Environmental Impact Study

46 Stevens Road Development

Kaitlin Corporation

24 June 2022

→ The Power of Commitment

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Contents

Table index

Figure index

Appendices

1. Introduction

1.1 Background

GHD Limited has been retained by the Kaitlin Corporation to complete an Environmental Impact Study (EIS) for a proposed development in the Municipality of Clarington (MOC). The proposed development is located adjacent to the Natural Heritage System which lies to the north, east, and south, in association with the Bowmanville Creek valley. Due to the presence of these sensitive natural features, the Municipality of Clarington requires an Environmental Impact Study to accompany the development application.

It should be noted that some of the field work for this project was completed in 2018 when Niblett Environmental Associates Inc. (NEA, now GHD Limited) was retained at that time to complete the EIS. However, the EIS was not fully completed as planning applications were not submitted at that time. Additional surveys in 2021 were required to obtain all the necessary up-to-date information to complete the EIS.

The current planning application submission is for the construction of 11 townhouses, two assisted care buildings (7 storey and 8 storey, respectively, a three storey central amenity building, a 10 storey seniors condominium along with associated infrastructure (e.g., roads, landscaped areas).

1.2 Location and Study Area

The property is located at 46 Stevens Road in the Town of Bowmanville, Region of Durham. Situated north of Highway 2 and East of Durham Regional Road 57, the property is a mixture of open field and wooded ravine. Some remains of a past single family dwelling were found on the site.

1.3 Scope and limitations

This report: has been prepared by GHD for Kaitlin Corporation and may only be used and relied on by Kaitlin Corporation for the purpose agreed between GHD and Kaitlin Corporation as set out in section 1 of this report.

GHD otherwise disclaims responsibility to any person other than Kaitlin Corporation arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

1.4 Study Rationale

This section identifies federal, provincial and other regulatory legislation, policies, official plans (OPs) and official plan amendments that are applicable and relevant to the study area and the immediate vicinity. This includes policies that triggered the study. These documents may identify Species at risk, natural features and habitats or other features relevant to this study.

1.4.1 Federal Legislation

1.4.1.1 Fisheries Act

The purpose of the Fisheries Act, Fish and Fish Habitat Program is to help conserve and protect fisheries and aquatic ecosystems. Specifically, the fish and fish habitat protection provisions are intended to prevent the death of fish or the harmful alternation, disruption or destruction of fish habitat from projects taking place in and around fish habitat. In addition, the Act administers relevant provisions of the federal Species at Risk Act.

If a project has the potential to cause the death of fish, harmful alteration, disruption or destruction of fish habitat than an authorization is required from the Minister of Fisheries and Oceans as per Paragraph 34.4(2)(b) or 35(2)(b) of the Fisheries Act Regulations.

1.4.1.2 Migratory Birds Convention Act

The purpose of the Migratory Birds Convention Act (MBCA 1994) is to implement the Convention by protecting and conserving migratory birds — as populations and individual birds — and their nests.

No work is permitted to proceed that would result in the destruction of active nests (i.e., nests with eggs or young birds) or the wounding or killing of bird species protected under the MBCA and/or Regulations under that Act.

1.4.2 Provincial Legislation

1.4.2.1 Endangered Species Act, 2007

The purposes of the Ontario Endangered Species Act (ESA 2007) are to:

1. To identify species at risk based on the best available scientific information, including information obtained from community knowledge and aboriginal traditional knowledge;
2. To protect species that are at risk and their habitats, and to promote the recovery of species that are at risk;
3. To promote stewardship activities to assist in the protection and recovery of species that are at risk. 2007, c. 6, s. 1. (Government of Ontario, 2019)

The ESA clearly defines the five classifications of species status as extinct, extirpated, endangered, threatened, or special concern, and provides guidelines on the process of species status determination.

Regulations made under this Act include: Ontario Regulation 230/08 and 242/08. Ontario Regulation 230/08 provides the list of Species at Risk (SAR) in Ontario, which is updated regularly. This list was most recently consolidated on August 1, 2018 (Government of Ontario, 2018). Species status provided in the list is assessed by an independent body, the Committee on the Status of Species at Risk in Ontario (COSSARO), based on the best-available science and Aboriginal Traditional Knowledge.

General habitat protection is afforded to all species listed as endangered or threatened. General habitat descriptions are technical, science-based documents that have been developed for some of the species that are most likely to be affected by human activity (Government of Ontario 2020). Further information including a Recovery Strategy or Management Plan is required for each listed species, on a timeline dictated by the species status.

Ontario Regulation 242/08 explains possible exemptions to the ESA and details on how the purpose of the ESA is to be carried out.

1.4.2.2 Provincial Policy Statement, 2020

The Provincial Policy Statement, 2020 (PPS) is the statement of the Ontario government’s policies on land use planning. It applies province-wide (in the province of Ontario) and provides provincial policy direction on land use planning. Municipalities use the PPS to develop their official plans and to guide and inform decisions on other planning

matters. The PPS is issued under Section 3 of the Planning Act and all decisions affecting land use planning matters 'shall be consistent with' the Provincial Policy Statement (Government of Ontario, 2020).

Portions of Sections 2.1.4-2.1.8 of the Provincial Policy Statement (PPS 2020) apply to this project.

2.1.4 Development and site alteration shall not be permitted in:

a. significant wetlands in Ecoregions 5E, 6E and 7E1; and

b. significant coastal wetlands.

2.1.5 Development and site alteration shall not be permitted in:

a. significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E;

b. significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);

c. significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);

d. significant wildlife habitat;

e. significant areas of natural and scientific interest; and

f. coastal wetlands in Ecoregions 5E, 6E and 7E1 that are not subject to policy unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

2.1.6 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.

2.1.7 Development and site alteration shall not be permitted in the habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.

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

1.4.2.3 A Place to Grow: Growth Plan for the Greater Golden Horseshoe

A Place to Grow: Growth Plan for the Greater Golden Horseshoe 2020 came into effect on August 28th, 2020, replacing the Growth Plan for the Greater Golden Horseshoe 2019 (Government of Ontario 2019b). The Growth Plan for the Greater Golden Horseshoe 2020 (herein referred to as GPGGH 2020) is a strategic, long-range, comprehensive, and integrated approach to guide future growth in Ontario. It includes planning for infrastructure, land use, economic development, and population health (Government of Ontario 2019b).

The Natural Heritage System (NHS) for the GPGGH 2020 excludes lands within settlement area boundaries that were approved and in effect as of July 1, 2020. As a result, the NHS-related policies of the GPGGH 2020 do not apply to the subject property.

1.4.3 Local and Other Regulatory Bodies

1.4.3.1 Durham Region Official Plan (2017)

The Durham Regional Official Plan designates the subject property as Regional Center and Major Open Space Areas within the Urban Area Boundary in the context of Regional Structure (Schedule A, Map A5).

No environmental features or designations are associated with this area in the Regional Official Plan.

1.4.3.2 Municipality of Clarington Official Plan and OPA 107 (June 2018)

The study area is located within the Bowmanville Urban Area. The Land Use Map for the Bowmanville Urban Area (Map A3) indicates that the central portion of the subject property is part of the Urban Residential Area and the eastern portion of the property (valley and creek) is designated as Environmental Protection (EP).

