Environmental Impact Study
Parkbridge Meaford Development

Report Prepared for:
Parkbridge Lifestyle Communities Inc.

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Executive Summary

Background and Purpose

Parkbridge Lifestyle Communities Inc. (Parkbridge) is in the process of development planning for a large block of land in the Christie Beach area, just west of Christie Beach Road, in the Town of Meaford, Ontario. The lands in question include properties at 207145 and 207065 Highway 26, with a total combined area of approximately 135 hectares (ha). Combined, these two properties are referred to herein as the "Meaford Property", or simply the "Property". To the immediate north of the Meaford Property, there is an additional 24-ha parcel that is referred to herein as the "Lower Lands".

In earlier stages of development planning, an Environmental Impact Study (EIS) was completed on behalf of Parkbridge to assess the natural heritage implications of general development options. The initial EIS (Morris, 2018) was intended to inform planning efforts at that time exclusively for the 135-ha Meaford Property. Following subsequent acquisition of the Lower Lands by Parkbridge, the EIS was then updated (Morris, 2019) to support broader planning exploration for the Meaford Property and Lower Lands combined.

At this time, Parkbridge has prepared a Demonstration Plan for the establishment of a mixed-use residential community within the Meaford Property, with up to 1,250 units. The EIS has now been further updated to directly consider that Demonstration Plan and to support pending development applications. Specifically, the EIS has been prepared in support of an application for Official Plan Amendment (OPA). The OPA would be required so that development consistent with that depicted in the Demonstration Plan would be a permitted land use. The focus of this EIS is the 135-ha Meaford Property where development is confined, as per the Demonstration Plan. As the Demonstration Plan does not call for land-use change within the Lower Lands, those lands are not explicitly subject to the OPA. However, the Lower Lands are included within the current EIS Study Area, primarily as *adjacent lands* (i.e., lands within 120 m) to the Meaford Property. The Lower Lands are also included in the Study Area owing to the fact that the Demonstration Plan identifies an access route traversing the Lower Lands to connect the Meaford Property to the Georgian Bay shoreline. The EIS provides limited high-level assessment of the potential implications of that access route, but this is not explicitly for the purpose of the OPA. Potential development scenarios for the Lower Lands, particularly in association with the 48 approved residential lots, are <u>not</u> subject to assessment in this EIS report.

This EIS has included focused assessment of several key natural heritage features, as identified through preliminary consultation with the Grey Sauble Conservation Authority and review of the official plans of the County and Municipality. The identified natural features are as follows:

- unevaluated wetlands within and immediately adjacent to the Meaford Property,
- Significant Woodlands within and immediately adjacent to the Meaford Property,
- a total of eight watercourses traversing some part of the Meaford Property,
- the near-shore waters of Georgian Bay, adjacent to the Meaford Property on the northern perimeter, and
- the possible presence of Species of Conservation Concern (SOCC), Species at Risk (SAR), and Significant Wildlife Habitat (SWH) within and around the Meaford Property and adjacent lands.

As the Meaford Property encompasses Significant Woodlands and unevaluated wetlands, it is possible that any development plan eventually proposed could infringe upon these features or their adjacent lands. This EIS has been prepared in part to provide an *a priori* understanding of the full range of natural heritage characteristics of the Meaford Property and adjacent lands. The EIS also provides an assessment of the potential implications of possible development activities on those features in a manner as specific as possible based on the Demonstration Plan and in absence of detailed designs. This information is intended to assess general feasibility of the Demonstration Plan in the OPA context, and also guide the advancement of development planning and to inform any future submissions to approval authorities in regard to that planning.

Scope and Content

The scope and content of this EIS are site-specific and have been developed so that concerns regarding the environment and natural heritage features are ultimately addressed to the satisfaction of approval authorities and other concerned agencies. The scope and content were originally defined in consultation with the GSCA, and to be consistent with the requirements specified in Section 7.11 of the Grey County OP (2019) and Section C6 of the Municipality of Meaford OP (2014).

The scope of the EIS has been established to address all known environmental concerns and also any natural heritage features newly identified during initial reconnaissance of the Study Area. The EIS scope has also been developed to specifically assess the current Demonstration Plan for the Property.

For this EIS, the core environmental issues of potential concern associated with the Meaford Property include:

- potential impacts that site development might have on areas of Significant Woodlands, and their various functions,
- potential impacts that site development might have on wetland features and their various functions,

- potential impacts that site development might have on aquatic features (ponds, watercourses) within and adjacent the Meaford Property, and their various functions,
- potential impacts on fish habitat associated with the near-shore environment of Georgian Bay along the Property's shoreline frontage, and
- potential impacts on Priority Species (i.e., species of conservation concern (SOCC) or legislated species at risk (SAR)), or otherwise significant wildlife or wildlife habitat (SWH), which might be present on or near the Meaford Property.

The EIS addresses, at a minimum, the potential impacts of possible site alteration or development on these features and functions. The coverage and level of detail of on-site monitoring are intended to allow adequate description of the general natural environment, and also allow detailed assessment of potential effects on site features and functions of focused concern.

The characterization of the Meaford Property and relevant features provides the primary basis for the evaluation of potential impacts. The characterization is based primarily on direct field-level surveillance within the Study Area. To effectively address the identified EIS requirements, this field surveillance has included:

- Direct examination of slope/topography, conveyance features (ditches, swales, streams), and overburden characteristics within the study are to understand hydrological processes and connectivity between the Property and associated aquatic features (i.e., drainage channels, wetlands, nearshore area of Georgian Bay)
- Direct assessment of all wetland features within the Study Area , including hydrological characteristics and functions, plant community composition, and potential habitat function for aquatic and terrestrial biota.
- Direct assessment of Significant Woodlands and all other wooded areas, including plant community composition, forest strata characteristics (e.g. species, age/size class, relative density), soil characteristics, and wildlife presence and utilization.
- Direct assessment of the physical and biological attributes of the shoreline area of the Property.
- Detailed inventories of terrestrial biota with a focus on identification of SOCC, SAR or wildlife habitat indicators that may be present. This includes;
    - a botanical survey, conducted following a wandering transect approach in the spring, summer and early fall,
    - a breeding bird survey (BBS), following the standard point-count approach of the Ontario Breeding Bird Atlas (OBBA) and also a wandering transect approach, and

  - an amphibian vocalization survey (AVS), conducted in the spring and early summer following the protocol of the Marsh Monitoring Program (MMP).
- In addition to the focused wildlife monitoring efforts noted above, general surveillance of animal and plant communities throughout the Property and adjacent lands.

The information acquired through the site-specific surveillance has been combined with previously compiled information for the local area to complete the required site characterization.

Summary of Monitoring Results

The Meaford Property is occupied largely by plant communities that are early succession and/or "Cultural" in nature, while the Lower Lands are almost entirely wooded. The prominent presence of cultural communities has facilitated the establishment of a significant presence of non-native plant species, including a number of which are considered to be invasive. Only one Priority Species of plant (i.e., Black Ash) has been observed within the Study Area in limited distribution primarily within the Lower Lands.

The associated faunal communities also consist mainly of common species from relatively secure populations. Monitoring has determined that there are eight species of fauna that are considered to be Priority Species that can be found within or near the Meaford Property. The species in question are relatively common and the concern is due to declining population trends rather than current rarity. The Eastern Meadowlark is the only species occurring within the Meaford Property that is formally listed as a Species at Risk. The observed presence of this *Threatened* species consists of 2 or 3 breeding territories within a 10-ha expanse of cultural meadow habitat within the Meaford Property. The other species that might warrant precautionary consideration in the planning of development within or adjacent to the Meaford Property are the Western Chorus Frog, Snapping Turtle, Midland Painted Turtle, and the Eastern Wood-pewee. The abundance and distribution of each of these species within the study area is quite limited.

Although much of the proposed area of development within the Meaford Property is occupied by relatively open Cultural communities (meadow, thicket, savannahs), woodlands and wetlands do occur throughout the Study Area. This includes approximately 47 ha of Significant Woodlands and about 10 ha of unevaluated wetlands. The characteristics of the woodland and wetland communities are such that most have relatively limited ecosystem function and value. The Meaford Property is also traversed by eight intermittent watercourses that run dry after the spring and support a relatively low level of hydrological or ecological functions. In addition, there are four small ponds found within or immediately adjacent to the Meaford Property, which appear to be man-made. The hydrological and ecological functions associated with three of the four ponds are relatively limited. The fourth pond, located outside of the Property boundary, is the

most naturalized and exhibits the greatest diversity of plant and animal life, including two species of turtle that are species of conservation concern.

Impact Assessment Summary

The Demonstration Plan includes development or alteration within the Meaford Property that is anticipated to occupy existing natural heritage areas and/or their adjacent lands. This may create risk of adverse effects on individual natural heritage features and also on the functional integrity of the local natural heritage system within and around the Christie Beach area. In the advancement of development planning for the Meaford Property, the individual and collective risks require assessment to identify possible needs for plan refinement by the proponent, and also to allow balanced consideration of those risks in context of other determinants of sound municipal planning (housing needs, servicing infrastructure requirements, community benefits, etc.).

The likelihood and potential significance of any potential impacts are the two main determinants of overall risk, and are dependent in part on the characteristics of the affected features, and also in part on various aspects of development. For example, development of an access route(s) in the Lower Lands would have a reasonable likelihood of loss of some area of designated Significant Woodland. However, the potential significance could be deemed to be low, owing to the fact that the total area of woodland affected is expected to be relatively small (~1 ha in total). Overall, The vegetation communities within the Study Area exhibit various ecological functions, but these functions are mostly neither critical nor sensitive. This general underlying condition inherently limits the significance of any land-use changes indicated in the Demonstration Plan. However, development of the Meaford Property may still pose a risk of detrimental effects that warrant mitigation.

Tables 11 and 12 summarize the likelihood and potential significance of the various impacts that have been identified and assessed, and also list the key factors that moderate the level of risk.

The primary risk associated with potential development at the Meaford Property is the loss of Significant Woodlands and unevaluated wetlands. The fact that there is a general absence of these features in the region and Province makes the loss or impairment of any area somewhat meaningful, regardless of the characteristics and specific functions of any given feature. In consideration of their specific attributes, the majority of the existing woodland and wetland areas within the Meaford Property tend to be relatively limited in terms of function, which in turn limits the potential significance of any impacts on these features. For a few limited areas of woodland and wetland, the presence of SWH and/or Priority Species elevates the likelihood and significance of environmental impacts that could occur.

There are two other identified risks that are not directly associated with either woodland or wetland. This includes possible direct harm and/or habitat loss of Eastern Meadowlarks, which is protected as an SAR under the ***ESA***. Also, there is some risk

associated with aquatic habitats, relating to possible works on the Georgian Bay shoreline or impaired quality of runoff originating within the Meaford Property and eventually discharging to the Bay. However, these specific risks can be substantially mitigated and will be evaluated further at the time of detailed design. Otherwise, the Demonstration Plan being considered at this time poses relatively low risk of impacts on the natural heritage system and associated functions within and around the Meaford Property.

Conclusions

In consideration of the information compiled as part of this EIS and the results of the current analysis of impacts, **it is concluded that the current Demonstration Plan could be implemented without significant negative impacts on the natural heritage system or its functions.** Qualifying considerations for each of the specific natural features of interest are as follows:

- Significant Woodlands - direct encroachment on Significant Woodlands and/or their adjacent lands will occur, but this encroachment is not expected to result in significant loss or impairment of priority natural heritage function. Mitigation measures are available and recommended herein to partly reduce or offset any effects on Significant Woodlands and their functions.
- Wetlands - direct encroachment on the large majority of the wetlands within the Property and/or their adjacent lands will occur, but the nature of these wetlands is such that the associated loss or impairment of natural heritage functions is not expected to be significant. Mitigation measures are available and recommended herein to partly reduce or offset effects on wetlands and their functions.
- Priority Species - development within the identified area of Meadowlark Habitat will constitute loss of SAR habitat and will require further evaluation and consultation with the Ministry of Environment, Conservation and Parks (MECP) in accordance with the ***ESA*** and associated regulations.
- Significant Wildlife Habitat - routing of the access route through the Lower Lands within or near the wetland areas where burrowing crayfish have been identified could cause adverse effects on this SWH element and therefore further evaluation will be required at the detailed design stage..
- Watercourses - the Demonstration Plan suggests that the existing intermittent watercourses will be retained with an adequate buffer (~20 m), and there is no expectation of adverse impacts on these features or their functions under these circumstances.
- Ponds - the Demonstration Plan suggests that two of the four ponds currently found within or near the Property will be retained while two ponds are expected to be encompassed within an SWM area. The nature of the latter ponds is such that there is no expectation of loss of significant natural heritage function if those ponds are altered for SWM purposes.

- Georgian Bay - with the retention of watercourses and implementation of effective SWM plans, there is no expectation of impairment of water quality in the waters of the Bay bordering the Property.

Recommendations

This EIS has been prepared with the intent of providing all required information necessary for effective consideration of natural heritage implications in the planning and approval process. At this time, the EIS provides assessment with focus on the natural heritage implications of the current Demonstration Plan (see Appendix B) developed for the 135-ha Meaford Property. Implications of potential future development of access routes within the Lower Lands are also briefly evaluated. The EIS should be revisited and updated if/when any plans for the Meaford Property are advanced and/or modified.

At this time, the findings of the EIS can serve as guidance for advancement and/or refinement of the Demonstration Plan. In general, planning decisions should be based on the objective of mitigating risks associated with all identified impacts (see Tables 11 and 12), with the level of mitigation effort proportional to the magnitude of risk.

Regardless of the level of risk, the overall advancement of development plans for the Meaford Property should consider efforts to minimize all impacts. Recommendations are provided below to avoid, limit or otherwise mitigate the potential impacts that have been identified. The recommendations should be reflected in a Management Plan to be prepared for all phases of any final development plan.

The over-arching general recommendation is to limit development or alteration within the specified natural heritage areas (Significant Woodlands, wetlands, significant wildlife habitat, SAR habitat) or their adjacent lands, or implement appropriate mitigation measures if/where these features are affected by development. Key measures recommended in consideration of the current Demonstration Plan include the following;

- Develop a Tree Preservation and Planting Plan (TPPP) that targets the post-construction presence of natural woody vegetation cover within 20 ha of the Meaford Property.
- Design and manage portions of watercourse setbacks and SWM areas to include natural wetland vegetation communities.
- Avoid or minimize changes below water-lines of Ponds #2 and #3 in the design and construction of the proposed SWM area.
- Schedule initial site clearance and construction to avoid the regional period in which migratory breeding birds may be present (i.e., April to August).
- Consult with the Ministry of Environment, Conservation and Parks (MECP) about appropriate measures to address the presence of Meadowlarks (an SAR) and their habitat in areas proposed for development.

- Consult with the Department of Fisheries and Oceans (DFO) in the event that any work is proposed in or near the waters of Georgian Bay that may have impact on fish or fish habitat.

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Acronyms and Abbreviations

ANSI	Area of Natural and Scientific Interest
BBS	Breeding Bird Survey
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
DBH	Diameter (of a tree) at breast height
EAB	Emerald Ash Borer
EIS	Environmental Impact Study
ELC	Ecological Land Classification
ESC	Erosion and Sediment Control
GSCA	Grey Sauble Conservation Authority
ha	hectare(s)
masl	meters above sea level
mbgs	meters below ground surface
MECP	Ministry of Environment, Conservation and Parks
MNRF	Ministry of Natural Resources and Forestry
NHIC	Natural Heritage Information Centre
OARA	Ontario Amphibian and Reptile Atlas
OBBA	Ontario Breeding Bird Atlas
OP	Official Plan
PSW	Provincially Significant Wetland
SAR	Species at Risk
SOCC	Species of Conservation Concern
SWH	Significant Wildlife Habitat
SWM	Stormwater Management
TPPP	Tree Preservation and Planting Plan
VPZ	Vegetation Protection Zone

1.0 INTRODUCTION

1.1 Background

1.1.1 Property Description

This EIS has been prepared for Parkbridge Lifestyle Communities Inc. (Parkbridge) in support of development planning and approval for a large block of land in the Christie Beach area, just west of Christie Beach Road, in the Town of Meaford, Ontario. This block of land includes properties at 207145 and 207065 Highway 26, with a total combined area of approximately 135 hectares (ha). Combined, these properties are referred to herein for presentation and discussion purposes as the "Meaford Property", or simply the "Property". To the immediate north, there is an adjoining 24-ha parcel that is referred to herein as the "Lower Lands". The location and outline of the lands in question, collectively owned by Parkbridge, are depicted in Figure 1.

The Meaford Property is bordered by Georgian Bay to the North, by the Highway 26 corridor to the south, by existing or proposed residential property to the east. Along its western perimeter, the Property is adjacent to Grey County Forest #40 (St. Vincent Tract) which consists of undeveloped woodlands and wetlands. Along its northern perimeter, the Meaford Property envelopes steep bluffs known as the "Southeast Claybanks", and encompasses about 600 m of shoreline frontage along Georgian Bay. On its eastern half, the northern boundary of the Meaford Property is shared as the southern boundary of the Lower Lands. The Lower Lands is bordered by Christie Beach Road to the east, and to the north by Fraser Street and a line of shoreline residential lots fronting the opposite side of the street. On its western perimeter, a very small part of the Lower Lands abuts the Georgian Bay shoreline (approximately 150 m of shoreline frontage) and also envelopes a small portion the Southeast Claybanks.

The Meaford Property is currently occupied by a single residential dwelling and various amenities (wind turbine, solar panels, private grassed landing strip). The Lower Lands is entirely vacant but encompasses 48 existing lots of record. These are single residence lots located along either side of the allowance for the extension of Barker Street, which traverses about half the length of the Lower Lands on its east-west axis. About half of the lots also border on Fraser Street along their northern perimeter.

The Meaford Official Plan (OP) land-use designation and zoning for the majority of the Meaford Property is "Rural", with select watercourses, wetland areas, and the steeply sloped Claybanks area designated as "Environmental Protection" (EP). About half the Lower Lands is also designated EP, largely reflecting the slope-related hazard across the southern half of the Property. The roughly 12-ha area encompassed by the existing lots of record in the north half of the Lower Lands is designated as "Shoreline".

1.1.2 Environmental Constraints

There are no Areas of Natural or Scientific Interest (ANSI), Provincially Significant Wetlands (PSW) or Significant Wildlife Areas, as identified in current mapping, in meaningful proximity to the Meaford Property The nearest significant natural heritage feature is the East Meaford Creek ANSI, located approximately 1 km west of the western perimeter of the Meaford Property and ~2 km west of the western perimeter of the Lower Lands.

There are a number of other environmental features and formal designations that have been identified as possible constraints to development within the Meaford Property. This includes:

- Hazard Lands - Portions of the Study Area are designated as Hazard Lands in the Grey County and Meaford OP, associated with watercourses and steep slopes. These hazard designations pertain to slope stability or flooding/erosion potential.
- Significant Woodlands - The Meaford OP and the Grey County OP also identify the presence of Significant Woodlands within the Meaford Property, primarily along the northern perimeter. Almost the entirety of the Lower Lands is mapped as Significant Woodlands.
- Wetlands - Several unevaluated wetlands, as delineated in spatial databases prepared by the Ministry of Natural Resources and Forestry (MNRF), are also present within the Study Area.
- Watercourses - As identified by Grey County and the Grey Sauble Conservation Authority (GSCA), a total of eight watercourses flow through the Meaford Property, and the paths of four of these continue northward across the full width of the Lower Lands.
- GSCA Regulated Areas - Regulated areas include all watercourses, wetlands and significant slopes within Study Area.

There is considerable overlap among these various natural feature designations, which are recognized as environmental constraints for the Meaford Property at the outset of this EIS. Mapping of these formally recognized constraints available from various agencies is provided in Appendix A.

1.1.3 Development Proposal

At this time, Parkbridge has developed preliminary plans for a mixed residential community, with up to 1250 units, occupying the majority of the Meaford Property. A copy of the current Demonstration Plan for the Meaford Development is provided in Appendix B of this EIS report. Potential uses being considered for the Lower Lands at this time are minimal, consisting primarily of the establishment of an access route(s) from

the Meaford Property to the waterfront. No specific land-use changes have been proposed for the Lower Lands at this time. This EIS is focused on the development scenario in the Demonstration Plan, and the assessment of impacts herein is focused on the Meaford Property.

As the Study Area encompasses Significant Woodlands and unevaluated wetlands, it is possible that any development plan could infringe upon these features or their adjacent lands. This EIS has been prepared in part to provide an understanding of the full range of natural heritage characteristics of the Study Area, including woodlands and wetlands, and to assess the potential implications of possible development activities (as per the Demonstration Plan) on those features. This information is intended to guide the advancement of development planning and to inform any consultation or applications with approval authorities in regard to that planning.

1.1.4 EIS Rationale and Objectives

The Meaford Development project is expected to occupy a majority of the Meaford Property. Under the land-use designations of the current Official Plan (OP), the Meaford Development would not be consistent with permitted uses. Accordingly, Parkbridge intends to submit an application for Official Plan Amendment (OPA) so that the Meaford Development Project could be formally recognized as a permitted use of the Meaford Property, pending compliance with other policy requirements of relevance.

The development will occur at least partly within policy-relevant natural heritage features (Significant Woodlands, wetlands, watercourses) and/or their adjacent lands. Accordingly, the overall objective of this EIS is to determine if development consistent with that illustrated in the Demonstration Plan can occur without adverse impacts on these features, or any other element of the natural heritage of system that could be affected (e.g. Species at Risk, Significant Wildlife Habitat). The findings and recommendations of this EIS are provided as a basis for refinement of plans for the Meaford Development, as warranted, to mitigate any identified potential adverse effects on natural heritage features and/or functions.

1.2 Scope of Work

The scope and content of this EIS are site-specific and have been developed so that concerns regarding the environment and natural heritage features are ultimately addressed to the satisfaction of approval authorities and other concerned agencies. In particular, the work-scope reflects comments provided by staff from the GSCA during a pre-consultation meeting in June 2016. In the early stages of the EIS, GSCA staff were advised of the undertaking of the initial phase of the EIS for the Meaford Property, and the various efforts comprising the EIS scope of work. A copy of the written notification to the GSCA is provided in Appendix C.

A second phase of the EIS was initiated in response to Parkbridge's later interest in the acquisition and possible development of the Lower Lands as an extension of the primary interest in the Meaford Property. Portions of the Lower Lands were addressed as adjacent lands in the original scope of the EIS for the Meaford Property. For the second phase of the EIS, the broad scope of work for the Meaford Property was simply expanded to encompass the full area of the Lower Lands (including the 48 approved Lots). This current EIS report presents the full combined findings of monitoring of the Meaford Property and Lower Lands. However, the analysis and interpretation of available information is focused on the Meaford Property where land-use changes are indicated in the Demonstration Plan.

The scope and content of both previous EIS phases were developed to be consistent with the requirements specified in Section 7.11 of the Grey County OP (2019) and Section C6 of the Municipality of Meaford OP (2014). The EIS has been completed to address all *known* natural heritage features and associated concerns, and also any such concerns newly identified during reconnaissance of the Property conducted as part of the studies. The EIS scope has also been developed to reflect the general nature of development options being considered for the Property.

For this EIS, the core environmental issues of potential concern associated with the Meaford Property include:

- potential impacts that site development might have on areas of Significant Woodlands, and their various functions,
- potential impacts that site development might have on wetland features and their various functions,
- potential impacts that site development might have on aquatic features (ponds, watercourses) within or near the Property, and their various functions,
- potential impacts on fish habitat associated with the near-shore environment of Georgian Bay along the Property's shoreline frontage, and
- potential impacts on species of conservation concern (SOCC), legislated species at risk (SAR), or otherwise significant wildlife or wildlife habitat (SWH), which might be present on or near the Property.

The EIS addresses, at a minimum, the potential impacts of possible site alteration or development on these features and functions. The coverage and level of detail of on-site monitoring are intended to allow adequate description of the general natural environment, and also allow detailed assessment of potential effects on site features and functions of focused concern. Accordingly, core monitoring objectives for the Meaford Property include the following:

- General characterization of the physical and ecological features and functions within and immediately adjacent to the Property,

- Focused characterization of the wooded areas throughout and adjacent to the Property,
- Detailed characterization of the wetland areas within and adjacent to the Property, and
- Determination of the presence and status of wildlife (woody and non-woody vegetation, amphibians, reptiles, mammals, invertebrates and birds) on and near the Property.

The characterization of the Meaford Property and relevant features is based primarily on direct field-level surveillance. To effectively address the identified EIS requirements, this field surveillance has included:

- Direct examination of slope/topography, conveyance features (ditches, swales, streams), and overburden characteristics within and adjacent to the Property, to understand hydrological processes and connectivity between the Property and associated aquatic features (i.e., drainage channels, wetlands, nearshore area of Georgian Bay)
- Direct assessment of all wetland areas, including hydrological characteristics and functions, plant community composition, and potential habitat function for aquatic and terrestrial biota.
- Direct assessment of Significant Woodlands and all other wooded areas, including plant community composition, forest strata characteristics (e.g. species, age/size class, relative density), soil characteristics, and wildlife presence and utilization.
- Direct assessment of the physical and biological attributes of the shoreline area of the Property.
- Detailed inventories of terrestrial biota with a focus on identification of SOCC, SAR or wildlife habitat indicators that may be present. This includes;
    - a botanical survey, conducted following a wandering transect approach in the spring, summer and early fall,
    - a breeding bird survey (BBS), following the standard point-count approach of the Ontario Breeding Bird Atlas (OBBA) and also a wandering transect approach, and
    - an amphibian survey, conducted in the spring and early summer following the protocol of the Marsh Monitoring Program (MMP).
- In addition to the focused wildlife monitoring efforts noted above, general surveillance of animal and plant communities throughout the Property.

The information acquired through the site-specific surveillance has been combined with previously compiled information for the local area to complete the required site characterization. Further details of monitoring methods are provided in Section 2.

2.0 METHODOLOGY

The work undertaken to allow the preparation of this EIS Report has included two main components;

1. a desktop review of previously recorded information regarding the characteristics of the Study Area, and
2. focused on-site monitoring of the Property and adjacent lands.

The assessment herein collectively considers the findings of the desktop review and the on-site monitoring in a weight-of-evidence manner, with primary emphasis on site-specific data.

The following sections describe the methods employed in conducting the various components of environmental monitoring for the purposes of the EIS. In summary, the methodology adopted for the monitoring documented herein was developed to provide results appropriate to the stated objectives, and is based on standard accepted protocol where available and relevant.

2.1 Review of Existing Information

A review of existing information of relevance to the Meaford Property was completed prior to onset of direct field assessment. Several sources of information were consulted for this purpose, including:

- Grey County's web-based interactive GIS mapping tool,
- the Natural Heritage Information Centre (NHIC) on-line database,
- the Ontario Breeding Bird Atlas (OBBA) (Cadman et al, 2007) and associated database (Bird Studies Canada (BSC) *et al*., 2017, 2018),
- the Soil Survey of Grey County (Richards and Gillespie, 1954),
- the Ontario Reptile and Amphibian Atlas (OARA) on-line database, and
- the results of environmental monitoring conducted over the period of 2017 to 2019 as part of other EIS for properties in the Christie Beach area.

The information obtained in this review has served in part to determine certain ecological characteristics of the Study Area, and also in part to identify possible features that would receive focused attention during the on-site monitoring.

2.2 On-Site Monitoring

On-site monitoring was intended to provide a sufficient understanding of all relevant characteristics of the Meaford Property and adjacent lands. Elements of the monitoring program were further focused on the noted endpoints of concern, including Significant Woodlands, unevaluated wetlands, species at risk (SAR), species of conservation concern (SOCC), and Significant Wildlife Habitat (SWH).

In terms of wildlife, on-site monitoring was focused in part on species of SAR or SOCC on record for the area in relatively close proximity to the Meaford Property. SAR known to occur in the surrounding area include some grassland bird species (Bobolink, Eastern Meadowlark) and bat species (e.g. Little Brown Myotis). In addition, the Property is within the reported general range of several amphibian and reptile SAR and/or SOCC that could be associated with wetlands or ponds found within or immediately adjacent to the Property (e.g. Snapping Turtle).

On-site surveillance of the Meaford Property was conducted on multiple site visits from late April to early October of 2017, providing appropriate seasonal coverage with regard to the series of specific monitoring efforts. Monitoring of the Lower Lands was completed over the period of April to October in 2018. Additional monitoring was conducted in 2019 for confirmation purposes, focused on endpoints potentially subject to annual variability in weather conditions (e.g., temporal and spatial patterns of standing water, amphibian activity and distribution). Additional monitoring within the Study Area in 2019 also included a more focused examination of the presence of Black Ash, which became a species of conversation concern in late 2018.

A handheld GPS unit (Garmin model "GPSmap 76") was used to delineate key features (e.g. drainage channels), to measure areas of features, and to provide the geographic coordinates of monitoring locations or key natural heritage features of relevance. All coordinates have been obtained using NAD83 datum. GPS-related information reported in this EIS is generally considered to have an accuracy of ± 5 m or better, and should not be relied upon where greater accuracy is required.

2.2.1 Avian Monitoring

A focused survey of birds was completed within the Study Area during the breeding season (May to August). The Breeding Bird Survey (BBS) used a combination of two methods; 1) the point-count method, and 2) incidental surveillance. The point-count method was implemented following protocol consistent with that employed for the Ontario Breeding Bird Atlas (OBBA) (Cadman et al., 2007) and the Marsh Monitoring Program (BSC, 2003).

For breeding bird point-count surveys, each individual bird heard or seen within a 100 meter radius (3.142 ha) of a fixed location was recorded over two successive five-minute periods (10 continuous minutes per survey episode). The distance from the observation

point was approximated for each individual bird occurrence. Birds seen or heard beyond the 100-m radius were also recorded to the extent reasonable. Breeding evidence for each bird species was documented using OBBA Evidence Codes.

Following OBBA protocol, the preferred station separation distance is 250 m for wooded areas and 500 m for open areas. A total of 14 point-count stations were established within the Study Area for BBS purposes. The stations were located to effectively represent the variety of habitat types found within the Meaford Property. The location of BBS point-count stations is depicted in Figure 2, and GPS coordinates and brief station descriptions are presented in Table 2. It should be noted that the initial phase of the EIS for the Meaford Property included a point-count station (PC-U8) situated within the confines of the Lower Lands. This station was established to effectively represent a specific forest habitat type that was only present on the margins of the Meaford Property, and also to provide breeding bird data for lands immediately adjacent to the Meaford Property. There is considerable spatial overlap between Station PC-U8 and Station PC-L1 established as directly representative of the Lower Lands.

Incidental surveillance was also conducted throughout both the Meaford Property and the Lower Lands, noting all individual bird occurrences and breeding evidence while traversing these areas during day and evening hours. Incidental surveillance was used to augment the temporal and spatial coverage of point-count monitoring and to provide a more complete assessment of avian diversity. The habitat and location of each bird observed during transect surveys was noted, along with notes regarding activity (foraging, in flight, singing, etc.).

Point-count monitoring within the Meaford Property was conducted on two occasions; 1) 07 June, and 2) 07 July 2017. For the Lower Lands, two iterations of point-count monitoring were conducted on 12 June and 05 July 2018. These days were selected in part to achieve appropriate conditions for BBS purposes (i.e., relatively calm winds and an absence of precipitation). Point-count monitoring was conducted between sunrise and 10:00 a.m.. Incidental surveillance was completed on these same dates, and also on 10 other days on which the site was visited. Incidental monitoring occurred throughout the full daylight period, and also in the half-hour following sunset on several dates during the breeding period (Meaford Property - 18 April, 06 June, and 25 July of 2017), (Lower Lands - 27 April, 14 May, and 11 June 2018).

Avian monitoring efforts described above gave focused attention to any indications of the possible presence of SOCC or SAR for which there was some existing record of occurrence in the vicinity of the Meaford Property. In consideration of recent site-specific reports of Eastern Meadowlark presence in the Meaford Property, additional focused monitoring efforts were implemented to ascertain the presence of this and other grassland bird SAR/SOCC within the Property. This specific monitoring effort followed a survey methodology developed for the Bobolink, which is a grassland SAR with similar habitat requirements to those of the Eastern Meadowlark. The survey consisted of repeat passes along a fixed transect established within suitable habitat. Transect passes were conducted between the period of sunrise and 9:00 a.m. on 07 June and 07 July 2017.

Records of grassland bird presence were recorded for a period of 10 minutes at each of a series of 5 stations spaced approximately 250 m apart along the full length of the transect. The location of the grassland bird transect is depicted in Figure 2.

2.2.2 Amphibian Monitoring

A total of seven amphibian vocalization surveys (AVS) monitoring stations were established, overlapping with BBS point-count stations in several instances. The associated 100-m radius encompassed representative units of the wetland types and aquatic features found within the Meaford Property and the Lower Lands (see Figure 3). The monitoring stations were positioned to encompass major wetland areas or aquatic features (ponds, water-courses) which generally provide conditions conducive to the presence of breeding amphibians.

The amphibian monitoring protocol established for the Marsh Monitoring Program (MMP) (BSC, 2003) was employed. All amphibian species that were heard or seen at these monitoring locations were recorded, noting a *Call Level Code* and the general abundance of individuals calling, where possible.

Monitoring in this manner was conducted at least 30 minutes after sunset on the nights of 18 April, 06 June and 05 July 2017 at the Meaford Property, and 27 April, 14 May and 25 June 2018 within the Lower Lands. Verification monitoring was undertaken at the Lower Lands on 22 April and 27 May in 2019. These nights represented the standard conditions defined in the protocol, relating largely on night-time temperatures. Timing also reflected the broader activity trends observed in southern Ontario through the season. It should be noted that relatively cool and wet conditions were experienced throughout the region in the spring and early summer of both 2017 and 2018, leading to some delays in the typical progression of onset of breeding calls of various species.

In addition to point-count monitoring of breeding vocalizations, areas where standing water of sufficient depth and area was present were directly examined during daylight hours for the presence of amphibian egg masses, larvae or adults. In addition to focused monitoring of potential breeding habitat, instances of any amphibian seen or heard at any location or time were recorded throughout the full period of study.

2.2.3 Mammal Surveillance

During all site visits, all observations of mammals on or near the Meaford Property were recorded, along with all other evidence of mammal presence (e.g. foot prints, scat, evidence of browsing on woody vegetation).

In addition, specific attention was paid to the possible presence of bats in flight around the Property at and after sunset on several evenings in the months of June and July. In addition, the Study Area was surveyed for the presence of features that might provide habitat function for bats (e.g. old large trees possibly providing hollows for roosting or hibernating). Characteristics of forest cover that are generally indicative of bat roosting

potential (e.g. presence of large diameter snags) were also examined and recorded as part of the surveillance of woodlands (see Section 2.2.8).

2.2.4 Reptile Surveillance

The Meaford Property was monitored for any evidence of the presence of reptiles during all site visits. This included turning of larger rocks present within the property, as well as surveillance of wetlands and ponds for the presence of basking turtles.

2.2.5 Botanical Inventory

Surveillance of terrestrial vascular plant species was completed following a basic "wandering transect" approach to determine the presence and general distribution of plant species within the Meaford Property and the Lower Lands. Survey routes were set to traverse all identified community types identified through Ecological Land Classification (ELC) efforts (see Section 2.2.6). Three-season botanical surveillance was conducted over the full period of study (i.e., from late April to early October).

2.2.6 Ecological Land Classification

The Meaford Property and Lower Lands were assessed following the Ecological Land Classification (ELC) methodology described by Lee *et al*. (1998). This approach generates classification and mapping of ecological communities down to a size of approximately 0.5 hectares or less and allows much more detailed classification of communities than broad scale Landsat imagery. ELC of the Study Area was completed through the following general task sequence:

- Initial site reconnaissance to ascertain major community types, topography, and soil characteristics (completed in April 2017 for the Meaford Property, and November 2017 and April 2018 for the Lower Lands)
- Subsequent delineation of community distribution using satellite imagery and/or aerial photos for a first approximation of ELC.
- Further detailed site monitoring to refine initial ELC approximation. Each distinct community was examined to determine soil characteristics and to determine the major woody and non-woody plant species present.

The initial approximation of ecological community boundaries was completed at the outset of the study to inform the locations to address in other ecological monitoring efforts (e.g. BBS, amphibian surveillance).

To facilitate characterizations of soil conditions (texture, moisture regimes) vertical soil profiles were completed in multiple locations in each distinct ecological unit. Soil

profiles were completed to a depth of approximately 0.5 to 1 m using a hand-auger, or less in a few locations with significant presence of rocks.

The detailed site monitoring included examination of topography/slope, surface soil profiles, the possible presence of elevated water table, the presence of wetland indicator species, and the density and characteristics of woody vegetation cover. Within each identified unit, the following information regarding plant cover was recorded:

- Relative species composition and percent cover of trees and shrubs,
- Caliper and height range of trees in wooded units, and
- General under-storey characteristics and non-woody species composition.

Wetland communities were visited several times throughout the period of study to ascertain the extent and duration of surface saturation or standing water and to assess plant community composition through seasonal transition. Further detail of wetland characterization methods is provided in Section 2.2.9.

2.2.7 Aquatic Features

The on-site reconnaissance conducted as part of the EIS included examination of all watercourses and ponds within and immediately adjacent to the Property. The near-shore waters of Georgian Bay along a portion of the northern perimeter of the Property were also examined.

For the watercourses, on-site monitoring included the visual assessment of habitat variables (substrate type, cover, channel morphology), measures of water temperature, and qualitative assessment of flow intensity.

For the purposes of this EIS, the hydrology of the site has been examined with particular attention paid to the hydrological connectivity between drainage channels, wetlands, and the waters of Georgian Bay. Hydrological characterization included the identification of any discernable sources of hydrological input, qualitative observations of flow volume, and measures of water temperature (when available).

All aquatic features were visited on repeat occasions over the period of study (April to October) to ascertain seasonal patterns of water levels and/or flow.

2.2.8 Woodland Characterization

Wooded areas within the Meaford Property and Lower Lands were initially characterized following the general principles of the Ecological Land Classification (ELC) system for southern Ontario (Lee et al., 1998). This included an initial delineation of areas of distinct and relatively homogenous tree cover assemblages, followed by more detailed

examination of the species composition of each distinct area. Other attributes of forested areas were also examined, including:

- degree of cover of woody vegetation,
- tree size classes, primarily as diameter-at-breast-height (DBH),
- presence of age-related tree decline, diseased or standing dead trees,
- species composition of forest strata (canopy, sub-canopy, under-storey),
- ground cover density and species composition,
- forest floor conditions (leaf litter, hummocks, fallen logs and other woody debris), and
- soil characteristics, ascertained though soil cores completed to ~ 0.5 to 1 meter below ground surface (mbgs) using a hand-held kjed auger.

2.2.9 Wetland Characterization

The wetland features located within and adjacent to the Meaford Property were examined in regard to core attributes of hydrology and ecology (both floral and faunal). The boundaries of all wetland areas were approximated following the principles described in the Ontario Wetland Evaluation System (OWES) manual (MNR, 2014a). The primary factor used to determine the boundary is the species composition of the plant community. The "50% wetland vegetation rule" was applied, in conjunction with consideration of soil characteristics, the spatial and temporal patterns of water presence at or above soil surface, and also fine-scale topography.

