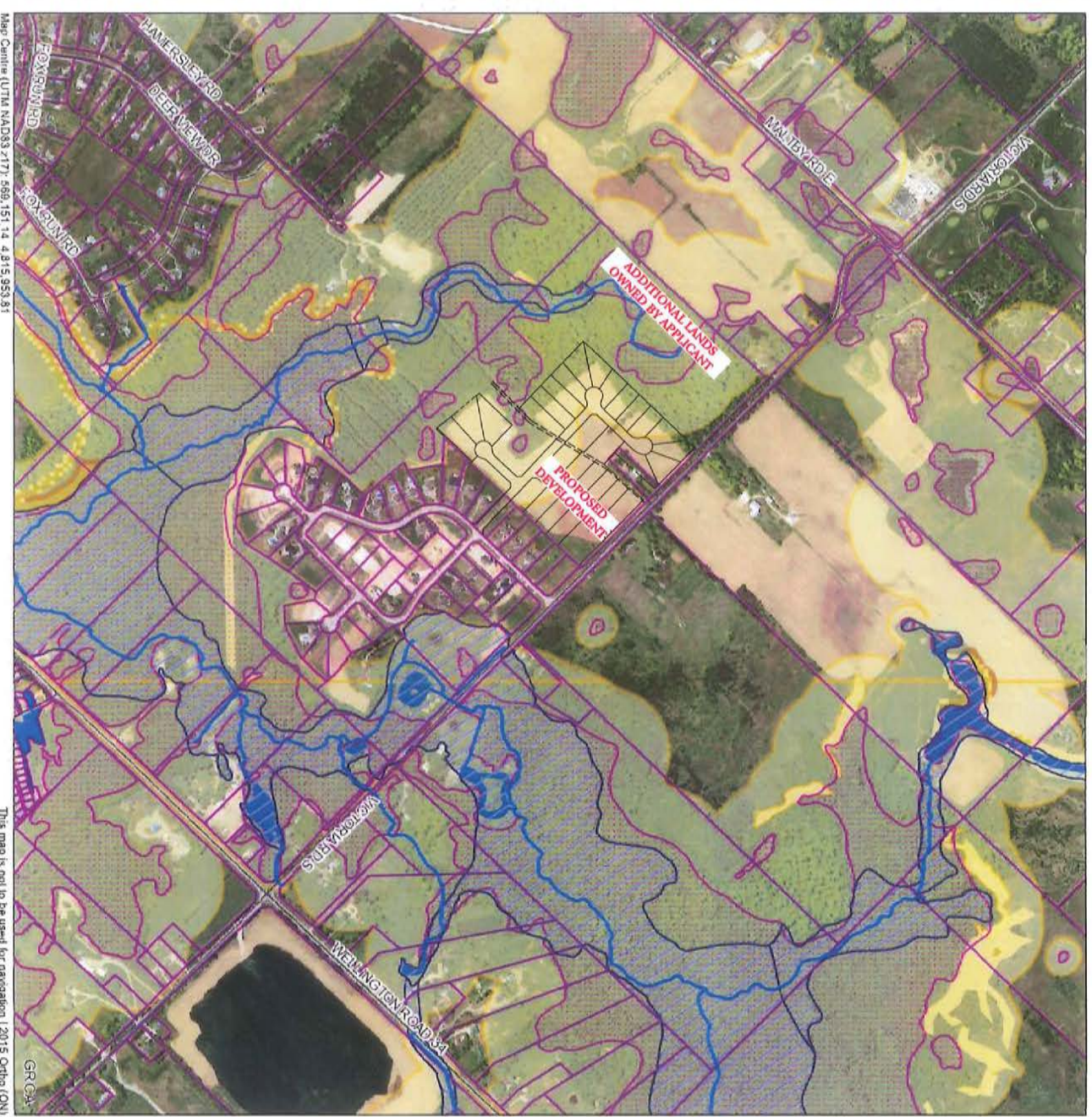
Grand River
Conservation Authority
Date: Jun 03, 2021

Audrey Meadows Ltd.

MAP 3: GRCA REGULATED AREAS

Legend

- Regulation Limit (GRCA)
 - Regulated Watercourse (GRCA)
 - Regulated Waterbody (GRCA)
 - Wetland (GRCA)
 - Floodplain (GRCA)
 - Engineered
 - Estimated
 - Approximate
 - Special Policy Area
 - Slope Valley (GRCA)
 - Slope
 - Oversteep
 - Sleep
 - Oversteep
 - Toe
 - Lake Erie Flood (GRCA)
 - Lake Erie Shoreline Reach (GRCA)
 - Lake Erie Dynamic Beach (GRCA)
 - Lake Erie Erosion (GRCA)
 - Parcel - Assessment (MPA/C/MNR)
- This legend is static and may not fully reflect the
layers shown on the map. The text of Ontario
Regulation 150/06 supersedes the mapping as
represented by these layers.



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This map is not to be used for navigation | 2015 Ortho (ON)

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The source for each data layer is shown in parentheses in the map
legend. For a complete listing of sources and citations go to:
<http://mga.gov.on.ca/mga/AboutUs/AboutUs.cfm>

Scale: 12,500
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Groundwater observations were carried out by HCS, 2021. The groundwater typically occurs under unconfined conditions in the major sand, and sand and gravel deposits in a southeasterly direction towards Mill Creek. The surface of the groundwater table generally reflects the ground surface and ranges from about 334 masl along the north property line, to about 328 masl at the southwest. The direction of the hydraulic gradient is southwards towards Mill Creek. The water levels in the ponds at the southeast of the site are close to the stabilized groundwater level.

2.2 Biologic Resources

The subject property is located with Site District 6-7, the Huron-Ontario section of the Great Lakes Forest Region (Rowe, 1972). Natural upland forest cover in this region is generally dominated by sugar maple, American beech, basswood, white ash, white oak, bur oak, eastern hemlock and eastern white pine. In lowland areas, silver maple, white elm, black ash, and eastern white cedar generally dominate. Wellington County has an estimated 18.2 % forest cover while forest cover in Puslinch Township is estimated to be 32.1% (MNR, 2002).

Background mapping from the GRCA and MNR illustrates significant natural heritage features, i.e. significant wetland and fish habitat in the local area (see Map 3). The significant wetland, referred to as the Mill Creek Wetland Complex, covers over 1400 ha (primarily the southwest corner of Puslinch Township). The Mill Creek Wetland Complex provides habitat for a variety of wildlife species, including white-tailed deer, and several significant plant and animal species. As previously described, Mill Creek is a recognized cold water fisheries resources that provides suitable habitat for resident Brook Trout and Brown Trout.

The significant wetland is located north and west of the subject property. A small tributary of Mill Creek is mapped north and west of the subject property. The watercourse is a first order tributary of Mill Creek. It is mapped, at its closest proximity to the proposal, approximately 80 m north of the site and over 150 m west of the site. The watercourse is intermittent in this location, but as it moves further south, it appears to have perennial flow.

The County of Wellington Official Plan recognizes the importance of the Mill Creek Wetland Complex. This significant wetland is designated Core Greenland in the land use schedule for Puslinch Township. Two small, unevaluated wetlands are mapped east of the Mill Creek Wetland Complex. These are shown as Core Greenland features in the County of Wellington Official Plan because they are regulated wetlands by the GRCA, but they have not been complexed into the Mill Creek Wetland Complex.

There are three additional Greenland features in the local area: significant woodland, Environmentally Sensitive Area, and significant wildlife habitat. These features are described below.

Portions of the woodland system south and west of the subject property are not mapped as wetland areas. These upland forest communities contain species such as sugar maple, white ash, black cherry and basswood. The County of Wellington maps these woodland areas as significant woodlands.

The western portion of the site has been mapped as part of the Aberfoyle Woods Environmentally Sensitive Area (ESA). The ESA extends south and west of the site, to incorporate much of the area mapped as part of the Mill Creek Wetland Complex. The Aberfoyle Woods ESA consists of a range of communities, including wetland systems and dry mature woodland habitats. The area that has been mapped is comprised of cultivated farm fields.

Deer wintering area has been mapped on lands south and west of the site. The deer wintering habitat is primarily related to the forested portions of the property that are mapped as part of the Core Greenland area.

2.3 Aquatic Resources

The aquatic habitat has been examined and summarized in the Mill Creek Subwatershed Plan (GRCA, 1996). The following overview has been adapted from background data contained in the Subwatershed Plan, and integrated with field data from a preliminary aquatic habitat investigation conducted in 2004.

Mill Creek – Western and Northern Tributary

A tributary of Mill Creek is located west of the existing subdivision and north of the proposed development. The tributary starts approximately 120 m west of Victoria Road and travels through several small wetland features and woodland areas as it travels in a south/southwest trending pattern.

North of the proposed development, this tributary of Mill Creek is characterized as follows: Channel gradient was very low for the 300m portion of the Mill Creek Tributary investigation (est. <0.2 %). Sinuosity was moderate to high in the Mill Creek Tributary with sections containing tight bends with radii of curvature estimated in the range 10 – 30 m.