Environmental features and designations outlined in the Official Plan (OP) that trigger the need for an EIS include the Environmental Protection land use designation (Map A3) and presence of a watercourse. It appears that the property abuts the Natural Heritage System designated in the Official Plan (Map D1) and the eastern most area designated as Flood Plain (Map F1).

According to the Municipality of Clarington's Official Plan, Natural Heritage System (NHS) means:

> *a system made up of natural heritage features and areas, hydrologically sensitive features and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. These systems can include natural heritage features and areas, hydrologically sensitive features, lands that have been restored to a natural state, areas that support hydrologic functions, and working landscapes that enable ecological functions to continue (p. 189).*

Section 3.1 clearly states the goals "To protect and enhance the natural heritage system and its ecological integrity; and to promote responsible stewardship of the natural heritage system and wise use of natural resources in order to provide long term and sustainable environmental, economic and social benefits."

Table 3-1 identifies that the minimum vegetation protection zones (VPZ) for Natural Heritage System features within the urban settlement area. The VPZs relevant to this project are:

- 15 m from the meander belt width for watercourses;
- 15 m from the stable top of bank for valleylands;
- 30 m from the outer extent of wetlands.

As stated in Section 3.4. 7, If more than one natural heritage system feature is identified on the subject lands, the provisions of Table 3-1 that are more restrictive apply.

Section 3.4.15 requires the preparation of an Environmental Impact Study for development proposed adjacent to these natural features:

An Environmental Impact Study, a Natural Heritage Evaluation and/or Hydrological Evaluation shall be undertaken for any development or site alteration proposed within the minimum area of influence of any natural heritage feature and/or hydrologically sensitive feature identified in Section 3.4.2, 3.4.3 or 3.4.11 but outside the feature itself and the related minimum vegetation protection zone identified in Table 3-1 of this Plan.

1.4.3.3 Central Lake Ontario Conservation Authority and Ontario Regulation 42/06

The Conservation Authority whose jurisdiction the study area falls under is Central Lake Ontario Conservation Authority. Under the Conservation Authorities Act, Ontario Regulation 42/06, *Regulation of Development Interference with Wetlands and Alterations to Shorelines and Watercourses* is applicable. Specifically, under this regulation, CLOCA is required to: *Prohibit, regulate or provide permission for straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream, watercourse or changing or interfering with a wetland. Prohibit or regulate or provide permission for development if the control of flooding, erosion, dynamic beaches, pollution or the conservation of land may be affected by the development.*

1.5 Other Resources Referenced

Prior to field surveys, background information for the study area and surrounding lands from a variety of sources was reviewed to provide context for the setting and sensitivity of the site. Background information sources included:

1.5.1 Data Sources

- Aerial imagery
- MNRF Land Information Ontario (LIO) database mapping and Natural Heritage Information Centre (NHIC) Make-a-map tool (2021)
- Ontario Breeding Bird Atlas data (Bird Studies Canada, (BSC) 2001-2005 field data)
- Ontario Ministry of Natural Resources Fish-On Line, Fish Species List
- Department of Fisheries and Oceans (DFO) Aquatic Species at Risk Mapping (DFO, 2019)

1.5.2 Literature and Resources

- Natural Heritage Reference Manual (MNRF, 2010)
- Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E. Peterborough, 38pp. (OMNRF, 2015)

  CLOCA Land and Water Conservation Website (CLOCA, 2005)

1.6 Description of Development

The proposed site plan would see the construction of 11 townhouses, two assisted care buildings (7 storey and 8 storey, respectively), a three storey central amenity building and a 10 storey seniors' condominium. Also included in the site plan is associated infrastructure (e.g., an access road and landscaping) (Appendix E)

1.6.1 Scope of Report

The scope of work for the project includes the following:

- description of current and proposed land uses
- Ecological Land Classification (ELC) of all vegetation communities
- Woodland/dripline delineation and setbacks
- Top of bank delineation and applicable setbacks
- mapping of watercourse and setbacks
- determination of fish habitat and setbacks
- breeding bird surveys (x2)
- assessment of woodland significance
- assessment of potential Significant Wildlife Habitat (SWH)
- Species At Risk (SAR) presence and habitat assessment, including habitat of endangered and threatened species
- analysis of possible impacts of development on the natural features and ecological functions of all significant features identified, including the wetland to the north
- mitigation recommendations
- figure illustrating all significant natural features and buffers/setbacks per EIS recommendations.

This report will only deal with the suitability of the site from a biological perspective and the constraints due to the presence of the key natural heritage features. Any other approvals or constraints due to zoning, flood and fill

regulations, health regulations, archaeology, slope stability studies, minimum distance separation or other approvals for the municipality and other agencies are the responsibility of the owner.

2. Study Methods

2.1 General Approach

Our approach to the preparation of the EIS consisted of four distinct phases.

In the first phase, GHD collected and reviewed available information about the study area from our past reports and current sources. This included information sources on key natural heritage features and environmental mapping, Official plan schedules of the Region of Durham and Municipality of Clarington, GIS mapping from the Municipality of Clarington, CLOCA and the Ministry of Natural Resources and Forestry (MNRF).

The second phase consisted of the preparation of the ToR, which was to be submitted to the Municipality of Clarington and CLOCA.

The third phase consisted of multi-season site visits by our terrestrial/wetland biologists and fisheries biologists in the spring and summers of 2018 and 2021 to confirm the data collected in the literature review. Surveys included Ecological Land Classification (ELC) mapping, vegetation community boundaries, fish habitat assessments, wildlife corridors and linkages and presence of significant species including Species at Risk. The presence of possible Species at Risk will be derived from our field investigations and background literature. Targeted surveys were designed to confirm presence/absence of suitable habitat. Focus of our biological investigations was on the fields, woodland, valley land and the watercourse.

The final phase was the preparation of the EIS that includes specific mitigation measures for protecting any sensitive species and other natural features on or adjacent to the study site and recommendations regarding the creek and woodlands, including buffers and setbacks. It has been written to meet the requirements of both the Durham Regional Official Plan and the Municipality of Clarington Official Plan. This report includes a figure that shows the location of all of the natural features in the study area as well as recommended setbacks/buffers. This defines the recommended development envelope and the natural heritage constraints.

2.2 Study Site Methodology

2.2.1 Physical Site Characteristics

Site characteristics were assessed during field visits. This assessment included general documentation of existing disturbances, current property use, age of vegetation cover, topography and natural features.

2.2.2 Biophysical Inventory

2.2.2.1 Vegetation

ELC Survey Method

All vegetation encountered in the study area was inventoried during the site visits. Delineation and classification of the vegetation community types was based on the Ecological Land Classification for Southern Ontario (Lee et al., 1998). General notes on disturbance, topography, soil types, soil moisture and state of each community were also compiled. All vegetation communities in the study area were included.

Rare, significant or uncommon species were searched for. Species significance or rarity on a national, provincial, regional or local level was based on published literature and standard status lists. These included SARA (2021), COSEWIC (2021), SARO (2018) and Cuddy et al. (1991).