Hydrological characterization included the identification of any discernable sources of hydrological input, observations of spatial and temporal dynamics of water at or above soil surface, and other observations of indicators of water presence (e.g. high water marks on trees), and examination of drainage characteristics of the overburden within the wetland and surrounding lands. Soil profiling to a depth of approximately 0.5 to 1 mbgs was conducted throughout the wetlands and the rest of the Property to determine soil saturation patterns and drainage characteristics.

The ecological attributes of the wetlands were ascertained in part through the various biological monitoring efforts conducted throughout the Property. All such monitoring efforts (plant, bird, mammal, amphibian and reptile surveys) were conducted with focused attention on the wetland areas. In general, the wetlands within the Meaford Property and Lower Lands were examined to determine status with respect to a range of functions, including:

- ground water recharge and discharge,
- water storage and release,

- flood damage reduction,
- shoreline stabilization,
- sediment trapping,
- nutrient and contaminant uptake and removal,
- food chain support,
- habitat for fish and wildlife, and
- attendant social and economic benefits.

The specific functional information collected for this EIS enables assessment of overall wetland function and value in a manner consistent with the OWES.

3.0 PHYSICAL CHARACTERISTICS

3.1 Topography

The Meaford Property borders the shoreline of Georgian Bay. The elevation of the Property ranges from ~180 meters above sea level (masl) at water's edge to a peak of ~235 masl at Highway 26. About 200 m in from water's edge, a prominent ridge with an elevation of ~220 masl laterally traverses the Property. This pronounced ridge and the even more significant ridge about 1 km further to the south are remnant beach ridges of ancient proglacial lakes (Lakes Nipissing and Algonquin). These ridges have a significant influence on local hydrology and also the ecology and of land-use patterns in the Christie Beach area.

Immediately below the ridge along the western half of the Meaford Property, the Southeast Claybanks exhibit a very steep slope (in the order of 45%) from top of bank to water's edge. Upgradient of the ridge, the entire width of the Meaford Property exhibits relatively low relief. The average slope across the main width of the Property is in the range of 1 to 2%. There are minor ridges and depressions encountered throughout the Meaford Property, including a number of instances where berms and trenches appear to have been excavated in the past, likely for the purpose of drainage management.

The slope face immediately below the ridge on the southern edge of the Lower Lands exhibits an elevation gain in the range of 20 to 25 m and an average slope of about 35%. At the far west end of the Meaford Property, the small inclusion of the Southeast Claybanks exhibits an even steeper slope (in the order of 45-50%) from top of bank to water's edge. Along most of the northern perimeter of the Lower Lands, bordering Fraser Street, there is a second abrupt drop in elevation of about 5 m with a gradient of about 35% on average.

Between the two slopes that effectively bound the Lower Lands on the long axis, there is a central plateau that occupies the core area. Within this core, the Lower Lands exhibit relatively low relief with an average slope in the range of 1 to 2%. The central plateau encompasses a large percentage of the area of the existing residential Lots.

There are some shallow natural depressions encountered within the central plateau, which in certain cases are a factor in the presence of wetlands within the Lower Lands. There is also a long narrow depression that runs approximately east-west through the core of the Lower Lands. This depression appears to be man-made, running parallel and immediately adjacent to what appears to be an old road-bed along the allowance for the extension of Barker Street. The depression and the raised road bed are functionally significant features within the relatively flat plateau area, and do have an influence on the hydrology of the Lower Lands (see Section 3.3).

3.2 Soils and Surficial Geology

According to the Grey County soil survey (Gillespie and Richards, 1954), the soils encountered throughout the large majority the Study Area are clay or clay loam. The dominant soil type within the Meaford Property is Brookston Clay Loam. This soil type is derived from gritty calcareous clay till, consisting of dark clay-loam over pale brown clay. This soil type is reported to be poorly drained.

The soil survey also indicates the presence of Vincent Silty Clay Loam and Kemble Silty Clay in minor portions of the Meaford Property, mainly on the southern perimeter between the Georgian Trail and Hwy 26. These soil types are prevalent within the Lower Lands, with Vincent Silty Clay Loam encountered on the south slope and Kemble Silty Clay throughout the rest of the Lower Lands below the slope. Kemble Silty Clay is characterized by imperfect drainage, whereas Vincent Clay loam exhibits good drainage, largely as a function of slope.

Other than these clay based soils, the soil survey depicts the presence of Brighton Sand in the extreme northwest corner of the Meaford Property. This soil type exhibits good drainage.

Soil profiling conducted throughout the Meaford Property and Lower Lands has confirmed the wide-spread presence of the clay-based soils, and also sandy soils in the northwest corner. Aside from the very limited area of sandy soil, clay is encountered within 20 - 30 cm of soil surface throughout the entire combined lands. This is a significant determinant of site hydrology, which in turn is a determinant of site ecology. There are no areas exhibiting organic soil types, including the wetland areas.

A geotechnical evaluation (WSP, 2016) reports the presence of shale bedrock throughout the Meaford Property at depths ranging from 180 to 400 cm below grounds surface (bgs), and typically 200 to 300 cm bgs. In all locations where boreholes were completed, the shale is described as grey shale of the Georgian Bay formation. The boreholes also revealed that the shale layer is immediately overlain by a layer of silty clay ranging from 30 to 230 cm thick.

3.3 Hydrology

Characterization of the hydrology of the Meaford Property has been based primarily on direct surveillance. Observations of flow quality and quantity were recorded during multiple site visits over the period of Aril to October in 2017, 2018 and also 2019.

It should be noted that records for the nearest Environment Canada climate station (Thornbury 3) indicate that average to above-average precipitation was received in this area during the study period (2017 - 2019). This includes relatively heavy precipitation in winter 2017-18 and 2018-19 and also spring 2019, and near-normal precipitation for the spring (April-June) and summer (July-Sept) period of 2018. The observations related

to hydrology within and around the Property are thus considered to represent conditions associated with normal to relatively high inputs during the main period of flow. A summary of monthly precipitation of the period of 2017 to 2019 for the Thornbury 3 climate station is provided in Appendix E.

The presence and movement of water within and through the Meaford Property is largely a function of the series of intermittent watercourses that traverse the Property, the widespread presence of poorly drained soils, and the relatively low topographical relief over most of the Property and Lower Lands. Combined, these physiological attributes lead to relatively long residence time of waters entering the Property, and the intermittent or prolonged presence of relatively wet conditions over much of the Meaford Property and within the central plateau area of the Lower Lands. The hydrology of the Property is also influenced by a variety of landscape alterations that direct or impede the movement of water.

The prevailing hydrological gradient is approximately south-to-north, leading across the Property from Hwy 26 towards the Georgian Bay shoreline. The roadbed of Hwy 26 functions as a hydrological barrier, as do the Georgian Trail (occupying the bed of a former rail line) and the private air-strip. Water flowing towards the Property from the south side of Hwy 26 is largely subject to considerable management, collating in ditches on the upstream side of the Hwy and conveyed via culvert to various channels that bisect the Property. Similar channeling and culvert conveyance occurs at the Georgian Trail, and also at the private air-strip (~1 km long) that laterally bisects the western half of the Property. The various watercourses, ponds and other relevant features are depicted in Figures 4 and 5.

The presence and movement of surface water within the Meaford Property also appears to be at least partly a function of beaver activity. During on-site monitoring, beaver damming activity was observed in several locations along one of the more significant water-courses that crosses the Property (i.e., Watercourse #1). This damming appears to be a significant determinant of water retention in the large marsh area that is bisected by this watercourse. Evidence of significant beaver activity was also observed on the upgradient periphery of the deciduous swamp areas in the northeast quadrant of the Meaford Property.

3.3.1 Watercourses

In total, there are seven watercourses that flow from Hwy 26 and convey runoff at least part way across the width of the Meaford Property towards Georgian Bay. There is one additional watercourse (Watercourse #6) that originates in the northeast corner of the Meaford Property, conveying drainage over a short distance towards the pond that lies just outside the Property boundary (Pond #4) and eventually continuing through the Lower Lands and discharging to the ditch along the west side of Christie Beach Road.

Watercourses 3, 4, 5 and 6 all eventually convey flow from the Meaford Property down the steep slope and across the Lower Lands. These watercourses all enter the Lower Lands at the top of the south slope, where intermittent flow is conveyed via prominent scours down the slope face. The episodic and high energy flows lead to dynamic channel alignment and a relatively high erosion potential. Below the base of the slope, Watercourses 2, 3 and 4 are subject to various degrees of braiding and diffusion across the relatively flat central plateau. Flow eventually collates and is conveyed via a second series of deep scours down the face of the shorter slope occupying the northern perimeter of the Lower Lands, leading down to Fraser Street. A series of ditches and culverts ultimately convey flow along and across Fraser Street and very shortly thereafter into Georgian Bay. For Watercourse 3, there is little braiding or diffusion, and there is a relatively short, straight and confined path of flow from the base of the slope directly to the Bay.

The watercourses that traverse the Property all appear to have been at least in part deliberately excavated for the purpose of drainage conveyance. Through the Meaford Property these channels exhibit relatively straight alignment and are lacking true aquatic substrate through most of their respective lengths. Limited stretches of gravel or silt substrate are present in close proximity to culverts at Hwy 26 or the Georgian Trail, but channel beds are otherwise occupied by terrestrial vegetation for most of their length.

All channels exhibit intermittent flow, driven by spring melt or precipitation events. Field observations indicate that flow arising from precipitation events rapidly abates or ceases altogether, typically within 24 hrs. Watercourse #1 and #2 maintain trickle flow in upper reaches for a longer duration, while most others become completely dry. By mid-summer, none of the watercourses exhibited meaningful flow through the Property other than in brief periods immediately following significant precipitation events.

In addition to the four continuous watercourses that flow across the Lower Lands and lead to Georgian Bay, there are a number of discontinuous flow paths encountered within the Lower Lands which are short and have no discernable direct surface connection to the Bay and/or to any up-gradient sources. This includes;

- a few short scours at the top of the south slope,
- secondary flow-paths diverging from the main watercourses (mostly near the base of the slope), and
- isolated paths on the north half of the central plateau that do not have a discernable connection to watercourses with a continuous path of surface flow through the full width of the Lower Lands.

For the purpose of this EIS report, these are described as "discontinuous" watercourses. The most prominent of these are depicted in Figure 5.

3.3.2 Ponds

There are also four ponds within or adjacent to the Property, as shown in Figure 4. These ponds range in size from about 0.2 to 0.4 ha, and all appear to be man-made. All four ponds are on-line, receiving and conveying flow from watercourses flowing through the Property. Ponds #1, #2 and # 3 are located within the Meaford Property but receive flow that originates at least partly off property. The pond immediately adjacent to the eastern perimeter of the Property (Pond #4) receives channeled drainage flow that appears to originate mostly within the Meaford Property.

3.3.3 Lateral Impoundment

As noted in Section 3.1, the remnant road-bed and associated lateral depression have an influence on the hydrology of the Lower Lands. These features result in substantial impoundment of water that would otherwise flow northward across the central plateau. Surface runoff is intercepted by the raised road-bed and conveyed slowly westward within the confines of the depression. Runoff is similarly intercepted and redirected along a stretch of approximately 100 m at the west end of the active length of Barker Street. Overall, Barker Street and its inactive extension function as a hydrological barrier across more than a third of the length of the Lower Lands. The redirected drainage is conveyed slowly westward in the lateral depression, ultimately converging with Watercourse #4 (see Figure 5). The westward flow is very slow, and the lateral depression exhibits a protracted presence of standing water relative to Watercourses 3 - 6. As a result, the depression exhibits characteristics indicative of a wetland (as discussed in Section 4.2.3). For the purpose of this EIS, this feature is identified as a water conveyance feature, but any potential wetland functions are fully considered in the assessment of ecological functions.

There is also a similar lateral depression that runs along the north side of the old road-bed, which also collects and conveys surface water westward toward Watercourse #4. However, the volume and duration of standing water in the northern depression constitute a minor fraction of that associated with the depression on the south side of the road bed.

3.3.4 Groundwater

The topography within and around the Meaford Property would generally be favourable to the presence of seeps or other groundwater encounters. In particular, groundwater discharge could be expected in association with the base of the significant slope which is immediately down-gradient of a considerable expanse of elevated table lands. However, the presence of relatively impermeable soils and underlying shale layers likely limit the potential for initial infiltration in the adjacent table lands, and also likely limit the potential for deep groundwater upwelling in low-lying areas where it might otherwise be expected.

Surveillance of the Meaford Property revealed evidence of minor groundwater discharge in the form of isolated seeps at the base of the clay bluffs. It appears that these seeps consist of relatively shallow groundwater rather than upwelling of deep groundwater.

Surveillance of the Lower Lands revealed evidence of only very minor groundwater discharge, mainly on the southern edge of the larger wetland located in the centre of the Property (see Figure 5). The frequency, duration and volume of this groundwater discharge were all very low, and it appears to be relatively shallow groundwater rather than upwelling of deep groundwater. Overall, groundwater does not appear to be a meaningful contributor to any hydrological features and functions within the Lower Lands. The minor presence of groundwater discharge does not appear to have any meaningful influence on floral or faunal communities.

Throughout the relatively flat expanses that occupy the Meaford Property and Lower Lands, depth to water table is variable but generally shallow. In the wetland areas standing water up to 30 cm deep is present during the spring run-off period. In these areas, the water table declines to typical depths of 10 to 30 cm bgs as summer progresses. In close proximity to the wetlands, the water table can be encountered from 10 to 0 cm bgs in the spring period, declining to >30 cm bgs by summer. Throughout the rest of the plateau areas, the depth to water table is >30 cm bgs in most locations.

As part of a geotechnical survey (WSP, 2016), water table elevation was recorded in early June at several boreholes within the Meaford Property. The reported depths to water table ranged from 190 to 497 cm bgs.

3.3.5 Wetlands

In a number of locations throughout the Property, the water table is encountered at or above ground surface over a spatial and temporal extent that has lead to the presence of hydric soils and plant communities dominated by hydrophilic species. These wetland areas are present in part due to the presence of shallow topographic depressions. The main hydrological input to these wetlands appears to be surface runoff, primarily as channeled flow entering the Property via the intermittent watercourses. In the Lower Lands, sheet flow also appears to be a relatively minor contributing input to the two wetland areas in the central plateau immediately downgrading of the major slope. Groundwater influx may be a minor input to the larger central wetland in the Lower Lands, but it does not appear to be a meaningful component of the hydrological balance of any of the wetlands within the Lower Lands or the Meaford Property. The hydrological output from both wetlands is a combination of evapotranspiration, infiltration and surface flow. During the spring runoff period when hydrological inputs are dominated by surface runoff, surface flow is also the dominant output component. Outside of periods of peak surface inflow, infiltration and evapotranspiration (ET) become the primary output mechanisms. The relative contribution of these output components has not been directly evaluated, but the nature of the soils is such that

infiltration rates are expected to be very low, and the nature of the plant community (i.e., deciduous forest) is such that rates of ET are likely relatively high.

4.0 ECOLOGICAL CHARACTERISTICS

The following sections describe the ecological characteristics of the Meaford Property. A description of the regional ecology is provided for context. Ecological monitoring results are summarized in Tables 1 to 10, and specific detailed results are provided in Appendix D.

4.1 Regional Ecology

The Meaford Property is situated within the Mixedwood Plains *Ecozone*, and more specifically within the Manitoulin – Lake Simcoe *Ecoregion*, equivalent to Site Region 6E under Provincial classification. This Ecoregion is characterized by warm summers, mild winters, and relatively abundant precipitation (700 to 1000 mm/a) that is evenly distributed throughout the year. The dominant land cover is cropped land with significant areas of mixed forest. Climax vegetation is characterized by mixed hardwoods, including Sugar Maple, American Beech, Eastern Hemlock, Red Oak, and Basswood. Pioneer species include White Pine, Paper Birch, and Trembling Aspen. Yellow Birch, White and Slippery Elm, Red Maple, Black Ash and White Cedar are typical forest cover species in depressions and moist areas. Much of this Ecoregion has been subject to anthropogenic influence to some degree. Largely as a result of past conversion of lands for agricultural use, wetlands account for only about 3.5% of the total land area within this Ecoregion.

More locally, the area bisected by Christie Beach Road in proximity to Georgian Bay is characterized by a relatively high presence of forest cover, particularly in association with the significant slopes associated with the former shorelines of ancient Lakes Nipissing and Algonquin. These slopes generally exhibit deciduous forest cover that is relatively mature compared to that encountered on lands adjacent to the slopes. In the plateaus near the base of the slopes, a number of wetlands have been mapped, most of them forested.

Most forest cover in the area is deciduous, although clusters of conifers (Eastern White Cedar, Eastern Hemlock, Balsam Fir) occur in some locations, particularly on slopes or where soils are moist or wet. There is evidence that lower areas, particularly closer to the Georgian Bay shore, were historically occupied at least in part by mature Eastern White Cedar forest. Other than the significant slope faces, much of the area has been subject to some degree of clearing in the range of perhaps 30 to 60 years ago. Much of this area has subsequently been left to regenerate. In these areas, thickets or woodlands comprised of early succession species (e.g. ashes, aspens) are dominant.

Overall, floral and faunal assemblages encountered over much of the area are typical of lands that have been directly or indirectly altered by past anthropogenic activities or land-uses.

4.2 Ecological Communities

The delineation of ecological communities completed for the Meaford Property is intended to identify vegetation communities at a scale that has meaning and relevance to the overall objectives of the EIS. Existing communities are delineated and discussed to either the Ecosite or Community Type level. The minimum size of identified areas of any given community is about 0.3 ha in most instances.

The presence of relatively small (<0.2 ha) inclusions are mentioned in the descriptions of each of the larger community types, but not formally delineated if there is no significant ecological function or conservation concern uniquely associated with the inclusion.

4.2.1 Overall Conditions

The ecological communities currently encountered within the Meaford Property are a largely a reflection of four key factors;

1) The presence of significant slopes on the northern perimeter of the Meaford Property, and both the southern and northern perimeter of the Lower Lands,
2) The passage of several intermittent watercourses through the Property and Lower Lands,
3) The relatively flat topography of the Meaford Property and the central core of the Lower Lands combined with the presence of clay soils with low infiltration rates, resulting in the presence of ecological communities that arise under relatively wet conditions (both wetland and upland communities), and
4) The fact that the vast majority of the Meaford Property and much of the surrounding landscape has been subject to some degree of significant anthropogenic alteration, resulting in the widespread presence of cultural communities.

The Meaford Property was subject to widespread clearing in the past, likely for agricultural purposes at the time. Under the ownership immediately prior to that of Parkbridge, the land-use of the Meaford Property had been non-agricultural and subject to different intensity and intent of management. Much of the Property has now been subject to some level of ecological restoration activity, largely in the form of tree planting. Outside of planted areas, the plant communities now found within the Meaford Property are largely those indicative of early succession habitats (i.e., weedy areas, grasslands, old fields or pastures, shrub thickets, and young forest).

The Lower Lands also appear to have been subject to some degree of historic clearing, but has been regenerating for a considerably longer time period than the Meaford Property and is now well naturalized. The Lower Lands are presently occupied almost entirely by deciduous forest that is either relatively young and in earlier stages of

succession, or mid-aged and more successionally advanced. There are isolated small depressions within the Lower Lands where the small wooded wetlands (*i.e.*, swamps) have established.

There are several linear anthropogenic features which laterally bisect portions of the Property and play some role in the nature of ecological communities that are present in certain locations. This includes the following:

- A 1-km private air-strip that bisects the western half of the Meaford Property, creating a large portion of the open meadow habitat that is present.
- The Georgian Trail, which also laterally bisects the Meaford Property over its full length. The raised bed of the former rail line is associated with a number of pockets of both wet habitats and pockets or narrow bands of woodland.
- The extended road allowance of Barker Street, laterally traversing much of the central core of the Lower Lands, and currently occupied by the remnants of a rudimentary road bed that has been undergoing regeneration for a few decades.

Following the ELC system of Lee *et al.* (1998), a total of 17 distinct community types have been delineated within or immediately adjacent to the Meaford Property. The specific community types and their ecological functions are briefly described in the following sections. Figures 6 and 7 illustrate the approximate distribution of the various ELC designations within the Meaford Property and Lower Lands.

4.2.2 Cultural Communities

The majority of the existing communities within the Meaford Property are present in large part due to landscape alterations undertaken for various purposes. In standard ELC terminology, the majority of the Meaford Property is occupied by what are described as "Cultural" communities, including meadows, thickets, savannahs, woodlands and plantations. This general state has significant bearing on the ecological features and functions associated with the Property. In total, the various cultural community types account for about 70% of the Meaford Property. All but about 0.5 ha of the Lower Lands is occupied by forest communities, and cultural communities are absent.

Mineral Cultural Meadow Ecosite (CUM1)

The Cultural Meadow (CUM) Ecosite accounts for about 10 ha of the Meaford Property, and includes the following:

- the actively maintained lawn area associated with the existing residence and its access lane,

- an area immediately to the east of the residential laneway, transitioning to Cultural Thicket habitat,
- a large swath in the centre of the western half of the Meaford Property that was maintained up until recently for use as a private air-strip,

The plant species assemblages in the CUM Ecosite are dominated by grasses and sedges. Non-native grasses (e.g. Common Timothy, Orchard Grass, Smooth Brome, Meadow Fescue) are both abundant and widespread. Sedges tend to be more abundant in locations with moister soil conditions (near water courses, in low areas). Commonly encountered sedges include Yellow Sedge and Tussock Sedge. There is also fairly widespread presence of non-graminoid species that are typical of disturbed or weedy sites. Knapweeds, thistles, various asters and goldenrods, plantains, dandelions, and vetches are among the most common. A number of the common forbs encountered in this community are non-native, with several considered to be invasive (e.g. Birdfoot Trefoil, Wild Carrot). Woody species are starting to establish in most areas of CUM, with Red Osier Dogwood being the most common.

In the areas of Cultural Meadow found between the Georgian Trail and Hwy 26, there are a few very small pockets (<0.05 ha), found primarily beside ditches or watercourses, that are occupied primarily by hydrophilic plants (e.g., cattails, Common Reed). For the purpose of this EIS, these very small areas are not explicitly considered as wetlands and are excluded from the assessment of wetland habitat.

The plants in the CUM Ecosite typically produce seed that serves well as forage for various common birds and small mammals. It also generally constitutes a habitat that might meet the needs of bird species that are grassland specialists. However, direct surveillance of birds within areas of CUM within the Property indicated a relatively low abundance and diversity of grassland species. A few nesting territories of Eastern Meadowlark were detected in areas of CUM, primarily the area associated with the former air-strip. The occurrence of this Species at Risk (SAR) is discussed further in Sections 4.4 and 4.8.

Mineral Cultural Thicket Ecosite (CUT)

The Cultural Thicket (CUT) Ecosite has arisen as a result of natural regeneration in previously cleared areas, and is encountered throughout the core of the Meaford Property.

Because of the relatively wet conditions widely encountered throughout the Property, the dominant shrub species in this community type is Red Osier Dogwood, which is a facultative wetland species. This species accounts for more than 60% of the woody cover in the CUT community. Other woody species encountered with notable frequency include Hawthorns, shrub Willows, Choke Cherry, European Buckthorn, and Poison Ivy. The density of shrub cover is variable, typically about 30 to 40%, but ranging from 75 to 95% in some locations where dense stands of Red Osier Dogwood have established.

Young specimens of early succession tree species are readily encountered in the CUT community. Most frequently this includes Green Ash, but White Elm, Trembling Aspen and Balsam Poplar are also regularly encountered. Hawthorns and European Buckthorn are also present, typically in clusters. Tree specimens are almost entirely <10 cm DBH, with the majority being <5 cm DBH. A few isolated specimens approaching 15 cm DBH are present, mostly Green Ash and White Elm. The density of tree presence within the CUT Ecosite is also variable, giving rise to inclusions of areas of Cultural Savannah (CUS) in various locations.

Throughout much of the CUT Ecosite, herbaceous ground cover is generally dense (>90%) and consists of a species assemblage closely resembling that of the CUM Ecosite; that is, primarily a mix of common grasses and sedges, and also a diversity of forbs largely typical of disturbed sites (e.g. thistles, goldenrod, vetches, asters). Ground cover is greatly reduced (<25%) in areas of extremely dense shrub presence. Such areas account for an estimated 15-20% of the area where the CUT community is present.

The ecological function of this habitat is related primarily to the fact that the prominent species (Red Osier Dogwood) provides fruit and foliage that provide valuable forage. The mix of shrubs and ground cover provides structure that is attractive to a variety of birds and mammals. Monitoring has indicated a relatively high abundance and diversity of bird species, with a few species (e.g. Woodcock) observed exclusively in association with the CUT habitat. There was also evidence of regular presence of mammals within the CUT community, including deer.

For the purpose of this EIS, the Cultural Thicket and Cultural Savannah Ecosites have been delineated (see Figure 5) and discussed as a single community, owing to the high degree of interspersion of these two communities and the lack of significant distinction between them in terms of ecological function. Combined, these two community types account for about 60% of the Meaford Property.

Mineral Cultural Savannah Ecosite (CUS)

In various locations, succession has advanced to the point where pioneer tree species have established relatively dense cover (i.e., between 25 and 35 % of total plant cover). These areas are often transition zones between areas of thicket and forest. In the east end of the Meaford Property, there are stand-alone areas away from Forest communities where regeneration has progressed to the point where tree cover is sufficient to warrant the CUS designation.

Green Ash is the dominant species in the CUS community. There are also areas where Trembling Aspen and/or Balsam Poplar are a relatively abundant component of the woody cover. This is mostly in close proximity to areas where mature specimens of these species are present, often planted in the case of Balsam Poplar. Hawthorns and European Buckthorn are also regularly encountered within the CUS community. In some areas, a few scattered young specimens of coniferous trees are present, including White Pine, Eastern White Cedar, and American Larch to a lesser extent. Their presence in most

cases is likely as a result of seed dispersal from nearby plantation areas. Throughout most of the CUS community, trees are interspersed with shrub cover, most commonly Red Osier Dogwood.

In most occurrences of this community type, the trees are relatively young and range in size up to 15 cm DBH, but most are <10 cm DBH. There are no CUS communities in which the trees are long-standing and mature. In time, trees will mature and account for a greater percentage of cover.

The ecological function of the CUS community largely overlaps with the CUT community with which it is regularly interspersed. It supports a variety and moderate abundance of common bird and mammal species, most of which are not extreme habitat specialists and none of which are SOCC.

Cultural Woodland (CUW)

There is approximately 1.3 ha of managed landscape immediately surrounding the existing residence in the Meaford Property. This area is largely turfed, but is also well-treed. The tree cover is sufficient to describe the yard as a whole as a Cultural Woodland. The tree species encountered in the yard include both native (e.g. Red Oak, Balsam Poplar) and non-native species (e.g. Norway Maple). Within the treed area of the yard, there is no sub-canopy or understory and the ground is covered with either anthropogenic turf grass or garden space.

Cultural Plantation (CUP)

The Meaford Property has been subject to a number of forestation and/or ecological restoration efforts. This includes several relatively large block plantations, which are referred to in the ELC terminology as Cultural Plantations (CUP). The largest block plantations are found in the west central part of Property (see Figure 6a). There are also plantation blocks between the Georgian Trail and Hwy 26, and also to the immediate north of the Trail. Most of the block plantations are composed of trees that are estimated to be 25-35 years old. In total, block plantations occupy about 9 ha within the Property.

There are plantings that consist of one or a few parallel lines of trees, or a more extensive series of widely spaced trees. The species included in these linear plantings are Balsam Poplar, Eastern Cottonwood, Green and White Ash, and White Spruce to a lesser extent. Unlike the block plantings, these linear or scattered plantings are not given explicit recognition as planted communities in this assessment. They are simply assessed as part of the overall presence of woody cover in the areas where they occur (meadows, thickets, savannahs).

It should be noted that survival and current condition of many planted trees appears to be poorer than might be expected, likely owing to relatively poor drainage within the Property. This is more the case for non-block plantings, likely because the main plantation blocks appear to have been subject to drainage enhancement.

In terms of tree species composition, there are two general types of plantation currently found at the Property; 1) Mixed Plantations, and 2) Coniferous Plantations.

Mixed Plantation (CUP2)

There are two locations within the Meaford Property where a mix of conifers and deciduous trees have been planted in block form. Both mixed plantations are situated between the Georgian Trail and Hwy 26. The block on the east side of the Property is a mix of Black Walnut, White Ash, White Pine, and White Spruce. Size of trees is variable, but most specimens are in the range of 15 to 25 cm DBH. The block on the west side of the laneway is a mix of Ash (Red and White) and White Spruce, with all trees <15 cm DBH. The latter block is characterized by an incomplete canopy, owing to the current size and spacing of trees. Ground cover within this block is relatively dense (80 - 90%) and generally consists of the same general assemblage of species as encountered in the CUM community. The Block on the east side of the existing laneway is more mature, and the canopy is more complete. There is no sub-canopy at this stage, and a few Buckthorn and young ash are present as under-story species. Ground cover is sparse (<30%) and includes common species such as wild raspberry, poison ivy, dandelion, and a few grasses.

Coniferous Plantation (CUP3)

The plantations within the Meaford Property are primarily or entirely coniferous, with most classed as White Pine Coniferous Plantation (CUP3-2). This includes the two largest block plantations, situated on the west half of the Property between the air-strip and the top of the bluff. These plantations appear to have all been established about 25-30 years ago, and most trees are less than 15 cm DBH. These plantation blocks are effectively pure monocultures of the planted species. There does not appear to have been any management efforts (e.g. selective thinning) implemented since the time of initial planting. The existing trees are tightly spaced, and the crowding has constrained the growth of the planted trees and has also largely prevented the establishment of any understory or ground cover. The few herbaceous plants that have established within the plantations represent common and often non-native species (e.g. Common Dandelion, Common Strawberry). A few small deciduous woody species (Red Osier Dogwood, European Buckthorn, Green Ash) have established in very low density along the perimeter of the plantation blocks, but trees other than planted conifers are effectively absent from the interior. These general characteristics are key determinants of the ecological function of these woodland features. The tight spacing, lack of true forest structure and an absence ground cover renders this habitat largely unattractive to most species of wildlife. Monitoring results indicate low abundance and diversity of breeding birds, an absence of amphibians and reptiles, and little usage by mammals.

There are two other smaller coniferous block plantations within the Meaford Property that consist of White Pine or White Pine are mixed with White Spruce. The conditions in

these blocks are largely consistent with those encountered in the largest plantation blocks, and their function is expected to be the same.

There is one other area of planted conifers abutting the south side of the former air-strip. This is a mix of White Pine and White Spruce, and also American Larch and some Eastern White Cedar. These trees are younger (estimated to be 15 to 20 years old) and smaller than those in the other conifer plantations, with almost all trees measuring < 15 cm DBH. The smaller size creates an open canopy and allows for the interspersed presence of shrubs, primarily Red Osier Dogwood but also some shrub willows. Ground cover in this area is solid, consisting mainly of a mix of sedges and grasses and also common forb species (e.g. asters, vetches, knapweeds, Teasel). The presence of shrubs and ground cover provides conditions more conducive to birds and small mammals. The ecological function of this particular area of coniferous plantation is expected to be very similar to that of the CUT or CUS Ecosites. The presence of conifers may be attractive habitat for certain birds that eat conifer seeds or prefer conifers for nesting purposes. This area also provides a mix of forage and cover that may be attractive to deer.

4.2.3 Forest Communities

There are approximately 57 ha of land within the Meaford Property and Lower Lands that can be described as either woodlands or forest (i.e., where trees make up 35% or 60% or more of the existing vegetation cover, respectively). In total, woodland and forest communities account for about 40% of the area of the Study Area.

In the Meaford Property, forest communities are of secondary prominence and occupy less than 30% of Property area. These forest communities are concentrated along the northern periphery of the Property, but are also present in relatively small pockets adjacent to the Georgian Trail. Woodlands also border the Property along the majority of its western and northern boundaries. All but about 0.5 ha of the Lower Lands is occupied by forest communities.

Based on direct surveillance, there are seven forested community types that exist within the Meaford Property and Lower Lands. This includes cultural plantations (see Section 4.2.2) and relatively small areas of forested wetlands (i.e., swamps) that account for about 5 ha in total, and which and are discussed separately as wetland communities (Section 4.2.4).

The large majority of the forest communities encountered within the Meaford Property and Lower Lands are natural upland deciduous forest, with the exception being a few relatively small pockets of mixed forest in scattered locations north of the prominent ridge that borders the Property. The deciduous forests within the Property and Lower Lands are composed primarily of a mix of common early succession tree species, mainly Aspen and Ash. In the majority of these forests, the trees are relatively young and even-aged, and range between 10 and 30 cm DBH, with only a small percentage of tree

specimens exceeding 35 cm. The forested areas contain no representations of the climax forest communities typical of the region (i.e., mature maple-beech forest).

The characteristics and functions of the various types of forest communities found within and immediately adjacent to the Property are briefly described below. Tables 8 and 9 provide a brief summary of the main attributes of each the forest communities encountered within the Property and Lower Lands. Figures 6 and 7 depict the distribution (± 5 m accuracy, approx.) of these forest community types.

Dry-Fresh Poplar Deciduous Forest Type (FOD3-1)

This community type occurs almost entirely within the Lower Lands, most notably on the slope face along the boundary between the Meaford Property and Lower Lands. This community type is also the dominant community occupying the face of the smaller slope along the northern perimeters of the Lower Lands. In total, this forest type occupies about 9 ha, or almost 7% of the combined area of the Meaford Property and the Lower Lands.

The canopy is solid (~85% to 90% closed) and consists mainly of Trembling Aspen, with White Birch also regularly present. While Aspen is the dominant species throughout this community, canopy composition does vary somewhat with position on the slope face. Birch and Oak are more frequently encountered on the upper half of the slope face, and Aspen and Ash are more concentrated on the lower half.

There is notable variability in size and age classes of trees within this community. The majority of canopy specimens are <35 cm DBH, but scattered Aspen specimens as large as 60 cm DBH are present, more so towards the base of the slope. White Ash, Red Oak and also a few Sugar Maple specimens ranging from 40 to 60 cm DBH are also present, more so toward the top of slope.

There is a well developed sub-canopy which consists of a mix of White Ash and younger Aspen and Birch. Basswood and White Elm are also found in the sub-canopy, along with a few scattered Ironwood and Eastern White Cedar. The shrub layer is reasonably well-established throughout most of the area occupied by this community, but it is neither dense nor continuous. European Buckthorn, Alternate-leaved and Round-leaved Dogwood, and Choke Cherry account for the majority of shrub presence.

The existing layers of woody vegetation provide substantial shading during the growing season, which is a contributing factor to the presence of ground cover that is patchy but relatively thin overall (~30% on average). Ground cover includes patches of moss and vascular species typical of deciduous forests in the region (e.g. Herb Robert, Dog Violet, Woodland Agrimony, Trout Lily, Canada Mayflower, woodland asters and woodland fern species). Vining species (Virginia Creeper, Wild Grape, Poison Ivy) are also present in relatively low abundance, more frequently on the lower slope face.

The heterogeneity in species composition is not very high, but this forest community does exhibit small isolated pockets of what could be designated as inclusions of other communities, particularly in proximity to watercourses. The noted inclusions consist of the following:

- cedar dominated mixed forest (FOM7 or FOM4) on the north slope face associated with the lower end of Watercourses 4 and 5 (see Figure 5).
- Dry-fresh Sugar Maple forest types (FOD5-1, FOD5-3) on the southern slope face, mainly in association with Watercourse 5.
- Dry-fresh Ash White Ash Deciduous Forest (FOD4-2) on the south slope face in close proximity to Christie Beach Road.

In regard to function, as summarized in Table 9, the information compiled during site surveillance indicates that ecological function of forest communities with the Meaford Property and Lower Lands is somewhat limited. Within the Property boundaries, these forest community types do not encompass any interior forest habitat for birds (i.e., forested areas more than 200 m from forest edge, as per MNRF, 2015). They do exhibit some degree of structural layering, which could be conducive to a diverse assemblage of forest birds. However, the trees are relatively small and consist mainly of an early-succession mix, which is less attractive to forest birds. Site surveillance has indicated the presence of a few bird species with general forest habitat associations (e.g. Eastern Wood-pewee, White Breasted Nuthatch). However, on the balance, forest-breeding bird species were detected in low abundance in association with this forest type. Overall, direct surveillance did not reveal any indications of animal or plant species or assemblages which would be considered significant or typically associated with mature or otherwise notable forest habitat types. The presence of intermittent watercourses does appear to create conditions with some potential to serve specific microhabitat functions (e.g. Winter Wren nesting) However, there were no observations to suggest that there is any Significant Wildlife Habitat (SWH) function along watercourses within the FOD3-1 community.

Dry-Fresh White Ash Deciduous Forest Type (FOD4-2)

Approximately 0.8 ha of forested area immediately east of the existing residence, bordering the top of the steep wooded slope, is dominated by White Ash. Most specimens of Ash are <25 cm DBH, but there are a few remnant older specimens in the range of 45 - 70 cm DBH. Red Ash and scattered Basswood are also present in the canopy, which is well developed. There is a weakly defined sub-canopy, consisting mainly of Ash along with a few Ironwood and young Sugar Maple specimens. The understory is relatively dense, and includes Ash saplings, scattered clusters of Choke Cherry and abundant European Buckthorn. Ground cover is relatively sparse (~20%), consisting of common forbs. This is one of only two areas within the Meaford Property where some typical deciduous forest floor plants (e.g. Trout Lily) are found.

Site surveillance did not indicate any notable ecological function associated with the very small patch of this forest community.

Fresh-Moist Ash Lowland Deciduous Forest (FOD7-2)

The Meaford Property encompasses a few low areas where young stands of Green Ash dominate. There are a few pockets of this community, found mainly on the periphery of areas of Ash Swamp. This reflects the fact there are nearby mature ash serving as a source of seeds for colonization of nearby open habitat. The total area within the Meaford Property that is occupied by this community is approximately 5 ha.

In the Lower Lands, the Ash Lowland forest type occupies about 6.3 ha, which is about 40% of the central plateau (see Figure 7). The eastern end of the Lower Lands adjacent to Christie Beach Road is occupied by this woodland type. A considerable portion of the combined area of the approved residential lots is also occupied by this forest community.

Judging by tree size and forest floor conditions, these woodlands are still in the relatively early stages of development. Owing to the relatively young age and small size (<20 cm DBH) of the Ash, there is an absence of well-developed stratification in these wooded areas, and the canopy is relatively thin. Also, because of the vigour and crowding of the Ash, the diversity of tree species is low.

These woodlands are dominated by Red Ash, with a variable secondary presence of Trembling Aspen, White Elm, White Spruce and also scattered Black Ash. A few isolated Silver Maples are also present in locations in the Lower Lands, but are not a meaningful component of the canopy. Buckthorn and Hawthorn are also found in spots, more so in the Meaford Property and usually closer to the perimeter. The individual trees of all species are relatively small, with most being less than 20 cm DBH, and only a few specimens approaching a diameter of 30 cm. The larger trees tend to be present towards the perimeter of the community, particularly adjacent to areas of Dry-Fresh Poplar Deciduous Forest (FOD3-1).

Partly because of a relatively open canopy, ground cover is fairly dense (~75% on average) and composed of a mix of graminoid species and common forbs (e.g. common strawberry, Forget-me not, various asters and goldenrod species), that are typical of moist and open forested sites.