Within the woodlot on Lots 17 and 18, there are several trails with culverts. The culverts act as a migratory barrier for any fishes; one culvert was approximately 70 cm elevated above the creek.

In proximity to the proposed development on Lot 17, there is no distinct creek channel. The watercourse was dry with pockets of standing water associated with wetland features. The substrate was dominated by organic material. Once the watercourse reached the approximate location of the Lot 17/18 limit, the watercourse was defined by low and stable banks dominated by organic material. The depth of the water at this location was less than 15 cm but there was a distinct flow. No fishes were observed.

Mill Creek (Western Tributary) is confined by low, stable banks dominated by organic material. Water clarity is unlimited at maximum depths observed (i.e., 31 cm). Substrate was dominated by organics and sand throughout the section investigated, with short sections of sand, gravel and cobbles interspersed at several locations. Large and small woody debris are common instream cover elements and help to form scour pools. Undercut banks were common throughout. Spot depths targeting deeper habitats (i.e. pools) averaged 22 cm (range = 16 to 31 cm). Spot bankfull widths averaged 1.57m (range = 1.35 to 1.80m). Water temperature was 10.0° C (Air Temperature was 16.0° C).

The riparian condition was dense mature forest providing extensive shade, with rare patchy openings. The riparian forest contributes large amounts of woody debris to the Mill Creek (Western Tributary).

A spring discharge area and old well casing are present approximately 15 m southwest from the edge of the field in Lot 19 of the existing subdivision. Water temperature was 8.5°C (Air Temp of 16.0°C) on October 6, 2004. The resulting surface water drained into the Mill Creek Tributary a further 15 m to the west. The riparian condition was dense mature forest providing extensive shade, with rare patchy openings. The riparian forest contributes large amounts of woody debris to the Mill Creek Tributary.

2.4 Vegetation Communities and Vascular Plants

The portion of the subject land proposed for development comprises primarily an active agricultural field. During the 2021 crop year, the field was planted in small grains, e.g. winter wheat. The landscape is open with few trees within the actively farmed area. No natural or semi-natural vegetation communities are mapped within this portion of the site. In the southeast corner of the site, the field was not cultivated and appears to be maintained as manicured lawn.

To the south of the proposed development is the existing Audrey Meadows subdivision. No natural or semi-natural vegetation communities were mapped in this area as part of the 2021 investigations.

Beyond the area proposed for development, to the west and north, is the Mill Creek Wetland Complex and associated upland (terrestrial) forests and plantations. The wetland areas are mainly bottomland swamp features, including coniferous, mixed and deciduous swamp communities. The conifer and mixed swamps support a range of tree species, including Eastern White Cedar (*Thuja occidentalis*), Eastern Hemlock (*Tsuga canadensis*), Balsam Fir (*Abies balsamea*), Tamarack (*Larix laricina*), Black Ash (*Fraxinus nigra*),

Green Ash (*Fraxinus pennsylvanica*), Red Maple (*Acer rubrum*), Swamp/Hybrid Maple (*Acer X freemanii*), Yellow Birch (*Betula alleghaniensis*), White Birch (*Betula papyrifera*), White Elm (*Ulmus americana*), Trembling Aspen (*Populus tremuloides*) and Balsam Poplar (*Populus balsamifera*).

There are also smaller, more isolated wetland pockets that occur at several locations on or adjacent to the subject land. These wetland pockets are mainly thicket swamps dominated by Shrub Willows (especially *Salix petiolaris*) and patches of sedge meadow.

The terrestrial (upland) communities are deciduous forests that surround much of the main Mill Creek Wetland Complex on the subject property, forming a buffer from the adjacent agricultural land uses and providing supporting habitat to the wetland. The deciduous forest patches are dominated either by poplars or by a mix of Sugar Maple (*Acer saccharum* ssp. *saccharum*), White Birch and poplars. A conifer plantation is located immediately to the west of the southwest portion of the proposed development. While the proposed development area is relatively flat, much of the woodland area exhibits kettle-kame topography, with varied slopes and aspects, and wetland pockets. The terrestrial woodlands have been mapped as Dry-Fresh Sugar Maple Deciduous Forest (FOD5); subdominant species include White Ash and in lowland/mid-slope areas Hemlock is mixed in with the Sugar Maple Forest. Groundcovers vary with disturbance history and canopy closure. Garlic Mustard (*Alliaria petiolata*), Dame's-rocket (*Hesperis matronalis*) and Urban Avens (*Geum urbanum*) are invasive alien plant species that occur in more disturbed areas. In contrast, richer areas support conservative native species such as Canada Waterleaf (*Hydrophyllum canadense*), Hitchcock's Sedge (*Carex hitchcockiana*) and Canada Violet (*Viola canadensis*).

Vegetation communities are shown on Map 4 and described briefly below. A working vascular plant checklist is provided in Appendix A.

Overview of Wetland Communities

SWD4-4 Yellow Birch Mineral Deciduous Swamp

Well north of the proposed development, there is a small wetland that includes a narrow band of Yellow Birch Mineral Deciduous Swamp (SWD4-4) which drains into a broader Black Ash Organic Deciduous Swamp (SWD5-1). Much of the woodlot has been selectively harvested; skidder trails, canopy gaps and logging debris is evident in many places.

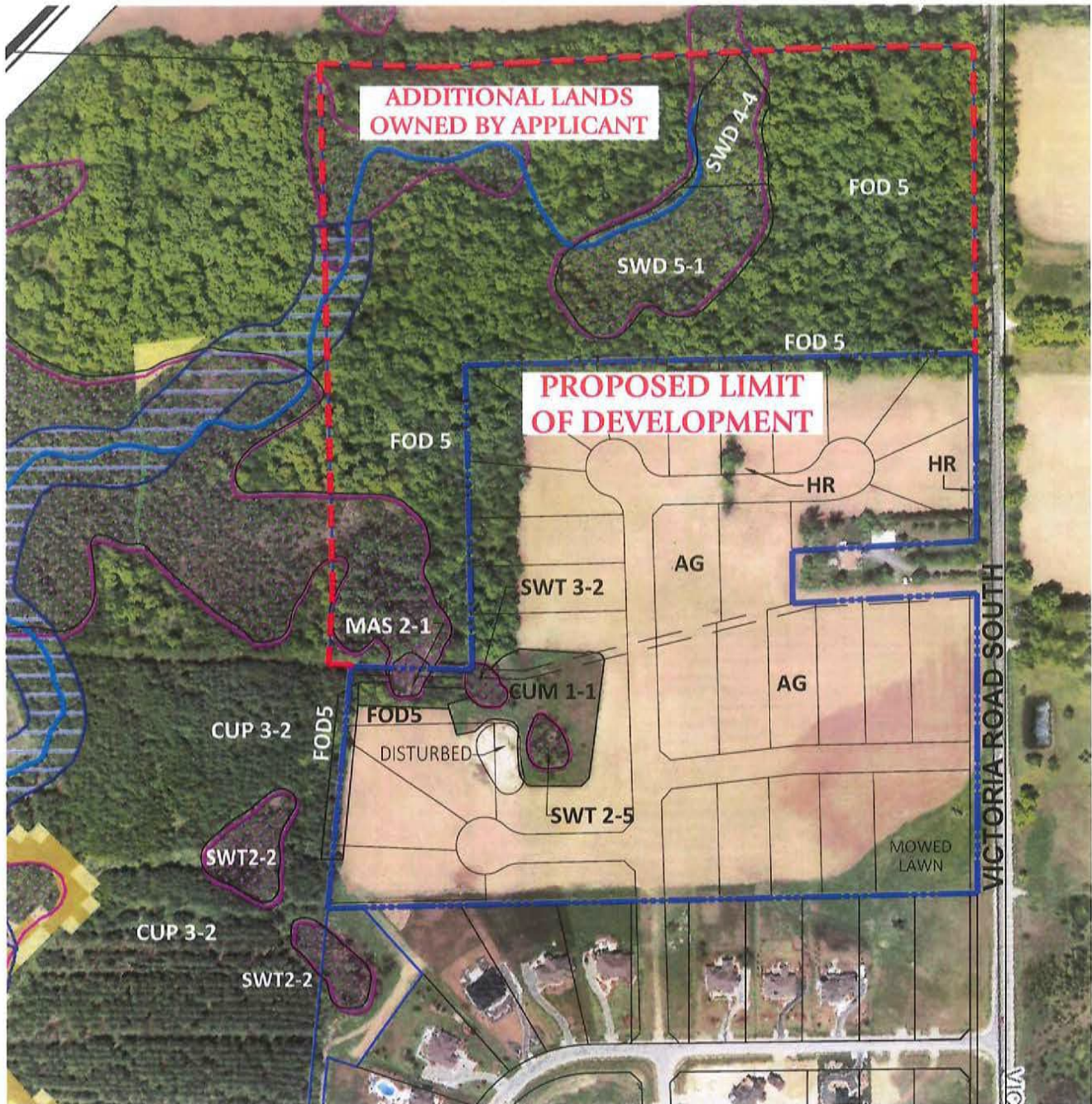
This area was mapped as Yellow Birch Mineral Deciduous Swamp (SWD4-4). The main tree species in SWD4-4 are Yellow Birch (*Betula alleghaniensis*), White Elm, Black Ash (*Fraxinus nigra*), Swamp Maple (*Acer X freemanii*), Eastern Hemlock and Eastern White Cedar (*Thuja occidentalis*). Canopy closure ranges from 60 to 80%. Trees are mainly in the 10-24 cm dbh size range. Seepage zones are evident along the margins of unit SWD4-4. Groundcovers include sedges (e.g. *Carex crinita*, *C. lacustris*, *C. lupulina*, *C. intumescens*, *C. stipata*, *C. scabrata*), Sensitive Fern (*Onoclea sensibilis*), Fowl Manna Grass (*Glyceria striata*), Orange Touch-me-not (*Impatiens capensis*), False Nettle (*Bohemeria cylindrica*) and Beggar's-ticks (*Bidens cernua*, *B. frondosa*, *B. tripartita*).