2.2.2.2 Birds

Breeding Bird Survey (BBS)

Bird surveys were conducted following the protocols of the Ontario Breeding Bird Atlas (OBBA) point count (Cadman et. al., 2021). Four-point count stations were established, with two surveys being conducted at each station during the breeding season. All birds seen or heard within each five-minute station period were documented and breeding evidence codes recorded. Surveys were conducted in the early morning at stations established in a variety of vegetation communities in order to adequately survey birds using all habitats in the study area. Surveys were conducted by experienced birders and point count surveyors. Any Species at Risk found in these surveys were located more precisely by a distance estimate and compass bearing from the point count station point.

Area Searches

In addition to breeding bird point counts, birds detected while on-site during all other field surveys were recorded along with a breeding evidence code if known. The search area for these surveys included all of the vegetation communities in the study area. Area searches include noting any birds that are flushed, nesting evidence or singing birds present on the site. The combination of point counts and area searches provides more coverage for more secretive species.

Targeted Species at risk Surveys – Bobolink and Eastern Meadowlark

Surveys were conducted according to the protocol developed by the OMNRF for the bobolink and adapted for the eastern meadowlark (OMNRF, 2013). Transects and point counts were established in appropriate habitat for this species (i.e., old field habitats with tall grasses). GPS locations were recorded for each point count.

Surveys began at dawn and continued until no later than 9am. Each point contained a ten- minute observation period specifically focusing on detecting the target species (i.e., bobolink or eastern meadowlark). The information recorded included variables such as species observed (by site or sound), species location, direction, distance and interactions with other bird species.

Three point-count surveys were conducted between the last week of May and the first week of July, with each survey separated by a week or more from previous surveys. Surveys were conducted on days with no precipitation, no or low wind speed and good visibility.

If bobolinks or eastern meadowlarks were detected, their habitat was documented. Information collected included habitat descriptors such as perches, fence lines, field hedgerows, height of vegetation and dominant vegetation species was recorded. Photographs of the site were taken. Searches for nest sites were not completed.

2.2.2.3 Other Wildlife

While surveyors were on site conducting surveys of vegetation communities (e.g., surveys of vegetation communities) observations of any wildlife encountered on site were recorded (including mammals, amphibians and reptiles). Documentation included notes about the species detected, their location and the type of encounter (i.e., direct sightings and indirect evidence such as calls, tracks, scat, burrows, dens, trails and browse).

2.2.2.4 Fish and Aquatic Habitat

Aquatic Habitat Assessment

Aquatic habitat assessments were conducted for all watercourses within the subject property documenting existing site conditions during high flow conditions. The following information was documented for each watercourse; presence of barriers, in-stream cover, overhead cover, dominate substrate and signs of erosion.

Assessments were conducted using standardized provincial aquatic protocols. Specifically, the Ontario Stream Assessment Protocol, Section 4, Module 11 (Stanfield L., 2017) and the Ontario Ministry of Transportation (MTO) Environmental Guide for Fish and Fish Habitat Protocol Section 4.0 (MTO, 2009) were used. Aquatic habitat was quantified and characterized based on local substrate composition, vegetation, flow influence and condition, sediment transport, cover, channel morphology, groundwater indicators, riparian habitat, barrier presence and form, land use and landscape influences, human modifications and unique features.

Surface water quality was collected by GHD biologists during the aquatic habitat assessments completed in 2018. Measured parameters included dissolved oxygen (mg/L), conductivity (us/cm), total dissolved solids (mg/L) and water temperature (°C) using a handled YSI Pro2030 System. The pH was recorded with a handheld waterproof pH meter and turbidity was recorded with a handheld LaMotte2020.

The Canadian Water Quality Guidelines for the Protection of Aquatic Life (Canadian Council of Ministers of the Environment, 2002) and the Provincial Water Quality Objectives (PWQO) were used to interpret water quality data (Energy, 1994).

Fish Community

Due to the presence of existing fish community data for the creek, GHD did not conduct fish community surveys (sampling). The fish species list was obtained from Central Lake Conservation Authority and the Ontario Ministry of Natural Resources and Forestry (CLOCA, 2000; OMNR, 2012).

2.2.2.5 Wetlands

Wetland boundaries were determined by GHD biologists certified to conduct wetland evaluations under the Ontario Wetland Evaluation System, third edition, version 3.3, southern manual (2014). Biologists first reviewed aerial photographs and available wetland mapping, including MNRF GIS database layers. Subsequently, they walked the entire property, checking plant species, soil type and soil moisture. The boundary of any wetland was then delineated in the field using a handheld GPS unit.

2.2.2.6 Woodlands

Significant Woodlands are one component of the Municipality of Clarington's Natural Heritage System. In the Official Plan, significant woodlands are defined as: "… old growth woodlands, or woodlands greater than 4 ha located outside of settlement areas, or greater than 1 ha in settlement areas" (Municipality of Clarington Official Plan, 2018). The forest communities that occur along Bowmanville Creek in the western edge of the study area appear to be included in the Municipality's natural heritage system mapping (Map D1, Municipality of Clarington Official Plan, 2018). The boundaries of these woodlands and associated woodland characteristics were confirmed by GHD biologists in the field. The size of the contiguous (i.e., continuous) woodland patch was confirmed in the office using aerial photography and GIS.

2.2.2.7 Significant Wildlife Habitat (SWH)

Prior to site visits, a candidate list of SWH features were determined based on the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E, 2015. During site visits, GHD biologists looked for evidence of those candidate significant wildlife habitat features (i.e., to determine presence/absence). Upon compiling field data and reviewing ELC codes and sizes of habitat patches, further analysis was conducted to which candidate SWHs could be confirmed as present on the property based on the confirmation criteria outlined in the above document.

3. Survey Results

The following section presents GHD site-specific survey data only. Supporting information, the background review and other sources of information will be presented and discussed in Section 4.0 – Discussion and Analysis.

3.1 Physical Site Characteristics

The subject property was located in the west-central area of the Town of Bowmanville. Land use in the immediate area includes regional center, living areas, and major open space. The area of the property proposed for development was abandoned field and sloped slightly eastwards towards the valley which is associated with Bowmanville Creek. There was a slight rolling topography to the site. The valley walls and top of valley was forested with a mix of tree species. Residential homes were found on the western edge of the site, while several homes are present along Stevens Road on the southern edge.

ELC Types - 1st Approximation
Ecological Land Classification for Southern Ontario: First Approximation and Its Application. 1998.