Portions of the Ash Lowland forest community exhibit micro-topographical heterogeneity which gives rise to very small scattered pockets with wetter soils and a more substantial presence of plants that are hydrophytes (e.g. Rough Avens, Late Goldenrod). In consideration of soil and vegetation status, these areas verge on classification as Ash Mineral Swamp (SWD2-2). These areas are mostly encountered in the Lower Lands below the base of the south slope where watercourses enter the relatively flat Ash Woodlands, and subsequently generate some level of diffuse overland flow. For the purpose of this EIS, the presence of these wet areas is considered as a characteristic of the Ash Lowland Forest, and also as a factor in characterizing the watercourses themselves.

The ecological function of the Ash Lowland Forest is reflective of the fact that it is an early succession community with minimal development of forest structure. In general, these characteristics are less likely to be associated with ecological functions that are typically considered a conservation priority (e.g. SOCC habitat, other SWH functions). On-site monitoring indicates that the few SOCC which are known to be in the general area have no significant affinity for this type of woodland. The notable exception is the localized presence of burrowing crayfish in areas associated with Watercourses 4 and 6 and in immediate proximity of the two identified areas of swamp habitat. This is discussed further as a SWH function in Section 4.9.

Fresh-Moist Poplar Deciduous Forest Type (FOD8-1)

A long narrow band of Trembling Aspen occupies the area adjacent to the top of slope along much of the northern perimeter of the Meaford Property. The are also several small stands of Trembling Aspen established adjacent to the Georgian Trail, on the periphery of other woodlands (plantations, swamps), or along watercourses in the middle of otherwise open habitat. In the open locations, the Aspen patches are expanding through clonal propagation.

This forest community type occupies a total of about 7 ha within the Lower Lands accounting for over 50% of the central plateau and encompassing most of the area of the existing lots of record. In the Meaford Property, this forest type accounts for a total of about 6 ha, distributed mainly in narrow bands along the top of the slope along the northern perimeter.

In the Meaford Property, the Aspen exist as almost pure stands, with very few other trees in the canopy. A few Red Oak, White Elm and White Ash are present, but >90% of the canopy is formed by Trembling Aspen. Most trees measure 10 to 20 cm DBH, with a few specimens in the range of 25 to 35 cm DBH. The sub-canopy is not well defined, and also consists almost entirely of Aspens. Due to a relatively open canopy, the ground cover is dense and diverse, consisting of a mix of grasses and common forbs (e.g. Dog violet, Wood Agrimony, Dandelion, Common Strawberry). There also tends to be a heavy under-story, especially in the area along the top of slope. Common woody species in the sub-canopy include European Buckthorn, Choke Cherry, Hawthorns, and Red Osier Dogwood. In several locations, seedlings and saplings of various tree species are starting to establish in the understory, including Ash (Red and White) and White Pine.

In the Lower Lands, Trembling Aspen is slightly less dominant, accounting for about 75% of canopy cover. The aspen are mostly <30 cm DBH, with some scattered specimens in the range of 30 to 35 cm DBH. Red Ash is the secondary canopy species, with White Ash, White Elm, and Sugar Maple also present in a scattered manner throughout the canopy. Specimens of species other than Aspen are almost exclusively less than 30 cm DBH, and the large majority are less than 20 cm DBH. The sub-canopy in this community is not well-developed. It consists of a mix of Ash and younger Aspen, with a presence of scattered specimens of elm and a few Silver Maple in a few low areas. The under-story is well established, dominated by relatively dense stands of European

Buckthorn. Other regularly encountered species in the shrub layer include saplings of ash (Red and White), Alternate-leaved Dogwood, and non-native honeysuckle. There is also a considerable presence of vining species (wild grape, poison ivy). Owing to the presence of a relatively open canopy, ground cover is relatively dense throughout this community, averaging about 75%. Ground cover is composed of a variety of common forbs (e.g. various woodland asters, mints) mixed with some graminoid plants as well as moss clusters. This includes numerous species that are typical of disturbed sites.

The FOD8-1 type is an early succession community, which typically establishes following significant disturbance. The ecological function of this habitat within the Meaford Property is limited due to several factors, including the small size of the existing patches of this community, limited floral diversity, a lack of forest structure, and the relatively even age of the primary tree cover. The results of on-site monitoring indicate that the wildlife associated with this forest type is neither abundant nor diverse, and consists of species that are regionally and provincially common. Monitoring has revealed no evidence of the presence of SOCC, SWH or other ecological features or functions that might warrant conservation priority.

Fresh-Moist White Cedar Mixed Forest Ecosite (FOM7)

The mixed forest community occurs in three locations within the Study Area:

1. at the far west end on an area of relatively steep slope, immediately east of the area of open bluff (see Figure 4 a), and
2. at the far east end of the Lower Lands, on the face of the southern slope in the small ravine associated with Watercourse #4 (see Figure 4b).
3. a narrow band between the base of the bluffs and the shore of Georgian Bay along the western half of the Meaford Property.

The total combined area of this community type within the Study Area is approximately 3 ha. The forest composition is variable, depending in part on position on the slope or proximity to the shoreline. On aggregate, this woodland community is described as mixed forest.

The most abundant tree species is Eastern White Cedar, with most specimens measuring 10-30 cm DBH but with some scattered trees in the range of 35-50 cm DBH. The Cedar is mixed with a variety of deciduous tree species, most frequently including Red and White Ash, White Birch, and Trembling Aspen. Also present to a lesser extent are Sugar Maple, Red Oak, and Yellow Birch. The deciduous trees are mostly in a similar size class. The larger deciduous trees, including Sugar Maple, are more frequently encountered moving towards the shoreline. This is the only forest area within or near the Property where there is some meaningful presence of mature Sugar Maple, which is a climax species in the region.
This forest area also contains other conifers, including clusters of relatively large specimens (up to 50 cm DBH) of Eastern Hemlock and Balsam Fir. Hemlock are present

in a few locations to the point where they constitute inclusions of Moist - Fresh White Cedar - Hemlock Coniferous Forest Type (FOC4-2). A few relatively small American Larch are also present in places along the perimeter of this forest area in the western half of the Meaford Property.

The canopy in this area is variable, but occupied mainly by either Cedar, Birch or Aspen, and Hemlock where they occur. Cedar is also dominant in the sub-canopy, along with Ash. The under-story is fairly well established, with Round-leaved and Alternate-leaved Dogwood both fairly common. Non-native Buckthorn, Lilac and Honeysuckle are also present, more so near the upslope periphery. Near the shoreline, Alders (native and non-native) and willow shrubs are also present in the understory.

Parts of this forest area are bisected by a few small ravines, up to 2 or 3 m deep, formed by the intermittent flow that cascades down the bluff face in several spots. The presence of Hemlock and Balsam Fir appears to be relatively concentrated near these ravines, but otherwise there is no noticeable vegetation association.

There are a number of small seepage zones within this forest area along the western half of the Meaford Property. Ground cover here includes hydrophytic sedge and rush species (e.g. Twig Rush, Common Three-square), and Horsetails (Field and Meadow). Away from the seeps, the ground cover varies depending on canopy structure. In areas of relatively dense cedar coverage, there is very little ground cover. Otherwise, there is a variety of plants typical of natural open woodlands (e.g. False Solomon's-seal, Canada Mayflower, Woodland Agrimony, Sarsaparilla,) and also disturbed sites (e.g. Common Strawberry, Common Burdock, knapweeds, Coltsfoot).

This community exhibits relatively high floral diversity, containing more trees species than other forest types found within the Study Area, and the only significant presence of conifers outside of the plantations. This forest also exhibits well developed structure, and a presence of understory and ground cover species typical of natural forests. This area also has some of the largest trees on the property, and encompasses an interface with lacustrine habitat. Limiting aspects include the narrow width and the resulting absence of interior forest habitat, and the significant presence of non-native and invasive plant species.

The general characteristics of this forest and its relative maturity would suggest that it might support a greater array of ecological functions than much of the forest cover within the Study Area. However, the actual function of this mixed forest community, as evidenced by on-site monitoring, appears to be relatively limited. The mixed forest does not appear to support SOCC or SWH or otherwise serve functions generally regarded as having any conservation priority. This general condition may simply be due to the small size of the patches of this habitat type within the Study Area.

4.2.4 Wetland Communities

In certain areas, most often adjacent to watercourses, the plant communities that have establishing within the Meaford Property are early succession wetland communities (marsh or swamp). In localized depressions within the Lower Lands, small patches of forested wetland communities are also established along the flow paths of intermittent watercourses.

The total area occupied by wetland communities within the Study Area is about 10 ha, which is approximately 7% of the combined property area. The majority of this area is encompassed by two closely spaced areas of marsh in the northwest part of the Meaford Property (refer to Figure 6a), and a cluster of swamp communities in the north-east quadrant of the Meaford Property (Figure 6b). Otherwise, there are a few small wetland pockets (mostly swamp) scattered throughout the Property, often in association with the Georgian Trail. There are also two small patches of swamp in the Lower Lands (see Figure 7). There is also a long narrow depression associated with the allowance for the extension of Barker Street that exhibits the characteristics of a wetland. For the purpose of this EIS, this feature is identified as a watercourse but the wetland characteristics and functions are described below and considered in the assessment of impacts.

Mineral Shallow Marsh (MAS)

The Meaford Property encompasses about 3.5 ha of mineral shallow marsh (MAS) community, mostly within two larger units in the north-west part of the Property (see Figure 6a). This includes a portion of the mapped wetland that extends over the western Property boundary. These marshes occupy relatively shallow topographical depressions and appear to be sustained largely by the intermittent watercourses that flow through the Property. There is some accumulation of fibrous organic matter in the larger marsh areas, but not enough to warrant categorization as "organic".

The marsh areas within the Property all have cattails as a dominant component of the vegetation cover. These marshes are thus assigned to the ELC designation of Cattail Mineral Shallow Marsh Type (MAS2-1). Both Broadleaf and Narrow-leaf Cattail are present, but Narrow-leaf Cattail is significantly more abundant. Although native, Narrow-leaf Cattail is generally regarded as an invasive species, capable of dominating wetlands and fully displacing other native plants. The mapped wetland bordering the western boundary of the Meaford Property has become almost a pure monoculture of Narrow-leaf Cattail. Wetland shrubs (willows, Red-osier Dogwood) and herbaceous species (sedges, rushes) are present on the extreme perimeter of this feature, but are effectively absent within the interior.

The other main area of Cattail Marsh is more diverse with regard to plant community composition. Cattails are dominant, but are interspersed with sedges, rushes and hydrophytic forbs. There is also a significant presence of Red-Osier Dogwood throughout much of this marsh, including small inclusions of Mineral Thicket Swamp (SWT) communities on the periphery. There are also a number of dead trees (Elm, Ash and Birch) scattered along the northern periphery of the marsh, and also a few within the centre. This suggests that flooding exposure in at least part of the marsh may be

relatively recent. This could be a result of damming activity by beavers, observed at the northern end of the marsh where Watercourse #1 (see Figure 4) discharges over the top of the bluff.

The Cattail Marsh community can support various species that are both upland and wetland associated. Breeding bird surveillance determined probable breeding presence of Swamp Sparrow, and Wilson's Snipe was also observed in proximity to the mapped marsh area on the western property boundary. Otherwise, bird abundance and diversity was somewhat limited in the marsh habitat, with most species being common and not wetland dependent. Monitoring for the EIS also indicated that amphibian distribution within the Meaford Property, in terms of abundance and diversity, is most concentrated in the areas of marsh habitat. However, abundance was still relatively low in an absolute sense, as was the intensity of activity indicative of breeding. In regard to mammals, both Beaver and Muskrat are resident in the larger areas of marsh habitat in the west end of the Meaford Property.

Green Ash Mineral Deciduous Swamp Type (SWD2-2)

Areas of Green Ash Deciduous Swamp (SWD2-2) have the largest combined area of just over 4 ha within the Study Area, accounting for about 40% of total wetland area. The majority of this swamp community is found in the eastern half of the Meaford Property.

The main areas of ash swamp exhibit relatively uniform characteristics. The tree coverage is fairly dense and dominated by Green Ash. A few specimens of White Elm and Black Ash are found within the canopy in some areas. A small cluster of Silver Maple occurs in one swamp area, representing an inclusion of the Silver Maple Mineral Deciduous Swamp Type (SWD3-2). Most trees range in size from 15 to 20 cm DBH, with a few specimens reaching 25-35 cm DBH. In the small pocket of ash swamp in the Lower Lands, the forest cover is slightly more mature. While the majority of trees are less than 30 cm DBH, in the core of this swamp area there are a number of more mature Ash in the range of 40 to 50 cm DBH.

Typically the sub-canopy is partly established and consists mainly of Green Ash and also a few Elm in some areas. There is no obvious understory, although small patches of thicket, especially Red Osier Dogwood, occur here and there. Buckthorn are also often present on raised hummocks found within the swamps.

Standing water to a typical depth of 10 - 15 cm is present in the spring and early summer, completely or mostly drying up by mid-June. The ground cover tends to be a fairly dense mix dominated by hydrophytes, such as Sensitive Fern, Fringed Sedge, Awl-fruited Sedge and Cyperus-like Sedge. Upland plant species (Agrimony, vetches, Common Strawberry, Poison Ivy) are also present on hummocks or at the base of trees.

Direct on-site monitoring indicates that species or assemblages of wildlife with a noted preference for wetland habitats are not meaningfully present in association with this wetland community type. There was no evidence of the presence of signature

invertebrates (e.g. Odonata), breeding amphibians, or breeding birds with obligate wetland habitat requirements. The notable exception was the presence of a small number of burrowing crayfish chimneys in the small Ash Swamp area in the Lower Lands, which is discussed further as Significant Wildlife Habitat (SWH) in Section 4.9.

Silver Maple Mineral Deciduous Swamp Type (SWD3-2).

There is a small (~0.5 ha) forested wetland located in the approximate centre of the Lower Lands (see Figure 7b). The canopy and sub-canopy are dominated by Silver Maple, typically in the range of 25 to 35 cm DBH. There are a few scattered larger maple specimens ranging up to 90 cm DBH that dominate the canopy. Scattered White Elm and Ash (Red and Black) are also present, accounting for about 20% of the canopy. A couple of ash specimens along the perimeter of the swamp reach 70 cm DBH. This woodland exhibits notable stratification, with a sub-canopy comprised primarily of a mix of Silver Maple and Ash, with some White Elm also present. The canopy and sub-canopy combine to provide for complete shading during the growing season.

Most of this swamp area is subject to seasonal flooding to a depth of up to 30 cm in the core. Standing water is present through the spring, with the majority of the area eventually drying by end of June. In 2018, a very small area (<0.005 ha) of remnant standing water in the core of the wetland persisted into early July.

Seasonal flooding and heavy shade appear to inhibit the establishment of a shrub layer, which is effectively absent. The ground cover is also sparse (<20%), consisting of patchy presence of hydrophytes, primarily confined to hummocks in the core area and increasing slightly in abundance and distribution towards the swamp perimeter. The ground cover consists mainly of scattered clusters of sedges (Fringed, Green, Crested, Hop and Bladder Sedge).

Surveillance of the Silver Maple swamp area has revealed a slightly greater presence of wetland-associated fauna than observed in association with the Green Ash swamp. This includes the presence of adult specimens of a few species of frog in low abundance. However, there was no evidence of any meaningful use of the swamp by any species of amphibian for reproductive purposes. This swamp area was also the only site of occurrence of a bird species (i.e., Wood Duck) with reliance on wetlands for nesting habitat. However, the occurrence was singular and there was no evidence of nesting. The most notable observation relating to the Maple Swamp was the presence of scattered chimneys of burrowing crayfish mainly on near the margins of the wetland. This is considered to be an element of SWH and is discussed further in Section 4.9.

Mixed Deciduous Swamp Feature

The long narrow depression bordering the allowance for the extension of Barker Street through the Lower Lands exhibits characteristics of a deciduous swamp. The feature exhibits slightly variable width and depth but on average is 4-5 m wide, and has a total area of about 0.2 ha.

The tree cover found along the length of this feature is a mix of Green Ash and Silver Maple. Conditions consistent with Green Ash Swamp (SWD2-2) are most prevalent along the length of this feature. In proximity to the central Silver Maple Swamp area, there is a greater presence of Silver Maple tree cover and the linear feature is more reflective of the characteristics of the Silver Maple Swamp type (SWD3-2).

Trees have established mostly on the perimeter of the depression and are all relatively young, typically less than 10 cm DBH with a few scattered specimens of Silver Maple in the range of 20 to 30 cm DBH. A few very young trees, mostly Green Ash, have established immediately within the depression. Scattered specimens of Red-osier Dogwood and willow shrubs are also present in low number and in very few locations.

The depression is occupied by varying depths of standing water through the spring, generally shallower and for shorter duration with westward progression. Most notably on the eastern end, the flooding appears to restrict the establishment of vegetation, and there are only scattered small clusters of a few species of herbaceous wetland plants (e.g. Water-horehound, Bladder Sedge, Hop Sedge). Progressing westward, the presence of herbaceous vegetation increases and transitions to a species mix with a greater terrestrial affinity and a higher presence of non-native plants.

Surveillance of this swamp community has revealed the occasional presence of a few specimens of adult frogs, but there was no evidence of any amphibian reproduction. Otherwise, the findings of the various monitoring efforts do not indicate that this feature meaningfully supports any species or species assemblages that might typically be associated with wetland communities.

Mineral Thicket Swamp (SWT)

Within the Meaford Property there are a few small isolated areas of distinct Swamp Thicket communities. These range in size from 0.2 to 0.4 ha, and have a combined area of <1.5 ha. There are also scattered occurrences of very small inclusions of thicket swamp within the larger areas of marsh or deciduous swamp. The small size and/or isolation of the areas of Thicket Swamp greatly limit the likelihood that they serve unique or significant ecological or hydrological functions. No unique or rare species or assemblages, either floral or faunal, were observed in association with the areas of Thicket Swamp within the Property.

There are two distinct types of Thicket Swamp encountered within the Meaford Property.

Red Osier Mineral Thicket Swamp (SWT2-5)

The Red Osier Thicket Swamp is encountered primarily as pockets within other wetland areas, or on the perimeter of those wetlands, especially the larger marsh areas in the western half of the Meaford Property. The dogwood tend to establish in very dense stands, with very few other shrubs occurring. The density of cover also effectively precludes the establishment of ground cover within this community. In general, the SWT2-5 community is expected to serve similar ecological functions as the terrestrial Cultural Thicket community, although the relatively low plant diversity of the Thicket Swamp would likely make this less attractive to foraging birds and mammals.

Willow Mineral Thicket Swamp Type (SWT2-2)

There are a few defined wetland pockets in the west half of Meaford Property where shrub willows dominate the plant cover. The combined area of this wetland community is about 1 ha. There are also scattered small inclusions of this community type associated with the larger wetland features, primarily the marshes.

This form of swamp occurs as fairly dense stands of shrub willows (e.g. Slender Willow, Peach-leafed Willow, Pussy Willow). A few scattered willows in tree form are also present, including both native Black Willow and non-native Weeping Willow. Red Osier Dogwood is a common secondary component of shrub cover, fairly abundant within this community type. Ground cover is variable but well-established on balance, comprised of mosses, sedges, a mix of hydrophytic forbs (e.g. Water-horehound) and upland forbs (e.g. Black Snakeroot, Climbing Nightshade, Wild grape).

Mixed Shallow Aquatic Ecosite (SAM1)

The small pond adjacent to the eastern edge of the Meaford Property is classed as Mixed Shallow Aquatic Ecosite. This pond lies outside the property boundaries, and this community does not occur anywhere within the property. This community type is nonetheless identified as one that has significant functional relationships with the land-base within the Property, and which may be affected by any proposed development. The area of the pond in question is approximately 0.3 ha. The water in this pond is relatively shallow water (<2 m) compared to the three Ponds found within the Meaford Property. Because of the shallow water, there is a mixture of emergent, floating and submergent aquatic plants occurring here that are not meaningfully present in the other ponds.

This feature serves a variety of functions, including aquatic habitat in support of amphibians, reptiles, wetland bird species, and a variety of aquatic invertebrates. This includes two species of turtle that are Species of Conservation Concern (SOCC). The pond also supports numerous species of terrestrial animal as a source of food and water. The characteristics and functions of this aquatic community and other aquatic features are discussed further in Section 4.7.2.

4.2.5 Bluff Communities

The western half of the northern perimeter of the Meaford Property and a very small portion of the western end of Lower Lands are occupied by the Southeast Clay Banks. The Bluff communities associated with this feature are not commonly encountered in Ontario due largely to the unique geography on which they are dependent. However, they are not listed by the NHIC as communities of conservation concern within the Province. The total area of bluff Ecosite occurring within the Property is about 5 ha, comprised of two different bluff community types.

Mineral Open Clay Bluff (BLO1-1)

Much of the upper half of the bluff face is devoid of vegetation, due to the relative steepness of the slope and recurring erosion processes driven by the steep grade and points of intermittent discharge of watercourses that flow across the Meaford Property. The Open Bluff community type is not likely to provide any significant habitat function for local wildlife. The possible exception would be nesting habitat for burrowing bird species, such as the Belted Kingfisher or Bank Swallow. During direct on-site monitoring, there was no evidence observed of the presence of either species in association with the bluff area.

Mineral Treed Bluff (BLT)

Vegetation has managed to establish in some relatively stable areas on the slope, mostly on ridges between prominent erosion gullies. Eastern White Cedar, White Birch and Trembling Aspen are the most prevalent constituents. There are also a few Ash (Red and White) as well, but they are much less frequently encountered, mostly on the lower part of the slope. There is a limited diversity of herbaceous growth present at the base of trees, including common species typical of open sites (Common Strawberry, Dandelion, Poison Ivy). The limited diversity and abundance of plants and the steep grade likely limit the attractiveness of this habitat for most wildlife species.

4.3 Vascular Plants

The detailed plant species list for the Study Area is provided in Table 1. This list reflects three-season monitoring through the period of April to October.

A total of 218 vascular plant species have been identified within the Meaford Property and Lower Lands. Of those that are native to Ontario, all are ranked as “Secure” (S5) or “Apparently Secure” (S4) in the Province. Black Ash is the only plant species observed within the Study Area that has been subject to assessment as a possible Species at Risk (SAR). While the Provincial Ranking of this relatively common species is “Apparently Secure” (S4), the Province has recently assessed Black Ash as *Endangered*. However, the onset of regulatory prohibitions under the Endangered Species Act (***ESA***) has been

postponed. The presence of this tree as a Priority Species is discussed further in Section 4.8.

The terrestrial plants found within the Study Area consist of a mix of native and non-native species, many of which are early succession species typical of sites that have been subject to anthropogenic disturbance. A total of 89 (`~40%) of the identified plant species are non-native. At least 30 of the vascular plant species identified within the Study Area are considered by various sources to be invasive in Ontario. This includes European Buckthorn (*Rhamnus cathartica*) which is both highly abundant and widely distributed throughout the Study Area. Other notable invasive species found within the Study Area are Narrow-leafed Cattail, Perennial Ryegrass, and Birdfoot Trefoil, all of which are more-or-less confined to the Meaford Property.

The majority of the Meaford Property is occupied by communities with a relative absence of trees, whereas the Lower Lands is dominated by tree cover. A total of 35 tree species have been observed, with the large majority (29 of 35) being deciduous. The presence of trees within the Meaford Property is frequently in the form of plantations or planted rows, especially the conifers. The presence of several species (White Pine, White Spruce, Black Walnut) is almost entirely in planted form. Aside from planted trees, there are only a few tree species that exhibit meaningful abundance and/or distribution within the Meaford Property. This includes primarily Green Ash and Trembling Aspen, which are both early-succession species and tolerant of wet conditions.

There are about 10 woody species that occur only in shrub form. Of these, Red Osier Dogwood is both abundant and very widely distributed, reflecting the widespread presence of relatively wet conditions, particularly in meadows and thickets within the Meaford Property. Due to the extensive presence of these relatively open habitats in the Meaford Property, there are also a number of herbaceous meadow species that are widespread and relatively abundant. This consists primarily of grass and sedge species. Non-native grasses (e.g., Common Timothy, Orchard Grass, Perennial Ryegrass) are dominant in most open areas, reflecting the past cultural modification of the Meaford Property for agricultural purposes.

About 25% of all the species encountered within the Study Area are species which have an affinity for wet conditions (i.e., with a coefficient of wetness of -3 to -5). These hydrophytes are distributed throughout the Study Area, most abundantly within defined wetlands, scattered depressions, or in association with watercourses or ponds.

There are a number of species that were effectively confined to the wooded area on the northern perimeter of the Meaford Property and extending down and across the Lower Lands. This includes trees, herbaceous plants and also some wetland species. This part of the Study Area does not appear to have been subject to the degree of cultural alteration experienced in the past through most of the Meaford Property. Despite this fact, the plant community in this location still includes numerous early succession species and a number of non-native species that are considered to be invasive.

Only 13 of the plant species recorded within the Study Area have a Coefficient of Conservatism of 7 or higher. These species were encountered mostly within the Lower Lands, either in the relatively mature forest community or in wet areas close to the Georgian Bay shoreline. None of these species were abundant or widespread. The implications are that the Study Area, particularly the Meaford Property, is generally occupied by plant species that are not typical of long-standing communities. Even within the most mature woodland cover, most species are not indicative of communities that are long-standing or reflective of later stages of succession.

4.4 Birds and Bird Habitat

A breeding bird survey (BBS) has been completed within the Study Area. This has included focused point-count census during the peak breeding period (June-July). Grass-land survey transects were also completed in the Meaford Property during the peak breeding period with a focus on the possible breeding presence of grassland SAR (i.e., Eastern Meadowlark, Bobolink). In addition to these focused efforts, more general surveillance was also conducted throughout the full monitoring period (April to October). These monitoring efforts provide a reasonably reliable indication of the status of the Study Area s in terms of avian presence and the provision of habitat for breeding and non-breeding purposes (e.g. foraging, migratory staging). The location of the point-count stations is depicted in Figure 2, and station characteristics are summarized in Table 2. Detailed results of the point-count monitoring program are provided Appendix D. A summary list of all bird species observed at the Study Area is provided in Table 3. The findings of the focused point-count survey are summarized in Table 4, and Grassland Transect results are summarized in Table 5.

The Meaford Property lies within Ontario Breeding Bird Atlas (OBBA) square 17NK33. Data have been obtained for this square and considered as local context in the assessment of the Meaford Property. The breeding status determined through the OBBA for square 17NK33 is included in Table 2. A summary of OBBA results for square 17NK33 is included in Appendix E.

Direct surveillance of the Study Area has revealed the presence of a moderate abundance and diversity of birds that are mostly typical for the region. All of the species observed within the Study Area are on record for the relevant OBBA square. In total, 69 species of birds were observed within or near the Property over the period of study. A total of 11 species were confirmed as breeding within the Study Area, and another 47 species were indicated as "probable" or "possible" breeders (as per OBBA breeding evidence criteria).

The Provincial ranking of all native species observed is "apparently secure" (S4) or "secure" (S5). The Eastern Meadowlark is Ranked as "apparently secure" (S4) but is nonetheless designated as "Threatened" both Provincially and Federally. There were three other species of bird observed which are considered as Species of Conservation Concern (SOCC). This included a single observation of a Bald Eagle (provincially designated as "Special Concern") and probable breeding occurrence of the Eastern Wood-

pewee (Special Concern) in forested habitat within the Lower Lands. There was also an observation of a Canada Warbler, a species which is designated as "Threatened" Federally and "Special Concern" Provincially. The observation of this species consisted of a single occurrence during the migratory period (late April) in forested lands adjacent to the Lower Lands and very close to Georgian Bay. These observations of SOCC are discussed in further detail in Section 4.8.

It should be noted that the Study Area was surveyed for the presence of stick nests in early spring prior to the emergence of deciduous foliage. A single possible stick nest was observed in an area of Ash Swamp on the east side of the Meaford Property. This nest was relatively small and in a state of deterioration. It was revisited on several occasions through the monitoring period, and remained inactive during 2017 and 2018.

There are notable differences between the bird communities of the Meaford Property and the Lower Lands. In the Meaford Property, the community is dominated by relatively common species that are typical of open or mixed habitat or shrubs (e.g. Song Sparrow, Red-winged Blackbird, American Goldfinch, American Redstart, Common Yellowthroat, Gray Catbird). These species exhibited some affinity for shrub habitat in proximity to watercourses. There are a number of species that generally prefer wet areas (e.g. Red-winged Blackbird, Woodcock) but only two species which would be considered true wetland breeding birds (Swamp Sparrow, Wilson's Snipe). There were also three species (Herring Gull, Belted Kingfisher, Double-crested Cormorant) with affinity for wetlands or aquatic habitat that were observed exclusively in association with the aquatic habitat of Georgian Bay. There was no evidence of breeding of these species within or near the Study Area. Throughout the Meaford Property, there was also a conspicuous absence of typical forest birds (e.g. Wood Thrush, Ovenbird).

The bird community encountered in the Lower Lands is a mix of species with habitat preferences for either forest (21 species) or early succession habitats (10), or which are habitat generalists (11 species). Of the observed species known as having a forest habitat preference, only one (i.e., Ovenbird) is considered to be a true forest interior species. There was a single occurrence of a singing Oven-bird in the early summer, but no subsequent evidence of nesting. Overall, the forest birds observed within the Lower Lands do not represent a forest interior or area-sensitive community. A single occurrence of a pair of wood ducks in proximity to the Maple Swamp area was the only instance of a species with a strong preference for wetland habitat. There was no additional evidence to indicate that this species was present within the Lower Lands for breeding purposes.

Through the point-count surveillance, the abundance and diversity of birds was variable between the Meaford Property and Lower Lands and among the different habitat types (see Tables 3a and 3b). Both abundance and diversity of birds were higher in the Meaford Property relative to the Lower Lands. In the Meaford Property, the number of species and total number of birds were both found to be lowest in the coniferous plantation and in the deciduous swamp habitats. Bird activity was observed to be most concentrated in thicket habitat and along woodland edges. This is likely partly due to the fact that shrub species commonly encountered within the Meaford Property, especially

Red-osier Dogwood, provide excellent nesting habitat for many songbirds and are also a valuable source of food for various bird species. The species most frequently observed were habitat generalists, most often in association with the Thicket or Savannah habitats. In the Lower Lands, the abundance and diversity of birds was relatively low in all survey locations and habitat types. The point-count station (PCL-2) encompassing the Maple Swamp area yielded the lowest counts in terms of both species and individual birds (see Table 4b).

Lands immediately adjacent to any of the Great Lakes often serve as staging or stop-over locations along migratory routes that pass through southern and central Ontario. Based on surveillance in the late spring and early fall, the Study Area appears to support some degree of migratory stop-over. Eight species (Golden Crowned Kinglets, Palm Warbler, Canada Warbler, Black-and-white Warbler, Mourning Warbler, Yellow-rumped Warbler, Black-throated Green Warbler, White-throated Sparrow) were observed only in spring or early fall, actively foraging in thickets or on woodland perimeters within or near the Study Area.

Overall, the Meaford Property and Lower Lands directly support a relatively abundant and diverse community of common bird species for breeding purposes. The Study Area also appears to serve a migratory stop-over function for a variety of song birds. The Meaford Property supports numerous species of open country or early succession habitat, but few forest birds are present. A limited diversity of wetland birds is also present within the Meaford Property. The Eastern Meadowlark is the only SAR or SOCC with a meaningful association with habitat encountered within the Meaford Property. The Lower Lands provide breeding habitat for a limited number of species with either forest, early succession or generalist habitat preferences, but does not support a forest interior or area-sensitive bird population. The Eastern Wood-pewee is the only SOCC observed within the Lower Lands.

4.5 Amphibians

During focused amphibian monitoring and broader general surveillance of the Study Area, the presence of six amphibian species was evidenced. A summary of amphibian presence within the Study Area is provided in Table 5.

Most of the amphibian species on record for the Study Area are relatively common and widespread in southern and central Ontario. Five of the six species are Provincially ranked as "secure" (S5). The only species that is formally identified as a conservation concern is the Western Chorus Frog. The Great Lakes/St. Lawrence - Canadian Shield population is listed as *Not at Risk* by COSSARO, but is listed as *Threatened* by COSEWIC. The Federal designation relates primarily to notable declines in the Quebec population which is confined to the St. Lawrence Valley. The Western Chorus Frog is tracked by the NHIC and the reported status in Ontario is "Apparently Secure″ (S4). This species is locally common and widespread in much of southern Ontario, but declines have been reported in some areas.

The Study Area offers potentially suitable breeding habitat for most of the species that have been observed. The possible exception is the Wood Frog, which prefers woodland vernal pools which are not found within the Meaford Property or the Lower Lands. Potential amphibian breeding habitat includes the three man-made ponds found within the Meaford Property, and the one pond (Pond #4) immediately to the east of the Property. Three of the species on record (i.e., Green Frog, Northern Leopard Frog and Western Chorus Frog) all prefer more permanent water bodies for breeding purposes, and are considered most likely to occur in association with any of the ponds. Standing water that is seasonally present within many of the identified wetland areas within the Meaford Property and Lower Lands could also serve as breeding habitat for some of the amphibians that have been observed. The Lower Lands contains a limited area (<1 ha total) of wetland that could function as amphibian breeding habitat for several of the species that have been observed. The standing water that is seasonally present in these limited locations does provide some general conditions consistent with preferred breeding habitat for the American Toad, Spring Peeper, and Wood Frog. This includes seasonal standing water over much of the area of the central Maple Swamp, portions of the narrow lateral impoundment along the edge of the old road-bed, and also the Ash Swamp area at the west end of the Lower Lands, to a lesser extent.

During on-site surveillance, the wetland features were all observed to exhibit standing water for only part of the breeding season, largely drying up by early summer. Some small remnant pockets of standing water persisted at the north end of the large Cattail Marsh in the western part of the Meaford Property, and also in the centre of the Maple Swamp area in the Lower Lands. The areas of standing water in wetland features were directly examined for evidence of amphibian reproduction (egg masses, larval young) and no such evidence was observed. In each of these features, standing water was observed to be present for only part of the breeding season, largely drying up by early summer. The focused amphibian monitoring yielded low rates of mating-related vocalizations (see Appendix C), suggesting a relatively low rate of amphibian breeding within the Study Area during the period of monitoring. Amphibian vocalizations were scattered and isolated, with no occurrences of full choruses. Species for which low levels of vocalizations were heard included Spring Peeper, Green Frog, and Western Chorus Frog. There were no obvious areas of concentration of breeding vocalizations, which were often heard in association with small wet pockets (e.g. low spots adjacent to the Georgian Trail) rather than concentrations in wetland or pond features. Chorus Frog vocalizations did occur in association with larger ash swamps in the eastern half of the Meaford Property, ditches alongside the Georgian Trail, the two ponds north of the Trail in the western half of the Meaford Property, and the Maple Swamp area in the Lower Lands. These were consistently in the form of infrequent individual calls, and full choruses were not heard at any time during surveillance within the Study Area.

Common woodland salamanders were not directly observed within the Study Area, but there is a reasonable likelihood that these species could be present to some extent in certain wooded areas. Woodlands with a more mature canopy and typical forest floor conditions would be the most likely locations to encounter woodland salamanders.

Species could include the eft stage of the Red-spotted Newt or the Eastern Red-backed Salamander. Species requiring woodland vernal pools (e.g. Jefferson or Spotted Salamander) are not considered likely to be present in the Meaford Property, owing to an absence of such pools.

The current potential of the near-shore waters of Georgian Bay to serve as amphibian habitat is considered to be limited owing to a relative absence of aquatic vegetation, the presence of fish that would prey on all amphibian life stages, and the relatively high level of hydrological perturbation associated with waves and currents of the open waters of the bay. There are no coastal wetland features that could serve as amphibian habitat.

Overall, the available information indicates that the Study Area supports a reasonable diversity of amphibians, but at a relatively low abundance and with low breeding intensity. It appears that the function of wetland features as reproductive habitat for amphibians is not significant and not likely meaningful in the population context, particularly for the areas of deciduous swamp.

4.6 Other Fauna

4.6.1 Reptiles

During direct on-site surveillance, only two reptile species were detected either within or adjacent to the Meaford Property (see Table 5). This includes direct observations of both Snapping Turtles and Midland Painted Turtles in Pond #4 immediately adjacent to the eastern perimeter of the Property (see Figure 3). There was also a predated turtle nest found in close proximity to the ponds in the west end of the Meaford Property, which may have been that of a Snapping Turtle. In general, the presence of turtle species is limited due to lack of permanent standing water within the Meaford Property, except in the excavated ponds. The Georgian Trail is a likely location for turtle nesting activity due to the presence of an elevated bed of coarse well-drained substrate.

The nature of the Meaford Property is such that locally common snakes (e.g. Eastern Gartersnake) might be present from time to time. No snakes were observed during on-site surveillance.

4.6.2 Mammals

Ecological monitoring of the Study Area revealed evidence of at least occasional presence of nine species of mammal, as follows:

- Meadow Vole (*Microtus pennsylvanicus*) - scattered observations - widespread occurrence within the Meaford Property is expected,
- Northern Raccoon (*Procyon lotor*) - a few direct sightings and regular observations of tracks or scat,

- White-tailed Deer (*Odocoileus virginianus*) - evidence of regular presence of deer throughout most of the Study Area,
- Beaver (*Castor canadensis*) - evidence of presence in the large cattail marsh area in the west half of the Meaford Property, and also near Swamp areas in east end of Meaford Property,
- Muskrat (*Ondatra zibethicus*) - observed in the large cattail marsh area in the west half of the Meaford Property,
- Coyote (*Canis latrans*) - vocalizations - tracks and scat observed in relatively open habitats,
- Eastern Cottontail (*Sylvilagus floridanus*) - scattered observations - widespread occurrence within the Meaford Property is expected,
- Red Squirrel (*Tamiasciurus hudsonicus*) - scattered observations - limited occurrence within the wooded areas of the Meaford Property and Lower Lands is expected,
- Eastern Chipmunk (*Tamias striatus*) - scattered observations - widespread occurrence within the Study Area is expected.

None of the mammals evidenced within or near the Meaford Property are designated SAR or considered to be SOCC. All of these mammal species are ranked as "secure" (S5) in the province of Ontario and are common in Grey County. Other regionally common species of mammal (e.g. White-footed Mouse, Striped Skunk) that were not directly evidenced during monitoring are considered likely to be occasionally present within the Study Area.

Based on direct observations of fauna and the habitat functions that can be associated with the plant community types found within the Study Area, the likelihood of unrecorded presence of mammal species that are of conversation concern is considered to be very low. The only mammalian SOCC with some potential for occurrence within or around the Property are species of bat that occur throughout southern and central Ontario. There were no observations of bat activity in or around the Meaford Property during on-site surveillance, which included surveillance in the period around dusk when bat activity tends to be observed. The potential presence of bats is discussed in further detail as an element of SWH in Section 4.9 of this report.

4.6.3 Invertebrates

The presence of invertebrates within the Study Area has been subject to incidental surveillance, with a primary focus on SAR/SOCC or species potentially indicative of SWH or other important ecological functions.

During surveillance, there were a number of observations of foraging adult Monarch Butterfly. The observations of this SOCC were confined to open areas within the Meaford Property. There were no instances in which this species was observed in

concentration or where there was a notable association with milkweed plants which are critical to the reproductive cycle. The Monarch is discussed further as an SOCC in Section 4.8.