SWD5-1 Black Ash Organic Deciduous Swamp

North of the proposed development is a deciduous swamp community developed on organic (muck) soils. The community is located approximately 45-85 m north of the proposed development. The intervening area between the proposed development consists of irregular hills and ridges that are forested and at the toe of the slope is a relatively small, basin; SWD5-1 is situated in this basin. Along the edge of the community is a band of Eastern Hemlock. Canopy closure within SWD5-1 varies between 40 to 70% with several blown down trees. Trees in the unit include Black Ash, Yellow Birch and White Elm. Groundcovers include Sensitive Fern, Fowl Manna Grass and Orange Touch-me-not.

SWT 2-5 Red-osier Thicket Swamp Type

This is the most eastern wetland feature at this site. It appears to be dry during May/June but from inspection it is clear that this small kettle is inundated seasonally. Typically tree or shrub cover is greater than 25%



Forest/Woodland

FOD5 Dry Fresh Sugar Maple Deciduous Forest Type

Cultural

AG Agricultural Field

HR Hedgerow

CUP3-2 White Pine Coniferous Plantation

CUM1-1 Dry-Moist Old Field Meadow Type

— PROPOSED LIMIT OF DEVELOPMENT
— REGULATED WATERCOURSE

Wetland

SWD5-1

SWD4-4

SWT2-2

SWT3-2

SWT2-5

MAS2-2



REGULATED WETLAND

Black Ash Organic Deciduous Swamp
Yellow Birch Mineral Deciduous Swamp
Willow Mineral Thicket Swamp Type
Willow Organic Thicket Swamp Type
Red-osier Thicket Swamp Type
Cattail Mineral Shallow Marsh Type



SCALE 1 : 4000

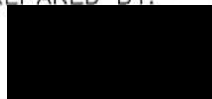
0 40 80 160 240 meters

SOURCE OF AERIAL PHOTOGRAPHY: GRCA 2015.

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VEGETATION COMMUNITIES

**MAP
4**

and vegetation is dominated by hydrophytic shrub and tree species. These features experience variable flooding regimes with a water depth of less than 2 meters. Standing water or vernal pooling occurs over 20% of the ground coverage. Shrubs include: Alternate-leaved Dogwood, Red-osier Dogwood, Common Buckthorn, Sandbar Willow, and Shining Willow. Trees include: Eastern White Cedar, American Elm and Basswood. Forbs included primarily facultative wetland plants and some plants that require cold damp sites including Field Equisetum and Sensitive Fern.

SWT 3-2 Willow Organic Thicket Swamp Type

This is the middle wetland of the three at this site. Some water was found in the depression bottom over about 90% of the bottom area. Typically tree or shrub cover is greater than 25% and vegetation is dominated by hydrophytic shrub and tree species. These features experience variable flooding regimes with a water depth of less than 2 meters. Standing water or vernal pooling occurs over 20% of the ground coverage. Substrates include at least some organic soils due to wetness and accumulation of duff. Shrubs include: Alternate-leaved Dogwood, Red-osier Dogwood, Wild Red Raspberry, Sand Bar Willow, Shining Willow and common Elderberry. Trees were found around the wet perimeter and included: Balsam Poplar, Sugar Maple, Green Ash, White Birch, and White Pine. Forbs included many facultative wetland species and some plants that require rich organic soils and cold damp sites such as Field Equisetum, Sensitive Fern, Nettle Chain Fern and Small Yellow Ladys Slipper.

MAS 2-1 Cattail Mineral Shallow Marsh Type

This is the lowest wetland of the three at this site. This vegetation community is in a low pocket in an FOD5 area and is the extension of a series of contiguous wetland habitat that extends to the west and north. The entire low basin in which this marsh occurs is wet and is dominated by the marsh and a surrounding shrub fringe. Typically tree and shrub cover is less than or equal to 25% while hydrophytic, emergent macrophyte cover is greater than or equal to 25%. These types of features have variable flooding regimes with a water depth of less than 2 meters and standing or flowing water for much or all of the growing season. Organic substrates are typical in sheltered areas as found at this site where there are low shoreline energies and disturbance.

Shrubs include: Alternate-leaved Dogwood, Red-osier Dogwood, Chokecherry, Bebb's Willow, Heart-leaved Willow, Sandbar Willow, Shining Willow and Common Elderberry. Trees include: Sugar Maple, White Birch, Green Ash, White Spruce, White Pine, Aspen Poplar, Black Cherry, Eastern White Cedar and Basswood. Forbs included: a predominance of broad-leaved Cattail, Sensitive Fern and a host of facultative and obligate plants.

SWT2-2 Willow Mineral Thicket Swamp Type

Several patches of thicket swamp dominated by shrub willows occur adjacent to the site. These communities typically feature varying levels of shrubby cover, with more open meadow marsh patches interspersed. Typical shrub willows include *Salix bebbiana*, *S. discolor*, *S. eriocephala*, *S. lucida* and *S. petiolaris*. The main groundcovers are sedges (*Carex atherodes*, *C. hystericina*, *C. lacustris*, *C. retrorsa*, *C. stricta*), Wool-grass (*Scirpus cyperinus*), Canada Blue-joint (*Calamagrostis canadensis*), Water-parsnip (*Sium suave*) and beggar's-ticks (*Bidens cernua*, *B. frondosa*, *B. tripartita*).

Overview of Terrestrial Communities

FOD5 (north woodland and adjacent west boundary) – Dry-Fresh Sugar Maple Deciduous Forest Ecosite

This type of forest has a tree cover of over 60%. Deciduous tree species make up 75% of canopy cover. These habitat types are found in moderately dry to fresh soil moisture regimes including shallow soil over bedrock, rock, sands and loams. Sites are usually rapid to well drained features and are typically on upper to middle slopes or table lands with suitable drainage. Shrubs included: Alternate-leaved Dogwood (*Cornus alternifolia*), Buckthorn, Chokecherry and Common Elderberry. Patches of Wild Red Raspberry (*Rubus idaeus* ssp. *melanolasius*) occur where the canopy is open. Trees included: Sugar Maple, White Ash, scattered White Elm (*Ulmus americana*), Bitternut Hickory (*Carya cordiformis*), Ironwood (*Ostrya virginiana*), Black Cherry (*Prunus serotina*), Red Oak (*Quercus rubra*), Eastern Hemlock (*Tsuga*

canadensis), White Pine (*Pinus strobus*), Green Ash, Basswood, Trembling Aspen, Balsam Poplar, and Slippery Elm. Forbes included species that are typically found in rich or dry woods.

Sugar Maple (*Acer saccharum* ssp. *saccharum*) is the dominant canopy tree, with White Ash (*Fraxinus americana*) as a frequent associate. The canopy is variable, ranging from greater than 90% in even-aged pole stands to less than 20% in areas cut more recently. Most of the trees are in the 10-24 and 25-50 cm dbh size ranges; dense patches of Sugar Maple and White Ash saplings occur in more open canopy conditions. There are some trees larger than 50 cm dbh. In some sections there are dense patches of Alternate-leaved Dogwood in the midstorey, in areas of previous selective cutting. Other shrubs include Chokecherry (*Prunus virginiana*) and Common Buckthorn (*Rhamnus cathartica*).

FOD5 (small segment south facing at MAS 2-1) – Dry-Fresh Sugar Maple Deciduous Forest Ecosite

This type of forest has a tree cover of over 60%. Deciduous tree species make up 75% of canopy cover. These habitat types are found in moderately dry to fresh soil moisture regimes including shallow soil over bedrock, rock, sands and loams. Sites are usually rapid to well drained features and are typically on upper to middle slopes or table lands with suitable drainage. Shrubs included: Common Buckthorn and Wild Red Raspberry. Trees included: Sugar Maple, Green Ash, White Spruce and Basswood. Forbes included species that are typically found in rich or dry woods.