ELC Code	Ecosite-Vegetation Type Description
CUM1-1	Dry-Moist Old Field Meadow
FOD3-1	Dry-Fresh Poplar Deciduous Forest
FOM4-2	Dry-Fresh White Cedar-Poplar Mixed Forest

HZ-01
01SFQ01
4 FOM4-2
15,749 m²
3 FOD3-1
2,768 m²
4 FOM4-2
3,004 m²
001
BBS03
BBS04
01EAME03
1 CUM1-1
23,294 m²
OLD HOUSE FOOTPRINT
3,942 m²
BBS01
3 FOD3-1
6,806 m²
BBS02
01EAME02
002
01EAME01
01EAME
Bowmanville Creek
KING STREET WEST

Data Disclaimer

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Legend

- Surface Water Quality Survey Station
- Butternut Sp. Occurrence
- Breeding Bird Survey Station
- EAME Survey Station
- EAME Survey Transect
- Aquatic Habitat Zone
- OHN Watercourse
- Surface Water
- Drip Line (GHD, July 2021)
- Vegetation Communities
- Property Limit
- 15 m Drip Line Buffer
- 30 m Butternut Buffer

1 cm = 20 meters
0 10 20 30 40
Meters
Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 17N
Paper Size ANSI B

N

GHD

Kaitlin Corporation
46 Stevens Road, Bowmanville, ON
Municipality of Clarington

Environmental Impact Study
Natural Heritage Features, Vegetation Communities, Surveys and Constraints

Project No. 12566433
Revision No.
Date Jun 27, 2022

Figure 1

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Print date: 27 Jun 2022 - 06:22

Data source: © Municipality of Clarington, 2021.

3.2 Biological Inventories

3.2.1 Vegetation

3.2.1.1 Level of Effort

The vegetation communities were delineated within the study area by GHD biologists according to methodologies outlined in Section 2.2.2.1. A summary of the level of effort and environmental conditions have been provided in Table 1.

Table 3.1 Vegetation Surveys - Level of Effort

Survey Date	Survey Type	Weather	Start Time	Effort (person hrs.)
June 14,2018	Ecological Land Classification (ELC)	17°C, Cloud cover 10%, Beaufort Wind Scale 3-4, no precipitation	8:00AM	6.0
July 20, 2021	Ecological Land Classification (ELC)	23°C, Cloud cover 0%, Beaufort Wind Scale 0, no precipitation	9:00AM	4.0
September 7, 2021	Ecological Land Classification (ELC)	21°C, Cloud cover 0%, Beaufort Wind Scale 0, no precipitation	9:00AM	2.0

3.2.1.2 ELC Code Descriptions

A total of five (5) ELC vegetation community types were identified within the study area. Each community is described below and illustrated on Figure 1.

A total of 131 plant species were identified during field surveys. The dominant species in each community are described below and a complete plant list is found in Appendix A.

Community 1 Dry – Moist Old Field Meadow (ELC Code: CUM1-1)

Community 1 was a gently rolling old field that surrounded the vacant residential building site (Community 2). When the original vegetation surveys were conducted, the field had been recently cut. Surveys in 2021 showed the field in a more successional state with shrubs beginning to appear. Vegetation detected in this community was typical of fields found in urbanized areas, with dominant species including Kentucky blue-grass (*Poa pratensis*), tall goldenrod (*Solidago altissima*), swallow-wort (*Cynanchum rossicum*) and white bedstraw (*Galium mollugo*).

Photo 1: Community (Photo Date – July 20, 2021)

Community 2 Homestead Area and Landscaping (No ELC Code Applicable)

Community 2 was found immediately adjacent to an old homestead site. The buildings had been removed sometime in last three years. Until recently, the gardens and lawns had been maintained and landscaped by the previous homeowners, and some landscape stock vegetation species had been planted. As the home was subsequently abandoned, the vegetation had been left to grow wild. Tree and shrub detected in the old residential area included: Norway maple (*Acer platanoides*), white spruce (*Picea glauca*), white birch (*Betula papyrifera*), black walnut (Juglans nigra), round-leaved dogwood (*Cornus rugosa*) and staghorn sumac (*Rhus typhina*). Herbaceous vegetation included Kentucky blue-grass, ostrich fern (*Matteuccia struthiopteris*), ground-ivy (*Glechoma hederacea*), day lily (Hemerocallis fulva), wild grape (*Vitis riparia*), ox-eye daisy (*Leucanthemum vulgare*) and garlic mustard (*Alliaria petiolata).*

Photo 2: Community 2 – (Photo Date: July 20,2021)

Community 3 Fence Row (ELC Code: Not applicable)

Community 3 established the western border in the south end of the study-site. This fencerow community's dominant canopy species was mature white spruce. Subcanopy tree species detected were: black cherry *(Prunus serotina*), Manitoba maple (*Acer negundo*), and sugar maple (*Acer saccharum*). Ground cover species included tall goldenrod, bull thistle (*Cirsium vulgare*), swallow-wort, tall buttercup (*Ranunculus acris*), and Indian balsam (*Impatiens grandulifera*).

Photo 3: Community 3 – Fence Row on left side of photo. (Photo Date: July 20, 2021).

Community 4 Dry – Fresh Poplar Deciduous Forest (ELC Code: FOD3-1)

Community 4 was a mature deciduous forest bordering the northern edge of Community 1. Dominant canopy species included trembling aspen (*Populus tremuloides*) and black walnut, while the subcanopy was predominantly eastern white cedar (*Thuja occidentalis*). In the understory layer, tartarian honeysuckle (*Lonicera tatarica*) was predominant. The amount of groundcover vegetation varied, with two invasive species, Himalayan balsam and swallow-wort, being the most abundant. Other plant species found included wild grape, garlic mustard, white baneberry (pachypoda Actaea), Japanese barberry (*Berberis thunbergii*), purple-flowering raspberry (*Rubus odoratus*), and dame's rocket (*Hesperis matronalis*).

Photo 4: Community 4 (Photo Date: June 14, 2018)

Community 5 Dry – Fresh White Cedar Mixed Forest Ecosite (ELC Code: FOM4)

This community was found both: a) within the northern extent of the proposed development area; and b) immediately to the east of community 1. To the north, this mixed forest community was narrow, and formed a steeply sloped riparian zone adjacent to Bowmanville creek. A number of snags of mature white ash (*Fraxinus americana*) were observed in this community. Canopy and subcanopy tree species included: Eastern hemlock (*Tsuga canadensis*), Eastern white cedar, trembling aspen and American basswood (*Tilia americana*). Subcanopy and understory species detected in this community included alternate-leaf dogwood and European buckthorn (*Rhamnus cathartica*). Groundcover species included ostrich fern, zig-zag goldenrod (*Solidago flexicaulis*), Canada mayflower (*Maianthemum canadensis*) and swallow-wort.

Photo 5: Community 5 in background – (Photo Date: July 20, 2021).

3.2.1.3 Targeted Species at Risk – Butternut

Two butternut trees (three live stems) were found on the subject property during surveys in 2018 (Figure 1). One was found in the southeast end of the property on the property line and the other to the northwest of the old field-meadow (Community 1). Butternut is significant at both the national and provincial levels (COSEWIC, 2020; COSSARO, 2018). It is considered to be a federally and provincially endangered species. The trees were assessed per the requirements of the OMNRF by a certified Butternut Health Assessor (BHA #527). The tree in the northwest corner was found to be in poor health, with evidence of twig and branch dieback and both open and sooty wounds. Based on its health, this tree was to be *Category 1*. The large tree in the southeast corner divided into two stems at approximately 1.3m above the ground. This tree was found to be in moderate health, with both callused and sooty wounds. This tree was considered to be *Category 2*, or *retainable*. These two trees were reassessed in 2021 by a certified Butternut Health Assessor (BHA #110) and were found to be in a slightly further state of decline but still scored as category 1 and 2 respectively.