The scattered occurrence of burrowing crayfish species was the one instance in which invertebrate occurrence was deemed to require further consideration in the EIS as an element of SWH. Specifically, the chimneys of burrowing crayfish were observed in the Lower Lands within and in very close proximity to the wetland features, and also in close proximity to Watercourses 4 and 5 where they first enter the central plateau of the Lower Lands. Based on reported species ranges, these chimneys were assumed to belong to Digger Crayfish (*Fallicambarus fodiens*), which has a Provincial Rank of S4 (Apparently Secure). The Digger Crayfish is one of the two noted indicator species for this habitat type. The presence of burrowing crayfish is discussed in further detail as an element of SWH in Section 4.9 of this report.

4.7 Aquatic Ecology

The characteristics of aquatic features (watercourses, ponds, Georgian Bay) are based primarily on direct surveillance completed in 2017, 2018 and 2019.

4.7.1 Watercourses

There are a total of eight watercourses under consideration which flow through the Property or very close to the Property perimeter. These watercourses (depicted in Figure 3) have several common core characteristics, as follows;

- they are all effectively first-order watercourses,
- they are all characterized by intermittent flow,
- flow is generally turbid, in general thermal equilibrium with ambient air temperatures, and appears to consist almost entirely of stormwater runoff,
- there is a general absence of true aquatic substrate, with upland vegetation occupying most of the width of each watercourse,
- all but one of the watercourses cascade down the bluff face or steeply sloped woods along the northern perimeter of the Property, presenting impassable conditions for fish, and
- they all pass through one or more culverts before eventual discharge to Georgian Bay, which can also act as fish barriers during low flow periods.

The basic characteristics of all the watercourses are such that the function and ecological value of these watercourses is inherently limited. In terms of aquatic habitat functions, the available information indicates that they do not support fish communities. During

surveillance, no fish were observed at any location in any of the watercourses. There are obstacles to fish passage both upstream and downstream of the Property, and direct monitoring indicates an absence of fish, amphibians, and any meaningful presence of aquatic plants or invertebrates. There are a few small remnant in-stream pools that can persist for some time after precipitation events, serving as refuge habitat for a few species of frog. A few specimens of Green and Leopard frog were observed on a few occasions in such pools along watercourses #1 and #4 within the Meaford Property, and also within the lateral impoundment feature in the core of the Lower Lands.

Flow in these watercourses does eventually discharge to Georgian Bay, so in this sense there is a possible fish habitat function downstream of the Property. Because of their small size and the intermittent occurrence of both flushing and drying, these pools would not be suitable for amphibian reproduction. The only other direct habitat function of the watercourses would be as a possible source of drinking water for birds and mammals within the Study Area.

The watercourses function primarily in the conveyance of stormwater to Georgian Bay, but there are no instances where the flows constitute meaningful inputs to any larger streams or to the Bay itself. For all but Watercourses #2 and #6 (see Figure 3), the flows do contribute to the hydrological balance of wetlands within and adjacent to the Property. Watercourses #1, #7 and #8 all serve some input function to the large Cattail Marsh areas on the west half of the Meaford Property. Watercourse #5 appears to be a significant source of input to a relatively large area of Ash Swamp on the eastern half of the Meaford Property. Watercourse #5 also appears to be a main input source for the Maple Swamp feature in the centre of the Lower Lands, while Watercourse 4 contributes to the hydrological balance of the smaller Ash Swamp area on the west side of the Lower Lands.

The watercourses do also contribute to the hydrological balance of the four ponds within or adjacent to the Property. Watercourses #1, #7 and #8 are all connected to one or more of the three ponds in the west end of the Meaford Property, and Watercourse #6 flows into Pond #4 just to the east of the Property.

4.7.2 Ponds

There are three ponds that lie within the Meaford Property, and also one pond immediately adjacent to the eastern perimeter of the Property that receives surface flow originating from within the Property. The ponds all appear to be man-made. Exposure to water table appears to be a meaningful component of the overall water balance of these ponds. All four ponds also receive intermittent surface inputs conveyed via watercourses. Each pond is characterized by persistent presence of water with little decline in water levels through the summer. Ponds #1, #2 and #3 all exhibit notable and persistent water turbidity. The water in Pond #4 is relatively clear and appears to be significantly shallower than the other ponds. The characteristics of the standing water are likely a factor in the nature of vegetation encountered at the ponds. Ponds #1, #2 and #3 have a

thin peripheral zone of emergent plants (mainly Cattails), and a very limited presence of some floating aquatic plant species (Pond Weed) in a few spots around their perimeters. Pond #4 has large zones of emergent plants (e.g. Narrow-leaf Cattail) extending outward from the perimeter and also substantial zones of both floating (e.g. Pond Weed) and submergent vegetation (e.g. Musk Grass).

All ponds support the presence of a few common species of fauna that have some aquatic habitat associations. Because of the abundant and diverse aquatic vegetation at Pond #4, the faunal assemblage encountered here is most diverse. This includes the confirmed presence of Snapping Turtle and Midland Painted Turtle (both SOCC), and at least three species of frog. There were no instances of basking turtles observed at Ponds #1, #2 or #3 within the confines of the Meaford Property.

As with the watercourses, the ponds are expected to function as a possible source of drinking water for birds and mammals within the Study Area. Some animals may also forage on plants, invertebrates or small vertebrates associated with the ponds. Deer and Raccoon tracks were observed at water's edge of Pond #4, and a Great Blue Heron was observed foraging at the pond.

4.7.3 Georgian Bay

The only other aquatic feature associated with the Property is the near-shore area of Georgian Bay, immediately adjacent to the northern perimeter of the western half of the Property. Along this stretch of shoreline, there is a sharp demarcation between the aquatic and upland habitat. At current water levels, there is effectively no zone of consistent wave action or the typical transitional habitat associated with the littoral zone. There is no significant presence of aquatic vegetation, either emergent or submergent, in the littoral zone. The substrate in the littoral zone is primarily fragmented shale, cobble and gravel.

There are obvious points along the shoreline where water from some of the watercourses flowing through the Study Area is intermittently discharged to the Bay. There are small ravines carved out in the upland areas, but there are no obvious aquatic microhabitats (e.g. embayments or plunge pools) that have been created at the discharge points. There is evidence of sediment deposition at the points of discharge, but it is not significant.

Quantitative evidence of fish community composition was not collected as part of this EIS. During simple visual assessment, no fish were observed in immediate proximity of the shoreline. However, observed presence of piscivorous birds (e.g. Kingfisher, Cormorant) within 100 m of shore suggests that small fish are likely present in the area. The absence of aquatic vegetation in the area adjacent to the shoreline likely reduces the value of this area as spawning or nursery habitat for most fish, but use by fish for some life-cycle processes is likely to occur to some extent.

Based on observations of wildlife and the observed characteristics of the near-shore area, it is likely that this zone serves a number of ecological functions, including foraging

habitat for certain species of bird (e.g. gulls, waterfowl, herons, terns) and mammal (e.g. raccoon, mink).

4.8 Priority Species

For the purpose of this EIS, the term "Priority Species" includes:

1. any species with a provincial (sub-national) conservation status rank (SRank) of S1, S2, S3 or SH, or otherwise considered rare Ontario, and
2. any species that has been designated as either *Endangered*, *Threatened*, or *Special Concern* by either the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or the Committee on the Status of Species at Risk in Ontario (COSSARO)

The term "Species of Conservation Concern" (SOCC) is generally applied to species other than those designated as *Threatened* and *Endangered.* The term "Species at Risk" (SAR) is typically applied to those included in regulatory listings as *Threatened* or *Endangered*, and thus subject to certain regulatory prohibitions.

Species of any of the noted designations are all tracked by the Natural Heritage Information Centre (NHIC). Historic records from the NHIC include records of nine species in proximity to the Meaford Property. The NHIC Element Occurrence (EO) records include any species that are considered herein as Priority Species. The EOs from the NHIC for the four 1-km grid segments overlapping or immediately adjacent to the Property are summarized in Table 7.

The Lake Sturgeon (*Acipenser fulvescens*) and the Massasauga (*Sistrurus catenatus*) are the only species on record with the NHIC that have been listed as *Endangered* or *Threatened* under Ontario's Endangered Species Act (***ESA***) and/or the Federal Species at Risk Act (***SARA***). As such, they are subject to the protective provisions of these acts and associated regulations as jurisdictionally appropriate.

The last reported observation of the Massasauga dates to 1905, and there is no expectation of encountering this species in the area of the Property at this time. The reported observation of Lake Sturgeon is recent, and pertains to each of the noted NHIC squares. The Provincial Status of the Great Lakes - Upper St. Lawrence population of Lake Sturgeon is "Imperiled" (S2), and it is designated by both COSSARO and COSEWIC as *Threatened*. The NHIC EOs for all but the Lake Sturgeon were last reported more than 40 years ago. None of the species identified in NHIC database were observed during the direct surveillance of the Meaford Property and immediately adjacent lands.

Recent monitoring conducted for EIS purposes at other properties in the Christie Beach area has also revealed the local presence of Butternut, which is listed as *Endangered* both

Federally and Provincially, and has a Provincial status of "Vulnerable" (S3). No Butternut specimens were observed during direct surveillance of the Meaford Property and immediately adjacent lands.

On-site monitoring has revealed the presence of nine Priority Species within or immediately adjacent to the Meaford Property that are not on record with the NHIC as EOs for the area. This includes the following:

- Snapping Turtle (*Chelydra serpentina*) - *Special Concern*, both Federally and Provincially, Provincially Ranked as "Apparently Secure" (S4) - Confirmed presence in Pond #4, and evidence of possible nesting in proximity to Pond #1.
- Midland Painted Turtle - (*Chrysemys picta marginata*) - recently (April 2018) designated by COSEWIC as *Special Concern*, but not yet added to regulatory lists under Federal or Provincial Legislation. Provincially Ranked as "Apparently Secure" (S4) - Confirmed presence in Pond #4 immediately adjacent to the Property, but not observed within the Property.
- Western Chorus Frog (*Pseudacris triseriata*) - *Special Concern* Federally and *Not at Risk* Provincially, Provincial Status is "Apparently Secure" (S4) - evidence of scattered occurrence within Lower Lands and Meaford Property, but not in abundance and with no evidence of meaningful levels of reproductive activity.
- Monarch Butterfly[1] (*Danaus plexippus*) - *Special Concern*, both Federally and Provincially, Provincially Ranked as "Apparently Secure" (S4) - Several observations during summer months, foraging in open habitats throughout the Meaford Property.
- Bald Eagle (*Haliaeetus leucocephalus*) - *Special Concern* in Ontario, Not at Risk (NAR) Federally, Provincially Ranked as "Apparently Secure" (S4) - a single observation of a mature adult flying over the Meaford Property. Direct use of Property is considered highly unlikely. Appropriate breeding habitat (i.e., large "supercanopy" trees along edge of major water bodies) is absent.
- Eastern Wood-pewee (*Contopus virens*)- *Special Concern*, both Federally and Provincially, Provincially Ranked as "Apparently Secure" (S4) - two occurrences of probable breeding evidence in woods within the Lower Lands. Not encountered within the Meaford Property.
- Eastern Meadowlark (*Sturnella magna*) - *Threatened,* both Federally and Provincially, Provincially Ranked as "Apparently Secure" (S4). A limited

[1] It should be noted that COSEWIC has very recently reassessed the Monarch Butterfly and has reclassified this species as *Endangered*. While its regulatory status under the Species at Risk Act (SARA) currently remains as *Special Concern*, this is likely to change in the near future to reflect COSEWIC's recent decision. Subsequent regulatory reclassification under the Province's Endangered Species Act (ESA) is probable. The primary focus in regard to this species' presence in Ontario is the protection of known migratory concentration areas.

number of occurrences in portions of cultural meadow habitat in the Meaford Property, with evidence of breeding territories.

- Canada Warbler (*Thryothorus ludovicianus*) - *Threatened* Federally and *Special Concern* Provincially, Provincially Ranked as "Secure" (S5) - observed during the spring migratory period in treed areas adjacent to the Lower Lands, but not observed within the immediate confines of the Meaford Property or Lower Land during the breeding season.

In addition to these SOCC, there is also a scattered presence of Black Ash (*Fraxinus nigra*) within the Study Area. This tree species was initially assessed and designated as *Threatened* by COSEWIC in 2018. The Province has more recently assessed Black Ash as *Endangered* and it has been added to Schedule 2 of Ontario Regulation 230/08 as of 26 January 2022. However, the Ontario Government has also announced a temporary 2-year suspension of regulatory prohibitions under the Endangered Species Act (***ESA***) and regulations made under the act. The current Provincial Ranking of this relatively common species is “Apparently Secure” (S4)

Black Ash have a meaningful presence within the Lower Lands, found as a secondary species within or near wetlands and near watercourses close to the base of the steep slope along the southern perimeter of the Property. The distribution of Black Ash is confined primarily to swamp communities (SWD-2 and SWD3-2) and also in a low density scattered presence in some portions of the Lowland Ash forest (FOD7-2)

In terms of *Threatened* or *Endangered* Species protected as SAR under Provincial legislation, monitoring conducted for the purpose of this EIS has indicated the presence of only one species within or near the Property; the Eastern Meadowlark (*Sturnella magna*). This species is designated as *Threatened,* both federally and provincially, and the primary identified threat in Ontario is loss or disturbance of its nesting habitat. This grassland bird requires open, grass-dominated habitat for breeding purposes, and such habitat is present within the Meaford Property. Focused monitoring conducted as part of this EIS has revealed evidence of 2 or 3 breeding territories within the Meaford Property. Table 5 summarizes the results of grassland transect monitoring which was undertaken specifically to ascertain the presence of Meadowlarks or Bobolinks within the Property. Figure 8 depicts the distribution of suitable meadowlark habitat and probable territory locations within the Meaford Property.

Other than the species identified above, all flora and fauna which are on existing record or have been observed during EIS monitoring as either on or near the Meaford Property are from relatively secure populations and do not warrant any formal consideration as conservation concerns.

4.9 Significant Wildlife Habitat

For planning purposes in Ontario, Significant Wildlife Habitat (SWH) is defined as habitat that is "*ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System*".

The information available for the purpose of this EIS, as presented in Sections 4.2 to 4.8, has been reviewed in specific consideration of the potential presence and implications of SWH within the Study Area. The analysis of potential SWH presence and impacts is based on guidance provided by the MNRF (MNR 2000, MNRF 2015). There are several categories and specific types of designated SWH, which are addressed below. These various categories have generally recognized associations with a number of the ELC community types that have been identified within the Study Area. The presence of these communities does not necessarily equate to the presence of SWH. The determination of SWH habitat is ultimately based on direct evidence of presence of specified indicator species of the class of wildlife in question.

4.9.1 Seasonal Concentration Areas

The life cycle of various animal species finds them present in certain areas at certain times in notably concentrated numbers. Usually the location is characterized by a relative abundance of food, shelter/cover or conditions required for breeding purposes. There are a variety of established types of seasonal concentration areas, a number of which could be supported by the plant communities found within the Study Area. The status of the candidate seasonal concentration areas considered is discussed below.

Deer wintering yards:

On the basis of MNRF mapping, the Grey County OP identifies small deer wintering areas in the Lora Bay area, about 2 km southeast of the Meaford Property at the most proximate point. However, no yards have been identified within or immediately adjacent to the Property. Within the Study Area, woodland areas with substantial conifer presence include the blocks of White Cedar Mixed Forest (FOM7) on the northwest perimeter of the Property, and several unmanaged conifer plantations (CUP2 and CUP3). The small size of these woodland areas (< 5 ha) generally confers a low likelihood of their use as this type of SWH.

Concentration areas for waterfowl and shorebirds:

There is no evidence that any of the wetlands or other habitat types found within or near the Property support concentrated breeding or migratory activity of waterfowl or shorebirds. Direct surveillance over the period of April to October indicates that these bird groups are effectively absent from the Property.

Raptor wintering areas:

Wintering raptors were not subject to direct monitoring as part of this EIS. The Meaford Property does contain areas of forest adjacent to open habitat types, which can represent suitable conditions for wintering raptors. However, most of the forest cover within the Meaford Property is young and distributed in relatively small patches, lowering the likelihood of functioning as wintering habitat for raptors. As a precaution, it can be assumed for the sake of this EIS that some blocks of woodland within the Property may function to some degree as wintering habitat for raptors. This assumption would be most appropriate for the larger blocks containing more mature trees, including the White Cedar Mixed Forest (FOM7) adjacent to the shoreline on the west half of the Property and the Poplar Forest (FOD3-1) on the top and face of the slope along the eastern half of the Meaford Property where it borders the Lower Lands.

Bat hibernacula and maternity colonies:

The Property and Lower Lands do not encompass any occurrences of Cliff-Cave ecosites, and there are no rock outcrops, caves or abandoned mines that could otherwise serve as hibernacula.

The possible presence of maternal colonies is generally dependent on the local abundance of large (≥25 cm DBH) snags/cavity trees. The forest communities found within the Study Area are relatively young, and there is a relative absence of large old trees that might contain hollows or cavities that could function as roosting sites. However, there a few tree specimens that could be regarded as favorable snag trees. The presence of large snag trees is confined to the FOD3-1 and SWD3-2 community types, but the density of snag trees does not meet the general requirement for high quality maternity roost habitat for indicator bat species (i.e., >10 snags/hectare).

In regard to the possible presence of species-at-risk bats, there are several bat species that can be found, at least on occasion, in Grey County. This includes four that are listed as ***Endangered***: Tricolored bat (*Perimyotis subflavus*), Little brown myotis (*Myotis lucifugus*), Northern myotis (*Myotis septentrionalis*), and the Eastern small-footed myotis (*Myotis leibii*). The Northern myotis is generally encountered in coniferous forest, while the three other species-at-risk bats are each common to deciduous or mixed forest habitat, and could theoretically be found within or immediately adjacent to the Meaford Property. As discussed in Section 4.6.2, there were no observations of bat activity in or around the Meaford Property during on-site surveillance, which included surveillance in the period around dusk when bat activity tends to be observed.

Overall, the Study Area generally lacks the attributes that would be conducive to the presence of bat hibernacula or maternal colonies. While there is some possibility of occasional and intermittent presence of bats within or near the Meaford Property, there is no reason to expect the concentrated presence of bats for hibernation or maternal roosting purposes.

Turtle wintering areas:

The four ponds on or near the Property provide permanent water that may serve as wintering habitat for turtles. As noted in Sections 4.6.1 and 4.7.2, both Snapping Turtle and Midland Painted Turtle have been confirmed as present in pond # 4 which is just outside the Property boundaries (see Figure 3). Monitoring has not produced direct evidence of turtle presence in the three ponds that lie within the Meaford Property boundary. As a precaution, the possible function of all four ponds as turtle wintering habitat could be considered in development planning and management.

4.9.2 Rare Vegetation Communities

As per the MNRF (2015) there are a number of vegetation communities that can be considered as rare in Ecoregion 6E, including alvars, dunes, prairies, barrens, cliffs and old growth forest. These community types are not found within the Meaford Property or Lower Lands (see Section 4.2). The communities found within the Property all have a Provincial Rank of S4 or S5.

4.9.3 Specialized Habitat for Wildlife

There are numerous species of wildlife that require substantial areas of certain habitat(s) that support critical stages of their life history in order for the local population to be sustainable.

Waterfowl Nesting Area:

The Meaford Property contains a notable presence of generalized habitat elements that are recognized as potential waterfowl nesting area (i.e., wetlands adjacent to open uplands). However, the breeding bird survey (BBS) conducted throughout the Study Area (see Section 4.4) did not yield any indication of the presence of any nesting waterfowl.

The Lower Lands do contain two small deciduous swamp features which represent ELC ecosites (i.e., SWD) that can also be associated with waterfowl nesting habitat. However, these swamps are encompassed within larger blocks of upland forest and are not adjacent to open uplands. The breeding bird survey (BBS) conducted throughout the Lower Lands did not yield any indication of the presence of any nesting waterfowl. The was a single occurrence of Wood Duck, which is an indicator species, but there was no evidence of persistent presence or nesting of this or any other species of waterfowl within the Lower Lands.

Bald Eagle and Osprey Habitat:

A single Bald Eagle was observed in flight over the southern edge of the Meaford Property late in the summer of 2017. Otherwise, eagles and osprey were not encountered

at any time or location within or adjacent to the Property. The Property and Lower Lands are generally devoid of habitat that would provide conditions suitable for nesting, perching or foraging by Ospreys or Bald Eagle. The possible exception of the small area of mixed forest (FOM7) overlapping the Meaford Property and Lower Lands, where there are relatively large trees adjacent to open water (Georgian Bay). This area was surveyed and no large stick nests were present. As a precaution, this wooded area could be considered as potential habitat for perching or foraging.

Woodland Raptor Nesting Habitat:

The Study Area does contain various areas of forested habitat that are generally recognized as potential nesting habitat for woodland raptor species. However, no raptor species were observed during the BBS conducted in all habitats within the Study Area, and only a single small stick nest was observed during surveillance conducted in the early spring before leaf-out. This nest was inactive through the duration of on-site surveillance.

Turtle Nesting Habitat:

The Property and Lower Lands are occupied predominantly by clay soils, and there are no significant areas of exposed mineral soil (sand or gravel) within the Study Area, except for the lane-way leading to the existing residence in the Meaford Property. This lane-way is not close to any of the existing ponds, and no evidence of turtle nesting was observed in association with the lane-way.

As noted in Section 4.6.1, a single predated turtle nest was found in close proximity to the ponds in the west end of the Meaford Property. The nest was within a very small lens of gravel that appeared to be a remnant of an access lane crossing the Georgian Trail, in proximity to Pond 3 (see Figure 3). The state of the nest precluded reliable determination of species, but it is possible that this was a Snapping Turtle nest. Despite the presence of a single nest, the nearby Georgian Trailway is likely to function as the site most preferred for turtle nesting. Overall, turtle nesting is not expected to occur at a meaningful level anywhere within the Property.

Amphibian woodland breeding habitat:

The Study Area encompasses forest and swamp habitat that could function as breeding habitat for amphibians. The forest habitats have been surveyed and found to be devoid of small ponds or vernal pools that could support breeding amphibians. Recurrent examination of the few areas of deciduous swamp revealed that standing water had largely receded by late June, even in a relatively wet year. Call count surveys conducted to encompass swamp areas indicate an absence or very low level of amphibian breeding activity in these areas (see Section 4.5). Overall, there is no evidence at this time to indicate that the wooded areas within the Property function as significant breeding habitat for amphibians.

Amphibian wetland breeding habitat:

The marshes and swamps within the Study Area did not maintain extensive standing water into the summer months in 2017, 2018 or 2019, which were all relatively wet years. Amphibian vocalization surveillance of these habitats indicated low levels of breeding activity of only two species, excluding any of the species identified as indicators of this type of SWH (MNRF, 2015). Overall, the weight of available evidence indicates that the wetlands within the Study Area do not function as amphibian breeding habitat to any meaningful extent. As a precaution, the possible function of wetland areas within the Meaford Property and the Lower Lands as amphibian breeding habitat should be considered in advancement of development planning and management.

Area-Sensitive Bird Breeding Habitat:

The wooded areas present within the Meaford Property are relatively small and immature, and do not provide the conditions that support area-sensitive birds (i.e., forest interior habitat). During breeding bird surveillance (BBS) of the Study Area, the presence of only two species listed by the MNRF as indicators was evidenced. This consisted of isolated observations of the Black-throated Green Warbler only during the spring migration period, and the presence of feeding holes made by Yellow-bellied Sapsuckers at an unknown time. There was no confirmed evidence of breeding of either species.

The Lower Lands do encompass ecosites that are listed as potentially serving as breeding habitat for area-sensitive birds. However, the majority of woodland communities are relatively young with a limited presence of larger (>25 cm DBH) mature trees. The size and configuration of the woodlands are also such that there are no areas that are 200 m or more from the forest edge. A total of four species identified by the MNRF as indicator species were observed within the Lower Lands, including the Red-Breasted nuthatch, Ovenbird, Winter Wren, and Yellow-bellied Sapsucker. The only species for which there was firm evidence of breeding was the Winter Wren, with a single nesting territory in the Aspen-Birch forest community (FOD3-1). The Canada Warbler was also observed on lands adjacent to the Lower Lands, but only during the spring migration period.

Overall, the Meaford Property and Lower Lands do not provide the conditions (i.e., forest interior habitat) that support area-sensitive birds, and surveillance suggests that such birds are almost entirely absent from the Study Area.

4.9.4 Habitat for Species of Conservation Concern

In this context, SOCC include wildlife species that are listed as *Special Concern* or provincially rare, but excludes those listed as *Endangered* or *Threatened*

Marsh Breeding Bird Habitat:

Marsh habitat is present within the Meaford Property, but none of the indicator species specified by the MNRF were observed during the BBS conducted throughout the Meaford Property in 2017. There is no marsh habitat present within the Lower Lands.

Open Country Bird Breeding Habitat:

The Meaford Property does contain areas of cultural meadow habitat, but none of the specified indicator species were observed during the BBS. The Lower Lands do not contain areas of cultural meadow habitat, and none of the specified indicator species were observed during the BBS conducted throughout the Lower Lands in 2018.

Shrub/Early Successional Bird Breeding Habitat:

Much of the Meaford Property is characterized as shrub/early successional habitat, but none of the indicator species specified for this habitat were observed during BBS conducted throughout the Meaford Property in 2017.

Almost the entirety of the Lower Lands is wooded. Although some of the woodlands are relatively young, there is no meaningful presence of what would be deemed shrub/early succession habitat. None of the indicator species specified for this habitat were observed during BBS conducted throughout the Lower Lands in 2018.

Terrestrial Crayfish Habitat

The Study Area does contain a total of about 5 ha of deciduous swamp (SWD) community that is identified as a candidate Ecosite for terrestrial crayfish habitat. As noted in Section 4.5, on-site surveillance did reveal the presence of chimneys of the Digger Crayfish (*F. fodiens*) in several specific locations within the Lower Lands. The Digger Crayfish is one of the two noted indicator species for this habitat type.

Special Concern and Rare Wildlife Species

As discussed in Section 4.8, there are five species Provincially designated as Special Concern and/or with a Provincial Rank of S1 to S3 that are known to be present in or near the Study Area. This includes the Western Chorus Frog (S3), Eastern Wood-pewee (Special Concern), the Snapping Turtle (Special Concern), the Midland Painted Turtle (Special Concern, COSEWIC only), and the Canada Warbler (Special Concern in Ontario).

Focused monitoring within the Study Area indicates that the Western Chorus frog may be associated with ponds and deciduous swamp (SWD) habitats, but those habitats do not support a meaningful level of reproductive activity for this or other amphibian species.

The Eastern Wood-pewee was observed in association with the Aspen-Birch deciduous forest type (FOD3-1) within the Lower Lands, but this species was present in very low abundance and there was no evidence to confirm nesting activity within the Property.

The Snapping Turtle and Midland Painted Turtle were observed in Pond #4 on lands adjacent to the Meaford Property, and a possible Snapping Turtle nest was observed near Pond #3 in the Property. Aside from the single nest, there is no evidence to suggest that the Meaford Property directly hosts or otherwise meaningfully supports either of these turtle species.

The Canada Warbler (Special Concern in Ontario) was observed on adjacent lands during the migratory period, and there is no evidence to suggest that the Meaford Property functions as meaningful habitat for this species.

Overall, there are no candidate species for this specific SWH category (i.e., "special concern or rare wildlife") with a meaningful presence within the Meaford Property and for which consideration of the implications of possible development is warranted.

4.9.5 Animal Movement Corridors

Amphibian Movement Corridors:

Corridors that facilitate movement of select amphibians between aquatic breeding habitat and terrestrial habitat, usually woodlands, can be specified as SWH. Within the Meaford Property and Lower Lands, the woodlands and wetlands have been surveyed and found not to constitute significant breeding habitat. Regular surveillance within the Study Area indicates a relatively low abundance and diversity of amphibians (see Table 6 and Section 4.5), and did not reveal any evidence of substantial migratory movement of amphibians.

Deer Movement Corridors:

Areas of continuous and appropriate vegetation cover may serve as corridors that facilitate movement of deer to and from wintering yards may constitute SWH. There are no deer wintering areas within or close to the Meaford Property. While there are small deer wintering areas located south of the Property (see Section 5.1.4), those areas are somewhat isolated from the Property by the presence of roads, residences and open spaces over the >2 km distance that separates them.

5.0 ANALYSIS OF POTENTIAL IMPACTS

The following analysis addresses each of the specific natural features of concern (i.e. significant woodlands, wetlands, aquatic features, species and habitat of conservation concern). For each feature, the likelihood and significance of effects potentially associated with the current Demonstration Plan (see Appendix B) are assessed.

At the highest level, the assessment of impact is conducted on the premise that development of the Property in a manner that does not invoke any of the planning policies that protect the natural environment is the baseline "no-impact" scenario. Consistent with the Provincial Policy Statement (PPS), the Grey County OP and Meaford OP include a number of policies that may constrain development in cases where specified natural heritage elements are present. Of relevance to the natural heritage features present within or near the Meaford Property, this includes the following:

- Significant Woodlands - no development or site alteration may occur within Significant Woodlands or their adjacent lands (within 120 m) unless it has been demonstrated through an EIS that there will be no negative impacts on the natural features or their ecological functions. In addition, fragmentation of significant woodlands is generally discouraged.

- Wetlands (other than PSW) - no development or site alterations are permitted within wetlands or their adjacent lands (within 30 m) unless it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

- Fish Habitat - development and site alteration are not permitted in Fish Habitat except in accordance with relevant provincial and federal requirements. No development will be permitted within 30 m of the banks of a stream, river, or lake unless an EIS, or the Conservation Authority, concludes setbacks may be reduced

- Significant Wildlife Habitat - development and site alteration is not permitted within Significant Wildlife Habitat or adjacent lands (120 m), unless it has been demonstrated through an EIS that there will be no negative impacts on the natural feature or its ecological functions.

- Habitat of Threatened/Endangered Species - no development or site alteration will be permitted within the habitat of threatened or endangered species except in accordance with provincial and federal requirements. No development or site alteration will be permitted within the adjacent lands (120 m) to these areas unless it has been demonstrated through an EIS that there will be no negative impacts on the natural features or their ecological functions.

The assessed potential for adverse effects is based in part on the characteristics of the policy-referenced features themselves, with a focus on characteristics and/or functions that are deemed to be conservation priorities. The assessment also considers the nature and extent of proposed development, including the potential placement and combined footprint of buildings and infrastructure, and the various activities that may occur within the Property or adjacent lands in the post-construction phase.

At this time, a Demonstration Plan has been developed for the Meaford Property, serving as an example of a project layout that is consistent with the high-level objectives. A copy of this plan is attached as Appendix B. The Demonstration Plan calls for community development throughout most of the Meaford Property, with up to 1,250 residential units distributed over approximately 85 ha of land. The plan also includes a central Village Centre supporting community and commercial uses, measuring about 10 ha. In addition, the plan identifies a simple loop road network for community access and three stormwater management (SWM) areas. For the Lower Lands, the Demonstration Plan simply identifies an access route(s) to the shoreline of Georgian Bay. No changes in land-use within the Lower Lands are considered in the Demonstration Plan.

The assessment seeks to provide an understanding of the potential for adverse effects that is quantitative and refined to the extent that it can be at this time. In absence of final detailed site plans, the analysis is partly constrained to a more qualitative and relative interpretation of the risk of adverse effects.

Conclusions and recommendations drawn from this analysis, including mitigation and monitoring recommendations, are provided in Section 6.

5.1 Significant Woodlands

The Provincial Policy Statement (PPS) defines significant woodland as "an area which is;

- ecologically important in terms of features such as species composition, age of trees and stand history,
- functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area, or
- economically important due to site quality, species composition, or past management history".

Regional assessments are undertaken by various agencies using criteria derived from this general definition to identify woodland areas for initial designation as "significant". The Natural Heritage Reference Manual (NHRM) provides detailed recommendations for criteria and standards to be used in the assessment of woodland significance at the planning level. An assessment of woodland significance has been conducted by the County of Grey for the purpose of its Official Plan (OP). The assessment is based on a desktop review using data provided by the MNRF. According to the OP, the main

criteria used in the County's assessment are 1) size, and 2) proximity to special features (PSW, ANSI). It is acknowledged that the assessment in the OP is not based on ground-level surveillance, and any site-specific consideration of woodland significance is best served by more detailed ground-level assessment.

For this EIS, the assessment of potential impacts on the Significant Woodlands found within and immediately adjacent to the Meaford Property is conducted in consideration of several of the core categories identified in the NHRM. This includes woodland size, forest cover characteristics, the presence of species of conservation concern, ecological functions and linkages, and water protection functions. Table 8 summarizes the general characteristics of the six types of woodland found within the Study Area, and Table 9 provides a summary of the associated functions.

5.1.1 Woodland Size

Almost 58 ha within the Meaford Property and Lower Lands are currently occupied by some form of woodland or forest cover. About 83% (~48 ha) of the combined wooded area is designated as Significant Woodlands (as per Appendix B of the Grey County OP). The Significant Woodlands within the Study Area are part of a continuous block measuring about 70 ha that extends as far east as Christie Beach Road. Immediately to the east of the Property, there is another ~45-ha block of Significant Woodland in the area bounded by Christie Beach Road, 39th Side Road and Sunset Boulevard. This is all part of a larger area of Significant Woodlands that envelopes about 200 ha stretching eastward along the Georgian Bay Shoreline to Lora Bay Drive. The continuity of this larger block is disrupted only by a few road corridors. Based on MNRF criteria, this 200-ha block can be considered as a single functional unit. The County's mapping of Significant Woodlands within and immediately adjacent to the Meaford Property is provided in Appendix A of this report.

Within the Meaford Property, about 75% (~25 ha) of the existing wooded cover is included as part of the larger area of Significant Woodlands. The general distribution of development presented in the Demonstration Plan and the location of woodland blocks within the Meaford Property are such that direct intrusion into those forested areas or their adjacent lands is expected to occur. In total, there are about 19 ha of Significant Woodland where development-related incursion into the woodlands could occur. This represents about 80% of the area that has been designated as Significant Woodlands within the Meaford Property.

Within the Lower Lands, total area affected depends in part on the final design and construction details of the proposed access route. It is assumed for the purpose of this EIS that this feature would be approximately 1 km in length and about 10 m in width (i.e., a total area of approximately 1 ha).

In combined total, there are up to 20 ha of Significant Woodland that could be subject to encroachment or incursion as a result of development of the Meaford Property.

Assuming 100% woodland clearance in the developed areas, this represents up to a 10% reduction of the larger block of designated Significant Woodland that occupies the surrounding area. In regard to size, there are no firm quantitative criteria available as a basis for the evaluation of any reduction in size of a given forested area. However, the Demonstration Plan would see 90% or more of the larger block retained, and that block would remain well above the 40-ha threshold underlying the designation of Significant Woodland specified in the Grey County OP.

The actual amount of woodland loss potentially associated with development can be mitigated through efforts at all stages (design, construction, post-construction) to optimize the long-term presence of trees and a canopy continuum within or near areas that are proposed for development (see discussion in Section 6.4.1).

5.1.2 Forest Characteristics

The designated Significant Woodlands within the Meaford Property consist mainly of either early succession deciduous forest cover or coniferous plantations. The plantations appear to be in the range of 30 to 40 years old, and there does not appear to have been any management efforts (e.g. selective thinning) implemented since the time of initial planting. The existing trees are tightly spaced, and the crowding has constrained the growth of the planted trees and has also largely prevented the establishment of any understory or ground cover. The few herbaceous plants that have established within the plantations represent common and often non-native species (e.g. Common Dandelion). The general state of the plantation areas is one of very low floral diversity and a lack of natural forest structure.

The naturally occurring woodlands within the Meaford Property are relatively young forest communities, with the large majority of trees <30 cm DBH and estimated to be less than 35 years old. The most common species in all forest communities within the Meaford Property (i.e., Aspens and Ash) are reflective of early succession communities that are common in the region. Because of the young age and transitional nature of these woodlands, forest structure is not well developed and the canopy tends to be incomplete. Where an understory community has developed, invasive European Buckthorn tends to be a dominant woody species. Ground cover tends to include a significant presence of non-native and sometimes invasive species.

There are three forest community types encountered within or near the Meaford Property that encompass more mature trees and more advanced forest structure. This includes the mixed White Cedar forest (FOM7) below the base of the bluff, the White Ash forest (FOD4-2) immediately east of the existing residence, and the Poplar forest (FOD3-1) occupying the slope adjacent to the boundary between the Meaford Property and Lower Lands. These communities have relatively solid canopies, well-developed sub-canopies and understories, and some tree specimens that exceed 40 cm DBH. There are non-native species in the understory and the ground cover, but these are the only locations with ground cover species that are typical of relatively mature forests of the region.

The Significant Woodlands within the Lower Lands consist almost entirely of deciduous forest, with just a few small pockets of mixed coniferous-deciduous forest that account for less than 5% of the total forest cover within the Property. The deciduous woodlands are mostly relatively young forest communities, with the large majority of trees <30 cm DBH. Within the central plateau of the Lower Lands, the deciduous forest cover is dominated by Ash and Aspen, which are typical of earlier stages of succession and which are common in the region. On the sloped portions of the Lower Lands, the forest cover is made up of slightly older and larger trees and a wider variety of tree species, but Aspen and Ash are still dominant. The forested slopes exhibit the most mature and structured forest communities within the Study Area, with a very minor presence of species (Sugar Maple, Ironwood, Beech) that represent mature forest conditions for the region.

Overall, the forested areas within the Study Area consist largely of early succession deciduous forest cover or coniferous plantations. Forest communities which are relatively mature and exhibit more advanced forest structure are confined largely to Hazard areas and are outside of areas of development presented in the Demonstration Plan. Any forested areas that might be subject to encroachment or incursion by anticipated development plans do not exhibit any uncommon characteristics that would warrant a designation as Significant or otherwise confer a level of priority from a conservation perspective. In regard to forest characteristics, the encroachment associated with development of the Meaford Property could occur without any significant impact.

5.1.3 Priority Species

The available information does not indicate a high likelihood of the presence of regulated Species at Risk (SAR) or other species of conservation concern (SOCC) within the woodlands located within the Study Area. Almost all of the species of plants and animals that have been observed within and around the woodlands within the Property are relatively common to the region and the Province, and many are typical of habitats influenced by some level of human disturbance. These species are not considered to be particularly sensitive or of any conservation concern.

There are nine Priority Species (SAR or SOCC) that have been identified as present within or near the Study Area, as discussed in Section 4.8. This includes three species primarily associated with wetlands (Western Chorus Frog, Snapping Turtle, Midland Painted Turtle) and two species associated with open habitats (Eastern Meadowlark, Monarch Butterfly). It is possible that the Western Chorus Frog (an SOCC) could occur in limited areas of deciduous swamp that have been designated as Significant Woodlands. However, focused on-site monitoring indicates that the abundance of all frogs, including the Chorus Frog, is relatively low in the wetlands within the Study Area, particularly the areas of deciduous swamp. The monitoring also indicates that swamps within the Study Area do not serve as meaningful breeding habitat for the Chorus Frog.

The only Priority Species that are primarily associated with forest habitat is the Eastern Wood-pewee and the Black Ash tree. In general, the Eastern Wood-pewee is most commonly associated with the mid-canopy layer in forest stands of intermediate age and in mature stands with little understory vegetation, although it is possible for this species to nest in just about any wooded habitat. The preferred habitat of this species is found primarily within the Dry-Fresh Poplar Forest (FOD3-1) associated with the slope face along the southern perimeter of the Lower Lands. The limited occurrences of this species recorded during monitoring of the Study Area were confined to this forested area. This is designated as Hazard Land and is outside of the development footprint depicted in the Demonstration Plan.