FOD5 (western-most edge leading south to pine plantation) – Dry-Fresh Sugar Maple Deciduous Forest Ecosite

This type of forest has a tree cover of over 60%. Deciduous tree species make up 75% of canopy cover. These habitat types are found in moderately dry to fresh soil moisture regimes including shallow soil over bedrock, rock, sands and loams. Sites are usually rapid to well drained features and are typically on upper to middle slopes or table lands with suitable drainage. Shrubs included: Alternate-leaved Dogwood, Buckthorn, Chokecherry and Common Elderberry. Trees included: Sugar Maple, Green Ash, Black Cherry and Basswood. Forbes included species that are typically found in rich or dry woods.

CUM1-1 Dry-Moist Old Field Meadow Type

This type of cultural meadow has a tree cover of less than 25% and a shrub cover of less than 25%. Site conditions and substrate types are variable. This type of community results from or is maintained by cultural or anthropogenic –based disturbances. Soils are typically parent mineral material or mineral soil. At this site past activities have included installation of a utility line, agriculture and gravel mining for a small borrow pit. This feature is typical of an Ontario old field meadow. Shrubs include Alternate-leaved Dogwood, Red-osier Dogwood, Buckthorn, Chokecherry and Common Elderberry. Trees include: Sugar Maple, Green Ash and Black Cherry. Forbes and grasses are typical of a dry-fresh environment and include many adventitious species many of which are aliens. Grasses were seasonally immature.

CUP 3-2 White Pine Coniferous Plantation Type

This type of plantation has a tree cover of greater than 60%. Site conditions and substrate types are variable. This type of community is resulting from or maintained by cultural or anthropogenic-based disturbances. This particular plantation is dominated by White Pine. Shrubs include: Choke Cherry, Red-osier Dogwood, Buckthorn and Common Elderberry. Trees include: White Pine, Red Pine, Scots Pine, Sugar Maple, Green Ash, White Spruce and Basswood. Forbes and grasses are typical of a dry-fresh environment and include many adventitious species many of which are aliens. Grasses were seasonally immature and will be identified later in the summer as they develop diagnostic characteristics. Groundcover within the plantation was typically devoid of a rich herbaceous layer.

Hedgerows

Two hedgerows were mapped along the northern and northeastern property boundary. The northern hedgerow is approximately 70 m long and 3-5 m in width. There is a distinct drop in elevation between the farm fields at this location marking the difference in fields. The trees are in poor shape and include the following: Sugar Maple, Basswood, White Ash, Black Walnut. The understorey is typically comprised of weedy species including several pasture grasses, burdock and trefoil.

The northeastern hedgerow is located along Victoria Road and is approximately 80 m in length. The hedgerow is dry and consists of a variety of species including: Sugar Maple, White Ash, Black Cherry, Eastern White Cedar. Additional species include Common Buckthorn and Riverbank Grape. The understory is comprised of weedy herbaceous species including Garlic Mustard (*Alliaria petiolata*), Dame's-rocket (*Hesperis matronalis*) and Urban Avens (*Geum urbanum*) and a variety of pasture grasses.

2.5 Wildlife and Wildlife Habitat

No provincially rare species of wildlife were observed during the field surveys of the subject property or adjacent land areas. A list of species observed is included in Appendix B. A total of 19 species were observed, including 17 bird and two mammal species were seen (white-tailed deer and grey squirrel) and signs other mammal species were encountered. The mammal species are abundant in Ontario and locally.

One amphibian species, American toad, was seen (SWT3-2). Green Frogs were heard in the wetland west of the subject property on the hydro corridor. This offsite wetland system is anticipated to provide breeding habitat for amphibians.

No reptiles were seen, but it is probable that common snake species such as eastern gartersnake (*Thamnophis sirtalis*) and red-bellied snake (*Storeria occipitomaculata*) are present on occasion.

All 17 of the bird species detected were considered probable breeders on site or immediately adjacent to the property. All of these species have an S-rank of S5 indicating that they are secure and common to abundant in Ontario. The diversity of bird species present and the assemblage of species is typical of deciduous woodlands in this region of Ontario.

Eastern Wood Pewee was heard in the woodland to the north of the proposed development.

No endangered or threatened species inhabit the subject lands. There is no significant habitat of endangered and threatened species on or adjacent to the site.

The primary area of wildlife habitat associated with the local area is the Mill Creek Wetland Complex and associated upland forest areas that abut the wetland systems. Extensive signs of wildlife use in these areas (primarily white-tailed deer) were observed during the field studies. The agricultural systems on the subject site contribute little in the way of wildlife habitat values.

SIGNIFICANT WETLANDS

The background information review and site investigations conducted as part of the EIS identified significant wetlands within 120 meters and as part of the development lands. The significant wetland is the Mill Creek Wetland Complex. This landscape feature covers over 1400 ha but intrudes in only one spot near to the old borrow pit in the north west where the MAS 2-2 feature was identified. Other smaller pocket wetlands occur nearby but have not been complexed with the larger wetland.

The County of Wellington Official Plan recognizes the importance of the Mill Creek Wetland Complex. This significant wetland is designated as Core Greenland in the land use schedule for Puslinch Township. Two small, unevaluated wetlands are mapped east of the wetland complex. These are shown as Core Greenland features in the County of Wellington Official Plan because they are regulated by the GRCA.

These features are part of an area that had been disturbed by historic farming activities including an aggregate borrow pit. Now that this area is actively regenerating it is recognized as having conservation value and will be set aside as public lands and a conservation reserve. Development envelopes will avoid this area and other affected woodlands. As well, zoning setbacks and other mechanisms could be drafted to ensure that development does not impact these features. Renaturalization of the area of the historic borrow pit as well as vegetated buffers will be implemented. Potential ecological enhancement areas have been identified.

SIGNIFICANT WOODLANDS

The woodlands surrounding the development site are recognized as significant primarily because of size and landscape contiguity over a large area. Portions of the woodland system south and west of the subject area are not mapped as wetland features. These upland forest communities contain species such as Sugar Maple, White and Green Ash, Black Cherry, Slippery Elm, White Pine, American Elm, Basswood and Eastern White Cedar. The County of Wellington has mapped these woodland areas as significant woodlands.

The western portion of the site has been mapped as part of the Aberfoyle Woods Environmentally Sensitive Area (ESA). The ESA extends south and west of the site and incorporates much of the area mapped as part of the Mill Creek Wetland Complex. The Aberfoyle Woods ESA consists of a range of habitats including wetlands and dry mature woodlands.

The woodlands will not be affected by this development because of setbacks and planned vegetative buffers which will use native species that are bioregionally appropriate.

SIGNIFICANT VALLEYLANDS

According to the Natural Heritage Reference Manual 2010 (NHRM), section 8.1, "*Valleylands means a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year.*" In accordance with Section 8.3 of the NHRM there are no significant Valleylands on or within 120m of the proposed development lands. It is noted that the Mill Creek traverses lands to the south of the first phase of the existing Audrey Meadows subdivision which is about 400 m away from the proposed development and will not be impacted through development activities. The development intent is to optimize recharge.

AREAS OF NATURAL AND SCIENTIFIC INTEREST

A review of current background information sources searched as part of this EIS did not identify any candidate or designated Areas of Natural and Scientific Interest (ANSI) on or within 120 meters of the proposed development site.

SIGNIFICANT WILDLIFE HABITAT

A review of historical data from the GRCA and the OMNRF was used along with site investigations at the study area to determine if this exists within or adjacent to the proposed development lands. Wildlife habitat was investigated in the study area to identify candidate Significant Wildlife Habitat (SWH). The ELC community mapping completed for this EIS (Map 4) was used as the basis for determining the presence (or absence) of candidate SWH.

The OMNR Significant Wildlife Habitat Technical Guide (OMNR 2000) and Significant Wildlife Ecoregion Criteria Schedules (OMNR, January, 2015) were the primary documents used to identify and evaluate wildlife habitat. The Significant Wildlife Habitat Technical Guide describes five broad categories of wildlife habitat which includes: (1) seasonal concentration areas; (2) rare vegetation communities; (3) specialized habitat for wildlife; (4) habitat for species of conservation concern; and (5) animal movement corridors.

A review of these documents as well as technical monographs for individual species were used to determine if there is potential habitat for species of conservation concern.

SEASONAL CONCENTRATION OF ANIMALS

The Significant Wildlife Habitat Technical Guide (OMNR) 2000 has identified 14 potential types of seasonal concentration areas:

WINTER DEER YARDS

- The OMNRF has undertaken mapping for “Areas of Wintering Deer Yard Habitat”. Deer wintering area has been mapped on lands south and west of the site. The deer wintering habitat is primarily related to the forested portions of the property that are mapped as part of the Core Greenland area.
- While there are deer game trails in the woodlands along the north and west edges of the proposed development lands there is no habitat within these lands which are under active agricultural usage.

MOOSE LATE WINTER HABITAT

- Not applicable in Wellington County

COLONIAL BIRD NESTING SITES

- No observations of colonial nesting birds were made during the site field visits. Landscape use, terrain characteristics and habitat types are not conducive to colonial bird nesting within the study area.