3.2.2 Birds

3.2.2.1 Level of Effort

Surveys for breeding birds were conducted in the study area by GHD biologists (Formerly NEA biologists) according to the methodologies outlined in Section 2.2.2.2. A summary of the level of effort and environmental conditions at the time of survey have been provided in Table 3.2.

Table 3.2 Bird Surveys – Level of Effort

Survey Date	Survey Type	Weather	Start Time	Effort (Person hrs.)
May 29, 2018	Breeding Bird Surveys	19°C, Cloud cover 10%, Beaufort Wind Scale 0, no precipitation	6:51	1.0
June 14, 2018	Breeding Bird Surveys	17°C, Cloud cover 10%, Beaufort Wind Scale 0, no precipitation	8:21	1.0

3.2.2.2 Breeding Bird Surveys

Breeding bird surveys were conducted in 2018 and GHD considers the data from these surveys still current as minimal changes have occurred on the property in the intervening years. No additional bird species were added to the species list during incidental surveys in 2021. Thirty-three (33) bird species were identified during breeding bird surveys conducted on May 29 and June 14, 2018. Survey stations were established throughout the study area to capture all habitat types, including hedgerows, open fields, and woodlands. A number of common species typical of the suburban landscapes and forest edge habitats were detected from four survey stations. These included black-capped chickadee (*Poecile atricapillus*), American robin (*Turdus migratorius*), gray catbird (*Dumetella carolinensis*), song sparrow (*Melospiza melodia*), rose-breasted grosbeak (*Pheucticus ludovicianus*) and least flycatcher (*Empidonax minimus*). Point count stations are identified in Figure 1. A detailed list of birds observed during the surveys and associated observations can be found in Appendix II.

3.2.2.3 Targeted Species at Risk Survey - Eastern Meadowlark and Bobolink

Targeted surveys for eastern meadowlark were conducted within the study by GHD biologists according to the methodologies outlined in section 2.2. Surveys were conducted on May 17th, May 29th and June 14th, 2018. A summary of the level of effort and environmental conditions at the time the surveys were conducted has been provided in Table 3.3.

Table 3.3 Species at Risk Surveys – Eastern Meadowlark and Bobolink – Level of Effort

Survey Date	Survey Type	Weather	Start Time	Effort (Person hrs.)
May 17, 2018	Eastern Meadowlark Survey	11°C, Cloud cover 30%, Beaufort Wind Scale 0, no precipitation	07:50	0..75
May 29, 2018	Eastern Meadowlark Survey	19°C, Cloud cover 0%, Beaufort Wind Scale 1, no precipitation	06:52	0.75
June 14, 2018	Eastern Meadowlark Survey	17°C, cloud cover 10/10, wind scale 4, no precipitation	08:00	0.75

Although old field habitat was present on site, neither eastern meadowlark, nor bobolink were detected. They were not detected during the targeted bobolink/meadowlark transect surveys, during breeding bird surveys or while other fieldwork was being conducted on the subject property. Site visits in 2021 showed the fields had progressed to thick weedy type habitat not favored by these species for nesting. For this reason GHD biologists did not conduct these surveys a second time.

3.2.2.4 Other Wildlife

NEA/GHD biologists kept a record of any bird, mammal and/or herpetofauna species encountered during vegetation survey work on the subject property (i.e., on June 14, 2018). Very few wildlife species were observed that had not already been encountered during other targeted survey work. Species observations were limited to red squirrel (*Sciurus vulgaris*) and eastern garter snake (*Thamnophis sirtalis sirtalis*), which were found along the western hedgerow (Community 3).

3.2.2.5 Woodlands

Using the definition of significant woodlands provided in the MoC's Official Plan (see Section 2.2.2.6), GHD's Terrestrial and Wetland biologists determined that significant woodlands were located to the north and east of the subject property. These woodlands are within the valley system associated with the main channel of Bowmanville Creek, and on areas immediately adjacent to the valley system (tablelands).

3.2.2.6 Significant Wildlife Habitat

Based on the criteria provided by OMNRF, GHD's Terrestrial and Wetland Biologists determined that no seasonal concentration areas for animals, rare vegetation communities, or habitat for species of conservation concern are found within the study area. Although two area sensitive bird species were detected in the forest communities to the north and east of the proposed development area, the woodland does not contain interior forest habitat (i.e., habitat that is >200m from forest edge) and therefore does not meet the criteria for specialized wildlife habitat. The identified woodland and valley features also provide some function as animal movement corridors, but also do not meet the criteria identified in the Significant Wildlife Habitat Criteria Schedule for Ecoregion 6E.

3.2.2.7 Valleylands

The MoC's Official Plan (see Section 2.2.2.4) includes valleylands as part of their Natural Features Mapping and Natural Heritage System. GHD's Terrestrial and Wetland biologists confirmed the presence of a major valley feature located to the north, northeast and east of the subject property. This valley is associated with the main channel of Bowmanville Creek. It is well outside of the proposed development area.

3.2.3 Fish and Aquatic Habitat

3.2.3.1 Level of Effort

The fish and aquatic habitat were assessed on June 26th, 2018, in Bowmanville Creek by GHD biologists. The level of effort and environmental conditions have been provided in Table #.3.4

Table 3.4 Fish and Aquatic Habitat Surveys – Level of Effort

Survey Date	Survey Type	Weather	Start Time	Effort (Person hrs.)
June 26, 2021	Aquatic Habitat Assessments & Surface Water Quality	Sunny (50% cloud cover), BWS 2, no precipitation during surveys	11:45 – 14:50	3hrs (x2 staff)

3.2.3.2 Bowmanville Creek

Bowmanville Creek is located directly to the north and east of the subject property. The section of Bowmanville Creek is a fifth order stream within the Bowmanville “A” Main Branch subwatershed and is fed by many first, second, third and fourth order streams. This branch directly outlets into Lake Ontario. The Bowmanville “A” Main Branch subwatershed is within the Bowmanville/Soper Creek Watershed (CLOCA, 2000). Bowmanville Creek has been classified as having a cold to cool thermal regime based on CLOCAs thermal analysis completed in 2013 (CLOCA, 2013).

3.2.3.3 Aquatic Habitat

The study area was classified into one habitat zone. Habitat zones are determined and differentiated based on presence of barriers, substrate composition, channel morphology, riparian habitat, percent in-stream cover, hydrological connection and unique features. The habitat zone location has been illustrated in Figure 1 and attributes have been summarized in Table 3.4. It should be noted that only a portion of the Bowmanville Creek was assessed during the site visit to aid in the stormwater outlet location.

Habitat Descriptions

Habitat Zone 1 encompassed approximately 251m of Bowmanville Creek located directly east of the proposed development (Figure 1). The left and right banks were slightly unstable with signs of moderate erosion scars (Photo 6).

The creek substrate was dominated by a mix of cobble/sand, with water depths ranging from 0.2 to 0.5m. The instream cover was moderate consisting of boulders, large and small woody debris, the canopy cover was low, covering 0-24% if the water surface. The overhead cover was also low, consisting of woody debris, trees and shrubs (Table 3.4). Refer to Section 3.2.1.2 for a description of the riparian habitat.