Black Ash were observed to be present only in the Lower Lands in a scattered manner, as a secondary species in association with three specific forest community types; 1) Ash Lowland Forest (FOD7-2), 2) Maple Deciduous Swamp (SWD3-2), and Ash Deciduous Swamp (SWD2-2). These forest community types occupy about 7 ha within the Lower Lands, all of which is within the designated area of Significant Woodlands.

In general, removal of forest cover and other construction activity poses a risk of direct harm to the wildlife associated with Significant Woodlands. Development can lead to alteration or loss of some portion of woodlands, which in turn could reduce or impair woodland habitat functions. Post-construction conditions within the development envelope can also result in disturbance of forest-associated wildlife in adjacent woodland habitat due to light, noise, and direct human incursion. In specific regard to the Meaford Property, there is a limited presence of any SAR/SOCC within the Significant Woodlands found within the Property. This greatly reduces any risk of impacts to such species as a result of loss or alteration of those woodlands. The scattered presence of Black Ash in the Lower Lands is the only instance of a Priority Species where incursion into certain areas of Significant Woodlands could result in direct harm. The potential impacts to this and other Priority Species are discussed further in Section 5.4.

5.1.4 Habitat and Linkage Function

Other than Significant Woodlands, there are no significant natural heritage features (i.e., PSW, ANSI) in close proximity to the Meaford Property, and the Property does not support any linkage to such features.

There are other specific habitat features/functions have been identified within or in proximity to the Property, including *forest interior* and *deer wintering yards*.

On the basis of MNRF mapping, the Grey County OP identifies small deer wintering areas in the Lora Bay area, about 2 km southeast of the Meaford Property at the most proximate point. The woodlands within the Property are somewhat isolated from these areas by virtue of roads, scattered residences and patches of open habitat. It is possible that larger mammals such as deer or coyotes could move from wooded areas within the Property to the areas identified as deer yards. The woodlands within the Study Area are

early succession and generally serve as good summer habitat for deer, but they do not provide good conditions for deer wintering. Any movement of deer from the Study Area to the area of Lora Bay is most likely to be seasonal movement of a small number of deer at the onset of winter. There is no expectation of frequent movement of substantial numbers of deer from the Property to adjacent areas of deer habitat.

The dimensions of the wooded areas within the Study Area are such that they provide about 2 ha of habitat that could be considered as *forest interior* based on a commonly applied general criterion (i.e., >100 m from forest edge in all directions). This interior forest area is confined to the core of the Lower Lands, almost entirely within the Lowland Ash Forest type (FOD7-2). In consideration of Significant Wildlife Habitat (SWH) elements that have an interior forest association (e.g. woodland raptor nesting habitat, area-sensitive breeding bird habitat), the criterion set by the MNRF is >200 m from forest edge. Using this criterion, there are no portions of the forested areas within the Meaford Property or Lower Lands which qualify as *interior forest*. Criterion aside, the findings of direct monitoring within the Study Area indicate that the faunal communities that are present, specifically within the Lowland Ash Forest community type, are not interior forest or area-sensitive communities.

Even in absence of any surrounding features with significant habitat functions, the forested communities within the Study Area still provide some ecological linkage within the local landscape. The immediate surrounding landscape has either been subject to some modification for human residential and recreational use or is occupied by forest cover similar in function to that found within the Study Area. The faunal community of this area is most likely adapted to such a landscape. This is evidenced by the nature of animals observed during on-site surveillance (i.e., common species, species adapted to human influences). The potential impacts of any disruption of ecological linkage would be confined to this faunal assemblage, which shows no indication of rarity or sensitivity.

The Significant Woodlands within the Study Area are all part of, or connected to, a continuous band of forest cover that traverses the shoreline along most of the Property's width. The Demonstration Plan depicts development that would be set back from the Hazard area associated with the steep slope that laterally traverses the Meaford Property and Lower Lands along their common boundary. A continuum of forest cover will be maintained across the area between the top of slope and the northern limit of the Lower Lands (i.e., Fraser Street). This forest cover is expected to continue to provide habitat continuity and some substantial degree of the linkage function that is currently associated with the forest cover within the Property. Development as proposed may result in some loss and interference in that linkage, but some meaningful level of linkage is expected to remain intact. Significant features and linkage to them would be largely unaffected, owing mainly to the limited presence of significant features in the immediate surrounding area.

5.1.5 Water Protection

Forest cover generally leads to improved quality of runoff (e.g. reduced erosion and sediment loads, reduced thermal loading), which can have a beneficial effect on down-gradient features. Loss or impairment of forested areas can result in a reduction of the collective attenuation benefits provided by the given forest area.

The extent to which forest cover provides attenuation of runoff traveling through the Study Area is not fully known at this time. However, the flow of water through the Property and Lower Lands at present is largely channelized which circumvents attenuation that might occur in forested areas. The watercourses that convey water across the Meaford Property flow largely through open habitats (meadow, thicket) and passage through wooded areas is very limited. Only watercourses #2 and # 5 (refer to Figure 4) pass through woodlands within the Meaford Property, for distances of only 100 to 150 m. Within the Lower Lands, flows in watercourses #3, #4, #5 and #6 pass through about 250 to 300 m of mainly forested land. Flow is rapid and largely unattenuated down the forested slope face along the southern perimeter. There is likely some degree of attenuation of flow in the central plateau area, primarily in association with Lowland Ash forest and also the small Maple Swamp and Ash Swamp features.

The nature of the watercourses traversing the Study Area is such that they do not serve as aquatic habitat and generally do not provide significant ecological function (see Section 4.7.1). The watercourses do not deliver flow to any larger streams before discharging to Georgian Bay, where their flow is subject to large-scale dispersion and dilution. It is not anticipated that any attenuation function provided by Significant Woodland areas within the Meaford Property has meaningful effect on the quality of downstream waters.

Overall, the loss or alteration of Significant Woodlands within the Meaford Property is likely to have limited influence on either quality or quantity of flow in the Watercourses, and the broader ecological implications of any changes in the intermittent flow would be minimal.

5.1.6 Summary

The Demonstration Plan for the Meaford Property is expected to result in some degree of direct incursion into areas currently designated as Significant Woodland or their adjacent land. In the Lower Lands, development of an access route(s) may result in minor direct incursion into about 1-ha Significant Woodlands. Depending on the final distribution of development within the Meaford Property, and other factors (e.g. tree preservation plans), as much as 19 ha of Significant Woodland could be directly impacted by development. The implications of any such impacts are discussed below in regard to the three core concepts which underlie the Significant Woodland designation (i.e., functional, ecological and economic importance).

The woodlands within the Meaford Property have no known economic importance. In regard to functional importance, by virtue of larger landscape contribution, the 200-ha continuous block of Significant Woodlands in and around the Christie Beach Area could

be reduced by up to 10%, but would still be designated Significant in consideration of size-related criteria (i.e., >40 ha) stipulated in the Grey County OP. On its own, this change does not necessarily have a significant adverse effect on the integrity of the Significant Woodland block or its functions.

In terms of ecological importance, the functions provided or supported within Significant Woodlands on or adjacent to the Meaford Property are as follows:

- no important linkage functions,
- limited presence of Priority Species, consisting of scattered presence of Black Ash in association with specific forest community types within the Lower Lands,
- limited SWH, consisting of scattered presence of burrowing crayfish habitat in association with specific forest community types within the Lower Lands, and
- limited water protection function, primarily within the Lower Lands

Loss or impairment of specific portions of Significant Woodlands within the study area, most notably within the Lower Lands, could result in some diminishment of these functions. The degree of impact would be constrained by the fact that at least half of the Significant Woodlands within the Lower Lands would not be directly affected by development as per the Demonstration Plan. The significance of any impacts is also dampened by the fact that the functions themselves are limited. Overall, development of the Meaford Property could occur with noted encroachment into Significant Woodlands and/or adjacent land with limited adverse impact on the Significant Woodland block and its functions. The implementation of various mitigation measures (as discussed in Section 6.4) could substantially offset the overall implications to the functional integrity of the affected woodlands.

5.2 Wetlands

The implications of any possible loss or disturbance of wetlands is dependent in part on their function and value. To understand the implications, the wetlands within the Study Area are assessed herein in context of the evaluation criteria and principles embodied in the Ontario Wetland Evaluation System (OWES, 2014). This system provides a framework for the evaluation of several key attributes of wetlands in southern Ontario, including hydrological functions, biological features and functions, and social functions. A summary of wetlands within the Study Area and their major functions is provided in Table 10.

5.2.1 Functions

Hydrology

The hydrological functions of interest and their relevance to the wetlands within and near the Meaford Property are as follows:

- flood attenuation - the wetland features offer limited flood attenuation value owing to their relatively small size, the absence of direct connectivity to permanent watercourses, and their perched position relative to Georgian Bay (i.e., immediately adjacent to the top of steep slopes leading to the water's edge).
- water quality improvements (e.g. nutrient attenuation) - there is some water quality improvement capacity, but it is generally expected to be of limited magnitude and value owing to absence of significant organic soil layer, the relatively small size of the wetlands, and the very high dilution capacity of the immediate downstream receiving waters (i.e., Georgian Bay).
- carbon sequestration - this is expected to be limited, owing to the small size of the wetlands and a lack of significant organic soil processes.
- shoreline erosion control - palustrine wetlands do not directly contribute to shoreline erosion control.
- groundwater recharge - the wetlands offer low groundwater recharge value owing to the nature of surficial geology (i.e., with significant impermeable clay underlain by substantial shale layers).

Overall, the hydrological function of the wetlands within the Study Area is quite limited. Accordingly, the direct loss or impairment of any wetland features within or near the Meaford Property has a highly limited potential to translate to a loss of significant hydrological function.

Biology

The biological function and value of the wetlands may pertain to the wetland plant community in its own right, and also the wildlife species that the wetland directly or indirectly supports. In regard to rarity of wetland type, the community types found within the Study Area are not particularly rare in Southern Ontario or the Ecodistrict (i.e., 6E-4). Following the ELC system of Lee et al., (1998) the wetlands encompass communities consistent with Mineral Cattail Shallow-water Marsh (MAS2-1), Green Ash Mineral Deciduous Swamp (SWD2-2), Maple Mineral Deciduous Swamp (SWD3), Red-Osier Mineral Thicket Swamp (SWT2-5), and Willow Mineral Thicket Swamp (SWT2-2). These community types have a Provincial Ranking of S5 (secure) but are nonetheless on the list of plant communities tracked by the NHIC. These swamp and marsh communities rate very low in regard to representing old established ecosystems.

Monitoring within and around the wetlands has not revealed any instances of species rarity for any plants or animals, either within or adjacent to the wetlands. The Western Chorus Frog is tracked by the NHIC even though the reported status in Ontario is S4 (apparently secure), and it is described as locally common throughout southern Ontario. This is the only known Priority Species of fauna whose life cycle might require habitat conditions found within the wetlands on or near the Property. The available information indicates that the Chorus Frog is not abundant within the study are nor does it exhibit high breeding intensity within the wetlands. In regard to flora, Black Ash is the only

Priority Species that has been identified as present within the Study Area, occurring in association with small patches of swamp communities (SWD2-2 and SWD3-2) within the Lower Lands.

The presence of burrowing crayfish in association with the two small swamp areas in the Lower Lands represents an element of Significant Wildlife Habitat (SWH). Otherwise, there are no special habitat features (e.g. deer wintering, waterfowl nesting or staging, colonial bird nesting, raptor wintering or roosting) associated with wetlands within or near the Property.

The wetlands do not provide any direct fish habitat, owing to the fact that standing water is intermittent and also effectively isolated from other nearby waters that provide fish habitat (i.e., Georgian Bay).

In summary, the information obtained from the monitoring within the Study Area, when interpreted in context of OWES evaluation process, leads to the following general conclusions regarding the wetlands that are present:

- they are expected to support relatively high plant productivity, owing to the clay/loam soils and climate variables of the region,
- they are small in size (<2 ha on average), and relatively isolated,
- they offer only limited hydrological function,
- the majority of the wetland features support limited natural habitat function, and the only functions of conservation priority are associated with the two small wetland patches in the Lower Lands
- they do not support any social functions at present, although such function could be partly realized as a result of proposed development, and
- they have no appreciable value in context of economic benefits, landscape aesthetics, public education, aboriginal or cultural heritage values.

Overall, the wetlands within or near the Meaford Property are regionally common and do not serve any unique or significant ecological or social functions. The two small patches of swamp community within the Lower Lands are recognized as exceptions in terms of ecological function, providing potential or confirmed habitat for two Priority Species (Chorus Frog and Black Ash) and SWH function (terrestrial Crayfish Habitat).

5.2.2 Potential Impacts

There are approximately 10 ha of wetlands currently found within the Meaford Property and Lower Lands, mainly in the form of Cattail Marsh or Ash Swamp. Development in a manner consistent with the current Demonstration Plan would result in some degree of incursion on ~9 ha of wetlands within the Meaford Property. Less than 1 ha of the shallow marsh (MAS2) community in the northwest corner of the Meaford Property, as

well as a small (<0.5 ha) patch of thicket swamp (SWT2-2) within the retained lands, are outside of the proposed limit of disturbance suggested by the Demonstration Plan. These wetland areas, particularly the shallow marsh, would still be susceptible to indirect effects resulting from land-use changes within immediately adjacent lands. The two patches of swamp community within the Lower Lands, totaling less than 1 ha, could also be subject to either direct or indirect effects, depending on the detailed characteristics of the access route(s) that may be created adjacent to those wetlands. In the case of direct incursion and loss of wetland areas, there will be attendant loss of associated function.

Indirect adverse effects on any area of retained wetland could occur as a result of hydrology-related changes arising as a result of development within adjacent lands. Changes in either quantity or quality of waters flowing into the wetlands have the potential to adversely affect their form and function. Such changes may arise due to several aspects of development, including:

- large scale alteration of site drainage for stormwater management (SWM) purposes,
- localized changes to surface permeability and runoff generation as a result of installation of paved or built surfaces, or
- conveyance of substances of possible concern (e.g. sediments, fertilizers, pesticides) from construction zones or final developed areas.

Landscape alteration and stormwater management are the main aspects of any development that could alter hydrological inputs to any or all retained wetlands within or near the Property. Development-related changes in hydrology could alter key characteristics the existing wetlands, and potentially impair their ecological functions. This is particularly the case for any aspect of development that alters the alignment or flow regimes of the watercourses that traverse the Study Area and serve as the primary hydrological input to most of the existing wetlands. Effects on wetland hydrology as a result of installation of pavement or other impermeable surfaces within the development envelope are effectively limited by the fact that the wetlands are sustained primarily by inflow from watercourses. Runoff or seepage from the development envelope likely represents only a small fraction of total input to the wetlands. If the primary inputs via watercourses are maintained, changes in local inflow of surface runoff would not likely have a measurable effect on the main wetland areas. The current Demonstration Plan indicates that existing watercourses are generally expected to be retained, which greatly mitigates any risk of changes in wetland hydrological balance. The wetlands within the Study Area are also mostly characterized by extensive periods where water-table is not above surface, and thus there is a general absence of biota that relay on relatively persistent standing water. Under these conditions, the risk of significant ecological implications of any changes in wetland hydrological balance is relatively low.

In terms of water *quality*, there is a risk of transport of contaminants from the development envelope to any retained wetlands during construction activities and, to a much lesser extent, during post-construction occupation of the completed residential development. This risk is inherently limited due to the fact that the runoff that might

flow from the area of development into the wetland would be very limited in volume and duration. The capacity to convey any substances of possible concern is generally proportional to runoff flow. Stormwater quality is also highly controllable when using standard mitigation techniques (see Section 6.4). In addition, the general absence of biota with a reliance on standing water for critical life stages also reduces the risk of adverse ecological effects associated with water quality impairment.

Adverse effects on retained wetlands are also possible during and after construction as a result of direct human incursion into the wetlands. The plant and animal communities associated with the wetlands within the Study Area generally exclude species that are rare or sensitive, which serves to limit the potential significance of any such impacts. Effects due to human incursion are not expected to be meaningful, and eventual Site Plans can include measures to minimize the likelihood of incursion.

In summary, the current Demonstration Plan suggests direct or indirect incursion on the majority of the wetland areas within the Meaford Property, and possible minor encroachment of the small wetland patches by the access route(s) being considered for the Lower Lands. Any retained wetlands would be subject to indirect effects as a result of land-use change within the lands immediately adjacent to the wetlands. The significance of any loss or impairment of any wetland function is inherently constrained by the generally limited function and overall value of the wetlands within or near the Meaford Property. As discussed, these wetlands are generally not significant in terms of size, hydrological function or natural habitat function, and are of no appreciable social or economic value. The two swamp patches in the Lower Lands are the only wetlands that support Priority Species and SWH function, and should be prioritized for preservation and protection at the time when plans for the access route(s) are advanced. To the extent possible, mitigation measures (as discussed in Section 6.4.2) should be implemented to reduce or offset the loss of wetland functions, regardless of the limited nature of those functions.

5.3 Aquatic Features

Aquatic features potentially influenced by the proposed development include the following:

- eight intermittent watercourses that flow within the Property or on immediately adjacent lands,
- four man-made ponds located within or immediately adjacent to the Property, and
- the waters of Georgian Bay adjacent to the shoreline frontage.

There are numerous paths of hydrological connectivity through these various features. The connectivity results exclusively from the intermittent flow of the watercourses, and thus the connectivity itself is intermittent. These aquatic features and flow paths are depicted in Figures 4 and 5.

5.3.1 Watercourses

The watercourses that traverse the Study Area function as a main hydrological input for a number of the existing wetland areas, and also for the ponds found within or adjacent to the Meaford Property. Changes in watercourse alignment or flows could secondarily lead to shifts in hydrology of any the ponds or wetlands. In the longer term, this could lead to loss or changes in the associated plant and animal communities. The significance of any such effect is limited owing to the relatively limited ecological functions of the wetlands and ponds within the Study Area.

If any of the watercourses that discharge over the top of the open bluff area are subject to re-alignment or flow augmentation, this could have significant effects on the bluff and the ecological communities that occur on the bluff face or immediately below its base. Increase in flow or relocation of points of discharge could lead to new or increased erosion on the bluff. The erosion could be significant enough to cause loss or disturbance of the relatively mature woodlands occurring along the lakeshore. Any new or increased erosion could also lead to siltation of adjacent near-shore waters of Georgian Bay, which could have localized negative implications to fish habitat.

As discussed in Section 4.7.1, the watercourses that traverse the Meaford Property function primarily as seasonal runoff conveyance features, and have limited function in terms of habitat for aquatic biota. As a result, potential development-related changes in watercourse alignment or flow patterns have limited implications in terms of ecological functions.

The current Demonstration Plan generally indicates that the existing watercourses will be retained with a set-back (~20 m) on either side. Under these circumstances, and given the nature of the watercourses, there is no expectation of significant adverse effects on the watercourses or their functions.

5.3.2 Ponds

The ponds are man-made and their ecological functions are relatively limited, although some ponds may provide habitat for any of three Priority Species (Snapping Turtle, Midland Painted Turtle, Chorus Frog). In the event that the ponds are filled or otherwise altered to accommodate development plans, some or all of the noted ecological function could be lost or impaired.

Development in the areas surrounding any of these ponds could alter the water balance of the pond, and possibly impair their function. Similar indirect impacts could result from alteration of the watercourses that flow into the ponds (watercourses #1, #6, #7 and #8). Surveillance of the ponds indicates that their water level stays relatively constant during the spring peak of runoff and also through the summer dry period.

Pond #4, immediately adjacent to the Property, is relatively shallow and has a much greater presence of aquatic biota than ponds #1, #2 and #3. There is a short watercourse that conveys runoff from part of the Meaford Property to Pond #4. Loss or alteration of this watercourse could have an effect on the Pond's water balance, which could have meaningful implications to the function of the Pond. Any changes that result in the delivery of high turbidity runoff to Pond #4 could also have an adverse effect on the existing aquatic vegetation and associated fauna. This could occur as a result of improperly managed construction activity or inappropriate SWM controls post-development.

In the current Demonstration Plan, Ponds #3 and #4 are outside of areas expected to be subject to various land-use changes, and the watercourses to which they are hydrologically connected are to be retained. It is anticipated that these ponds and their functions will not be subject to adverse effects. Ponds #1 and #2 are encompassed within an SWM area, and are thus considered subject to alteration of key characteristics (e.g. shoreline attributes, depth, hydroperiod). In absence of detailed SWM design, the nature and extent of any such change is uncertain. In consideration of the limited natural heritage functionality that is associated with these specific Ponds, the implications of any changes associated with SWM alterations are inherently limited. Recommendations pertaining to SWM design and other aspects of development are provided herein (see Section 6.4.3) to maintain or promote natural heritage functions associated with these ponds.

5.3.3 Georgian Bay

Although not specified in the Demonstration Plan, general development objectives for the Property could include amenities at water's edge below the bluff. Any in-water works or development immediately onshore could have adverse effects, either direct or indirect, on the aquatic habitat occupying the near-shore area of Georgian Bay. The most significant risks are associated with siltation and direct incursion into potential fish spawning or nursery habitat. Existing databases indicate the possible presence of Lake Sturgeon,

which is Species at Risk (SAR), in the waters of Georgian Bay in proximity to the Property. This is discussed further in Section 5.4. Any future work that may occur in or near the waters of Georgian Bay should be subject to consultation with the Department of Fisheries and Oceans (DFO) to ensure that fish habitat is not adversely affected.

Overall, there is no indication that potential development would result in significant deterioration of the quality or quantity of water flowing through the Property via various watercourses, ultimately causing measurable change in water quality in Georgian Bay. Effective stormwater management planning can ensure that there is no appreciable risk of adverse effects related to water quality and quantity.

5.4 Priority Species

Monitoring within the Study Area has revealed the presence of nine Priority Species (SOCC or SAR), including one plant, one amphibian, two reptiles, one invertebrate, and four bird species. The Eastern Meadowlark is the only species with meaningful presence within the Property that is currently subject to regulatory prohibitions as Species at Risk (i.e., *Threatened* or *Endangered* status) in the Ontario ***ESA***.

Development could possibly result in direct harm to any of the Priority Species that have been confirmed as present within or near the Property. The risk of direct harm is dependent on the timing and location of construction activities, and the extent to which each species is present within the Property. There is also potential risk associated with loss of habitat for any of the Priority Species.

The Eastern Wood-pewee was observed in one forest community type within the Lower Lands in very limited abundance (i.e., one possible nesting territory). This forest bird was not observed elsewhere within the Study Area and is not expected to nest within the Meaford Property owing to an absence of preferred habitat. The location of occurrence and also the availability of preferred habitat lies within areas designated as Hazard land. Overall, the risk of either direct or indirect harm is considered to be minimal.

The Monarch Butterfly is currently designated as *Special Concern* under both Provincial and Federal Regulations, but this is may to change to reflect COSEWIC's most recent reclassification of this species as *Endangered*. At present, the Meaford Property contains a substantial amount of open habitat (meadow and thicket) that could be used by Monarchs. Milkweed plants, which are an obligate requirement for reproduction, are present in small clusters within the Meaford Property but are neither abundant nor widespread. The Meaford Property appears to offer only incidental habitat for Monarchs, while Monarch habitat is effectively absent from the Lower Lands. It is likely that much of this habitat will be removed or altered following any development of the Property. This is not expected to have a meaningful impact on critical life stages or in a population context.

Development within the Meaford Property could result in both direct and indirect impacts to the Chorus Frog, the Snapping Turtle, the Midland Painted Turtle and the Meadowlark.

There are number of locations where the Chorus Frog may be found within the Study Area. Direct monitoring suggests that this amphibian species is not highly abundant within the Study Area, and not highly affiliated with any particular habitat type or specific feature. In general, loss of any wetland or watercourse poses a risk of both direct and indirect impacts to a relatively small number of this species. Because of the relatively low abundance and low breeding intensity, neither direct nor indirect impacts are expected to have meaningful implications at the local population level.

The Snapping Turtle and Midland Painted Turtle would be associated with the ponds that are within or adjacent to the Property, with confirmed presence only in Pond #4. The available evidence suggests that they are relatively few in number. Loss or impairment of the ponds poses some risk of impacts on these turtles. Individual turtles may also be subject to direct harm from construction activities during the period when they leave the ponds for egg-laying purposes (May to October). There is a similar risk from post-development residential traffic if the ponds are retained and continue to support turtles. These turtles, especially the Snapping Turtle, have life cycle characteristics that make the loss of even a few mature females potentially meaningful to local populations. With an absence of direct or indirect effects on Pond # 4, the risk of meaningful adverse effects on turtles within the Property is deemed to be very low. Regardless, recommendations are provided in Section 6.4 to further reduce that risk and/or enhance turtle habitat.

The Eastern Meadowlark is the only species found within the Study Area that is subject to formal regulatory protection as a Species at Risk (SAR). Development of the Property as suggested in the Demonstration Plan is expected to encroach upon the open habitat in the Meaford Property's core that is suitable for Meadowlark nesting activity. Development in and/or adjacent to this area would most likely preclude any future nesting activity of Eastern Meadowlark within the Property. Direct harm could also occur as a result of operation of construction machinery in active nesting areas during the breeding season (May to July). Monitoring efforts indicate that the current extent of nesting is confined to a limited area within the Meaford Property, and the number of nesting sites is low. The potential impact associated with direct harm to nesting birds or loss of nesting habitat is thus limited in its magnitude, but these effects still require efforts to conform to current regulatory requirements relating to this SAR.

Specimens of Black Ash are present in association with the two small swamp features in the Lower Lands, and also in confined portions of the Lowland Ash forest in close proximity to the wetlands and near watercourses near the base of the slope. A considerable portion of the locations of Black Ash occurrence is within Hazard designation. Outside of the Hazard area, development within the Lower Lands could result in direct loss of Black Ash specimens where clearing occurs. Drainage management could also result in changes in the wetness of soils where Black Ash are present, potentially affecting the long-term viability of this hydrophilic species. The potential for such effects is dependent in part on finalization of plans for the access route(s) that may traverse land close to the wetland features.

The Lake Sturgeon (*Acipenser fulvescens*) has not been directly observed along the shoreline frontage of the Property, but it is reported by the NHIC as present in the waters of Georgian Bay in the vicinity of the Property. The Great Lakes population of this species is designated by COSSARO and COSEWIC as *Threatened*. Certain lake-dwelling sub-populations will spawn along gravel or rocky shorelines exposed to wave action, and these conditions exist along the stretch of shoreline adjacent to the Property. Accordingly, there is some potential for adverse effects on a Species at Risk. Any future work that may occur in or near water should be subject to consultation with the DFO to ensure that neither Lake Sturgeon nor their habitat are adversely affected.

5.5 Significant Wildlife Habitat

In considering the principles and specific criteria developed by the MNRF, the presence of SWH within the Study Area consists of the following:

- possible raptor wintering habitat associated with the woodlands immediately along the northern perimeter of the Meaford Property,
- possible perching or foraging habitat for Bald Eagles or Osprey, associated with the same woodlands,
- possible wetland and woodland breeding habitat for amphibians,
- possible turtle wintering areas associated with any of the four ponds found on or adjacent to the Property, and
- confirmed burrowing crayfish habitat in confined swamp and forest areas near the base of the slope in the Lower Lands.

The possible presence of all but burrowing crayfish habitat are identified here as a precautionary consideration. The defining criteria for these habitat functions have not been fully met at any location within the Study Area , but some of the general conditions required for these functions are encountered, at least to some extent.

Any aspect of proposed development that results in loss or impairment of specific features or community types within or adjacent to the Property could result in SWH loss or impairment. By convention, any SWH element is deemed to be associated with the full area of the corresponding ELC classification. Within the Study Area, the primary SWH concern (burrowing crayfish habitat) is associated with the Maple Swamp (SWD3-2), the Ash Swamp (SWD2-2) and the Lowland Ash Forest (FOD7-2) community types within the Lower Lands. The SWH elements that are considered as a precautionary measure have the following ELC associations:

- raptor wintering habitat and perching/foraging habitat for Bald Eagles or Osprey - White Cedar Mixed Forest (FOM7) and Dry-Fresh Poplar Forest (FOD3-1)

- possible woodland breeding habitat for amphibians - Maple Swamp (SWD3-2) and the Ash Swamp (SWD2-2)
- possible wetland breeding habitat for amphibians - Cattail Marsh (MAS2-1)

Most of the ELC community types with potential SWH function (i.e. FOD3-1, FOM7, SWD3-2) are outside of areas proposed for land-use change in the current Demonstration Plan. The Demonstration Plan does suggest likely incursion on the Cattail Marsh and Ash Swamp communities, and additional pockets of Ash swamp and Maple Swamp may be directly or indirectly affected to a very limited extent by the creation of an access route(s) within the Lower Lands. In the Lower Lands, the presence of Terrestrial Crayfish is confirmed and measures to avoid direct or indirect effects on this species or its habitat are warranted. Within the Meaford Property, there is no evidence to confirm SWH function in the noted communities. However, recommendations are still provided (see Section 6.4.5) for precautionary consideration.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary of Existing Conditions

The Meaford Property is occupied largely by plant communities that are early succession and/or "Cultural" in nature, while the Lower Lands is almost entirely wooded. The prominent presence of cultural communities has facilitated the establishment of a significant presence of non-native plant species, including a number of which are considered to be invasive. Black Ash is the only Priority Species (i.e., SAR or SOCC) of plant that has been observed within the Study Area, in limited distribution only within the Lower Lands.

The associated faunal communities also consist mainly of common species from relatively secure populations. Monitoring has determined that there are eight species of fuana that are considered to be Priority Species that can be found within or near the Property. The species in question are relatively common and the concern is due to declining population trends rather than current rarity. The Eastern Meadowlark is the only species occurring within the Property that is formally listed as a Species at Risk (SAR) and subject to current regulatory prohibition under the ***ESA***. The observed presence of this *Threatened* species consists of 2 or 3 breeding territories within a 10-ha expanse of cultural meadow habitat within the Meaford Property. The other species that might warrant precautionary consideration in the planning of development within the Property are the Western Chorus Frog, Snapping Turtle, Midland Painted Turtle, and the Eastern Wood-pewee. The abundance and distribution of each of these species within the Study Area is quite limited and there is no evidence to confirm meaningful presence of any of these species in locations proposed for land-use change under the Demonstration Plan.

Although much of the primary projected development area within the Property is occupied by relatively open Cultural communities (meadow, thicket, savannahs), woodlands and wetlands do occur within the Meaford Property. Within the combined full Study Area, there are approximately 47 ha of Significant Woodlands and about 10 ha of unevaluated wetlands. The characteristics of the woodland and wetland communities are such that most have relatively limited ecosystem function and value. The Property is also traversed by eight intermittent watercourses that run dry after the spring and support a relatively low level of hydrological or ecological functions. In addition, there are four small ponds found within or immediately adjacent to the Property, and which all appear to be man-made. The hydrological and ecological functions associated with three of the four ponds are relatively limited. The fourth pond, located outside of the Property boundary, is the most naturalized and exhibits the greatest diversity of plant and animal life, including two species of turtle that are Priority Species.

6.2 Potential Impacts of Development

In regard to the Meaford Property, the Demonstration Plan suggests that development or alteration is expected to occur to some extent within the specified natural heritage areas and/or their adjacent lands. This creates a risk of adverse effects on the functional integrity of the local natural heritage system within and around the Christie Beach area.

The vegetation communities within the Study Area exhibit various ecological functions, but these functions are mostly neither critical nor sensitive. This general underlying condition inherently limits the significance of any land-use changes indicated in the Demonstration Plan. However, development of the Meaford Property may still pose a risk of detrimental effects that warrant mitigation. Assuming complete alteration within areas of land-use change identified in the Demonstration Plan, and without accounting for any mitigating measures or other planning-related restrictions (e.g. Hazard designation), the theoretical worst-case impacts include;

- loss/impairment of Significant Woodlands, to a maximum of approximately 20 ha,
- loss/impairment of wetlands, to a maximum of approximately 10 ha,
- loss/interference of up to 8 watercourses,
- loss/interference of up to 4 ponds, and
- impacts on up to 9 priority species (SOCC or SAR) in the form of direct harm or habitat loss/interference.
- loss or impairment of at least 1 Significant Wildlife Habitat element associated with swamp and woodland communities within the Lower Lands.

The likelihood and potential significance of any potential impacts are the two main determinants of overall risk, and are dependent in part on the characteristics of the affected features, and also in part on various aspects of development. For example, development in the Lower Lands would have some likelihood of loss of some area of designated Significant Woodland. However, the potential significance could be deemed to be very low, owing in part to the fact that the total area directly affected would be in the order of only 1 ha.

Tables 11 and 12 summarize the likelihood and potential significance of the various impacts that have been identified and assessed, and also list the key factors that moderate the level of risk.

The primary risk associated with potential development at the Meaford Property is the loss of Significant Woodlands and unevaluated wetlands. The fact that there is a general absence of these features in the region and Province makes the loss or impairment of any area somewhat meaningful, regardless of the characteristics and specific functions of any given feature. In consideration of their specific attributes, the existing woodland and

wetland areas within the Study Area tend to be relatively limited in terms of function, which in turn limits the potential significance of any impacts on these features. For some specific areas of woodland and wetland, the presence of SWH and/or Priority Species elevate the likelihood and significance of environmental impacts that could occur.

There are two other identified risks that are not directly associated with either woodland or wetland. This includes possible direct harm and/or habitat loss of Eastern Meadowlarks, which is protected as an SAR under the ***ESA***. Also, there is some risk associated with aquatic habitats, relating to possible works on the Georgian Bay shoreline or impaired quality of runoff originating within the Property and eventually discharging to the Bay. Otherwise, the Demonstration Plan being considered at this time poses relatively low risk of impacts on the natural heritage system and associated functions within and around the Property.

6.3 Overall Conclusions

In consideration of the information compiled in this EIS and the results of the current analysis of impacts, it is concluded that **the current Demonstration Plan could be implemented without significant negative impacts on the natural heritage system or its functions.** Qualifying considerations for each of the specific natural features of interest are as follows:

- Significant Woodlands - direct encroachment on Significant Woodlands and/or their adjacent lands will occur, but this encroachment is not expected to result in significant loss or impairment of priority natural heritage function. Mitigation measures are available and recommended herein to partly reduce or offset any effects on Significant Woodlands and their functions.
- Wetlands - direct encroachment on the large majority of the wetlands within the Property and/or adjacent lands is expected to occur, but the nature of these wetlands is such that the associated loss or impairment of natural heritage functions is not expected to be significant. Mitigation measures are available and recommended herein to partly reduce or offset effects on wetlands and their functions.
- Priority Species - development within the identified area of Meadowlark Habitat will constitute loss of SAR habitat and will require further evaluation and consultation with the Ministry of Environment, Conservation and Parks (MECP) in accordance with the ***ESA*** and associated regulations.
- Significant Wildlife Habitat - future development within the Lower Lands within or near the wetland areas where burrowing crayfish have been identified could cause unacceptable impacts on this SWH element and should not be considered without further evaluation.
- Watercourses - the Demonstration Plan generally indicates that the existing intermittent watercourses will be retained with an adequate buffer (20 m), and there is no expectation of adverse impacts on these features or their functions.

- Ponds - the Demonstration Plan suggests that two of the four ponds currently found within or near the Property will be retained, while two ponds are expected to be encompassed within an SWM area. The nature of the latter ponds is such that there is no expectation of loss of significant natural heritage function if those ponds are altered for SWM purposes.
- Georgian Bay - with the retention of watercourses and implementation of effective SWM plans, there is no expectation of impairment of water quality in the waters of the Bay bordering the Property.

6.4 Recommendations

This EIS has been prepared with the intent of providing all required information necessary for effective consideration of natural heritage implications in the planning and approval process. At this time, the EIS provides assessment with focus on the natural heritage implications of the current Demonstration Plan that has been developed for the Meaford Property (see Appendix B). The EIS should be revisited and updated if/when any plans for the Meaford Property, or the Lower Lands, are advanced and/or modified.

At this time, the findings of the EIS can serve as guidance for advancement and/or refinement of the Demonstration Plan. In general, planning decisions should be based on the objective of mitigating risks associated with all identified impacts, with the level of mitigation effort proportional to the magnitude of risk. Tables 11 (Meaford Property) and 12 (Lower Lands) provide a summary of identified impacts and their associated level of risk.

Regardless of the level of risk, the overall advancement of development plans for the Meaford Property should consider efforts to minimize all impacts. Recommendations are provided below to avoid, limit or otherwise mitigate the potential impacts that have been identified. The recommendations should be reflected in a Management Plan to be prepared for all phases of any final development plan.

The over-arching general recommendation is to avoid or limit development or alteration within the specified natural heritage areas (Significant Woodlands, wetlands, significant wildlife habitat, SAR habitat) or their adjacent lands. The more specific recommendations below include those that broadly consider the Property in its current state, and also those that reflect specific consideration of the current Demonstration Plan. Figure 9 depicts features and areas identified below as priorities for protection and/or mitigation.

6.4.1 Significant Woodlands

Both the municipal and county OP seek to avoid the loss or fragmentation of significant woodland features and the habitats and ecological functions they provide. In general, the Property should be developed so as to avoid or minimize loss of woodlands, particularly those designated as *Significant*. Relatively high priority should be given to the following:

- the area of mixed forest (FOM7) found below the top of slope along the west half of the Property,
- areas of Ash Swamp in both the Meaford Property and Lower Lands,
- the area of Maple Swamp (SWD3-2) in the centre of the Lower Lands, and
- the areas of Dry-fresh Poplar Deciduous Forest (FOD3-1) along the top-of-slope within the Meaford Property and on both the south and north slope face in the Lower Lands.

Woodlands that have been determined to be cultural plantations (CUP) do not exhibit any functional characteristics that warrant priority for protection.

Plans for woodland protection should maximize connectivity with the larger block of Significant Woodlands that overlaps the Property and extends east of Christie Beach Road. Fragmentation and isolation of the existing area of Significant Woodlands within or adjacent to the Property should be avoided.

The characteristics of the woodlands within the Study Area are such that they are not likely to be adversely affected by conditions within adjacent lands. Non-native and invasive species are already widely present, and none of the woodlands provide interior habitat function. The faunal species associated with the woodlands are neither rare nor sensitive. Still, as a general good practice, establishment of a default set-back is recommended, primarily to protect the root zones of perimeter trees. The set-back should be occupied by natural vegetation, and embody specific edge-management elements for the purpose of stabilization of exposed forest edges.

In the event of development that results in loss of some woodlands that have been designated as *Significant*, the functional implications to the local natural heritage system are not anticipated to be significant. Woodland loss could occur without significant effects on natural heritage functions that are recognized as conservation priorities.

Various measures are available to reduce or substantially offset loss of woodlands or woodland function. The primary measure is the development of a Tree Preservation and Planting Plan (TPPP) to maximize the post-construction presence of trees within the developed area. The TPPP should include objectives for the retention and protection of existing native trees, to the extent feasible. The TPPP should also include requirements for post-construction planting of native woody vegetation within the development

footprint (i.e., within residential yards or at roadside, as available) and also within designated open spaces. Candidate planting areas should include the ~12 ha encompassed within the anticipated 20-m watercourse setback, most of which is unforested in the current state. As an overall objective, the TPPP should seek to establish woody cover within a combined area that is equivalent to the total area of existing woodland that would be lost during initial site clearance and construction. Plantings should be planned to include a mix of native tree and shrub species arranged to emulate natural woodland conditions (e.g. structural layering) to the extent possible.