WATERFOWL STOPOVER AND STAGING AREAS

- The Guelph District of OMNRF, Canadian Wildlife Service and Ducks Unlimited Canada have jointly undertaken historical land reviews for potential significant waterfowl stopover and staging areas in Wellington County. The subject lands have not been identified nor do they have suitable habitat to support this ecological function within the proposed licensed boundary or adjacent lands.

WATERFOWL NESTING HABITAT

- No suitable waterfowl nesting habitat occurs within the subject lands or the adjacent lands.

SHOREBIRD MIGRATORY STOPOVER SITES

- No habitat is available within the subject lands.

LAND BIRD MIGRATORY STOP OVER AREAS

- There are no habitat opportunities within the agricultural lands which make up over 90% of the subject lands.
- Woodland and wetland areas provide opportunities for seasonal migrants and these areas will remain as they are and will not be impacted by the proposed development.

RAPTOR WINTERING AREAS

- There is potential for hawks such as Red-tailed hawk, Coopers Hawk and American Kestrel to find habitat at this site. All birds favor a landscape habitat mix of open fields, scrub land and woodlands. In this case with land use dominated by agriculture opportunities are limited and will be about the same in a developed state. It is noted that a Red-tailed Hawk was seen flying over the site on May 23, 2021. Since the surrounding regional landscape is largely rural and natural it is expected that raptors are commonly sighted.

WILD TURKEY WINTERING AREAS

- The only potential for Wild Turkey to winter here is the west-central area of the former borrow pit near to the MAS 2-2 which is likely to have springs and has the kind of mixed habitat with Eastern White Cedar groupings for cover.

TURKEY VULTURE SUMMER ROOSTING AREAS

- No suitable habitat or surrounding habitat features to support this ecological function were found within the subject lands or adjacent lands.

REPTILE HIBERNACULA

- No suitable habitat or surrounding habitat features to support this ecological function were found within the subject lands or adjacent lands.

BAT HIBERNACULA

- No suitable habitat or surrounding habitat features to support this ecological function were found within the subject lands or adjacent lands.

BULLFROG CONCENTRATION AREAS

- At the time of the spring field survey (May 23, 2021) no bull frogs were seen or heard calling. It is noted that habitat conditions were not suitable for any sizeable amphibian concentrations and there is no open water within the subject lands or adjacent lands.

MIGRATORY BUTTERFLY STOPOVER AREAS

- The subject lands are under agricultural production with little old field character. Therefore, there is no suitable habitat or surrounding habitat features to support this ecological function within the proposed development lands or on adjacent lands.

WILDLIFE MOVEMENT CORRIDORS

No provincially or regionally significant corridors are designated for this area of Ontario. Locally the Mill Creek and associated woodlands provide cover for deer herds. There are game trails within the woodlands and along the edges of farm fields but these are small and incidental. Field investigations confirmed that no significant wildlife corridor functions occur within the subject lands or adjacent lands. It is noted that there are game trails at the woodland edges that lead into the adjacent woodlands and disperse thereafter.

RARE VEGETATION COMMUNITIES OR SPECIALIZED HABITAT

- RARE VEGETATION COMMUNITIES
 - No rare or unusual vegetation communities are found within the proposed development lands. Most of the land use is for agricultural purposes and the vegetation and ELC units within the subject lands and adjacent lands have been described as not significant in the foregoing.
- SPECIALIZED HABITAT FOR WILDLIFE
 - The Significant Wildlife Habitat Technical Guide (OMNR, 2000) identifies 12 categories for the evaluation of specialized habitat for wildlife:
 - Sites supporting area sensitive species:
 - No suitable habitat or surrounding habitat features were observed to support this ecological function within the subject lands or the adjacent lands. The majority of current land use within the subject lands is predominantly agricultural.
 - Forest stands providing a diversity of habitat:

- The results of field studies indicate that the only forest stands of significance are on adjacent lands. The subject lands have only a very small fringe of woodland to the north and west.
- Old Growth or mature forest stands:
 - There were no old growth characteristics, as defined by the Province for Old Growth Forests. Mature forest stands were found within the woodlands on adjacent lands.
- Seeps and Springs:
 - There are seeps and no clear springs associated with MAS 2-2 which is part of the Mill Creek Wetland Complex. There is potential for this landscape feature to have over wintering habitat for Wild Turkeys.
- Woodlands Supporting Amphibian Breeding Ponds:
 - As noted earlier no open water was found at the MAS 2-2 feature. Amphibian breeding habitat was not identified in the spring field season.
- Special Woodland Feeding Habitat:
 - Game trails of white-tailed deer are found within the subject lands and the adjacent woodland to the north and west. However, there is no special woodland feeding habitat found in the subject lands or adjacent lands. No mast trees were found here.
 - It is not expected that development of the subject lands would negatively affect wildlife.
- Osprey and specialized raptor nesting habitat:
 - No suitable habitat was found within the subject lands.
- Turtle Nesting Habitat:
 - No suitable habitat or evidence of turtle nesting was found within the subject lands or adjacent lands.
- Special Moose Habitats:
 - Not applicable in Wellington County.
- Mink and Otter Feeding/Denning Sites; Marten and Fisher Denning Sites:
 - No suitable habitat for Otter, Marten, Fishers was found at the subject lands.
 - Mink feeding and denning habitat was not found at the subject lands or adjacent lands.
- Areas of High Diversity:
 - No areas of high diversity or specialized microhabitat were found or recognized within the subject lands; there is high diversity in the Mill Creek Wetland Complex on adjacent lands.
- Cliffs and Caves:
 - No geological features of this nature were identified within the subject lands or the adjacent lands.

HABITAT OF SPECIES OF CONSERVATION CONCERN

FLORA

Field investigations of the subject lands and adjacent lands included plant surveys which were used to complete Ecological Land Classification inventories and habitat descriptions. Plants are described in Appendix "A" – Plant Species List. It is noted that no plant species of Conservation Concern at any level of classification was found.

FAUNA

The results of the background information review, ELC mapping and field surveys showed that the subject lands do not contain significant wildlife habitat features.

During Breeding Bird surveys, the Eastern Wood Peewee was detected signing in woodlands of the adjacent lands; this was identified in earlier studies for the original Audrey Meadows development. This species is rated as S4B Provincially.

FISHERIES HABITAT

Section 34 of the Fisheries Act notes that, "... fish habitat" means spawning grounds and nursery, rearing, food supply and migration areas on which fish depend on directly or indirectly in order to carry out their life processes ...". There are no fish habitat on or within 120 m of the subject property.

2.6 Environmental Constraints

Potential environmental constraints include the following:

Significant Natural Heritage Features

- Mill Creek Wetland Complex – provincially significant wetland complex. This feature basically reflects the limits of the Regulated Wetlands with the exception of units SWT3-2 and SWT2-5 which are not complexed into the provincially significant wetland.
- Mill Creek – cold water fisheries (providing Brook habitat further south of the proposed development) are shown as the Regulated Watercourse.
- Significant Woodland - This feature basically reflects the limits of community FOD5.
- Significant Wildlife Habitat – deer wintering area associated with the woodland and wetland systems west and south of the site. This feature basically reflects the limits of community FOD5 and the Regulated Wetlands.

Other Potential Environmental Constraints

- Aberfoyle Woods ESA – recognized as a Greenland feature in the County of Wellington Official Plan. This feature basically reflects the limits of community FOD5.
- Two Wetlands – these wetlands (SWT2-5 and SWT3-2) were unevaluated by the MNRF but are Regulated Wetlands by the GRCA.
- Fill Regulated Areas (Yellow) on the site.

Map 4 illustrates these environmental constraints on the Vegetation Communities Map.

For the most part, environmental constraints are primarily associated with the woodland/wetland feature that is located north and west of the site. As can be seen from a review of Map 4, the proposed development minimally encroaches into any natural or semi-natural environmental systems. The encroachment is related to rear lotting of approximately 15 rural settlement lots. Given the inaccuracy of the aerial photography used as part of the mapping for this study, the precise limits and extent of the encroachment cannot be determined. Future surveys of the proposed lot boundaries, to be completed during the draft plan of subdivision process, will clarify the extent of encroachment.

2.7 Natural Heritage Features and Functions

The following table summarizes the functions associated with adjacent land areas in proximity to the subject land.

Table 1: Functions Associated with Site and Adjacent Lands

Function	Description/Relationship to Site
Groundwater Recharge	Recharge functions for local aquifer – Paris Galt Moraine
Groundwater Discharge	Discharge functions are related to Mill Creek & Wetlands
Groundwater Quality	Primarily related to Mill Creek and Wetlands
Groundwater Quantity	Land up-gradient of Mill Creek and Wetlands

Surface Water Storage and Conveyance	Land up-gradient of Mill Creek and Wetlands
Surface Water Quality	Land up-gradient of Mill Creek and Wetland areas
Aquatic Habitat	Mill Creek (cold water fish habitat, i.e. Brook Trout)
Terrestrial Habitat	Wetland and Forest lands adjacent to site
Linkages/Corridors	Lands adjacent to Wetland and Forest Systems

The reader is directed to the Groundwater Science Corp. report (June, 2021) dealing with the Paris and Galt Moraine and associated Official Plan policies. This report provides an overview of the groundwater and surface water functions and potential impacts of the proposed development on these functions. A primary component of the moraine system relates to groundwater infiltration. As noted on the development concept, an area has been set aside in the proposed development to commit to infiltration and stormwater management. This area is located at the southeastern portion of the proposed development and is associated with the infiltration area set aside for the approved development south of the subject property.