The aquatic habitat hydrology was composed of runs, pools, riffles and flats. The run, pool and riffle habitat each made up 30% of the habitat zone. The remaining 10% was composed of flat habitat.

It should be noted that during GHDs habitat assessments a headwater drainage feature that is connected to Bowmanville Creek was located on the property. The feature was mostly dry with standing pockets of water. Headwater drainage feature assessments were out of the project scope, therefore not completed by GHD.

Photo 6: Habitat Zone 1, photo showing large bank erosion scar of left bank, aquatic and riparian habitat. Photo facing west (Photo Date: June 26th, 2018).

Photo 7: Habitat Zone 2, photo showing aquatic and riparian habitat. Photo facing downstream (south) (Photo Date: June 26th, 2018).

Photo 8: Habitat Zone 3, photo showing aquatic and riparian habitat. Photo facing downstream (south) (Photo Date: June 26th, 2018).

Table 3.5 Habitat Zone Characteristics

Habitat Zone	Percent Substrate Composition	Percent Instream Cover	Percent Canopy Cover (%)	Overhead Cover	Water Depth Range (m)	Wetted Width Range (m)	Zone Length (m)
1	20% boulder 25% cobble 20% gravel 25% sand 9% clay 1% fine organics	15% large woody debris 5% small woody debris 20% boulders	0-24	5% shrubs 5% trees 10% woody debris	0.2-0.5	10-15	251

Surface Water Quality Parameters

Surface water quality parameters were collected during the aquatic habitat assessments in Habitat Zone 1 (Figure 1). A summary of results and information on the parameter specifics has been provided in Table 3.5.

Table 3.6 [Insert Table Caption]

Water Quality Parameters	Habitat Zone (Sample Number) 1 (1)	Accepted Parameter Range
Date (dd/mm/yy)	26/06/18	N/A
Time (hh:mm)	12:30	N/A
Weather Conditions	sunny (50% cloud cover), BWS 2- and no precipitation	N/A
Sample Depth (m)	0.03	N/A
Air Temperature (°C)	22.5	N/A
Water Temperature (°C)	18.4	N/A
Dissolved Oxygen (mg/L)	10.06	8-10*
Total Dissolved Solids (mg/L)	302.90	N/A
Conductivity (SPC-us/cm)	466.5	N/A
Salinity (ppt)	0.23	N/A
pH	8.65	6.5-8.5**
Turbidity (NTU)	1.66	Normal**

Note: BWS=Beaufort wind scale (Government of Canada, 2017), N/A= not applicable and/or specific guidelines not available.
*Lowest acceptable range for coldwater biota (Canadian Council of Ministers of the Environment, 2002), ** (MOEE, 1994).

3.2.3.4 Fish Community

Fish community surveys were not conducted by GHD biologists in Bowmanville Creek due to the presence of existing fish community data for the study area. A summary of the fish species present within the study area has been provided in Appendix D.

4. Discussion and Analysis

4.1 Species and Communities

4.1.1 Vegetation

Seven (7) significant plant species were found during the field inventories based on COSEWIC, 2021; COSSARO, 2021; SARA, 2018 and Varga et al., 2000). One species at risk, butternut, was detected on the subject property. Six additional species are considered regionally rare (Varga et al., 2000). Further information on these species can be found below.

Butternut

The two butternut trees (three live stems) found on site (Communities 4 and 5) were assessed. One was determined to be a *Category* 1, or *non-retainable* tree by a certified Butternut Health Assessor. The other was determined to be a *Category* 2, or *retainable*. Both are outside of the development envelope, including the 15m minimum vegetation protection zone. As such the trees will not be removed or harmed by the proposed development. Leaving the trees is recommended. A 25-metre harm zone has been shown on the figure, based on recommended buffers for trees and development related impacts that may “harm” the tree.

Locally and Regionally Rare Species

Six additional species, which are considered to be regionally rare (Varga et al., 2000), were detected on the subject property. Wood anemone (*Anemone quinquefolia*), moonseed (*Menispermum canadense*), prickly rose (*Rosa acicularis*) were all exclusively observed in the riparian forest of Community 5 (FOM4). Wild crabapple (*Malus coronaria*) was found in Community 2 (Homestead Area). One cow parsnip (*Heracleum lanatum*) was found growing along the hedgerow which makes up Community 3. Red-panicled dogwood (*Cornus foemina Miller ssp. racemosa*) also occurred in this area. A complete list of rare species as well as their designation can be found in Appendix I-B.

GHD will prepare a plant salvage plan as part of the updated EIS at the site plan stage, which will be submitted for approval to CLOCA and the Municipality of Clarington, for those species that may be affected by the proposed development.

None of the ecological communities (i.e., ELC ecosites or vegetation communities) found in the study are considered provincially rare (NHIC, 2021).

4.1.2 Birds

Two bird species detected during GHD’s (formally NEA) breeding bird surveys are considered to be significant at the federal (COSEWIC & SARA, 2021 – Threatened and Special Concern) and provincial level (COSSARO, 2018 – Threatened and Special Concern). The federally and provincially threatened chimney swift (*Chaetura pelagica*) nests in man-made structures, usually large open chimneys. This species was observed foraging above Community 1 (CUM1-1) and was likely not nesting within the study site buildings, as the chimneys were capped. The eastern wood-pewee is listed as special concern both federally and provincially. This species was heard singing in the northwest corner of the study site during the first breeding bird survey (conducted on May 29, 2018). The preferred breeding habitats for Eastern wood-pewees are deciduous forests, mixed woods, or pine plantations. It is possible that this species is breeding in the contiguous woodland within the northern portion of the study area. As no trees are to be removed and the woodland retained outside of the development envelope, with a 15 m VPZ, no impacts on the nesting or foraging habitat of this species will occur.

Records obtained from the Ontario Natural Heritage Information Centre (2021), indicate one Species At Risk occurred within the 1km x 1 km square overlapping the property (17PJ8486). This record of Northern bobwhite (*Colinus virginianus*) dates back to 1860. Northern Bobwhites are tallgrass prairie-savanna species that also live in mid-

successional forest habitats and open areas such as agricultural fields and grasslands. Although both forest and grassland habitats were present on site, the absence of this species from the region for over a century suggest it is unlikely that the species occurs in the area.

Ontario Breeding Bird Atlas (OBBA) records for the 10 km x 10 km square that overlaps the property (17PJ86) include seven (7) bird species that are considered provincially significant (COSSARO, 2018). These records are for: least bittern (Threatened), chimney swift (Threatened), eastern wood-pewee (Special Concern), bank swallow (Threatened), barn swallow (Threatened), wood thrush (Special Concern), bobolink (Threatened), and eastern meadowlark (Threatened). Some of the OBBA records were associated with larger natural features outside of the proposed development area, including the provincially significant Maple Grove Wetland Complex (PSW) to the northwest of the subject property, and the Bowmanville Coastal Wetland Complex (PSW) to the south. Only one of these species (eastern wood-pewee) was detected on, or immediately adjacent to the study site.