6.4.2 Wetlands

In general, plans for the Property should consider measures to minimize any loss or impairment of wetlands, with relatively high priority given to the following:

- the relatively large marsh in the western half of the Meaford Property, bisected by watercourse # 1,
- the mapped marsh wetland on the Meaford Property's western perimeter,
- the two areas of Ash swamp, which are also Significant Woodlands, in the east half of the property that are in close proximity to the Meaford Property's northern boundary, and
- the area of Maple Swamp in the centre portion of the Lower Lands.

The characteristics of the wetlands within or near the Property are such that they are not particularly sensitive nor do they provide critical functions. Activity in adjacent lands is not expected to pose any risk of meaningful impacts to the wetlands or their functions. As a good practice, a set-back of 10 meters or more is recommended for all wetlands. Post-construction landscape management programs should consider adoption of practices that minimize use of fertilizers and pesticides in the lands immediately adjacent to any retained wetlands.

To protect retained wetlands and also aquatic features, an Erosion and Sediment Control (ESC) plan should be developed, with appropriate measures to mitigate erosion and runoff during construction activities (e.g. silt fencing, avoidance of work in wet weather). Post-construction stormwater management (SWM) plans should be developed so that the hydrological inputs and outputs of any retained wetlands remain similar to pre-development conditions. This is particularly relevant for those instances where watercourses play a significant role in the hydrological balance of the wetland.

Under the current Demonstration Plan, about 9 ha of wetland within the Meaford Property is within areas which would be subject to land-use change. These wetlands have limited function, but measures to compensate for any functional loss are recommended. To the extent feasible, and where soil and topography would allow for the establishment of hydric soils, wetland vegetation (woody or non-woody) could be established within portions of anticipated watercourse setback area (~12 ha in total area). Also, designated SWM areas should be designed to include wetland plant communities to

the extent feasible in consideration of engineering requirements and objectives. In general, effectively designed SWM facilities will provide hydrological function similar to that which the existing wetlands provide. The inclusion of wetland vegetation and other naturalization features (e.g. basking structures for turtles) as part of SWM design will also support some of the ecological function of existing wetlands or ponds.

6.4.3 Aquatic Features

To the extent possible, the alignment and flow regime of existing watercourses should be maintained. This measure is facilitated primarily through site plan development and stormwater management planning. Priority should be given to Watercourses #1 and #5 (see Figure 4) due to their role in the hydrology of priority wetlands within or near the Property. Those watercourses that currently discharge over the face of the clay bluffs should also be prioritized in regard to maintaining alignment and flow regime. This includes Watercourses #1,# 2 or #3.

As a best practice, riparian buffers should be established along the retained watercourses. Because these are intermittent stormwater conveyance features, and serve no significant function as aquatic habitat, a buffer width of 10 m is deemed acceptable.

The four ponds within or immediately adjacent to the Meaford Property should be retained and protected if possible. Priority should be given to protection of Pond #4, which is not within the Property boundaries. SWM plans should be developed so that the hydrological contributions to this wetland that originate from within the Meaford Property are not substantially altered. A buffer zone of 5 m or more is recommended for ponds #1, 2 or 3. For Pond #4, a buffer of at least 20 m is recommended.

Under the current Demonstration Plan, Ponds #2 and #3 are encompassed within an SWM area. Under this circumstance, it is recommended that the existing ponds be incorporated into a wet SWM scheme that retains the existing pond footprints and minimizes any engineering modifications below water line. SWM plans should also seek to naturalize the ponds and surrounding upland zones within all SWM areas to the maximum extent feasible.

At present, there is no evidence to confirm the presence of turtles at Ponds #1, #2 and #3. The planning and establishment of the SWM area encompassing Ponds #2 and #3 should include pre-construction efforts to confirm absence of turtles. In the event that turtles are determined to be meaningfully present, salvage efforts should be considered (see further discussion in Section 6.4.5).

6.4.4 Priority Species

Monitoring within the Study Area has not revealed evidence of meaningful presence of reptiles or amphibians in association with any features within the Property boundaries.

Still, efforts to mitigate any risks to turtles and frogs that could be found in association with wetlands and aquatic features (watercourses and ponds) are recommended. Clearing and construction activities near wetlands, watercourses and ponds should be timed to avoid the period when standing water is present in wetlands (March to July), and the time of egg-laying of turtles (May to October). Barriers could also be put in place to prevent incursion of construction equipment into select areas of Priority Species habitat, and also to restrict movement of those species (e.g. turtles) into the construction zone.

In regard to Eastern Meadowlarks and their habitat, a permit may be required for development within the area identified as potential habitat (see Figure 8). As part of the permitting process, a plan for habitat compensation or a species-specific habitat management plan may be required. Permitting and planning will require consultation with the MECP. Restriction of timing of cutting or clearing within the areas of Meadowlark habitat will reduce risk of direct harm, and will likely be part of any permit conditions. The window of avoidance would run from May to July (inclusive).

If any development is proposed in or near locations where Black Ash may be present, steps should be taken to avoid or mitigate the risk of loss or harm of this species. The specific measures taken to address the presence of this species should evolve to reflect the regulatory developments for this species for which prohibitions under the ***ESA*** at this time are temporary and may change in the relatively near future. At this time, appropriate measures could include a focused survey of Black Ash presence within the development envelope, and subsequent measures to optimize retention and survival of those specimens that might be affected. Compensation planting plans could be developed as warranted. In consideration of the current Demonstration Plan, lower lying sections of the proposed watercourse setback area and SWM areas may warrant consideration as candidate areas for Black Ash compensation planting.

To avoid impacts to migratory birds, whether Priority Species or otherwise, the clearing of any woodlands, significant or not, or other natural vegetation should be timed so as to avoid the regional period of active bird nesting (i.e., April to August). This also serves to avoid impacts to any maternal roosting bat species that might be present.

In regard to any in-water or near-shore works that may be proposed along the Georgian Bay shoreline, potential impacts to fish habitat will require focused consultation with the Department of Fisheries and Oceans (DFO) and MECP to assess risks and to develop a mitigation plan specific to fish habitat.

6.4.5 Significant Wildlife Habitat

The presence of areas confirmed as Significant Wildlife Habitat (SWH) is confined to swamp and limited woodland areas at the base of the large slope that occupies the southern perimeter of the Lower Lands. The available information suggests that these features would support relatively small numbers of criteria wildlife species, if any, and would be of relatively low significance. Notwithstanding, these features are identified as priority features for preservation and protection in consideration of their overall ecological function and relative importance within the Study Area.

As discussed in Section 3, there are several elements of SWH for which some of the requisite conditions are encountered on the site, but full qualification criteria have not been met. In any instance in which development or site alteration is being considered within or near the associated ELC community types, further assessment should be conducted.

If necessitated by eventual site plans, turtle salvage could be considered as a measure to address possible SWH concerns relating to any alteration or removal of any of the ponds. This would require the selection of a suitable destination for salvaged turtles, presumably including any on-site ponds that would not be subject to any alteration. Various measures, such as planting of aquatic vegetation, to replicate the characteristics of the source pond should be implemented. Capture and relocation should be supervised by a qualified biologist and should occur during the warm season (May to September) when reptiles are relatively active and capable of feeding and otherwise coping and adapting to the transfer.

6.4.6 Vegetation Protection Zone

It is recommended that a set-back be established along the entire length of the top of slope along northern perimeter of Meaford Property, except at the location of the existing residence. The set-back should function as a Vegetation Protection Zone (VPZ), where native plant material is maintained. The VPZ will function to protect the woodland communities found below the top of slope, and to retain ecological connectivity across the Property. For this purpose, a set-back distance of 20 to 25 m is deemed to be acceptable. Set-back requirements to address slope-related hazards may be greater, in which case the greater set-back distance should be managed, at least in part, as part of the VPZ.

6.4.7 Enhancement Opportunities

The proposed development also affords some opportunity for ecological enhancement. The main recommendation for enhancement is control or removal of invasive plant

species, especially European Buckthorn which is present throughout the woodland areas within the Property and adjacent Lower Lands.

Green-space vegetation should be planned and managed to improve conditions for Monarchs. This could include the use of native flowering plants that serve as forage for Monarchs, other butterflies, and a variety of pollinator insects.

A contingency plan should be developed to address the pending implications of Emerald Ash Borer (EAB). This insect pest is now well-established in southern Ontario, including Grey County. In time, it is anticipated that all ash trees will be affected by EAB. Ash species are a significant component of swamps and most woodlands within the Meaford Property. In many cases, loss of ash will compromise the integrity and function of woodlands and swamps. A pro-active plan to minimize the implications of the loss of ash is recommended.

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TABLES

Table 1: Plant Species List for the Study Area

Common Name	Scientific Name	Provincial Status (S-RANK)[1]	COSEWIC Status	COSSARO Status	Native vs Non-Native Status	Coefficient of Conservatism[2]	Wetness Coefficient[2]
Alternate-leaved Dogwood	*Cornus alternafolia*	S5	-	-	Native	6	3
American Basswood	*Tilia americana*	S5	-	-	Native	4	3
American Beech	*Fagus grandifolia*	S4	-	-	Native	6	3
American Larch	*Larix laricina*	S5	-	-	Native	7	-3
American Mountain-ash	*Sorbus americana*	S5	-	-	Native	8	0
American Water-horehound	*Lycopus americanus*	S5	-	-	Native	4	-5
Asparagus-fern	*Asparagus officinalis*	NA	-	-	Non-native	NA	3
Awl-fruited Sedge	*Carex stipata*	S5	-	-	Native	3	-5
Balsam Fir	*Abies balsamea*	S5	-	-	Native	5	-3
Balsam Poplar	*Populus balsamifera*	S5	-	-	Native	4	-3
Bebb's Sedge	*Carex bebbii*	S5	-	-	Native	3	-5
Beggar-ticks	*Bidens frondosa*	S5	-	-	Non-native	3	-3
Birdfoot Trefoil*	*Lotus corniculatus*	NA	-	-	Non-native	NA	3
Black Ash	*Fraxinus nigra*	S4	THR	THR	Native	7	-3
Black Cherry	*Prunus serotina*	S5	-	-	Native	3	3
Black Knapweed*	*Centaurea nigra*	NA			Non-native	NA	5
Black Medic*	*Medicago lupulina*	NA	-	-	Non-native	NA	3
Black Nightshade	*Solanum nigrum*	NA	-	-	Non-native	1	3
Black Snakeroot	*Sanicula marilandica*	S5	-	-	Native	5	3
Black Walnut	*Juglans nigra*	S4	-	-	Native	5	3
Black Willow	*Salix nigra*	S4	-	-	Native	6	-5
Black-eyed Susan*	*Rudbeckia hirta*	S5	-	-	Native	0	3
Bladder Campion	*Silene cucubalus*	NA	-	-	Non-native	NA	5
Bladder Sedge	*Carex intumescens*	S5	-	-	Native	6	-3
Blue-eyed Grass	*Sisyrinchium montanum*	S4	-	-	Native	4	0
Bouncing Bet	*Saponaria officinalis*	NA	-	-	Non-native	NA	3
Broad-leaf Cattail	*Typha latifolia*	S5	-	-	Native	1	-5
Brown Knapweed*	*Centaurea jacea*	NA	-	-	Non-native	NA	5
Bull Thistle	*Cirsium vulgare*	NA	-	-	Non-native	NA	3
Butter-and-eggs	*Linaria vulgaris*	NA	-	-	Non-native	NA	3
Calico Aster	*Symphyotrichum lateriflorum*	S5	-	-	Native	3	0
Canada Anemone	*Aneomone canadensis*	S5	-	-	Native	3	-3
Canada Goldenrod	*Solidago canadensis*	S5	-	-	Native	1	3
Canada Mayflower	*Maianthemum canadense*	S5	-	-	Native	5	0
Canada Rush	*Juncus canadensis*	S5	-	-	Native	6	-5
Canada Thistle*	*Cirsium arvense*	NA	-	-	Non-native	NA	3
Canadian Yew	*Taxus canadensis*	S4	-	-	Native	7	3
Catnip	*Nepeta cataria*	NA	-	-	Non-native	NA	3
Chicory	*Chicorium intybus*	NA	-	-	Non-native	NA	5
Choke Cherry	*Prunus virginiana*	S5	-	-	Native	2	3
Climbing Nightshade	*Solanum dulcamara*	NA	-	-	Non-native	NA	0
Cockspur Hawthorn	*Crataegus crus-galli*	S4	-	-	Native	4	0
Coltsfoot*	*Tussilago farfara*	NA	-	-	Non-native	NA	3
Common Burdock*	*Arctium minus*	NA	-	-	Non-native	NA	3
Common Buttercup*	*Ranunculus acris*	NA	-	-	Non-native	NA	0
Common Cinquefoil	*Potentilla simplex*	S5	-	-	Native	3	3

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Common Name	Scientific Name	Provincial Status (S-RANK)[1]	COSEWIC Status	COSSARO Status	Native vs Non-Native Status	Coefficient of Conservatism[2]	Wetness Coefficient[2]
Common Comfrey	*Symphytum officinale*	SE	-	-	Non-native	NA	5
Common Dandelion*	*Taraxacum officinale*	NA	-	-	Non-native	NA	3
Common Elderberry	*Sambucus nigra*	S5	-	-	Native	5	-3
Common Evening Primrose	*Oenothera biennis*	S5	-	-	Native	0	3
Common Lilac*	*Syringa vulgaris*	SE	-	-	Non-native	NA	5
Common Milkweed	*Asclepias syriaca*	S5	-	-	Native	0	5
Common Mullein*	*Verbascum thapsis*	NA	-	-	Non-native	NA	5
Common Plantain	*Plantago major*	NA	-	-	Non-native	NA	3
Common Ragweed	*Ambrosia artemisiifolia*	S5	-	-	Native	0	3
Common Reed*	*Phragmites australis*	S5	-	-	Non-native	NA	-3
Common Sow-thistle	*Sonchus oleraceus*	NA	-	-	Non-native	NA	3
Common Speedwell	*Veronica officinalis*	NA	-	-	Non-native	NA	5
Common St. Johnswort	*Hypericum perforatum*	S5	-	-	Non-native	NA	5
Common Strawberry	*Fragaria virginiana*	S5	-	-	Native	2	3
Common Three-square	*Schoenoplectus pungens*	S5	-	-	Native	6	-5
Common Timothy	*Phleum pratense*	NA	-	-	Non-native	NA	3
Common Yarrow	*Achillea millefolium*	NA	-	-	Non-native	NA	3
Creeping Bellflower	*Campanula rapunculoides*	NA	-	-	Non-native	NA	5
Crested Sedge	*Carex cristatella*	S5	-	-	Native	3	-3
Curly Dock	*Rumex crispus*	NA	-	-	Non-native	NA	0
Cyperus-like Sedge	*Carex pseudocyperus*	S5	-	-	Native	6	-5
Daisy Fleabane	*Erigeron hyssopifolius*	S5	-	-	Native	0	3
Deptford Pink	*Dianthus armeria*	NA	-	-	Non-native	NA	5
Dewberry (Dwarf Raspberry)	*Rubus pubescens*	S5	-	-	Native	4	-3
Dog Violet	*Viola conspersa*	S5	-	-	Native	3	0
Domestic Apple	*Malus pumila*	NA	-	-	Non-native	NA	5
Downy Hawthorn	*Crataegus mollis*	S4/S5	-	-	Native	4	0
Eastern Hemlock	*Tsuga canadensis*	S5	-	-	Native	7	3
Eastern White Cedar	*Thuja occidentalis*	S5	-	-	Native	4	-3
Eastern White Pine	*Pinus strobus*	S5	-	-	Native	4	3
Elecampane Flower*	*Inula helenium*	NA	-	-	Non-native	NA	3
Enchanter's Nightshade	*Circaea lutetiana ssp. canad*	S5	-	-	Native	2	3
English Hawthorn*	*Crataegus monogyna*	NA	-	-	Non-native	NA	3
English Plantain	*Plantago lanceolata*	NA	-	-	Non-native	NA	3
European (Black) Alder*	*Alnus glutinosa*	NA	-	-	Non-native	NA	-3
European Barberry	*Berberis vulgaris*	NA	-	-	Non-native	NA	3
European Beggar-ticks	*Bidens tripartita*	NA	-	-	Non-native	5	-3
European Buckthorn*	*Rhamnus cathartica*	NA	-	-	Non-native	NA	0
European Vervain	*Verbena officinalis*	NA	-	-	Non-native	NA	3
False Nettle	*Boehmeria cylindrica*	S5	-	-	Native	4	-5
False Solomon's-seal	*Maianthemum racemosum*	S5	-	-	Native	4	3
Field Horsetail	*Equisetum arvense*	S5	-	-	Native	0	0
Field Pussytoes	*Antennaria neglecta*	S5	-	-	Native	3	5
Field Sow-thistle	*Sonchus arvensis*	NA	-	-	Non-native	NA	3
Forget-me-not*	*Myosotis scorpioides*	NA	-	-	Non-native	NA	-5
Forsythia	*Forsythia sp.*	NA	-	-	non-Native	NA	NA

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Common Name	Scientific Name	Provincial Status (S-RANK)[1]	COSEWIC Status	COSSARO Status	Native vs Non-Native Status	Coefficient of Conservatism[2]	Wetness Coefficient[2]
Fowl Bluegrass	*Poa palustris*	S5	-	-	Native	5	-3
Fragrant Bedstraw	*Galium triflorum*	S5	-	-	Native	4	2
Fringed Aster	*Symphyotrichum ciliolatum*	S5	-	-	Native	6	5
Fringed Sedge	*Carex crinita*	S5	-	-	Native	6	-5
Garlic Mustard*	*Alliaria petiolata*	NA	-	-	Non-native	NA	0
Golden Willow	*Salix alba*	NA	-	-	Non-native	NA	-3
Gooseberry	*Ribes oxyacanthoides*	S5	-	-	Native	NA	3
Green Foxtail	*Setaria viridis*	NA	-	-	non-Native	NA	5
Green Sedge	*Carex viridula*	S5	-	-	Native	5	-5
Ground Ivy	*Glechoma hederacea*	NA	-	-	Non-native	NA	3
Hairy Lettuce	*Lactuca hirsuta*	S4	-	-	Native	7	5
Hairy Vetch	*Vicia hirsuta*	NA	-	-	Non-native	NA	5
Hairy Willowherb	*Epilobium hirsutum*	NA	-	-	Non-native	NA	5
Harlequin Blue Flag	*Iris versicolor*	S5	-	-	Native	5	-5
Heart-leaved Aster	*Symphyotrichum cordifolium*	S5	-	-	Native	5	5
Heath Aster	*Symphyotrichum ericoides*	S5	-	-	Native	4	3
Herb-Robert	*Geranium robertianum*	NA	-	-	Native	2	3
Horse-Chestnut	*Aesculus hippocastanum*	NA	-	-	Non-native	NA	5
Intermediate Woodfern	*Dryopteris intermedia*	S5	-	-	Native	5	0
Ironwood	*Ostrya virginiana*	S5	-	-	Native	4	3
Jewelweed	*Impatiens capensis*	S5	-	-	Native	4	-3
King Devil	*Pilosella piloselloides*	NA	-	-	Non-native	NA	5
Lady's Thumb	*Persicaria maculosa*	NA	-	-	Non-native	NA	-3
Lance-leaved Goldenrod	*Euthamia graminifolia*	S5	-	-	Native	2	0
Large-leaved Aster	*Eurybia macrophylla*	S5	-	-	Native	5	5
Late Goldenrod	*Solidago gigantea*	S5	-	-	Native	4	-3
Leafy Spurge	*Euphorbia esula*	NA	-	-	Non-native	NA	5
Manitoba Maple*	*Acer negundo*	S5	-	-	Native	0	0
Marsh Bedstraw	*Galium palustre*	S5	-	-	Native	5	-5
May-apple	*Podophyllum peltatum*	S5	-	-	Native	5	3
Meadow Fescue	*Schedonorus pratensis*	NA	-	-	Non-native	NA	3
Meadow Horsetail	*Equisetum pratense*	S5	-	-	Native	8	-3
Moneywort	*Lysimachia nummularia*	NA	-	-	Non-native	NA	-3
Mouse-ear Chickweed	*Cerastium fontanum*	S5	-	-	Non-native	NA	3
Mouse-ear Hawkweed	*Hieracium pilosella*	NA	-	-	Non-native	NA	5
Narrow-leaved Cattail*	*Typha angustifolia*	NA	-	-	Native	NA	-5
New England Aster	*Symphyotrichum novae-angli*	S5	-	-	Native	2	-3
Northern Bedstraw	*Galium boreale*	S5	-	-	Native	7	0
Northern Bush-honeysuckle	*Diervilla lonicera*	S5	-	-	Native	5	5
Northern Red Currant	*Ribes rubrum*	NA	-	-	Non-native	NA	5
Norway Maple*	*Acer platanoides*	NA	-	-	Non-native	NA	5
Orange Daylily*	*Hemerocallis fulva*	NA	-	-	Non-native	NA	5
Orange Hawkweed	*Hieracium aurantiacum*	NA	-	-	Non-native	NA	5
Orchard Grass	*Dactylis glomerata*	NA	-	-	Non-native	NA	3
Ostrich Fern	*Matteuccia struthiopteris*	S5	-	-	Native	5	0
Oxeye Daisy*	*Leucanthemum vulgare*	NA	-	-	Non-native	NA	5

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Common Name	Scientific Name	Provincial Status (S-RANK)[1]	COSEWIC Status	COSSARO Status	Native vs Non-Native Status	Coefficient of Conservatism[2]	Wetness Coefficient[2]
Panicled Aster	*Symphyotrichum lanceolatun*	S5	-	-	Native	3	-3
Peach-leaved Willow	*Salix amygdaloides*	S5	-	-	Native	6	-3
Pear	*Pyrus communis*	NA	-	-	Non-native	NA	5
Perennial Ryegrass*	*Lolium perenne*	NA	-	-	Non-native	NA	3
Periwinkle*	*Vinca minor*	NA	-	-	Non-native	NA	5
Phildelphia Fleabane	*Erigeron philadelphicus*	S5	-	-	Native	1	-3
Pin Cherry	*Prunus pensylvanica*	S5	-	-	Native	3	3
Poison Ivy	*Toxicodendron radicans*	S5	-	-	Native	2	0
Purple Loosestrife	*Lythrum salicaria*	NA	-	-	Non-native	NA	-5
Pussy Willow	*Salix discolor*	S5	-	-	Native	3	-3
Red (Green) Ash	*Fraxinus pennsylvanica*	S5	-	-	Native	3	-3
Red Baneberry	*Actaea rubra*	S5	-	-	Native	6	3
Red Clover*	*Trifolium pratense*	NA	-	-	Non-native	NA	3
Red Fescue	*Festuca rubra*	S5	-	-	Native	NA	3
Red Maple	*Acer rubrum*	S5	-	-	Native	4	0
Red Oak	*Quercus rubra*	S5	-	-	Native	6	3
Red Raspberry	*Rubus idaeus*	S5	-	-	Native	2	3
Red-osier Dogwood	*Cornus sericea*	S5	-	-	Native	2	-3
Reed Canary Grass	*Phalaris arundinacea*	S5	-	-	Native	0	-3
Rough Avens	*Geum laciniatum*	S4	-	-	Native	4	-3
Rough-fruited Cinquefoil*	*Potentilla recta*	NA	-	-	Non-native	0	5
Round-leaved Dogwood	*Cornus rugosa*	S5	-	-	Native	6	5
Round-leaved Goldenrod	*Solidago patula*	S4	-	-	Native	8	-5
Sarsaparilla	Aralia nudicaulis	S5	-	-	Native	4	3
Scotch Thistle	*Onopordum acanthium*	NA	-	-	Non-native	NA	5
Scots Pine*	*Pinus sylvestris*	NA	-	-	Non-native	NA	3
Self-heal	*Prunella vulgaris*	S5	-	-	Non-native	NA	0
Sensitive Fern	*Onoclea sensibilis*	S5	-	-	Native	4	-3
Serviceberry	Amelanchier canadensis	S5	-	-	Native	5	3
Showy Mountain-ash	*Sorbus decora*	S5	-	-	Native	8	3
Silver Maple	*Acer saccharuinum*	S5	-	-	Native	5	-3
Silverweed	Potentilla anserina	S5	-	-	Native	5	-3
Slender Willow	*Salix petiolaris*	NA	-	-	Native	3	-3
Small Bugloss	*Lycopsis arvensis*	NA	-	-	Non-native	NA	NA
Small White Aster	*Symphyotrichum lateriflorum*	S5	-	-	Native	NA	-3
Small-flowered Forget-me-not	*Myosotis stricta*	NA	-	-	Non-native	NA	5
Smooth (Awnless) Brome	*Bromus inermis*	NA	-	-	Non-native	NA	5
Soft Rush	*Juncus effusus*	S5	-	-	Native	4	-5
Soft-stemmed Bulrush	*Schoenoplectus tabernaemo.*	S5	-	-	Native	5	-5
Spotted Knapweed	*Centaurea biebersteinii*	NA	-	-	Non-native	NA	5
Staghorn Sumac	*Rhus typhina*	S5	-	-	Native	1	3
Starry False Solomon's-seal	*Maianthemum stellatum*	S5	-	-	Native	6	0
Stinging Nettle	*Urtica dioica*	NA	-	-	Non-native	2	0
Sugar Maple	*Acer saccharum*	S5	-	-	Native	4	3
Swamp Milkweed	*Asclepias incarnata*	S5	-	-	Native	6	-5
Tall Blue Lettuce	*Lactuca biennis*	S5	-	-	Native	6	0

Table 1: Plant Species List for the Study Area

Common Name	Scientific Name	Provincial Status (S-RANK)[1]	COSEWIC Status	COSSARO Status	Native vs Non-Native Status	Coefficient of Conservatism[2]	Wetness Coefficient[2]
Tall Goldenrod	*Solidago altissima*	S5	-	-	Native	1	3
Tartarian Honeysuckle*	*Lonicera tatarica*	NA	-	-	Non-native	NA	3
Teasel	*Dipsacus sylvestris*	NA	-	-	Non-native	NA	3
Trembling Aspen	*Populus tremuloides*	S5	-	-	Native	2	0
Trout-lily	*Erythronium americanum*	S5	-	-	Native	5	5
Tufted Vetch*	*Vicia cracca*	NA	-	-	Non-native	NA	5
Tussock Sedge	*Carex stricta*	S5	-	-	Native	4	-5
Twig Rush	*Cladium mariscoides*	S5	-	-	Native	9	-5
Viper's Bugloss	*Echium vulgare*	NA	-	-	Non-native	NA	5
Virginia Creeper	*Parthenocissus quinquefolia*	S4	-	-	Native	6	3
White Ash	*Fraxinus americana*	S5	-	-	Native	4	3
White Birch	*Betula papyrifera*	S5	-	-	Native	2	3
White Clover*	*Trifolium repens*	NA	-	-	Non-native	NA	3
White Elm	*Ulmus americana*	S5	-	-	Native	3	-3
White Spruce	*Picea glauca*	S5	-	-	Native	6	3
White Sweet Clover	*Melilotus albus*	NA	-	-	Non-native	NA	3
White Vervain	*Verbena urticifolia*	S5	-	-	Native	4	0
Wild Bean	*Phaseolus polystachios*	S5	-	-	Native	NA	NA
Wild Blue Phlox	*Phlox divaricata*	S4	-	-	Native	7	3
Wild Carrot*	*Daucus carota*	NA	-	-	Non-native	NA	5
Wild Cucumber	*Echinocystis lobata*	S5	-	-	Native	3	-3
Wild Grape	*Vitis riparia*	S5	-	-	Native	0	0
Wild Madder	*Galium mollugo*	NA	-	-	Non-native	NA	5
Wild Mint	*Mentha arvensis*	S5	-	-	Native	3	-3
Wild Raspberry	*Rubus occidentalis*	S5	-	-	Native	2	5
Wood Nettle	*Laportea canadensis*	S5	-	-	Native	6	-3
Wood Strawberry	*Fragaria vesca*	S5	-	-	Native	4	3
Woodland Agrimony	*Agrimonia striata*	S4	-	-	Native	3	3
Woodland Horsetail	*Equisetum sylvaticum*	S5	-	-	Native	7	-3
Wool Grass	*Scirpus cyperinus*	S5	-	-	Native	4	-5
Woundwort	*Stachys palustris*	NA	-	-	Non-native	NA	-5
Yellow Birch	*Betula alleghaniensis*	S5	-	-	Native	6	0
Yellow Goatsbeard	*Tragopogon pratensis*	NA	-	-	Non-native	NA	5
Yellow Sedge	*Carex flava*	S5	-	-	Native	5	-5

* - species marked with an asterisk are considered by various sources to be invasive in Ontario

1. Provincial Rank: S4 - Apparently Secure, S5 - Secure, NA = not applicable (non-native species)

2. Coefficients as reported by Oldham et al., 1995

Table 2: BBS Point-Count Station Characteristics

Station ID	UTM Coordinates (Centroid)[1]		Main Habitat Type
	Easting	Northing	
PC-U1	536185	4937530	Cattail Shallow Marsh
PC-U2	536670	4937275	Ash Lowland Forest, Thicket Swamp
PC-U3	536455	4937645	Cattail Shallow Marsh, Thicket Swamp
PC-U4	536515	4937455	Cultural Meadow, Cultural Thicket
PC-U5	537005	4937550	Coniferous Plantation
PC-U6	537195	4937310	Cultural Thicket, Cultural Meadow
PC-U7	537560	4937360	Cultural Thicket, Cultural Meadow
PC-U8	537555	4937705	Poplar Forest
PC-U9	537825	4937400	Ash Deciduous Swamp
PC-U10	537910	4937170	Cultural Thicket, Cultural Meadow
PC-U11	538165	4937320	Ash Deciduous Swamp
PC-L1	537585	4937740	Poplar and Lowland Ash Forest
PC-L2	537950	4937750	Maple Swamp, Aspen Forest
PC-L3	538400	4937680	Ash Lowland Forest

1 - coordinates obtained using handheld GPS, NAD83 datum. Reported to the nearest 5 m.

Table 3: Bird Species Observed within the Study Area

Species		Breeding Status		Conservation Status		
Common name	Scientific name	Parkbridge Property[1]	OBBA[2]	SRANK[3]	COSEWIC[4]	COSSARO[5]
American Crow	*Corvus brachyrhynchos*	Probable	Confirmed	S5	-	-
American Goldfinch	*Carduelis tristis*	Confirmed	Probable	S5	-	-
American Redstart	*Setophaga ruticilla*	Probable	Probable	S5	-	-
American Robin	*Turdus migratorius*	Confirmed	Confirmed	S5	-	-
American Woodcock	*Scolopax minor*	Probable	Possible	S4	-	-
Bald Eagle	*Haliaeetus leucocephalus*	Observed	Not Reported	S4	NAR	SC
Black-and-White Warbler	*Mniotilta varia*	Observed	Probable	S5	-	-
Belted Kingfisher	*Ceryle alcyon*	Possible	Possible	S5	-	-
Black-capped Chickadee	*Poecile atricapillus*	Confirmed	Confirmed	S5	-	-
Black-throated Green Warbler	*Setophaga virens*	Possible	Possible	S5	-	-
Blue Jay	*Cyanocitta cristata*	Confirmed	Confirmed	S5	-	-
Brown Creeper	*Certhia americana*	Observed	Observed	S5	-	-
Brown-headed Cowbird	*Molothrus ater*	Probable	Probable	S5	-	-
Canada Goose	*Branta canadensis*	Possible	Confirmed	S5	-	-
Canada Warbler	*Wilsonia canadensis*	Observed	Observed	S5	THR	SC
Cedar Waxwing	*Bombycilla cedrorum*	Confirmed	Probable	S5	-	-
Chestnut-sided Warbler	*Setophaga pensylvanica*	Possible	Possible	S5	-	-
Chipping Sparrow	*Spizella passerina*	Probable	Confirmed	S5	-	-
Common Grackle	*Quiscalus quiscula*	Confirmed	Confirmed	S5	-	-
Common Raven	*Corvus corax*	Possible	Possible	S5	-	-
Common (Wilson's) Snipe	*Gallinago delicata*	Possible	Not Reported	S5	-	-
Common Yellowthroat	*Geothlypis trichas*	Probable	Possible	S5	-	-
Double-crested Cormorant	*Phalacrocorax auritus*	Observed	Possible	S5	NAR	NAR
Downy Woodpecker	*Picoides pubescens*	Possible	Possible	S5	-	-
Eastern Kingbird	*Tyrannus tyrannus*	Probable	Confirmed	S4	-	-
Eastern Meadowlark	*Sturnella magna*	Probable	Confirmed	S4	THR	THR
Eastern Phoebe	*Sayornis phoebe*	Probable	Possible	S5	-	-
Eastern Towhee	*Pipilo erythrophthalmus*	Possible	Possible	S4	-	-
Eastern Wood-pewee	*Contopus virens*	Possible	Possible	S4	SC	SC
European Starling	*Sturnus vulgaris*	Probable	Confirmed	SE	-	-
Field Sparrow	*Spizella pusilla*	Possible	Possible	S4	-	-
Golden-crowned Kinglet	*Regulus satrapa*	Observed	Not Reported	S5	-	-
Gray Catbird	*Dumetella carolinensis*	Confirmed	Confirmed	S5	-	-
Great Crested Flycatcher	*Myiarchus crinitus*	Possible	Possible	S5	-	-
Hairy Woodpecker	*Picoides villosus*	Possible	Probable	S5	-	-
House Wren	*Troglodytes aedon*	Probable	Confirmed	S5	-	-
Killdeer	*Charadrius vociferus*	Possible	Confirmed	S5	-	-
Mallard	*Anas platyrhynchos*	Probable	Confirmed	S5	-	-
Mourning Dove	*Zenaida macroura*	Probable	Confirmed	S5	-	-
Mourning Warbler	*Geothlypis philadelphia*	Observed	Possible	S5	-	-
Northern Cardinal	*Cardinalis cardinalis*	Possible	Probable	S5	-	-
Northern Flicker	*Colaptes auratus*	Probable	Confirmed	S5	-	-
Northern Oriole	*Icterus galbula*	Probable	Confirmed	S5	-	-
Ovenbird	*Seiurus aurocapilla*	Possible	Probable	S5	-	-
Palm Warbler	*Dendroica palmarum*	Observed	Not Reported	S5	-	-
Pileated Woodpecker	*Dryocopus pileatus*	Possible	Probable	S5	-	-
Red-breasted Nuthatch	*Sitta canadensis*	Observed	Probable	S5	-	-
Red-eyed Vireo	*Vireo olivaceus*	Probable	Probable	S5	-	-
Red-winged Blackbird	*Agelaius phoeniceus*	Confirmed	Confirmed	S5	-	-
Ring-billed Gull	*Larus delawarensis*	Observed	Possible	S5	-	-
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	Possible	Probable	S5	-	-
Ruby-throated Hummingbird	*Archilochus colubris*	Probable	Probable	S5	-	-
Ruffed Grouse	*Bonasa umbellus*	Probable	Probable	S5	-	-
Sharp-shinned Hawk	*Accipiter striatus*	Possible	Possible	S5	-	NAR
Song Sparrow	*Melospiza melodia*	Confirmed	Confirmed	S5	-	-
Swamp Sparrow	*Melospiza georgiana*	Probable	Possible	S5	-	-
Tree Swallow	*Tachycinate bicolor*	Probable	Confirmed	S5	-	-
Turkey Vulture	*Cathartes aura*	Possible	Possible	S5	-	-
Veery	Catharus fuscescens	Probable	Possible	S5	-	-
Warbling Vireo	*Vireo gilvus*	Probable	Probable	S5	-	-
White-breasted Nuthatch	*Sitta carolinensis*	Possible	Confirmed	S5	-	-
White-throated Sparrow	*Zonotrichia albicollis*	Observed	Probable	S5	-	-
Wild Turkey	*Meleagris gallopavo*	Confirmed	Confirmed	S5	-	-
Winter Wren	*Troglodytes hiemalis*	Confirmed	Confirmed	S5		
Wood Duck	*Aix sponsa*	Possible	Probable	S5	-	-
Yellow-bellied Sapsucker	*Sphyrapicus varius*	Possible	Possible	S5	-	-
Yellow-billed Cuckoo	*Coccyzus americanus*	Possible	Possible	S4	-	-
Yellow-rumped Warbler	*Setophaga coronata*	Possible	Possible	S5	-	-
Yellow Warbler	*Setophaga petechia*	Probable	Probable	S5	-	-

1 - includes adjacent lands within 50 m of property perimeter
2 - the highest breeding status reported in the OBBA (2001-2005) for Square 17NK33
3. Provincial Rank: S4 = Apparently Secure, S5 = Secure, SE = Exotic
4. Federal Status: NAR = Not at Risk, SC = Special Concern, THR = Threatened
4. Provincial Status: NAR = Not at Risk, SC = Special Concern, THR = Threatened

Table 4a: Summary of BBS Point-Count Survey Results - Meaford Property

Species		Station Totals											Survey
Common name	**Scientific name**	**PC-U1**	**PC-U2**	**PC-U3**	**PC-U4**	**PC-U5**	**PC-U6**	**PC-U7**	**PC-U8**	**PC-U9**	**PC-U10**	**PC-U11**	**Total**
American Crow	*Corvus brachyrhynchos*											1 (1)	1 (1)
American Goldfinch	*Carduelis tristis*	3 (2)	2 (2)	9 (2)	7 (3)	2 (2)	7 (3)	6 (3)			9 (2)	1 (1)	46 (20)
American Redstart	*Setophaga ruticilla*		3 (2)	3 (2)			1 (1)				1 (1)		8 (6)
American Robin	*Turdus migratorius*	1 (1)		3 (2)		1 (1)	4 (4)	2 (2)	1 (1)	4 (2)			16 (13)
Black-capped Chickadee	*Mniotilta varia*					2 (2)	1 (1)		3 (2)				6 (5)
Blue Jay	*Cyanocitta cristata*			12 (1)		1 (1)							13 (2)
Brown-headed Cowbird	*Molothrus ater*		1 (1)		1 (1)		1 (1)						3 (3)
Cedar Waxwing	*Bombycilla cedrorum*		1 (1)		4 (2)								5 (3)
Common Grackle	*Quiscalus quiscula*			1 (1)				2 (1)					3 (2)
Common Yellowthroat	*Geothlypis trichas*	5 (4)	3 (2)		9 (4)		4 (3)			2 (1)		2 (2)	25 (16)
Downy Woodpecker	*Picoides pubescens*								1 (1)				1 (1)
Eastern Kingbird	*Tyrannus tyrannus*				1 (1)			8 (4)					9 (5)
Eastern Meadowlark	*Sturnella magna*						1 (1)						1 (1)
Eastern Phoebe	*Sayornis phoebe*	2 (2)	3 (2)	2 (2)	3 (2)		2 (2)	3 (3)			4 (2)		19 (15)
Eastern Towhee	*Pipilo erythrophthalmus*										1 (1)		1 (1)
Eastern Wood-pewee	*Contopus virens*								1 (1)				1 (1)
Field Sparrow	*Spizella pusilla*									1 (1)			1 (1)
Gray Catbird	*Dumetella carolinensis*	1 (1)		4 (3)	6 (3)					2 (2)	4 (4)	1 (1)	18 (14)
Great Crested Flycatcher	*Myiarchus crinitus*		1 (1)						2 (2)	2 (2)		1 (1)	6 (6)
Northern Cardinal	*Caridinalis cardinalis*								4 (2)				4 (2)
Northern Flicker	*Colaptes auratus*		2 (2)							1 (1)			3 (3)
Red-eyed Vireo	*Vireo olivaceus*	2 (2)	3 (2)	2 (2)					5 (4)			4 (3)	16 (13)
Red-winged Blackbird	*Agelaius phoeniceus*	8 (4)	6 (2)	9 (3)	9 (2)		4 (2)	13 (3)			3 (2)		52 (18)
Song Sparrow	*Melospiza melodia*		3 (2)	3 (2)	8 (4)		7 (4)	10 (4)		3 (2)	4 (3)	1 (1)	39 (22)
Swamp Sparrow	*Melospiza georgiana*	4 (4)											4 (4)
Tree Swallow	*Tachycinate bicolor*				6 (1)								6 (1)
White-breasted Nuthatch	*Sitta carolinensis*								1 (1)				1(1)
Wild Turkey	*Meleagris gallopavo*											1 (1)	1(1)
Yellow Warbler	*Setophaga petechia*		3 (2)	2 (1)	3 (2)		3 (2)	1 (1)			4 (3)		16 (11)
Species Count		8	12	11	11	4	11	8	8	7	9	8	29
Individual Bird Count		26	31	50	57	6	35	45	18	15	31	12	326

Summary counts herein include only those birds occurring within 100m of the centre of the point count station
Bracketed values indicate the number of survey intervals (5 minutes each, 2 per survey event) with the species present

Table 4b: Summary of BBS Point-Count Survey Results - Lower Lands

Species		Station Totals			Survey
Common name	**Scientific name**	**PC-L1**	**PC-L2**	**PC-L3**	**Total**
American Redstart	*Setophaga ruticilla*		1 (1)		1 (1)
American Robin	*Turdus migratorius*	2 (2)		2 (2)	4 (4)
Downy Woodpecker	*Picoides pubescens*			1 (1)	1 (1)
Eastern Wood-pewee	*Contopus virens*	2 (2)		1 (1)	3 (3)
Great Crested Flycatcher	*Myiarchus crinitus*			2 (2)	2 (2)
House Wren	*Troglodytes aedon*			1 (1)	1 (1)
Northern Flicker	*Colaptes auratus*	2 (2)	1 (1)		3 (3)
Red-eyed Vireo	*Vireo olivaceus*	5 (3)	8 (4)	4 (3)	18 (10)
Ruby-throated Hummmingbird	*Archilochus colubris*			1 (1)	1 (1)
Warbling Vireo	*Vireo gilvus*		1 (1)	1 (1)	2 (2)
White-breasted Nuthatch	*Sitta carolinensis*	1 (1)	2 (2)		3 (3)
Winter Wren	*Troglodytes hiemalis*	1 (1)			1 (1)
Yellow-bellied Sapsicker	*Setophaga petechia*			1 (1)	1 (1)
Species Count		6	5	9	13
Individual Bird Count		13	13	14	33

Summary counts herein include only those birds occurring within 100m of the centre of the point count station
Bracketed values indicate the number of survey intervals (5 minutes each, 2 per survey event) with the species present

Table 5: Grassland Bird Transect Results

Station ID	UTM Coordinates (Centroid)[1]		Meadowlark Observations	
	Easting	Northing	07 June	07 July
GB-1	536330	4937480	no observations	no observations
GB-2	536515	4937455	no observations	no observations
GB-3	536720	4937445	1 male - low fly-over, singing	no observations
GB-4	536930	4937435	no observations	buzz calls, 3 distinct birds
GB-5	537145	4937420	1 male - recurring ground-level singing	buzz call, single bird

1 - coordinates obtained using handheld GPS, NAD83 datum. Reported to the nearest 5 m.