With respect to aquatic habitat, it is recognized that the tributaries of Mill Creek are well separated from the proposed development, and no further habitat enhancements are required to maintain aquatic habitat functions.

With regard to enhancements of terrestrial habitat and linkages, it is noted that the area CUM1-1 has been set aside in the proposed development and will be enhanced with native plantings. This area could be dedicated to the municipality or GRCA, subject to conditions within draft plan approval.

3. DESCRIPTION OF THE DEVELOPMENT PROPOSAL

The proposed development is a rural settlement subdivision. The total land base included in this development proposal is as follows:

- 10 ha set aside for rural settlement residential lots,
- 1.55 ha to be used for Ecological Enhancements/Open Space (i.e. Block E),
- 0.58 ha for Stormwater Management and Infiltration Facility, and
- The remainder for internal roads and Open Space areas.

The proposed rural settlement subdivision, for the most part, will be situated on the farmland portion of the site. The future draft plan of subdivision will be designed to ensure that the removal of trees in natural/semi-natural communities is minimized and to minimize the potential for encroachment into significant woodland areas or wetland areas. Details of the specific setbacks will be documented in a future draft Plan of Subdivision application, subject to approval of the Official Plan Amendment.

The Audrey Meadows concept plan includes the following:

- 29 rural settlement lots (approximately 0.30 ha in size),
- private individual wells (i.e. deep drilled wells into the bedrock aquifer),
- private individual septic systems with tertiary nitrate treatment,
- all private tertiary systems are to be located in the front yards to maximize the separation distance from the septic system to adjacent natural heritage features, and
- fully landscaped lots by the builder, in accordance with proposed agreements and Environmental Management Principles that will be either registered on title or set out as a condition of Draft Plan Approval.

The overall plan of development allows for a complete integration of developer/builder, where the Good family and George R. Good Construction Limited will be in charge of the project from start to finish.

A primary design focus of the proposed development has been on the grading plan for the site. Grading on the site will be minimized, primarily restricted to road construction. To large extent, existing grades and drainage patterns will be replicated in the grading plan. At-source infiltration of water from roof leaders within the subdivision will be employed. The proposed storm water management facilities will be located as far from existing wetlands and natural heritage features as possible. Emphasis will be placed on ensuring that the water quality will not be degraded, and if possible, water quality will be improved.

3.1 Stormwater Management Report

A Stormwater Management Plan for the proposed development was prepared by Triton Engineering Services Limited (2021). The main components of the stormwater plan area as follows:

- *Stormwater management controls will be implemented to provide both quality and quantity control, thereby mitigating negative impacts to the existing drainage system. The proposed SWMF Block is sufficient to accommodate the foot print of the proposed facility that will have the capacity to provide Quality treatment and to attenuate post to pre development storm events up to the 100-year event"*

3.2 Functional Servicing

Triton Engineering Services Limited completed a Functional Servicing and Stormwater Management report (2021). The conclusions of the report are as follows:

"Based on the information provided within this Functional Servicing Report, we conclude that the Audrey Meadows development can be adequately serviced as outlined in this report. Summary as follows;

- *The site can be accessed via two entrances; new Victoria Road entrance and a road extension from Old Ruby Lane. Internal roads will be constructed to Township of Puslinch municipal standards for an urban local road on a 20m Right-of-Way.*
- *Private sanitary treatment systems can be adequately accommodated on the proposed large lots. Preliminary geotechnical background information indicates that site conditions are suitable for septic sewage systems.*
- *Private wells are proposed for water servicing of the development. The lot configurations are sufficient to adequately accommodate a well on each lot. Preliminary hydrogeologic background information indicates that site conditions are suitable to provide adequate potable water for the proposed development.*
- *The development can be fully serviced with natural gas, hydro, cable and telecommunications.*

4. POTENTIAL IMPACTS OF DEVELOPMENT AND MITIGATION RECOMMENDATIONS

4.1 Potential Direct Impacts

The range of potential environmental impacts can be divided into two categories: direct impacts and indirect impacts. Direct impacts typically include effects such as habitat alteration, forest removal and/or draining of a wetland or nearby watercourse. Direct impacts tend to be immediate and obvious to recognize. Direct impacts that will be assessed include: 1) Removal of woodland or wetland area, 2) Disruption of surface water flow to wetland areas, and 3) Removal of wildlife or aquatic habitat.

Removal of Woodland or Wetland Areas

The proposed development will not result in the removal of woodland area or wetland area. The development design has placed particular emphasis on avoiding natural heritage features and retaining a separation distance from the adjacent natural heritage features. The proposed development concept will focus on the existing agricultural fields and cultural landscape associated with the farmland.

The proposed development concept illustrates some limited backlotting into the woodland system. The extent of backlotting will be confirmed later in the process through the draft plan of subdivision process. The accuracy of the mapping, due to the fact that aerial photography has been used to develop the figures in this report, will be refined through surveys typically associated with a latter phase of the development approvals.

Through conditions of draft plan approval, it is anticipated that an appropriately worded restrictions can be put in place to ensure that the woodland is not removed to facilitate construction of the building envelope.

For the most part, wetland communities are setback further into the woodlands in proximity to the site. A 30 m setback for most of the lots will be provided. However, the lots next to the unclassified wetlands, SWT2-5 and SWT3-2, will have 15 m setbacks. A reduced setback is considered appropriate for these wetlands given that the adjacent lands are heavily disturbed from previous extraction and other activities (i.e. ATV trails). The surrounding area, CUM1-1 and the Disturbed land, will be revegetated with native species appropriate for the area.

Disruption of Surface Water Flow to the Wetland Areas

The proposed development will not significantly alter surface water contribution to any adjacent wetland areas. The profile of the road and the grading plan proposed for the development have emphasized the need to replicate existing drainage patterns as much as possible.

Removal of Wildlife or Aquatic Habitat

The proposed development will not result in the removal or disruption of wildlife or aquatic habitats. As previously described, most of the lots will remain setback from natural heritage features thus ensuring that wildlife and aquatic habitat functions are retained. For lots that included portions of the dripline and edge species, restrictions will be implemented to ensure that these areas are not disturbed.

Potential Indirect Impacts

Indirect impacts refer to the secondary impacts of development. Indirect impacts may be transported to downstream locations and become apparent over time. A "time lag" may also be a characteristic of an indirect impact, whereby the effect may take some months or years to be noticeable. As a result, indirect impacts are often more difficult to define and assess than direct effects. The integration of other disciplines, such as hydrology and hydrogeology, will be important in conducting this component of the assessment.

The main indirect effects that will be addressed include the following: Effects on Fish Habitat, Effects on Surface Water Storage and Conveyance, Effects on Ground Water Recharge and Discharge, and Effects on Environmental Linkages and Corridors.

Effects on Fish Habitat

The proposed development is well separated from fish habitat. The closest residential lot is approximately +/- 85 m of an intermittent tributary of Mill Creek. The intervening lands between are comprised of existing vegetation associated Sugar Maple Forest. Much of the remainder of the proposed development is located well over 120 m from the northern/western tributary of Mill Creek.

The main types of impacts that could occur on the fish habitat relate to decreased water quality, primarily associated with suspended sediments and nitrate loadings. The potential for increased sediment loads into the creek system is not felt to be significant concern given that the tributary of Mill Creek is well buffered (e.g. existing vegetation) and well setback from the proposed development. In addition, the proposed development contemplates limited site grading and any sediment that is transported down gradient from the site can be contained by proper erosion control measures.

The proposed development will be serviced by individual private sewage treatment systems with tertiary treatment for nitrate. The nitrate loading is expected to be less after residential development compared

to current nitrate loading from agricultural use of the site (Groundwater Science Corp. 2021). Given this finding, it is reasonable to conclude that the water quality of Mill Creek and the adjacent natural heritage features could be improved by removing the existing agricultural uses associated with the subject property. In the long run, this could prove to be a significant net improvement to the ecological functions associated with the site.

Surface Water Storage and Conveyance

A primary concern is focused on the surface water storage and conveyance impacts associated with development on the subject property. To accommodate these types of concerns, particular emphasis was placed on onsite stormwater management, i.e. at-source infiltration of water, limiting the amount of onsite grading through the use of a rural cross-section for the internal road design. In addition, the current plan of development does not encroach into any flood regulated area. Therefore, the proposed development is not anticipated to significant impact on the existing surface water storage and conveyance functions on the site.