4.1.3 Other Wildlife

No other federal or provincial species at risk were recorded on the subject property during the site visit (SARA 2021; COSEWIC 2020; COSSARO, 2018). Our background review using the Ontario Natural History Information Centre did not identify any significant wildlife species on the property. Habitat for foraging bats may exist on the property. GHD did not identify any candidate maternity roost trees on site.

4.2 Natural Features

The valley feature associated with Bowmanville Creek is included in the Municipality of Clarington's Environmental Protection Designation. No development will be permitted within these valleylands. An appropriate buffer has been recommended to protect this feature its functions (refer to Section 5.1).

4.2.1 Woodlands

Significant woodlands were identified along the northern, north-eastern and eastern portions of the subject property. No development will be permitted within the significant woodlands. An appropriate buffer has been recommended to protect this feature its functions (refer to Section 5.2).

4.2.2 Significant Wildlife Habitat

Significant wildlife habitat often occurs within other natural heritage features and areas covered by Policy 2.1 of the Provincial Policy statement (e.g., significant wetlands). Therefore, it has been suggested that identification and evaluation of significant wildlife habitat is best undertaken after other natural heritage features have been identified (Natural Heritage Reference Manual, 2010).

GHD biologists analyzed the information collected from the ecological communities on the subject property using the criteria for Significant Wildlife Habitat in Ecoregion 6E (2015) and identified three (3) candidate SWH on the property:

- Bat Maternity Colonies,
- Area-Sensitive Bird Breeding Habitat,
- Special Concern and Rare Wildlife Species.

None of these candidate SWH were confirmed to be occurring within the recommended development envelope. They were associated with the woodland and woodland edge which will not be impacted or removed due to the buffers required from the dripline, creek and top of bank.

4.2.3 Wildlife Corridors/Connectivity

Biologist's ground-truthed the boundaries of the Natural Heritage System identified by the Municipality of Clarington in their Official Plan (2018). This system is found along the northern, north-eastern and eastern portions of the subject property and incorporated both valleyland and significant woodland features (as described in Section 4.2). The Natural Heritage System serves as a regional corridor for wildlife. A buffer has been recommended to protect identified natural features and their function as wildlife corridors (refer to Section 5.6).

4.2.4 Fish and Aquatic Habitat

Fish and Aquatic Habitat

Bowmanville Creek (habitat zone 1) supports all life history phases for the fish community present including spawning, nursery, feeding, cover and overwintering habitat. Specifically, it provided hydrologically connections, sources of nutrients, allochthonous sediments and food supply inputs to fish habitat downstream. These attributes are important for the sustainability of the Bowmanville fish community.

No critical habitat for Aquatic Species at Risk (DFO, 2017) or sensitive spawning habitat was identified within the study area (OMNR, 2012). Fish habitat in Ontario is managed federally by the Minister of Fisheries and Oceans Canada and therefore the Fisheries Act applies to this project.

The surface water quality parameters collected in 2018 were within the normal ranges listed in Section 3.2.3.3, with the exception of pH. pH was only 0.15 above the acceptable range, since these are baseline values, analysis of a trends cannot be achieved until post construction.

These data obtained can be used as a baseline and compared to construction and post construction monitoring results to ensure all parameters are maintained within an acceptable range.

Fish Community

The fish species community data obtained from MNRF and CLOCA reported no special concern, threatened or endangered on a national, provincial or regional level for Bowmanville or Soper Creeks (COSEWIC, 2021; COSSARO, 2018).

The Bowmanville Creek fish community was composed of fish species that prefer warm, cool and cold-water thermal regimes. Spawning timing for the community occurs in the spring and fall. The fish species found in Bowmanville Creek watershed are widely distributed throughout southern Ontario. Cumulatively, 20 fish species have been documented in Bowmanville Creek and represent the following families: *Catostomidae, Centrarchidae, Cottidae, Cyprinidae, Percidae, Petromyzontidae and Salmonidae*. Of note, four species of *Salmonidae* are present: Brown Trout (*Salmo trutta*), Chinook Salmon (*Oncorhynchus tshawytscha*), Coho Salmon (*Oncorhynchus kisutch*) and Rainbow Trout (*Oncorhynchus mykiss*). One established invasive species are also present; Sea Lamprey (*Petromyzon marinus*) (Appendix #).

The reach of Bowmanville Creek within the study area functions as a migratory corridor for recreation sport fish species, Brown Trout, Chinook Salmon, Coho Salmon, Rainbow Trout and White Sucker (*Catostomus commersonii*) (CLOCA, 2013). Site-specific spawning and fish sampling surveys were not conducted within the subject property and therefore, spawning habitat was not verified.

5. Impact Assessment and Recommendations

The following section provides a description of the predicted impacts that may result from the proposed development (Table 7). It also identifies mitigation measures to be implemented to avoid and/or minimize adverse effects to the natural environment features within or near the project. A full list of mitigation measures has been provided in Section 7 of this report. The impact assessment is based on defining the development envelope for these planning submissions. A detailed impact assessment will be required when site plans have been prepared and a development application is being made to the Municipality of Clarington.

5.1 Natural Features

5.1.1 Valleyland

The valley feature associated with Bowmanville Creek is protected under the Municipality of Clarington's Environmental Protection designation. It can be found in the north, northeast and east of the subject property. The boundary of the feature is the top of bank. The valley feature will be protected outside of the development envelope by a 15 m minimum vegetation protection zone (i.e., buffer) or the greater of a 15m from the stable top of bank (Figure 1).

5.1.2 Woodlands

The significant woodlands on site are protected under the Municipality of Clarington's Environmental Protection designation and Natural Heritage System policies. The woodland features were delineated in the field by GHD staff. The boundaries of the woodlands are entirely outside of the proposed development. The woodland features are found to the northern, north-eastern and eastern portions of the site and are part of a large contiguous block of woodland that extends north and south of the subject property. The Municipality of Clarington's Official Plan (2018) identifies how significant woodland features are to be protected from development in settlement areas.

The woodlands contained various ecological functions including providing habitat for area sensitive birds, cover for wildlife, protection for watercourses, erosion and slope protection and habitat for significant bird species. All of these functions will be protected by a 15-meter buffer from woodland dripline. A silt fence should be installed along these buffers to ensure any grading or moving of topsoil does not encroach on the woodlands.

5.1.3 Natural Heritage System

The extent of the Natural Heritage System (NHS) on the property is defined by woodland edges. The proposed development envelope is located entirely outside of the Natural Heritage System. A 15m buffer (vegetation protection zone) will be placed between the Natural Heritage System and the proposed development envelope. The edge of the NHS is considered to the current dripline in this case. The buffer will protect the functions of the natural features within the NHS.

5.1.4 Wildlife Corridors/Connectivity

The woodlands on the site are associated with a river-valley corridor. This river-valley corridor is identified in the Greenbelt Plan (2017) and is also protected by the MoC's Environmental Protection designation and Natural Heritage System policies. The corridor extends north of the subject property to Protected Countryside areas within the Greenbelt area, and south of the subject property to Lake Ontario. The wildlife corridor along Bowmanville Creek could be used by larger mammals such as white-tailed deer, as well as smaller animals, birds, reptiles and amphibians.