Table 6: Amphibians and Reptiles Observed within the Study Area

Species		COSEWIC Status[2]	COSSARO Status[3]	"S" Rank	Preferred Breeding Habitat	Distribution and Abundance	
Common Name	**Scientific Name**					**Upper Property**	**Lower Property**
American Toad	*Anaxyrus americanus*	-	-	S5	Variety of warm, shallow waters	Only one specimen observed. No breeding vocalizations recorded.	Isolated adult specimens observed in upland habitat. No breeding vocalizations.
Green Frog	*Lithobates clamitans*	-	-	S5	Shallow permanent water	Observed and heard in isolation on various occasions, not abundant or widespread	A few adult specimens observed in standing water in maple swamp area. No egg masses or larvae.
Northern Leopard Frog	*Lithobates pipiens*	NAR	NAR	S5	Relatively permanent ponds without fish	A few adults spoecimens observed, mainly in upland locations and also Pond #4	A few isolated adult specimens observed in upland habitat, No breeding vocalizations.
Spring Peeper	*Pseudacris crucifer*	-	-	S5	Temporary woodland ponds, or swamps	Fairly widespread but isolated breeding vocalizations. No obviosu association with wetland features	Isolated and scattered vocalizations. No obvious association with wetland features
Western Chorus Frog	*Pseudacris maculata*	THR	NAR	S4	Fishless ponds with ≥10 cm of water	Occasional breeding vocalizations, especially in association with low areas beside Georgian Trailway. Not frequent or abundant.	Isolated and scattered vocalizations. No obvious association with wetland features
Wood Frog	*Lithobates sylvaticus*	-	-	S5	Vernal woodland pools	Not observed.	Isolated adult specimens observed in upland habitat. No observations in association with wetland habitat.
Midland Painted Turtle	*Chrysemys picta marginata*	SC	-	S4	Fishless ponds with ≥10 cm of water	A few adult specimens observed at Pond #4 (off property)	A few adult specimens observed at Pond #4 (off property)
Snapping Turtle	*Chelydra serpentina*	SC	SC	S4	Fishless ponds with ≥10 cm of water	adult specimen observed at Pond #4 (off property). Possible nest observed near Pond # 2	adult specimen observed at Pond #4 (off property). Possible nest observed near Pond # 2

1. Provincial Rank: S3 = Vulnerable, S4 = Apparently Secure, S5 = Secure
2. Federal Status: NAR = not at risk, THR = Threatened, SC = Special Concern
3. Provincial Status: NAR = not at risk, SC = Special Concern

Table 7: NHIC Element Occurrences (EO) in Vicinity of the Meaford Property

Common Name	Scientific Name	SRank[1]	COSSARO Status[2]	COSEWIC Status[3]	Last Observation
Lichen	*Cyphelium notarisii*	S1			7/27/1976
Eastern Milksnake	*Lampropeltis triangulum*	S4	SC	SC	6/1/1940
Eastern Ribbonsnake	*Thamnophis sauritus*	S4	SC	SC	9/7/1938
Lake Sturgeon (Great Lakes - Upper St. Lawrence River population)	*Acipenser fulvescens pop. 3*	S2	THR	THR	9/1/2010
Massasauga (Great Lakes / St. Lawrence population)	*Sistrurus catenatus*	S3	THR	THR	1975
Scarlet Beebalm	*Monarda didyma*	S3	-	-	7/20/1942
Shining-branch Hawthorn	*Crataegus magniflora*	S3	-	-	6/12/1975
Shrubby St. John's-wort	*Hypericum prolificum*	S2	-	-	8/19/1943
Smith's Bulrush	*Schoenoplectiella smithii*	S2/S3	-	-	8/19/1943

1 - Provincial Rank - S1 = Critically Imperiled, S2 = Imperiled, S3 = Vulnerable, S4 - Apparently Secure
2 - Provincial status - SC = Special Concern, THR = Threatened
3 - Federal status - SC = Special Concern, THR = Threatened
EO records obtained for NHIC 1-km squares 17NK3537, 17NK3637, 17NK3737, and 17NK3837

Table 8: Summary of Woodland Characteristics

Community Type[1]	Approximate Area (ha)[2]		Typical Canopy Characteristics		Size (DBH) Distribution[5]		
	Total	Designated "Significant"	Cover[3]	Composition[4]	<20 cm	20 cm to 35 cm	>35 cm
Treed Bluff (BLT)	1	1	50%	Aspen=Cedar>Birch	90%	10%	0%
Mixed Plantation (CUP2)	1.5	0	70%	Pine=Spruce>Walnut	90%	10%	0%
Coniferous Plantation (CUP3)	11	7	>95%	Pine>>Spruce	75%	25%	0%
Cultural Woodland (CUW1)	1	1	50%	Balsam Poplar>>Norway Maple	30%	50%	20%
Dry-Fresh Poplar Forest (FOD3-1)	10	10	85%	Aspen>>Birch>Ash	60%	30%	10%
Dry-Fresh White Ash Forset (FOD4-2)	1	1	80%	White Ash>Red Ash>Basswood	60%	25%	15%
Green Ash Lowland Forest (FOD7-2)	11	8.5	70%	Green Ash>>>Elm>Black Ash	75%	20%	5%
Fresh-moist Poplar Forest (FOD8-1)	13	12	75%	Aspen>>Ash>Elm	70%	25%	5%
White Cedar Mixed Forest (FOM7)	3	3	80%	Cedar>Aspen>Hemlock=Birch	40%	35%	25%
Green Ash Deciduous Swamp (SWD2-2)	4.5	3.5	75%	Green Ash>>Black Ash>Elm	60%	30%	10%
Silver Maple Mineral Deciduous Swamp (SWD3-2)	0.5	0.5	95%	Silver Maple>>Ash>Elm	20%	40%	30%

1 - Community type as determined through ELC following Lee et al., 1998. See Figure 4.

2 - area estimates rounded to the nearest half hectare

3 - estimate of average absolute cover of upper canopy, as per Lee et al. 1998

4 - estimate of relative abundance of tree species present in canopy, as per Lee et al., 1998

5 - estimated percentage of trees within canopy in the noted range of diameter at breast height (DBH)

Table 9: Summary of Woodland Functions

Community Type[1]	Water Protection Function	Ecological Function	
		SOCC/SAR	SWH
Treed Bluff (BLT)	no attenuation	none	none
Mixed Plantation (CUP2)	minor attenuation	none	none
Coniferous Plantation (CUP3)	minor attenuation	none	none
Cultural Woodland (CUW1)	no attenuation	none	none
Dry-Fresh Poplar Forest (FOD3-1)	minor attenuation	Eastern Wood-pewee	none
Dry-Fresh White Ash Forset (FOD4-2)	minor attenuation	none	none
Green Ash Lowland Forest (FOD7-2)	minor attenuation and recharge	Black Ash	Burrowing Crayfish Habitat
Fresh-moist Poplar Forest (FOD8-1)	moderate attenuation	none	none
White Cedar Mixed Forest (FOM7)	minor attenuation	none	Possible Eagle/Osprey Habitat
Green Ash Deciduous Swamp (SWD2-2)	minor attenuation and recharge	Black Ash	Burrowing Crayfish habitat
Silver Maple Mineral Deciduous Swamp (SWD3-2)	minor attenuation and recharge	Chorus Frog, Black Ash	Burrowing Crayfish habitat

1 - Community type as determined through ELC following Lee et al., 1998. See Figures 6 and 7.

Table 10: Summary of Wetland Characteristics and Functions

Community Type[1]	Approximate Combined Area (ha)[2]		Associated Watercourses[3]	Key Attributes
	Total	Number of distinct areas		
Cattail Shallow Marsh (MAS2-1)	3.5	3	#1, #7, #8	Dominated by invasive species. Moderate abundance and diveristy of birds, but few wetland specialist species. Beaver and muskrat present. Limited amphibian presence.
Green Ash Deciduous Swamp (SWD2-2)	4.5	6	# 4, #5	Relatively young trees. Low faunal association. Burrowing crayfish present (SWH) in Lower Property. No significant hydrological function. Subject to EAB[4].
Silver Maple Mineral Deciduous Swamp (SWD3-2)	0.5	1	#5	Relatively mature tree canopy. No meaningful associations of wetland fauna. Burrowing crayfish present (SWH). No significant hydrological function.
Mineral Thicket Swamp (SWT2-2 and 2-5)	1.5	4	#3	Small pockets associated with larger wetland areas or large expanses of Cultural thicket, No obvious functional distinction from Cutlural Thicket Habitat.

1 - Community type as determined through ELC following Lee et al., 1998 (see Figure 4)
2 - area estimates rounded to the nearest half hectare
3 - refer to Figure 3
4 - EAB = Emerald Ash Borer

Table 11: Summary of Potential Environmental Impacts - Meaford Property

Affected Feature	Potential Impact	Likelihood	Potential Significance	Limiting and Mitigating Factors[1]
Significant Woodlands	Direct loss of woodlands	Very High	Low	Approx. 25 ha of Signficant Woodlands present, with about 20 ha currently subject to direct incursion. Forest communities are young and composed of common species and lack valued characteristics (age, structure). Area of actual loss subject to other restrictions (hazard, top-of-slope set-back). Mitigation through plan modifications, TPP and compensation planting in other areas (e.g. watercourse setbacks).
	Habitat Loss/Impairment	Very High	Low	Plant and animal communities are not rare or sensitive. Habitat functions limited. Functional integrity of larger surrounding woodland block largely retained. Mitigation through construction timing, site plan considerations, and compensation planting.
	Loss/impairment of socio-economic function	Very Low	Very Low	Woodlands currently have very limited socio-economic function.
	Impaired Hydrological Function	Low	low	Hydrological function of woodlands is limitied. Absence of significant aquatic features within Property.
Wetlands	Direct loss of wetland	High	Low	Direct loss of up to 9 ha of wetlands is possible Functions and value of wetlands are relatively limited. Mitigation through site design.
	Hydrological impairment	High	Low	Volume and duration of primary flow of water into wetlands could be altered. Hydrological function of wetlands is limited. Mitigation through site design and SWM.
	Indirect Habitat Alteration/Impairment	Low	Low	Plant and animal species in wetlands are not rare or sensitive. Mitigation through set-back, construction timing, ESC, SWM and site design considerations
Aquatic Habitats	Loss or interference of water courses	Low	Low	Water courses serve limited ecological function, but may have secondary effects in regard to erosion of bluff. All watercourses are retained with adequate set-back.
	Habitat impairment/destruction	Low	High	No fish habitat found within Upper Property. Low risk of impacts to fish habitat in Georgian Bay, where SAR may occur. Need to consult with DFO for works that may be proposed along the shoreline. Mitigation through set-back, construction timing, ESC, SWM and site design considerations.
Priority Species	Direct Harm or Habitat Loss - Species at Risk (SAR)	High	High	Meadowlark (SAR) habitat is directly impacted. Consultation with MECP required to ensure compliance with ESA and associated regulations.
	Direct Harm or Habitat Loss - Species of Conservation Concern (SOCC)	Low	Low	Very limited SOCC presence within the Upper Property. Mitigation through construction timing and site design considerations
Significant Wildlife Habitat (SWH)	Direct loss or impairment of SWH	Low	Medium	No confirmed SWH presence within Upper Property. Mitigation of possible impacts to turtle wintering habitat through SWM design considerations and possibly wildlife salvage.

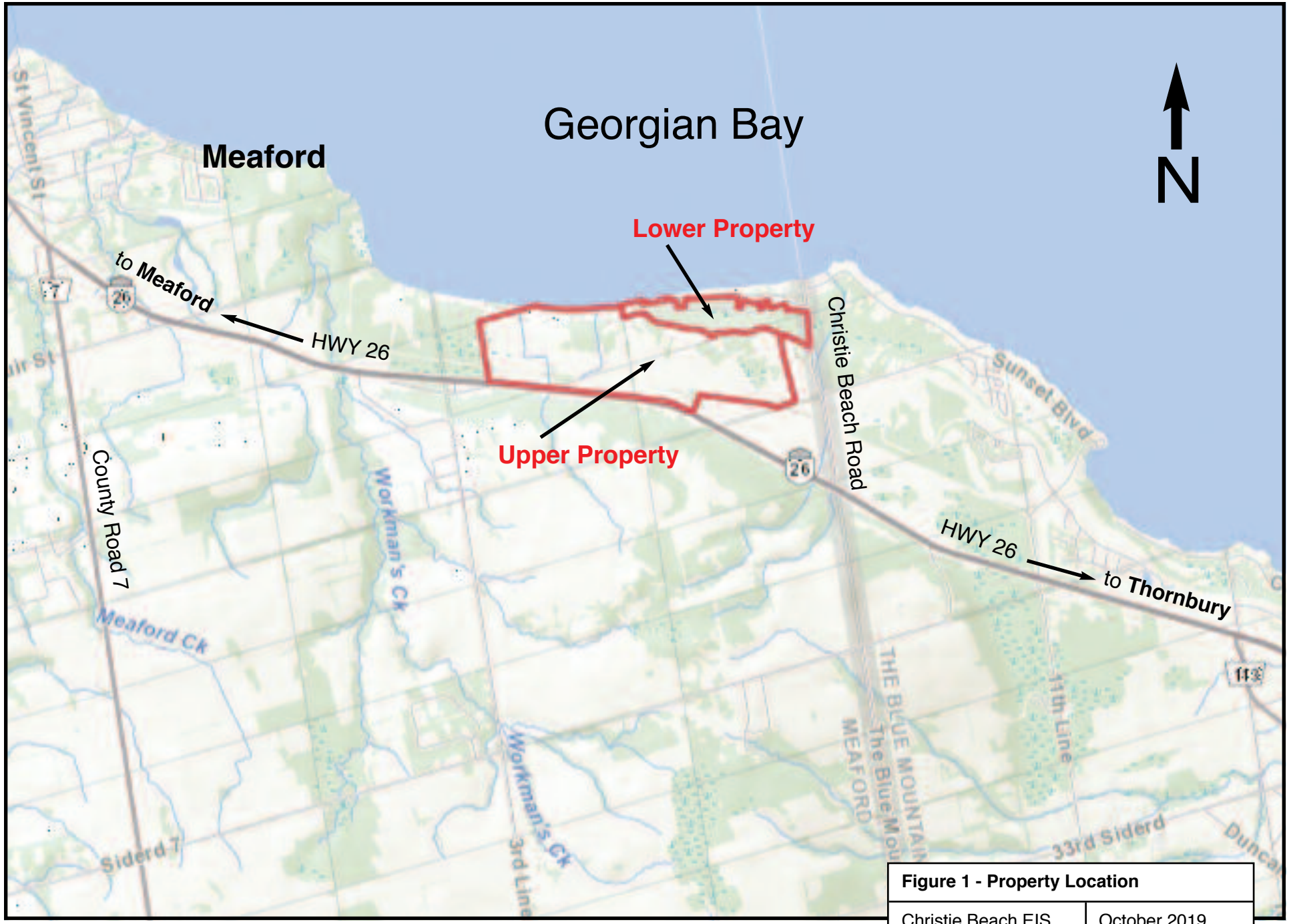
1 - ESC = erosion and sediment control, SWM = stormwater management
TPP = Tre Protection Plan, VPZ = Vegetation Protection Zone

Table 12: Summary of Potential Environmental Impacts - Lower Lands

Affected Feature	Potential Impact	Likelihood	Potential Significance	Limiting and Mitigating Factors
Significant Woodlands	Direct loss of woodlands	High	Low	Forest communities are mostly young and have limited function and value. Approx. 60% of forest within Hazard Lands. Some presence of more mature and structured forest, almost all within Hazard Land. Overall functions of larger woodland block are effectively retained. Mitigation through alignment and design details for access route.
	Habitat Loss/Impairment	High	Low	Plant and animal communities are mostly neither rare nor sensitive. Limited and localized presence of Priority Species and SWH. Mitigation through construction timing and access route design.
	Loss/impairment of socio-economic function	Very Low	Very Low	Woodlands currently have very limited socio-economic function.
	Impaired Hydrological Function	Very Low	Very Low	Hydrological function of woodlands is limited. Absence of significant aquatic features within Property.
Wetlands	Direct loss of wetland	Low	Low	Direct loss of a very small area of wetlands is possible. Wetlands exhibit evidence of SWH function. Mitigation primarily through alignment of access route.
	Hydrological impairment	Low	Low	Volume and duration of primary flow of water into wetlands could be altered. Wetlands themselves serve limited hydrological function. Mitigation through alignment and design of access route.
	Indirect Habitat Alteration/Impairment	Low	Medium	Plant and animal species generally not rare or sensitive. Limited presence of Priority Species and SWH. Mitigation primarily through alignment and design of access route.
Aquatic Habitats	Loss or interference of water courses	Low	Medium	Water courses serve limited ecological function, other than input to small wetlands. Mitigation through routing and design of access route.
	Habitat impairment/destruction	Low	Medium	No fish habitat found within Property. Low risk of impacts to fish habitat in Georgian Bay, where SAR may occur. Need to consult with DFO for works that may be proposed along the shoreline. Mitigation through construction timing and access route alignment and design.
Priority Species	Direct Harm or Habitat Loss - Species at Risk (SAR)	Low	Medium	No known presence of SAR habitat within Property. For hypothetical presence of SAR bats, mitigation through construction timing and access route alignment.
	Direct Harm or Habitat Loss - Species of Conservation Concern (SOCC)	Low	Medium	Localized presence of two SOCC (Black Ash, Eastern Wood-pewee). Mitigation through additional survey, construction timing and access route design.
Significant Wildlife Habitat (SWH)	Direct loss or impairment of SWH	Low	Medium	Localized presence of burrowing crayfish habitat, associated primarily with wetland features. Mitigation through construction timing and access route alignment and design.

1 - ESC = erosion and sediment control, SWM = stormwater management
TPP = Tre Protection Plan, VPZ = Vegetation Protection Zone

FIGURES



Approximate Property Boundary

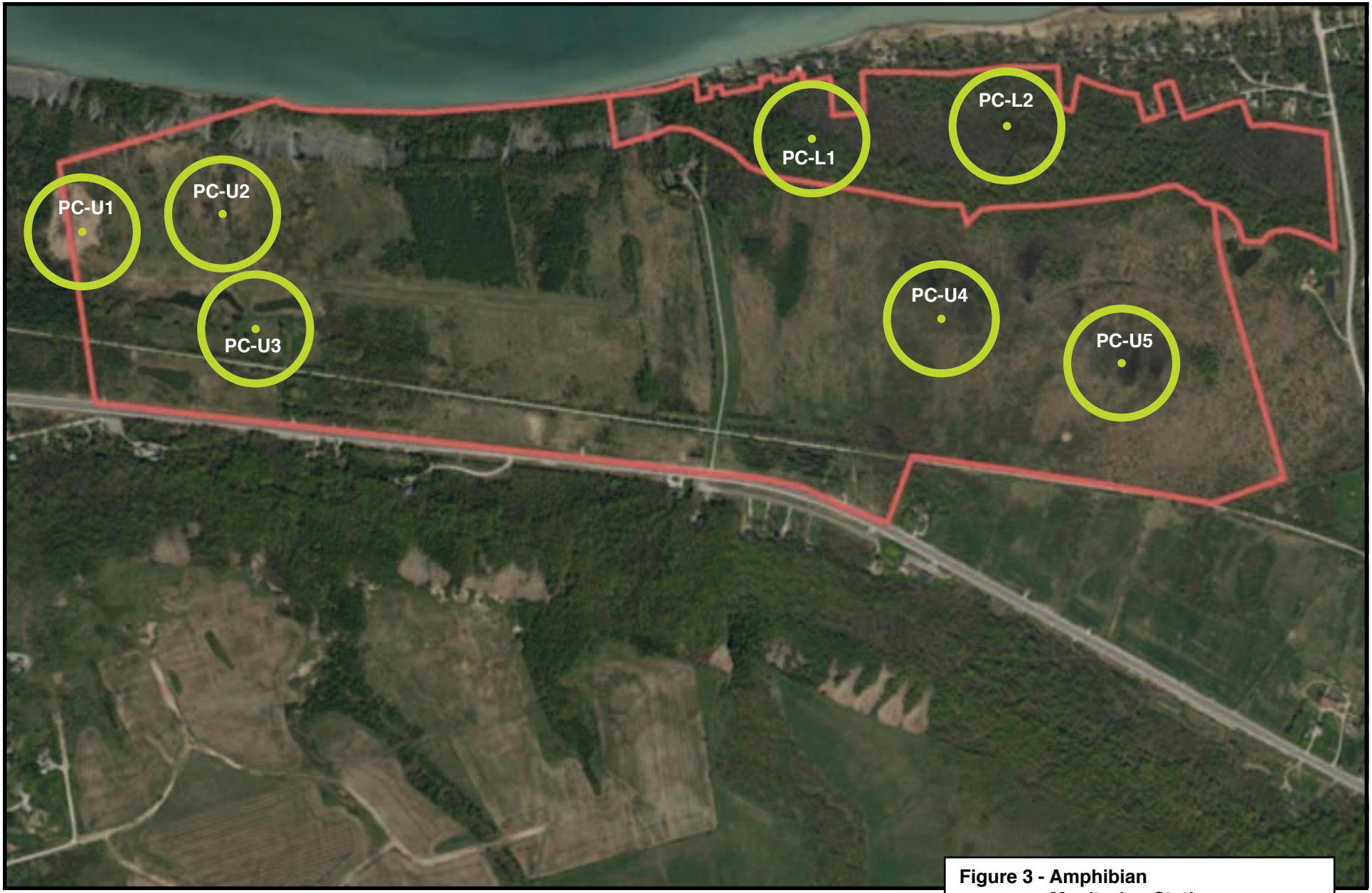
Figure 1 - Property Location	
Christie Beach EIS Project #18-07	October 2019

Point-count Stations

Grassland Bird Transect

Figure 2 - Breeding Bird Monitoring Stations

Christie Beach EIS Project #18-07	October 2019



Point-count Stations

Figure 3 - Amphibian Monitoring Stations

Christie Beach EIS Project #18-07	October 2019

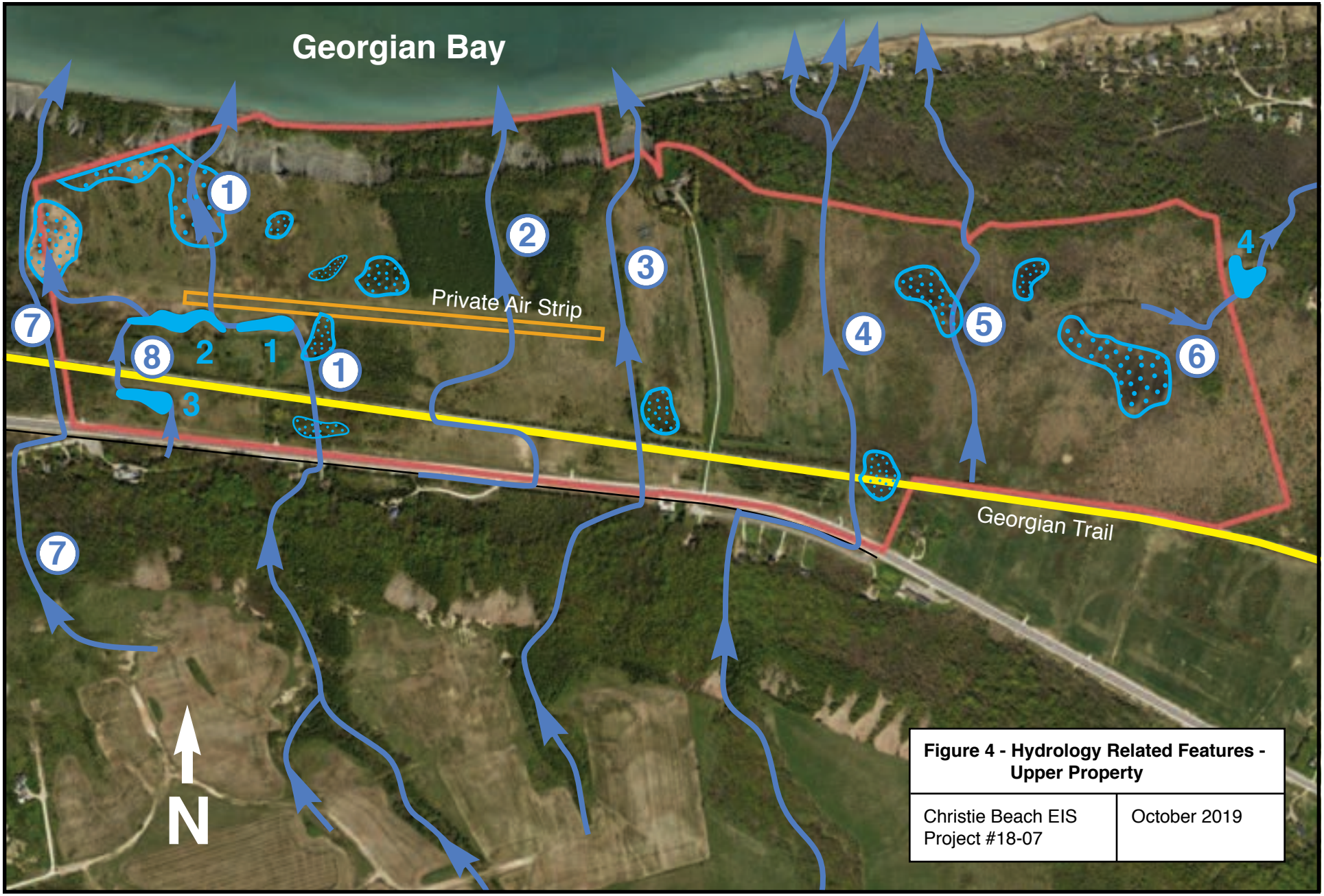


Figure 4 - Hydrology Related Features - Upper Property

Christie Beach EIS Project #18-07	October 2019

Property Boundary

Man-made Pond

Wetland

Intermittent Watercourse

Figure 5 - Hydrology Related Features - Lower Property

Christie Beach EIS Project #18-07	October 2019

Man-madePond Wetland Intermittent Watercourses Discontinuous Watercourses

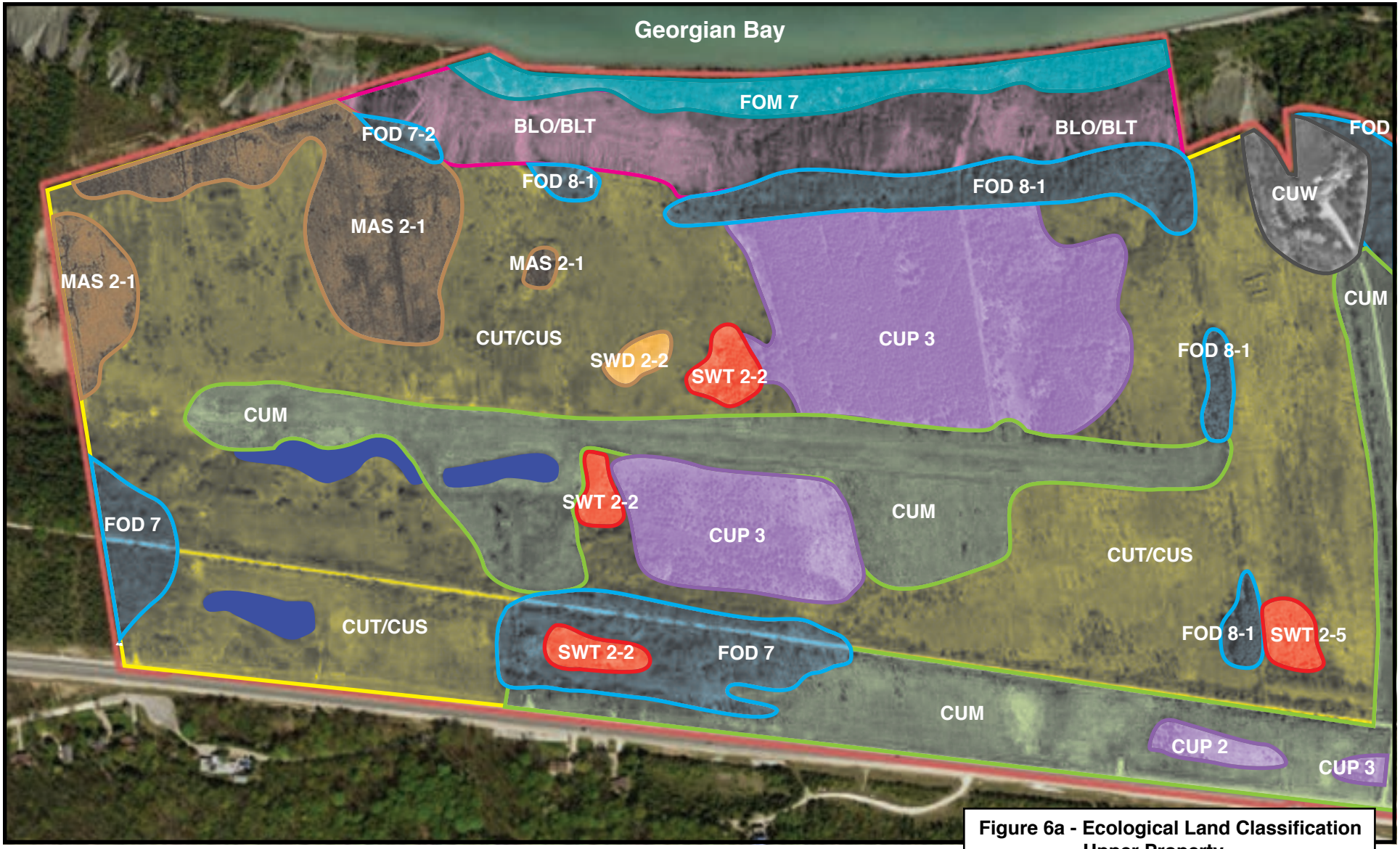


Figure 6a - Ecological Land Classification Upper Property

Christie Beach EIS Project #18-07	October 2019

- Cultural Meadow (CUM)
- Cultural Thicket/Savannah (CUT/CUS)
- Cultural Plantation (CUP)
- Deciduous Forest (FOD)
- Mineral Deciduous Swamp (SWD)
- Mineral Shallow Marsh (MAS)
- Mixed Forest (FOM)
- Mineral Open Bluff (BLO) Mineral Treed Bluff (BLT)
- Cultural Woodland (CUW)
- Mineral Thicket Swamp (SWT)

Cultural Meadow (CUM)

Deciduous Forest (FOD)

Cultural Thicket/Savannah (CUT/CUS)

Mineral Deciduous Swamp (SWD)

Cultural Plantation (CUP)

Cultural Woodland (CUW)

Figure 6b - Ecological Land Classification Upper Property

Christie Beach EIS Project #18-07	October 2019

Mineral Open Clay Bluff

Fresh-Moist White Cedar Mixed Forest

Deciduous Forest

Mineral Deciduous Swamp

Figure 7a - Ecological Land Classification Lower Property

Christie Beach EIS Project #18-07	October 2019

Mixed Forest

Mineral Deciduous Swamp

Deciduous Forest

Figure 7b - Ecological Land Classification Lower Property

Christie Beach EIS Project #18-07	October 2019

Suitable Meadowlark Habitat

Singing Male Occurrences

Figure 8 - Eastern Meadowlark Habitat and Occurrences

Christie Beach EIS Project #18-07	October 2019

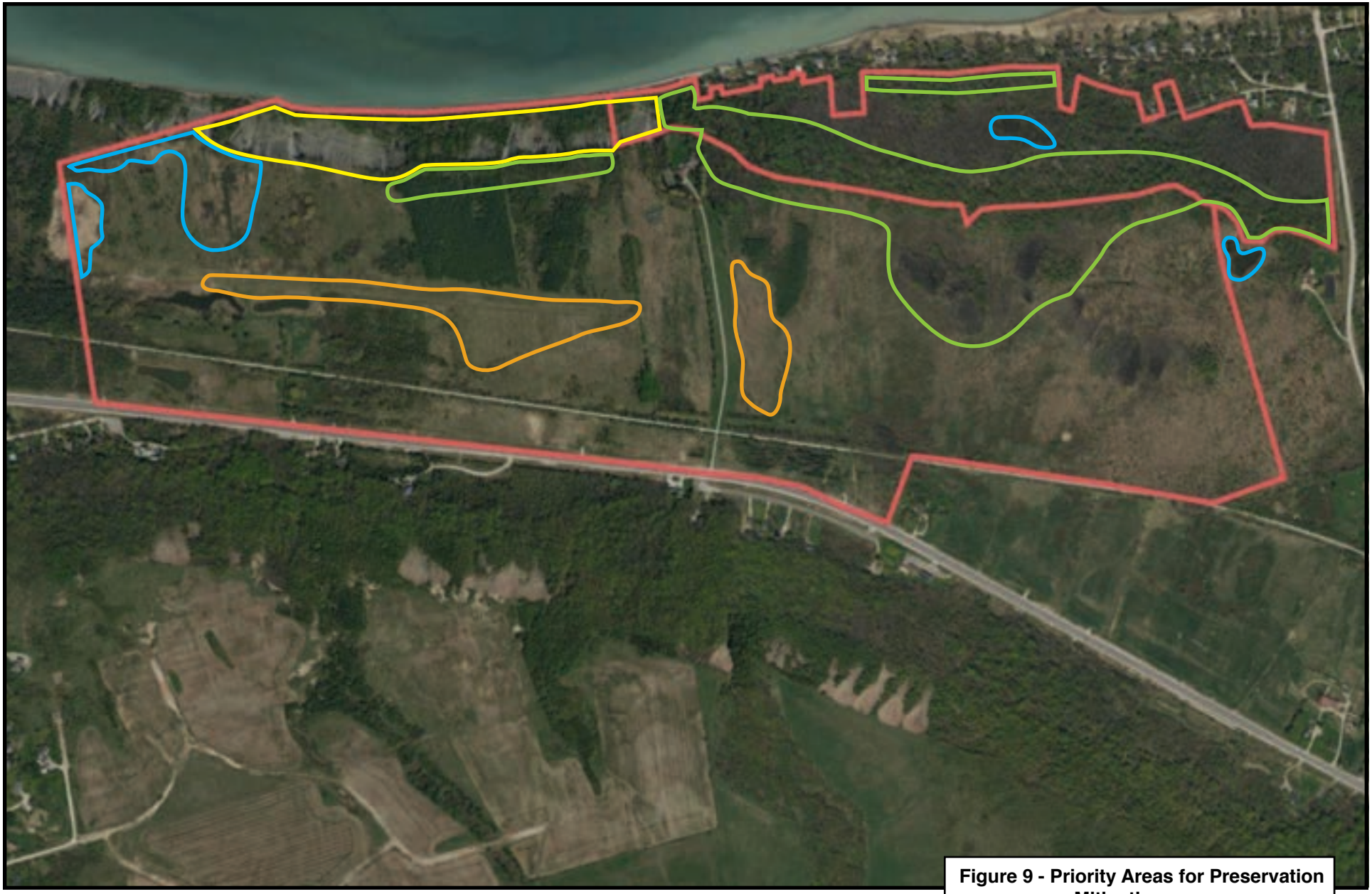


Figure 9 - Priority Areas for Preservation or Mitigation

Christie Beach EIS Project #18-07	October 2019

APPENDICES

Appendix A – Land-use and Constraint Mapping

A1 – MNRF Mapping

Ontario

Ministry of Natural Resources and Forestry

Make-a-Map: Natural Heritage Areas

MNRF Mapped Features - Parkbridge Properties

Notes: Enter map notes

Legend

Assessment Parcel
Woodland
Conservation Reserve
Provincial Park
Natural Heritage System
Ecoregion

Wetland
Provincially Significant Wetland Evaluated
Non - Provincially Significant Wetland Evaluated
Unevaluated Wetland

Area of Natural Heritage & Scientific Interest (ANSI)
Provincially Significant Life Science ANSI
Provincially Significant Earth Science ANSI

Greenbelt Plan
Boundary
River Valley Connections

Land Use Designations
Protected Countryside
Towns and Villages
Hamlets
Urban River Valley
Specialty Crop Area

Niagara Escarpment Plan (NEP)
Boundary
Parks and Open Space System

Land Use Designations
Escarpment Natural Area
Escarpment Protection Area
Escarpment Rural Area
Mineral Resource Extraction Area
Escarpment Recreation Area
Urban Area
Minor Urban Centre

Oak Ridges Moraine Conservation Plan (ORM)
Boundary

Land Use Designations
Natural Core Area
Natural Linkage Area
Countryside Area
Rural Settlement
Palgrave Estates Residential Community
Settlement Area

0.7 0 0.33 0.7 Kilometers

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Natural Resources and Forestry(OMNRF) shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.