Ground Water Recharge and Discharge

The ground water recharge functions of the site will remain the same or improve as a result of the proposed development. The use of infiltration methods to control surface water runoff will assist in enhancing this function. The discharge functions on the site are limited to wetland and near wetland areas. As previously described, there is no impact on wetland systems or functions anticipated.

Environmental Linkages and Corridors

There are no existing environmental linkages or corridors on the site. All wildlife habitat values associated with the local area are attributed to natural and semi-natural systems located on the perimeter of the proposed development.

4.2 Mitigation and Enhancement Recommendations

In summary, the main method of minimizing impacts on the natural environment is through avoidance. Emphasis at the site plan stage has been placed on avoiding all natural and semi-natural heritage features associated with the site.

Setbacks

A setback has been placed along the rear lot lines of the proposed development. The setback is described as follows:

- Abutting the rear lot lines of Nos. 5, 6 and 7, a 15 m setback has been recommended. This setback will help to ensure that impacts on the adjacent wetland feature are minimized. No development or disturbance will occur within the setback area;
- Abutting the rear lot lines of Nos. 8-19, a 5 m setback from the dripline of trees has been recommended. This setback will ensure that impacts on the adjacent forest are minimized. No development or disturbance will occur within the setback area;
- A variable setback of 15-30 m has been established around unit SWT2-5 (unevaluated wetland). For the most part this setback ensures that the road system is well removed from the adjacent natural heritage system.

As previously note, Block E should be re-planted with native materials. The size and type of ecological plantings should be detailed in a Vegetation Management Plan to be prepared as a condition of Draft Plan of Subdivision.

Public Education

It is recommended that a simple program of public education could be developed to supplement the mitigation measures described above. This program could include the following:

- Signage identifying the wetland area and creek system;

- A Notice posted on title prohibiting grade alteration or construction outside defined building envelopes;
- A general homeowners' information package on the responsibilities of living next to natural areas, pet control, and dealing with wildlife.

Landscaping

The landscaping program for the proposed development is to be planned, with input from the Township of Puslinch, by a qualified Landscape Architect. The landscaping program for the site should include, as a minimum, the following:

- The use of native vegetation for all tree and shrub species;
- The utilization of species in the rear lawns that are low maintenance, require minimal irrigation and, if possibly nitrogen fixers; and
- The implementation of a 5 m native tree planting along the rear of Lot Nos. 5-7 and 8-19, inclusive.

4.3 Net Environmental Effects

The net environmental effect of the proposed development is considered to be positive, given the potential for ecological enhancements and the potential for surface water-quality improvement in the local area. The following table summarizes the net environmental impacts for the proposed development, after mitigation is included.

Table 2: Net Environmental Impacts – Audrey Meadows

Ecological Function	Area Affected	Potential Effect	Mitigation	Net Effect
Groundwater Recharge	Recharge areas include most of the site.	Minimal	Stormwater management plan to replicate or enhance water recharge. Infiltration area (Block B) to be integrated with Storm Water Management in the Southeast portion of the site.	No negative impact
Groundwater Discharge	Discharge areas include Mill Creek tributaries and the wetland areas	Minimal	Enhanced infiltration, i.e. lot level controls	No negative impact
Water Quality	Mill Creek tributaries (primarily) and wetland areas to a lesser extent	Minimal	Tertiary treatment systems to reduce Nitrogen loading on offsite areas. Nutrient loading to be reduced, as compared to agricultural usage. Implementation of vegetated buffers and erosion/sediment control measures to maintain or improve water quality. Onsite landscaping and Vegetation Management Plan to assist in nutrient uptake.	No negative impact, possible positive impact
Surface Water Storage and Conveyance	Mill Creek tributaries, wetland areas	Minimal	All areas to be avoided and development to be setback from these areas. Storage and Conveyance functions to be protected with maintenance of existing forest cover, vegetated buffers and ecological plantings.	No negative impact
Aquatic Habitat	Mill Creek Tributaries	Minimal	Development to be setback from intermittent tributary of Mill Creek and Vegetated buffers to be implemented.	No negative impact and possible positive impact
Terrestrial Habitat	Wetland and Woodland Areas	None	Development envelopes to avoid wetland and woodland areas. Zoning setbacks and other binding restrictions could be drafted to ensure construction does not occur within woodland systems. Vegetated buffers to be implemented.	No negative impact and possible positive impact

			Potential ecological enhancement areas identified.	
Linkages and Corridors	Lands adjacent to Wetland and Woodland Areas	Minimal	Potential ecological enhancement areas have been identified and could improve the overall connectivity of the site to adjacent natural heritage features.	No negative impact and possible positive impact

5. RECOMMENDATIONS AND CONCLUSIONS

Stovel and Associates Inc. were retained by Audrey Meadows Inc. to complete an Environmental Impact Study for a proposed rural settlement subdivision in the Township of Puslinch. As part of the approval process for the proposed development, an Official Plan Amendment and Zoning By-law Amendment are needed. Given the site's proximity to significant natural heritage features, primarily the Mill Creek Wetland Complex and Mill Creek, an Environmental Impact Study is a requisite study requirement.

The ecological recommendations for the proposed development include the following:

- Maintenance of a 15 m setback from adjacent wetland systems,
- Maintenance of a 5 m setback from the dripline of adjacent woodlands,
- Ecological enhancements in Block E,
- Public awareness education, and
- Erosion and sedimentation control.

With the implementation of these recommendations, in conjunction with the recommended measures described in the Paris and Galt Moraine Assessment, Functional Servicing and Stormwater Management Report, it is concluded that the proposed development will not result in a negative impact on provincially significant greenland features or functions.

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APPENDIX "A" - PLANT COMMUNITIES

AUDREY MEADOWS SITE - PUSLINC H TOWNSHIP		ELC - VEGETATION COMMUNITIES								CONSERVATION STATUS	
PLANT LIST - MAY 2021		1	2	3	4	5	6	7	8	Global	Provincia
<i>Scienti fic Name</i>	COMMON NAME	FOD 5	CUM 1-1	SW T 3-2	SW T 2-5	FOD 5	MA S 2-2	FOD 5	CUP 3-2	GRANK	SRANK
Acer saccharinum	Silver Maple									G5T5	S5
Acer saccharum ssp. saccharum	Sugar Maple	X	X	X		X	X	X	X	G5T5	S5
Achillea millefolium	Common Yarrow		X							G5T5	S5
Actaea pachypoda	White Baneberry									G5	S5
Alliaria petiolata	Garlic Mustard	X	X	X	X	X	X	X	X	GNR	SE5
Anemone canadensis	Canada Anemone		X							G5	S5
Antennaria howellii	Pussytoes		X							G5G4T	S5
Arctium minus ssp. minus	Common Burdock	X	X							GNRTN R	SNA
Arisaema atrovirens	Jack In The Pulpit	X				X				G5T5	S5
Asarum canadense	Wild Ginger	X								G5	S5
Aster novae-angliae	New England Aster		X		X					G5	S5
Betula papyrifera	White Birch						X			G5	S5
Cornus alternifolia	Alternate-leaved Dogwood	X	X	X	X		X	X		G5	S5, G5
Cornus stolonifera	Red-osier Dogwood		X	X	X		X	X	X	G5	S5
Cypripedium parviflorum	Yellow Lady's									G5T	S4/S5

	Slipper										
<i>Daucus carota</i>	Wild Carrot		X							GNR	SNA
<i>Diervilla lonicera</i>	Bush Honeysuckle									G5	S5
<i>Dipsacus fullonum</i>	Teasel		X							GNR	SNA
<i>Epipactis helleborine</i>	Common Helleborine					X				G?	SE5
<i>Erigeron annuus</i>	Daisy Fleabane		X							G5	S5
<i>Erythronium americanum</i>	Trout Lily	X						X		G5T5	S5
<i>Equisetum arvense</i>	Field Horsetail			X	X					G5	S5
<i>Eupatorium perfoliatum</i>	Common Boneset		X	X						G5	S5
<i>Fragaria virginiana</i> ssp. <i>virginiana</i>	Wild Strawberry		X		X					G5	S5
<i>Frangula alnus</i>	Buckthorn	X			X			X	X	G?	SE5

ALDREY MEADOWS SITE - PUSLINCH TOWNSHIP		ELC - VEGETATION COMMUNITIES								CONSERVATION STATUS	
PLANT LIST - MAY 2021		1	2	3	4	5	6	7	8	Global	Provincial
Scientific Name	COMMON NAME	FOD5	CUM 1-1	SWT 3-2	SWT 2-5	FOD5	MAS 2-2	FOD5	CUP 3-2	GRANK	SRANK
Fraxinus Americana	White Ash	X								G5	S5
Fraxinus pennsylvanica	Green Ash	X	X			X	X	X	X	G5	S5
Galium aparine	Common Bedstraw				X					G5	S5
Geranium robertianum	Herb Robert	X						X		G5	SE5
Impatiens capensis	Jewelweed			X						G5	S5
Juniperus communis	Low Juniper		X							G5	S5
Leonurus cardiaca	Common Motherwort		X							GNR	SNA
Leucanthemum vulgare	Ox-eye Daisy		X							G?	SE5
Lonicera tatarica	Tatarian Honeysuckle									G5	SNA
Maianthemum stellatum	Star-flowered Solomons Seal					X				G5	S5, G5
Myrrhis odorata	Sweet Cicely	X								G?	S5
Mitella diphylla	Mitrewort	X					X	X		G5	S5
Nepeta cataria	Catnip	X	X							G5	SE5
Onoclea sensibilis	Sensitive Fern			X	X		X			G5	S5
Parthenocissus quinquefolia	Virginia Creeper	X	X		X			X	X	G5	S4, G5
Parthenosis vitaceae	Native Virginia Creeper							X		G5	S5
Phlox alyssifolia	Blue Phlox	X								G5	S5
Plantago major	Common Plantain		X							G5	SE5
Picea glauca	White Spruce					X	X		X		
Pinus strobus	White Pine						X		X		
Populus balsamifera	Balsam Poplar			X						G5	S5
Populus tremuloides	Aspen Poplar		X				X			G5	S5
Prunus serotina	Black Cherry	X					X	X		G5	S5
Prunus virginiana ssp. virginiana	Choke Cherry	X					X	X	X	G5	S5
Ribes cynosbati	Prickly Gooseberry				X					G5	S5
Rhamnus cathartica	Common Buckthorn				X	X				GNR	SNA
Rosa blanda	Wild Rose		X							G5	S5

AUDREY MEADOWS SITE - PUSLINGTON TOWNSHIP		ELC - VEGETATION COMMUNITIES										CONSERVATION STATUS	
2021	PLANT LIST - MAY	1	2	3	4	5	6	7	8			Global	Provincial
Scientific Name	COMMON NAME	FOD5	CUM 1-1	SWT 3-2	SWT 2-5	FOD5	MAS 2-2	FOD5	CUP 3-2	GRANK	SRANK		
Rubus idaeus ssp. Idaeus	Wild Red Raspberry	X	X	X	X	X		X	X	G5T5	SE5		
Salix bebbiana	Bebb's Willow						X			G5	S5		
Salix eriocephala	Heart-leaved Willow						X			G5	S5		
Salix exigua	Sandbar Willow			X	X		X			G5	S5		
Salix lucida	Shining Willow			X	X		X			G5	S5		
Sambucus Canadensis	Common Elderberry	X		X			X	X	X	G5T5	S5		
Schoenoplectus validus	Soft-stemmed Bulrush						X			G?	S5		
Soncha arvensis ssp. arvensis	Sow thistle		X							GNRTNR	SNA		
Solidago Canadensis	Canada Goldenrod		X		X					G5	S5		
Solidago flexicaulis	Zigzag Goldenrod	X		X	X			X		G5	S5		
Solidago nemoralis ssp. nemoralis	Gray Goldenrod		X		X					G5T5	S5		
Solanum Linnaeus	Enchanter's Nightshade	X				X		X		G5	S5		
Taraxacum officinale	Common Dandelion		X					X		G5	SNA		
Thalictrum polygamum	Tall Meadow rue	X						X		G5	S5		
Thuja occidentalis	E. White Cedar		X		X		X			G5	S5		
Tilia americana	Basswood	X			X	X	X	X	X	G5	S5		
Trillium erectum	Red Trillium	X						X		G5	S5		
Trillium grandiflorum	White Trillium	X			X			X		G5	S5		
Typha latifolia	Broad-leaved Cattail				X		X			G5	S5		
Ulmus american	American Elm									G5	S5		
Ulmus rubra	Slippery Elm	X								G5	S5		
Verbascum thapsus	Mullein	X							X	G5	SE5		
Viola pensylvanica	Smooth Yellow Violet	X						X		G5	S5		
Viola sororia	Blue Violet	X								G5	S5		
Vitis aestivalis	Summer Grape	X					X	X	X	G5	S4		
Woodwardia areolata	Netted Chain Fern			X	X		X			G5	S4		

TERMS AND DEFINITIONS FOR PLANT SPECIES LIST:

1. RARITY/POPULATION STATUS

National		Provincial		Regional
SARA (Species At Risk Act)	G-rank	ESA (Endangered Species Act)	S-rank Provincial Rarity	
END - Endangered	GX - Presumed Extinct	END - Endangered	S1 - Critically imperiled	Rare in county or regional municipality as determined by municipality
THR - Threatened	GH - Possibly Extinct	THR - Threatened	S2 - Imperiled	
EXP - Extirpated	G1 - Critically Imperiled	EXP - Extirpated	S3 - Vulnerable	
SC - Special Concern	G2 - Imperiled	SC - Special Concern	S4 - Apparently secure	
NAR - Not at Risk	G3 - Vulnerable	NAR - Not at Risk	S5 - Secure	
DD - Data Deficient	G4 - Apparently Secure	DD - Data Deficient	SE - Exotic (non-native)	
	G5 - Secure		? - uncertain about status	

2. WETNESS*

-5	Obligate Wetland	occurs almost always in wetlands under natural conditions (>99% probability)
-2 to -4	Facultative Wetland	usually occurs in wetlands, but occasionally found in non-wetlands (67-99% probability)
1 to -1	Facultative	equally likely to occur in wetlands or non-wetlands (34-66% probability)
2 to 4	Facultative Upland	occasionally occurs in wetlands, but usually occurs in non-wetlands (1-33% probability)
5	Obligate Upland	occurs almost never in wetlands under natural conditions (<1% probability)

* Based on Floristic Quality Assessment System (MNR 1995)

3. PLANT SPECIES SENSITIVITY*

0 - 3	Plants found in a wide variety of communities, including disturbed sites
4 - 6	Plants typically associated with a specific plant community, but tolerate moderate disturbance
7 - 8	Plants associated with a community in an advanced successional stage that has undergone minor disturbance
9 - 10	Plants with a high degree of fidelity to a narrow range of specific habitats or ecological conditions

* Values and terminology derived from Floristic Quality Assessment (MNR 1995)

4. WEEDINESS*

-1	Non-native plants with little or no impact on natural areas
-2	Non-native plants that sometimes cause problems, but only infrequently or in localized areas
-3	Non-native highly invasive plants that can become serious problems in natural areas by displacing native flora

* Based on Floristic Quality Assessment (MNR 1995)

5. RELATIVE ABUNDANCE OF PLANT SPECIES ACCORDING TO VEGETATION COMMUNITY*

D - dominant	Represented by large numbers of individuals or clumps; visually more abundant than other plant species
A - abundant	Represented in the vegetation community by large numbers of individuals or clumps
O - occasional	Present as scattered individuals or represented by one or more large clumps of many individuals

R - rare

Represented in the vegetation community by less than three to five individuals or small clumps

** Based on Ecological Land Classification for Southern Ontario (MNR 1998)*

APPENDIX "B" LIST OF WILDLIFE

AUDREY MEADOWS – Wildlife Surveys (05-23-2021) with Conservation Rankings (SRANK)

Breeding Birds:

Agelaius phoeniceus – Red-winged Blackbird – S4
Branta Canadensis – Canada Goose - S5B
Buteo jamaicensis – Red-tailed Hawk – S5
Contopus virens – Eastern Wood Peewee – S4B
Colaptes auratus – American Flicker - S4B
Corvus brachyrhynchos – American Crow - S5B
Cyanocitta cristata – Blue Jay – S5
Dumetella carolinensis – Gray Cat Bird – S5
Icterus galbula – Baltimore Oriole – S4
Melanerpes carolinus – S5
Picoedes pubescens – Downy Woodpecker – S5
Poecile atricapillus – Black Capped Chickadee – S5
Seiurus aurocapilla – Oven Bird – S4
Turdus migratorius – American robin – S5B
Vireo olivaceus – Red-eyed Vireo – S5B
Zenaida macroura – Mourning Dove – S5
Zonotrichia albicollis – White-throated Sparrow - S5

Mammals:

Odocoileus phoeniceus – White Tailed Deer – S5
Procyon lotor – Raccoon – S5
Sciurus carolinensis – Black Squirrel – S5

Amphibians:

Bufo mericanus – American Toad – S5
Rana pipiens – Leopard Frog – S5

ENVIRONMENTAL IMPACT STUDY: AUDREY MEADOWS
PROPOSED RURAL SETTLEMENT DEVELOPMENT

PARTS OF LOTS 17 & 18
CONCESSION 8
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

This EIS was prepared by Stovel and Associates Inc. with assistance of Lincoln Environmental Consulting Corp.

Stovel and Associates Inc. was responsible for background data collection, mapping and impact assessment.



Robert P. Stovel, M.Sc., R.P.P., P.Ag

July 23, 2021
Date

Lincoln Environmental Consulting Corp. was responsible for all biological field assessments including landscape assessment, botanical and wildlife surveys and ELC analysis.

Chris Hart, M.Sc., M.L.A. conducted all biological field surveys.



Chris Hart, M.Sc., M.L.A.
Lincoln Environmental Consulting Corp.

July 23, 2021
Date