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A2 – Grey County Mapping

Natural Heritage Features

Legend

Zoning - Chatsworth

- A1 Rural
- A2 Restricted Rural
- C1 General Commercial
- C2 Rural Commercial
- C3 Local Commercial
- EP Environmental Protection
- I Institutional
- M1 General Industrial
- M2 Rural Industrial
- M3 Extractive Industrial
- M4 Local Industrial
- OS1 Open Space 1
- OS2 Open Space 2
- R1 Rural Residential
- R2 Urban Residential
- R3 Lake Residential
- R4 Multiple Residential
- T Tent & Trailer Campground
- W Wetlands Protection
- ND No Development
- NEP Niagara Escarpment Plan

Zoning - Hanover

- R1 - Residential Type 1
- R2 - Residential Type 2
- R3 - Residential Type 3
- R4 - Residential Type 4
- R5 - Residential Type 5
- C1 - Downtown Commercial
- C2 - Corridor Commercial
- C3 - Large Format Commercial
- C4 - Restricted Commercial/Industrial
- C5 - Local Commercial
- C6 - Recreation Commercial
- M1 - Restricted Industrial
- M2 - General Industrial

Notes

1 0 0 1 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

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THIS MAP IS NOT TO BE USED FOR NAVIGATION

Landuse

Legend

Zoning - Chatsworth

- A1 Rural
- A2 Restricted Rural
- C1 General Commercial
- C2 Rural Commercial
- C3 Local Commercial
- EP Environmental Protection
- I Institutional
- M1 General Industrial
- M2 Rural Industrial
- M3 Extractive Industrial
- M4 Local Industrial
- OS1 Open Space 1
- OS2 Open Space 2
- R1 Rural Residential
- R2 Urban Residential
- R3 Lake Residential
- R4 Multiple Residential
- T Tent & Trailer Campground
- W Wetlands Protection
- ND No Development
- NEP Niagara Escarpment Plan

Zoning - Hanover

- R1 - Residential Type 1
- R2 - Residential Type 2
- R3 - Residential Type 3
- R4 - Residential Type 4
- R5 - Residential Type 5
- C1 - Downtown Commercial
- C2 - Corridor Commercial
- C3 - Large Format Commercial
- C4 - Restricted Commercial/Industrial
- C5 - Local Commercial
- C6 - Recreation Commercial
- M1 - Restricted Industrial
- M2 - General Industrial

Notes

1 0 0 1 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

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GSCA Features and Regulated Areas

Legend

- CA Boundaries
- Wet Areas - GSCA
- Wet Areas - GRCA
- Water Features
- Watercourses
- Floodplains - NVCA
- Floodplains - GRCA
- Approximate Regulated and Screen SVCA
  - Approximate Regulated Area
  - Approximate Screening Area
- Regulations - GSCA
- Regulations - NVCA

Notes

1 0 0 1 Kilometers

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A3 – GSCA Mapping

The regulated areas (151/06) shown on these maps are for demonstration purposes only and may vary from the description provided within the text of the regulation document. In the event of a conflict between the lines on these maps and the text of the regulation, the **text in the regulation will prevail**. Information made available is not intended to constitute advice nor is it to be used as a substitute for specific advice from a licensed professional. You should not act, or refrain from acting, based upon information in this site without obtaining professional advice regarding your circumstances. The information made available on this site is not intended to be used and should not be used for navigational purposes.

To verify the location of the regulated area on a specific property and for permit applicationinformation, PLEASE CONTACT ENVIRONMENTAL PLANNING STAFFat Grey Sauble Conservation (GSC). (519-376-3076)

Appendix B – Demonstration Plan

Georgian Bay

Christie Beach Conservation Area

Sunset Blvd

Fraser St

Barker St

Christie Beach Road

Bluffs

to Meaford

Georgian Trail

Old Hwy 26

HIGHWAY 26

Starlight Ln

39th Side Rd

Georgian Trail

to Thornbury

Christie Beach Road

LEGEND

- Site Boundary
- Highway 26
- Potential Road
- Georgian Trail
- Public Trail Loop
- Potential Public Trail to Water
- Environmental Area (+/- 29.2ha)
- Community Use and Village Centre (+/- 11ha)
- Residential Community (+/- 91ha)

SvN
110 Adelaide St. E.
Toronto, Canada
M5C 1K9
416.593.6499
www.svn-ap.com

Christie Beach
Parkbridge Meaford Development
Master Plan
Meaford, Ontario

Community Structure Plan

ver. 21J

January 24, 2024

A01

Community Demonstration Plan

1. Community facility
2. Village green and retail/service commercial hub
3. Georgian Trail
4. Main spine
5. Views from bluffs
6. Bluff top trail loop
7. Other community trails
8. Potential trail to water
9. Local parks
10. Stormwater ponds
11. Residents recreation

Unit Summary

Total Units	+/- 1250
Single Detached	68%
Town House	28%
Mixed Use	4%

Appendix C – Communications with GSCA

NEIL MORRIS
Consulting Ecologist

2480 Olde Baseline Rd., Caledon
Ontario, Canada. L7C 0J3
tel: (905) 838-1485
e-mail: neilpmorris@msn.com

14 June 2017

Mr. Tim Lanthier, Watershed Planner
Grey Sauble Conservation Authority
237897 Inglis Falls Road
R.R. #4
Owen Sound, ON
N4K 5N6

By E-mail

Mr. Lanthier,

Re: EIS Terms of Reference – Parkbridge Property near Meaford

This letter is submitted in regard to properties located at 207145 and 207065 Highway 26, Meaford, Ontario, hereafter referred to collectively simply as 'the Property'. The Property measures approximately 130 ha, and is situated between Hwy 26 and Georgian bay, just west of Christie Beach Road.

The purpose of this letter is to initiate the establishment of a Terms of Reference (TOR) for an Environmental Impact Study (EIS) that has now been initiated at this Property. In have recently had a brief discussion of this issue with your colleague Andrew Sorensen. Andrew had made brief comment on this file representing GSCA at a consultation meeting in Owen Sound on 20 June 2016. I believe you were on leave at this time, and Andrew has indicated that this is a file for your attention at this time. I have copied Andrew on this in the event that he will take direct interest or has specific insights to share.

This current understanding of environmental conditions at the Property is based in significant part on observations made during several site visits I have conducted at the Property from mid-April to date. It is also based in part on a review of existing databases (MNRF NHIC database, Ontario Breeding Bird Atlas database) and on-line mapping applications (Grey County GIS, MNRF Natural Heritage Mapping). The primary environmental constraints and issues for consideration in the EIS that have been identified at this time include the following:

- Wooded areas within and adjacent to the Property that are identified as Significant Woodlands, as mapped under the Grey County Official Plan (OP),
- The presence of unevaluated wetlands within and adjacent to the Property,
- The presence of six water conveyance features (streams, ditches) that traverse the property from Hwy 26 towards Georgian Bay, and
- The possible presence of Species at Risk (SAR) within or adjacent to the Property, including Eastern Meadowlark.

Reference: EIS TOR – Parkbridge Meaford

The EIS is being undertaken to address, at a minimum, the relevant Natural Heritage issues identified above.

In keeping with the expectations and specifications of the OP for the Town and County, the EIS will include the following:

(i) a description of the natural environment, including both physical form and ecological function;
(ii) summary of the development proposal;
(iii) prediction of potential direct, indirect and cumulative effects of development compared with overall environmental goals;
(iv) identification and evaluation of options to avoid impacts;
(v) identification and evaluation of options for mitigation or rehabilitation, including setbacks;
(vi) an implementation plan, and
(vii) evaluation of the need for a monitoring program.

The primary basis of analysis will be the findings of on-site surveillance targeting the features of interest. The coverage and level of detail of on-site surveillance that is proposed herein are intended to allow adequate description of the general natural environment, and also allow detailed assessment of effects on site features and functions of focused concern (i.e., Significant Woodlands, wetlands). To effectively address the identified EIS requirements, this field reconnaissance would include:

- General characterization of the physical and ecological features and functions within and immediately adjacent to the Property.
- Ecological Land Classification (ELC) of the entire Property, consistent with the standard guidance of Lee et al., 1998.
- Focused characterization of all wooded areas within and immediately adjacent to the Property, including Significant Woodlands. Characterization will include tree species composition, age and size of trees, canopy configuration, ecological function (habitat, ecological connectivity).
- Characterization of unevaluated wetland features, including direct assessment of their hydrology and habitat characteristics and ecological functions.
- Direct examination of slope/topography, conveyance features (swales, seeps), and overburden characteristics within and adjacent to the Property, to understand hydrological processes and connectivity between the Property and the wetlands.
- Direct examination of all surface water conveyance features (streams, drainage channels) in regard to their role in the hydrology of the Property, and also in regard to their ecological functions.
- Detailed plant and animal inventories with a focus on identification of possible SAR that may be present. This will include;

Reference: EIS TOR – Parkbridge Meaford

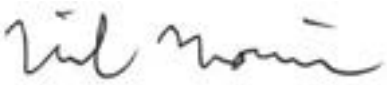
- a botanical survey, conducted throughout the spring and summer following a transect approach,
- a breeding bird survey (BBS) – 2 sessions conducted in June and/or early July following the standard point-count approach of the Ontario Breeding Bird Atlas, and also wandering surveillance throughout the Property and through the full period of study, and
- a herpetofaunal survey – 3 sessions conducted from mid-April to early July following the protocol of the Marsh Monitoring Program, and also wandering surveillance during the full period of study.

Please note that on-site monitoring of vegetation, amphibians and birds has already been initiated. Details of survey methodology and point-count stations can be provided if required to advance the development of the ToR.

This outline of EIS efforts is provided as a basis for formal development of the ToR. When your schedule permits, I am hoping to discuss your thoughts and expectations for the ToR. I am happy to meet with you in the near future at a time that is convenient for you. Please advise as to how you might be able to proceed.

In the interim, if you or other parties have any questions or concerns regarding the matter discussed herein, please do not hesitate to contact me at your convenience.

Sincerely,



Neil Morris, Consulting Ecologist
2480 Olde Baseline Rd.
Caledon, Ontario
L7C 0J3

cc via e-mail: Mr. Robert Wagner (Parkbridge)
Mr. Andrew Sorensen, GSCA

Appendix D – Detailed Ecological Monitoring Data

D1 – Detailed BBS Point-Count Results

Project:	Christie Beach EIS
Station:	PC-1
Date:	7-Jun-17
Start Time:	7:40
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Goldfinch	*Carduelis tristis*			1				1
American Robin	*Turdus migratorius*						1	1
Blue Jay	*Cyanocitta cristata*						1	1
Common Yellowthroat	*Geothlypis trichas*		1			1		2
Eastern Phoebe	*Sayornis phoebe*		1			1		2
Gray Catbird	*Dumetella carolinensis*		1					1
Northern Oriole	*Icterus galbula*						1	1
Red-winged Blackbird	*Agelaius phoeniceus*		2	1		1	1	5
Swamp Sparrow	*Melospiza georgiana*	1			1			2

Notes: Most birds associated with trees or shrubs on perimeter. Swamp sparrow occurrence in middle of cattails

species count	9
total birds	16

Project:	Christie Beach EIS
Station:	PC-2
Date:	7-Jun-17
Start Time:	6:55
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Crow	*Corvus brachyrhynchos*			1			1	2
American Redstart	*Setophaga ruticilla*		1		1	1		3
Brown-headed Cowbird	*Molothrus ater*					1		1
Great Crested Flycatcher	*Myiarchus crinitus*		1	1			1	3
Mourning Dove	*Zenaida macroura*						1	1
Northern Flicker	*Colaptes auratus*			1		1		2
Red-eyed Vireo	*Vireo olivaceus*		1		1	1		3
Song Sparrow	*Melospiza melodia*				1			1

Notes: Considerable traffic noise

species count	8
total birds	16

Project:	Christie Beach EIS
Station:	PC-3
Date:	7-Jun-17
Start Time:	6:00
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Crow	*Corvus brachyrhynchos*			1			1	2
American Goldfinch	*Carduelis tristis*				1			1
Blue Jay	*Cyanocitta cristata*	12						12
Common Grackle	*Quiscalus quiscula*				1			1
Common Yellowthroat	*Geothlypis trichas*						1	1
Eastern Phoebe	*Sayornis phoebe*		1	1		1	1	4
Gray Catbird	*Dumetella carolinensis*	1			1			2
Red-winged Blackbird	*Agelaius phoeniceus*	2	2		2	1		7
Song Sparrow	*Melospiza melodia*		2		1			3
Yellow warbler	*Setophaga petechia*	1			1			2

Notes: Canada goose occurrence consisted of a single bird calling off shore

species count	10
total birds	35

Project:	Christie Beach EIS
Station:	PC-4
Date:	7-Jun-17
Start Time:	8:11
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Goldfinch	*Carduelis tristis*		1					1
Brown-headed Cowbird	*Molothrus ater*					1		1
Common Yellowthroat	*Geothlypis trichas*	1	2		1	1		5
Eastern Phoebe	*Sayornis phoebe*		1	1		1		3
Gray Catbird	*Dumetella carolinensis*					1	1	2
Great Crested Flycatcher	*Myiarchus crinitus*						1	1
Mourning Dove	*Zenaida macroura*			1			1	2
Red-winged Blackbird	*Agelaius phoeniceus*	2	2		2	3		9
Song Sparrow	*Melospiza melodia*	1	1		1	1		4
Tree Swallow	*Tachycinate bicolor*		6					6
Yellow warbler	*Setophaga petechia*				1			1

Notes:

species count	11
total birds	35

Project:	Christie Beach EIS
Station:	PC-5
Date:	7-Jun-17
Start Time:	6:29
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Goldfinch	*Carduelis tristis*					1		1
American Robin	*Turdus migratorius*					1		1
Black-capped Chickadee	*Poecile atricapillus*		1		1			2
Blue Jay	*Cyanocitta cristata*		1					1
Great Crested Flycatcher	*Myiarchus crinitus*			1				1
Northern Oriole	*Icterus galbula*						1	1
Red-winged Blackbird	*Agelaius phoeniceus*						1	1
Song Sparrow	*Melospiza melodia*						1	1

Notes: Only 5 species were encountered or heard within the plantation habitat. Others were heard at distances >100m or were observed in overflight

species count	8
total birds	9

Project:	Christie Beach EIS
Station:	PC-6
Date:	7-Jun-17
Start Time:	7:15
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Crow	*Corvus brachyrhynchos*			1				1
American Goldfinch	*Carduelis tristis*		1					1
Blue Jay	*Cyanocitta cristata*			1				1
Common Yellowthroat	*Geothlypis trichas*		1	1			1	3
Eastern Phoebe	*Sayornis phoebe*		1		1			2
Mourning Dove	*Zenaida macroura*			2			1	3
Northern Flicker	*Colaptes auratus*			1				1
Red-winged Blackbird	*Agelaius phoeniceus*	1	1	2	1	1		6
Song Sparrow	*Melospiza melodia*		1			1		2
Wild Turkey	*Meleagris gallopavo*			1				1
Yellow warbler	*Setophaga petechia*	1	1			1		3

Notes: some interference due to traffic noise from Hwy 26

species count	11
total birds	24

Project:	Christie Beach EIS
Station:	PC-7
Date:	7-Jun-17
Start Time:	8:55
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Crow	*Corvus brachyrhynchos*			1				1
American Goldfinch	*Carduelis tristis*		1			1		2
American Redstart	*Setophaga ruticilla*			1			1	2
American Robin	*Turdus migratorius*	1						1
Eastern Kingbird	*Tyrannus tyrannus*					2		2
Eastern Phoebe	*Sayornis phoebe*		1	1		1	1	4
Northern Flicker	*Colaptes auratus*						1	1
Northern Oriole	*Icterus galbula*			1				1
Red-winged Blackbird	*Agelaius phoeniceus*		1			1	1	3
Song Sparrow	*Melospiza melodia*	2	2	2	2	1	1	10
Yellow Warbler	*Setophaga petechia*					1		1

Notes:

species count	11
total birds	28

Project:	Christie Beach EIS
Station:	PC-8
Date:	7-Jun-17
Start Time:	10:55
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Robin	*Turdus migratorius*	1						1
Downy Woodpecker	*Picoides pubescens*		1					1
Eastern Wood-pewee	*Contopus virens*					1		1
Great Crested Flycatcher	*Myiarchus crinitus*		1			1		2
Mourning Dove	*Zenaida macroura*			1				1
Northern Cardinal	*Cardinalis cardinalis*	2			2			4
Red-eyed Vireo	*Vireo olivaceus*	1		1	1			3
Yellow-bellied sapsucker	*Sphyrapicus varius*						1	1

Notes:

species count	8
total birds	14

Project:	Christie Beach EIS
Station:	PC-9
Date:	7-Jun-17
Start Time:	10:20
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
Gray Catbird	*Dumetella carolinensis*		1			1		2
Great Crested Flycatcher	*Myiarchus crinitus*		1			1		2
Northern Flicker	*Colaptes auratus*	1					1	2
Northern Oriole	*Icterus galbula*			1				1
Red-eyed Vireo	*Vireo olivaceus*			2			2	4

Notes:

species count	5
total birds	11

Project:	Christie Beach EIS
Station:	PC-10
Date:	7-Jun-17
Start Time:	9:32
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Redstart	*Setophaga ruticilla*						1	1
Common Yellowthroat	*Geothlypis trichas*						2	2
Eastern Phoebe	*Sayornis phoebe*	1	1		1	1		4
Gray Catbird	*Dumetella carolinensis*	1				1		2
Mourning Dove	*Zenaida macroura*			1			1	2
Northern Oriole	*Icterus galbula*			1			1	2
Rose-breasted Grosbeak	*Pheucticus ludovicianus*			1				1
Song Sparrow	*Melospiza melodia*		1		1			2
Warbling Vireo	*Vireo gilvus*			1			1	2
Yellow Warbler	*Setophaga petechia*	1			1	1		3

Notes:

species count	10
total birds	21

Project:	Christie Beach EIS
Station:	PC-11
Date:	7-Jun-17
Start Time:	9:51
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Crow	*Corvus brachyrhynchos*			1				1
American Goldfinch	*Carduelis tristis*					1		1
Gray Catbird	*Dumetella carolinensis*				1			1
Great Crested Flycatcher	*Myiarchus crinitus*					1		1
Red-eyed Vireo	*Vireo olivaceus*	1			1		1	3
Wild Turkey	*Meleagris gallopavo*					1		1

Notes:

species count	6
total birds	8

Project:	Christie Beach EIS
Station:	PC-1
Date:	7-Jul-17
Start Time:	8:45
Wind (Beaufort):	1
Sky:	cloudy
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Goldfinch	*Carduelis tristis*	2				1	1	4
American Robin	*Turdus migratorius*					1		1
Common Yellowthroat	*Geothlypis trichas*	1			1	1		3
Red-eyed Vireo	*Vireo olivaceus*		1			1		2
Red-winged Blackbird	*Agelaius phoeniceus*	2	1		1	1	1	6
Swamp Sparrow	*Melospiza georgiana*	1			1			2

Notes: Most activity associated with non-wetland habitat (i.e. peripheral woodlands and thickets)

species count	6
total birds	18

Project:	Christie Beach EIS
Station:	PC-2
Date:	7-Jul-17
Start Time:	9:05
Wind (Beaufort):	1
Sky:	cloudy
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Goldfinch	*Carduelis tristis*	1			1			2
Cedar Waxwing	*Bombycilla cedrorum*	1						1
Common Yellowthroat	*Geothlypis trichas*	1		1	1	1		4
Eastern Phoebe	*Sayornis phoebe*	1	1		1			3
Northern Flicker	*Colaptes auratus*	1						1
Red-winged Blackbird	*Agelaius phoeniceus*	2	1	1	1	2		7
Song Sparrow	*Melospiza melodia*		2					2
Yellow Warbler	*Setophaga petechia*	1			2			3

Notes:

species count	8
total birds	23

Project:	Christie Beach EIS
Station:	PC-3
Date:	7-Jul-17
Start Time:	9:25
Wind (Beaufort):	1
Sky:	cloudy
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Goldfinch	*Carduelis tristis*	3	2		2	2		9
American Redstart	*Setophaga ruticilla*	1	1		1			3
American Robin	*Turdus migratorius*	1	1		1			3
Gray Catbird	*Dumetella carolinensis*				2			2
Red-eyed Vireo	*Vireo olivaceus*		1			1		2
Red-winged Blackbird	*Agelaius phoeniceus*		2	1				3

Notes:

species count	6
total birds	22

Project:	Christie Beach EIS
Station:	PC-4
Date:	7-Jul-17
Start Time:	8:13
Wind (Beaufort):	1
Sky:	cloudy
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Goldfinch	*Carduelis tristis*	2	2		2			6
Black-capped Chickadee	*Poecile atricapillus*						1	1
Cedar Waxwing	*Bombycilla cedrorum*		1		3			4
Common Yellowthroat	*Geothlypis trichas*	1	1		1	1	1	5
Eastern Kingbird	*Tyrannus tyrannus*				1			1
Gray Catbird	*Dumetella carolinensis*	2			3			5
Song Sparrow	*Melospiza melodia*	1			1	2		4
Yellow Warbler	*Setophaga petechia*	2						2

Notes:

species count	8
total birds	28

Project:	Christie Beach EIS
Station:	PC-5
Date:	7-Jul-17
Start Time:	9:50
Wind (Beaufort):	1
Sky:	cloudy
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Goldfinch	*Carduelis tristis*		1				1	2
American Redstart	*Setophaga ruticilla*	1						1
American Robin	*Turdus migratorius*		1			1		2
Black-capped Chickadee	*Poecile atricapillus*					1		1
Common Yellowthroat	*Geothlypis trichas*						1	1
Northern Flicker	*Colaptes auratus*			1				1

Notes:

species count	6
total birds	8

Project:	Christie Beach EIS
Station:	PC-6
Date:	7-Jul-17
Start Time:	7:05
Wind (Beaufort):	1
Sky:	cloudy
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Goldfinch	*Carduelis tristis*	1	2	1	2	1		7
American Robin	*Turdus migratorius*		1			1		2
Brown-headed Cowbird	*Molothrus ater*		1					1
Common Yellowthroat	*Geothlypis trichas*	1	2	1	1			5
Eastern Meadowlark	*Sturnella magna*		1					1
Mourning Dove	*Zenaida macroura*						1	1
Song Sparrow	*Melospiza melodia*	1	1		2	1		5

Notes:

species count	7
total birds	22

Project:	Christie Beach EIS
Station:	PC-7
Date:	7-Jul-17
Start Time:	5:19
Wind (Beaufort):	1
Sky:	cloudy
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Crow	*Corvus brachyrhynchos*			1			1	2
American Goldfinch	*Carduelis tristis*	2	2					4
American Robin	*Turdus migratorius*		1					1
Cedar Waxwing	*Bombycilla cedrorum*						1	1
Common Grackle	*Quiscalus quiscula*					2		2
Eastern Kingbrid	*Tyrannus tyrannus*	2	1		1	2		6
Eastern Phoebe	*Sayornis phoebe*				1			1
Red-winged Blackbird	*Agelaius phoeniceus*	3	2	1	4	2	1	13
Song Sparrow	*Melospiza melodia*		1	1		2	1	5

Notes: Red-winged blackbirds very active and territorial

species count	9
total birds	35

Project:	Christie Beach EIS
Station:	PC-8
Date:	7-Jul-17
Start Time:	7:05
Wind (Beaufort):	1
Sky:	mainly cloudy
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
Black-capped Chickadee	*Poecile atricapillus*		2			1		3
Blue Jay	*Cyanocitta cristata*			1				1
Eastern Wood-pewee	*Contopus virens*						1	1
Red-eyed Vireo	*Vireo olivaceus*		1	1		1		3
White-breasted Nuthatch	*Sitta carolinensis*		1					1
Yellow-bellied sapsucker	*Sphyrapicus varius*			1			1	2

Notes:

species count	6
total birds	11

Project:	Christie Beach EIS
Station:	PC-9
Date:	7-Jul-17
Start Time:	6:40
Wind (Beaufort):	1
Sky:	mainly cloudy
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Robin	*Turdus migratorius*	2			2			4
Common Yellowthroat	*Geothlypis trichas*				2			2
Field Sparrow	*Spizella pusilla*					1		1
Mourning Dove	*Zenaida macroura*						1	1
Song Sparrow	*Melospiza melodia*	2	1		1			4

Notes:

species count	5
total birds	12

Project:	Christie Beach EIS
Station:	PC-10
Date:	7-Jul-17
Start Time:	5:50
Wind (Beaufort):	1
Sky:	cloudy
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Goldfinch	*Carduelis tristis*	2	3		3	1	1	10
American Redstart	*Setophaga ruticilla*					1		1
Eastern Kingbird	*Tyrannus tyrannus*	1						1
Eastern Towhee	*Pipilo erythrophthalmus*				1			1
Gray Catbird	*Dumetella carolinensis*		1			1	1	3
Mourning Dove	*Zenaida macroura*			1			1	2
Red-winged Blackbird	*Agelaius phoeniceus*	1	1		1			3
Song Sparrow	*Melospiza melodia*					2		2
Yellow Warbler	*Setophaga petechia*	1						1

Notes:

species count	9
total birds	24

Project:	Christie Beach EIS
Station:	PC-11
Date:	7-Jul-17
Start Time:	6:20
Wind (Beaufort):	1
Sky:	mainly cloudy
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Crow	*Corvus brachyrhynchos*		1	1			2	4
Blue Jay	*Cyanocitta cristata*			1			1	2
Common Yellowthroat	*Geothlypis trichas*		1			1		2
Red-eyed Vireo	*Vireo olivaceus*	1	1					2
Song Sparrow	*Melospiza melodia*		1					1

Notes: Most activity external to swamp perimeter

species count	5
total birds	11

Project:	Lower Beachlands EIS
Station:	PC-1
Date:	12-Jun-18
Start Time:	7:25
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Crow	*Corvus brachyrhynchos*						1	1
House Wren	*Troglodytes aedon*			1			1	2
Northern Flicker	*Colaptes auratus*	1				1		2
Red-eyed Vireo	*Vireo olivaceus*		1				2	3
Song Sparrow	*Melospiza melodia*						1	1
White-breasted Nuthatch	*Sitta carolinensis*		1					1

House Wren and Song Sparrow in close proximity to woodland edge adjacetn to road

species count	6
total birds	10

Project:	Lower Beachlands EIS
Station:	PC-2
Date:	12-Jun-18
Start Time:	7:11
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Redstart	*Setophaga ruticilla*				1			1
Eastern Wood-pewee	*Contopus virens*			1			1	2
Northern Flicker	*Colaptes auratus*	1						1
Red-eyed Vireo	*Vireo olivaceus*	1			1			2
White-breasted Nuthatch	*Sitta carolinensis*		1			1		2
Wild Turkey	*Meleagris gallopavo*			1				1

Turkey call coming from direction of top of wooded slope to the south

Pewee call from location to the west of PC2

species count	6
total birds	9

Project:	Lower Beachlands EIS
Station:	PC-3
Date:	12-Jun-18
Start Time:	6:45
Wind (Beaufort):	0
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Robin	*Turdus migratorius*		1			1	1	3
Downy Woodpecker	*Picoides pubescens*				1			1
Great Crested Flycatcher	*Myiarchus crinitus*		1			1		2
Red-eyed Vireo	*Vireo olivaceus*	1	1		1		1	4

Red-eyed vireo call loud and persistent, creating some auditory interference

species count	4
total birds	10

Project:	Lower Beachlands EIS
Station:	PC-1
Date:	5-Jul-18
Start Time:	6:05
Wind (Beaufort):	0-1
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Robin	*Turdus migratorius*		1		1			2
Eastern Wood-pewee	*Contopus virens*	1			1			2
Northern Flicker	*Colaptes auratus*			1				1
Red-eyed Vireo	*Vireo olivaceus*		1	1	1	1		4
Winter Wren	*Troglodytes hiemalis*					1		1

species count	5
total birds	10

Project:	Lower Beachlands EIS
Station:	PC-2
Date:	5-Jul-18
Start Time:	6:31
Wind (Beaufort):	0-1
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
Blue Jay	*Cyanocitta cristata*						1	1
House Wren	*Troglodytes aedon*			1			1	2
Mourning Dove	*Zenaida macroura*						1	1
Red-eyed Vireo	*Vireo olivaceus*	1	2		1	2		6
Warbling Vireo	*Vireo gilvus*		1					1

species count	5
total birds	11

Project:	Lower Beachlands EIS
Station:	PC-3
Date:	5-Jul-18
Start Time:	6:48
Wind (Beaufort):	0-1
Sky:	clear
Observer:	Neil Morris

Species		First 5 minutes			Second 5 minutes			
Common name	**Scientific name**	0 - 50 m	50 - 100 m	>100 m	0 - 50 m	50 - 100 m	>100 m	Total
American Crow	*Corvus brachyrhynchos*			2			1	3
Eastern Wood-pewee	*Contopus virens*		1					1
Great Crested Flycatcher	*Myiarchus crinitus*			1				1
House Wren	*Troglodytes aedon*					1		1
Red-eyed Vireo	*Vireo olivaceus*					1		1
Ruby-throated Hummingbird	*Archilochus colubris*	1						1
Warbling Vireo	*Vireo gilvus*		1				1	2
Yellow-bellied sapsucker	*Sphyrapicus varius*		1					1

species count	8
total birds	11

Appendix E – Additional Information

Ontario Breeding Bird Atlas (OBBA) Data

Atlas summary: Species list for square 17nk33

Species		SRank[1]	COSEWIC Status[2]	COSSAO Status[2]	OBBA Breeding Status - Square 17NK33
American Bittern	*Botaurus lentiginosus*	S4			Probable
American Crow	*Corvus brachyrhynchos*	S5			Confirmed
American Goldfinch	*Spinus tristis*	S5			Probable
American Kestrel	*Falco sparverius*	S4			Confirmed
American Redstart	*Setophaga ruticilla*	S5			Probable
American Robin	*Turdus migratorius*	S5			Confirmed
American Woodcock	*Scolopax minor*	S4			Possible
Baltimore Oriole	*Icterus galbula*	S4			Confirmed
Bank Swallow	*Riparia riparia*	S4	THR	THR	Confirmed
Belted Kingfisher	*Megaceryle alcyon*	S4			Possible
Black-and-white Warbler	*Mniotilta varia*	S5			Possible
Black-capped Chickadee	*Poecile atricapillus*	S5			Confirmed
Black-throated Blue Warbler	*Setophaga caerulescens*	S5			Possible
Black-throated Green Warbler	*Setophaga virens*	S5			Possible
Blue Jay	*Cyanocitta cristata*	S5			Confirmed
Blue-winged Teal	*Anas discors*	S4			Possible
Bobolink	*Dolichonyx oryzivorus*	S4	THR	THR	Probable
Brown Thrasher	*Toxostoma rufum*	S4			Probable
Brown-headed Cowbird	*Molothrus ater*	S4			Probable
Canada Goose	*Branta canadensis*	S5			Confirmed
Cedar Waxwing	*Bombycilla cedrorum*	S5			Probable
Chestnut-sided Warbler	*Setophaga pensylvanica*	S5			Possible
Chimney Swift	*Chaetura pelagica*	S4	THR	THR	Probable
Chipping Sparrow	*Spizella passerina*	S5			Confirmed
Clay-colored Sparrow	*Spizella pallida*	S4			Probable
Cliff Swallow	*Petrochelidon pyrrhonota*	S4			Confirmed
Common Grackle	*Quiscalus quiscula*	S5			Confirmed
Common Loon	*Gavia immer*	S5	NAR	NAR	Probable
Common Merganser	*Mergus merganser*	S5			Confirmed
Common Nighthawk	*Chordeiles minor*	S4	SC	SC	Possible
Common Raven	*Corvus corax*	S5			Possible
Common Yellowthroat	*Geothlypis trichas*	S5			Possible
Downy Woodpecker	*Picoides pubescens*	S5			Possible
Eastern Bluebird	*Sialia sialis*	S5	NAR	NAR	Confirmed
Eastern Kingbird	*Tyrannus tyrannus*	S4			Confirmed
Eastern Meadowlark	*Sturnella magna*	S4	THR	THR	Confirmed
Eastern Phoebe	*Sayornis phoebe*	S5			Possible
Eastern Screech-Owl	*Megascops asio*	S4	NAR	NAR	Possible
Eastern Towhee	*Pipilo erythrophthalmus*	S4			Possible
Eastern Wood-Pewee	*Contopus virens*	S4	SC	SC	Possible
European Starling	*Sturnus vulgaris*	SNA			Confirmed
Field Sparrow	*Spizella pusilla*	S4			Possible
Golden-winged Warbler	*Vermivora chrysoptera*	S4	THR	SC	Possible
Gray Catbird	*Dumetella carolinensis*	S4			Confirmed
Great Crested Flycatcher	*Myiarchus crinitus*	S4			Possible
Great Horned Owl	*Bubo virginianus*	S4			Confirmed
Green Heron	*Butorides virescens*	S4			Confirmed
Hairy Woodpecker	*Picoides villosus*	S5			Possible
Henslow's Sparrow	*Ammodramus henslowii*	SH	END	END	Possible
Herring Gull	*Larus argentatus*	S5			Confirmed
Horned Lark	*Eremophila alpestris*	S5			Possible
House Finch	*Haemorhous mexicanus*	SNA			Confirmed
House Sparrow	*Passer domesticus*	SNA			Confirmed
House Wren	*Troglodytes aedon*	S5			Confirmed
Indigo Bunting	*Passerina cyanea*	S4			Probable

Species		SRank[1]	COSEWIC Status[2]	COSSAO Status[2]	OBBA Breeding Status - Square 17NK33
Killdeer	*Charadrius vociferus*	S5			Confirmed
Least Flycatcher	*Empidonax minimus*	S4			Probable
Magnolia Warbler	*Setophaga magnolia*	S5			Possible
Mallard	*Anas platyrhynchos*	S5			Confirmed
Marsh Wren	*Cistothorus palustris*	S4			Possible
Merlin	*Falco columbarius*	S5	NAR	NAR	Confirmed
Mourning Dove	*Zenaida macroura*	S5			Confirmed
Mourning Warbler	*Geothlypis philadelphia*	S4			Possible
Nashville Warbler	*Oreothlypis ruficapilla*	S5			Possible
Northern Cardinal	*Cardinalis cardinalis*	S5			Probable
Northern Flicker	*Colaptes auratus*	S4			Confirmed
Northern Harrier	*Circus hudsonius*	S4	NAR	NAR	Possible
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	S4			Confirmed
Ovenbird	*Seiurus aurocapilla*	S4			Possible
Pileated Woodpecker	*Dryocopus pileatus*	S5			Probable
Purple Finch	*Haemorhous purpureus*	S4			Probable
Purple Martin	*Progne subis*	S3,S4			Confirmed
Red-breasted Nuthatch	*Sitta canadensis*	S5			Probable
Red-eyed Vireo	*Vireo olivaceus*	S5			Probable
Red-tailed Hawk	*Buteo jamaicensis*	S5	NAR	NAR	Probable
Red-winged Blackbird	*Agelaius phoeniceus*	S4			Confirmed
Ring-billed Gull	*Larus delawarensis*	S5			Possible
Rock Pigeon	*Columba livia*	SNA			Confirmed
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S4			Probable
Ruby-throated Hummingbird	*Archilochus colubris*	S5			Probable
Ruffed Grouse	*Bonasa umbellus*	S4			Probable
Savannah Sparrow	*Passerculus sandwichensis*	S4			Probable
Scarlet Tanager	*Piranga olivacea*	S4			Possible
Sedge Wren	*Cistothorus platensis*	S4	NAR	NAR	Possible
Sharp-shinned Hawk	*Accipiter striatus*	S5	NAR	NAR	Possible
Song Sparrow	*Melospiza melodia*	S5			Confirmed
Spotted Sandpiper	*Actitis macularius*	S5			Probable
Swamp Sparrow	*Melospiza georgiana*	S5			Possible
Tree Swallow	*Tachycineta bicolor*	S4			Confirmed
Turkey Vulture	*Cathartes aura*	S5			Possible
Upland Sandpiper	*Bartramia longicauda*	S4			Possible
Veery	*Catharus fuscescens*	S4			Possible
Vesper Sparrow	*Pooecetes gramineus*	S4			Possible
Virginia Rail	*Rallus limicola*	S5			Possible
Warbling Vireo	*Vireo gilvus*	S5			Probable
Whip-poor-will	*Antrostomus vociferus*	S4	THR	THR	Possible
White-breasted Nuthatch	*Sitta carolinensis*	S5			Confirmed
White-throated Sparrow	*Zonotrichia albicollis*	S5			Probable
Wild Turkey	*Meleagris gallopavo*	S5			Confirmed
Winter Wren	*Troglodytes hiemalis*	S5			Confirmed
Wood Duck	*Aix sponsa*	S5			Probable
Wood Thrush	*Hylocichla mustelina*	S4	THR	SC	Possible
Yellow Warbler	*Setophaga petechia*	S5			Probable
Yellow-bellied Sapsucker	*Sphyrapicus varius*	S5			Possible
Yellow-rumped Warbler	*Setophaga coronata*	S5			Possible

1 - SH = Possibly Extirpated, S3 = Vulnerable, S4 = Apparently Secure, S5 = Secure
2 - NAR = Not at Risk, SC = Special Concern, THR = Threatened, END = Endangered

Environment Canada Precipitation Data

Environment Canada - Precipitation (mm) - Thornbury 3 Station

Month	2017	2018	2019	Normal (1981 - 2010)
January	156.2	93.4	123.2	100
February	108.2	99	99.4	68.4
March	58.9	32.8	87.1	64
April	141	127.8	168.9	65.3
May	118.8	50.8	122	82.7
June	178.9	47.2	71.6	79.1
July	83.3	85.9	59.4	72.1
August	91.8	114.8	38.9	78.2
September	94.5	78.5	94.7	95.9
October	109	131.8	NA	87.3
November	86.2	120	NA	99.6
December	191.3	96.3	NA	99.4
Annual Total	1418.1	1078.3	865.2	992

Thornbury monthly data for station "Thornbury 3", operative since 2006
1981-2010 Normal Data for Thornbury from "Thornbury Slama", discontinued in 2005.

Season	2017	2018	2019	Normal
Winter (Jan-Mar)	323.3	225.2	309.7	232.4
Spring (Apr-Jun)	438.7	225.8	362.5	227.1
Summer (July-Sept)	269.6	279.2	193	246.2
Fall (Oct-Dec)	386.5	348.1	NA	286.3