5.1.5 Species at Risk

Butternut

Generally, it is an offence under the Endangered Species Act, 2007 to kill, harm, or take a butternut tree. However, Ontario regulation 242/08 (under the ESA) provides exemptions for some activities pertaining to Butternut (Forest Gene Conservation Association, 2013). If ten or fewer naturally-occurring retainable butternut trees are on site and there is a plan to remove them (i.e., kill or transplant them), or they may be harmed by planned activities, a written planting plan must be submitted to the OMNRF describing how Butternut seedlings will be planted to replace any trees that are harmed and killed, following the applicable conditions in Ontario Regulation 242/08 (Forest Gene Conservation Association, 2013). This has recently been updated by the Ontario government to be up to 15 trees.

The two trees are located on the subject property (Figure 1). One Category 1 tree in the northwest corner inside the woodland edge by 10 metres and a large specimen on the southeast property line. Both will be retained and no impacts on the trees is anticipated. The trees will be retained. As will the 25-metre protection zone afforded trees where no “harm” can occur.

Eastern Wood-Pewee

The eastern wood-pewee was detected within community 5 (FOM4). The proposed development will not interfere with the breeding habitat for the eastern wood-pewee on the site. The proposed development is outside of the 15-meter buffer associated with the significant woodland and 15 m outside of the woodland dripline. The eastern wood-pewee will continue to utilize the contiguous woodland area for foraging. Habitat suitable for breeding will also continue to occur. No negative impacts are anticipated on the eastern wood-pewee as a result of the development.

5.1.6 Area Sensitive Birds

Two area sensitive bird species were identified during GHD field surveys. Yellow-bellied sapsuckers (*Sphyrapicus varius*) live in both deciduous (i.e., hardwood) and coniferous forests. They often nest in groves of small trees and spend winters in open woodlands. Their diet is a combination of sap, sapwood, wild berries, fruit and flying insects (Agriculture and Agri-Food Canada, 2014). Yellow-bellied sapsuckers usually nest in holes high above the ground in the heartwood of dead or dying trees located near their preferred feeding habitats. Red-breasted nuthatches (*Sitta canadensis*) also live in both deciduous and coniferous forests. Their diet consists primarily of insects in the summer and seeds in the fall and winter. They create or re-use nest cavities in dying and decaying trees and have a particular preference for soft wood species.

As the woodland is being retained and a 15 m buffer established, no impacts on these two species will occur.

5.1.7 Regionally Rare Plants

As several regionally rare plant species were detected in the hedgerow community (Community 3), a plant salvage plan must be prepared by GHD and submitted for approval to CLOCA. This will be included as part of the updated EIS and once the site plan has been reviewed.

5.1.8 Fish and Aquatic Habitat

Bowmanville Creek provides directs and indirect fish habitat. The natural features form and function will be protected from development by a 30 m buffer from the highwater mark. Development includes vegetation removal or clearing, houses, pools, accessory buildings, lawns, septic, and utilities.

A detailed sediment and erosion control plan must be prepared for all construction activities to ensure disturbed soils are not transported off-site into the negatively impacting aquatic life, fish and fish habitat.

To protect the watercourse and to ensure the project complies with the PPS and Fisheries Act, recommendations have been provided in Section 7.0 for incorporation into the final site plan.

The proposed development is located greater than 30 m from Bowmanville Creek (Appendix F). No significant impacts to fish or fish habitat are anticipated from the proposed development provided the setback from all fish habitat is respected and the mitigation measures and recommendations are implemented as outlined in this report. Any future development of the site needs to respect the 30m setback from the normal high-water mark. Other constraints from the woodland and NHS with their respective buffer widths are greater constraints than the fisheries setback.

If future development includes any road crossing of the watercourse, work near or in- water, the site plans must be reviewed by a professional biologist, the Department of Fisheries and Oceans (DFO) staff, the municipality and conservation authority

Table 5.1 Impact Assessment and Recommendation Summary

Feature or Function	Impact to Feature of Function	Mitigation	Residual Effect
Natural Features: Valleyland	No impact anticipated: proposed development will be located greater than 15m from the stable top of bank	The greater of the buffers, dripline/NHS or the top of bank or stable top of bank will be the line that determines the development envelope. Silt fencing be installed around any future building envelopes during construction and remain in place until after construction is complete and landscaping as established enough to stabilize the soil.	None
Natural Features: Significant Woodland	No impact anticipated: proposed development will be located 15 meters from dripline of woodland	15-meter buffer from dripline of any woodlands, staked in field.	None
Natural Heritage System	No impact anticipated: proposed development will be located 15 meters from the outer edge of identified natural heritage features.	15-meter buffer from dripline of natural heritage features identified (i.e., valley and woodland), staked in field	None
Wildlife Corridors / Connectivity	No impact anticipated: proposed development will be at least 15m from the significant natural heritage features identified on site.	15-meter buffer from dripline of identified natural heritage features (i.e., valley and woodland), staked in field.	None
Species at Risk -Butternut	Trees to be retained	None	none
Species at Risk – Eastern wood-pewee	No impact anticipated: proposed development will be outside of the bird's preferred habitat (woodland)	15-meter buffer from woodland and protection of entire woodland. Therefore no mitigation required.	None
Area sensitive Birds	No impact anticipated: proposed development will be located 15 meters from dripline of woodland	15-meter buffer from woodland and protection of entire woodland. Therefore no mitigation required.	None

Feature or Function	Impact to Feature of Function	Mitigation	Residual Effect
Regionally Rare Plants	No impact anticipated	Plant salvage plan to be prepared by GHD and submitted for approval to CLOCA	None
Fish and Aquatic Habitat	Impact on watercourse to be determined once stormwater management plan is underway.	Mitigation measures and design of outfall, if required will be determined at site plan submission stage and detailed design of stormwater facilities. Mitigation may include LID measures.	None if mitigation completed.
Fish and Aquatic Habitat *Watercourse*	Impact on watercourse to be determined once stormwater management plan is underway.	Mitigation measures and design of outfall, if required will be determined at site plan submission stage and detailed design of stormwater facilities. Mitigation may include LID measures.	None if mitigation completed.

6. Policy and Legislative Compliance

The following section describes how the proposed development will be in conformance with the relevant federal, provincial and other regulatory legislation, policies, official plans and OP amendments that are applicable and relevant to the study area and the immediate vicinity.

6.1 Federal Legislation

6.1.1 Migratory Birds Convention Act

The core breeding period in Ontario for migratory birds under the MBCA for Bird Conservation Region 13 (i.e., the one the subject property lies within) extends from April 15th to August 15th (Environment and Climate Change Canada, 2014). As such clearing of the trees and other vegetation for the development cannot occur during this timing window.

6.1.2 Fisheries Act

The potential works in the valley associated with a stormwater outfall may have the potential to cause the harmful alteration, disruption or destruction of fish habitat. The project detailed design is required to fully assess the potential impacts to fish and fish habitat with respect to the Fisheries Act.

However, to comply with the Fisheries Act, all project work near and below the high-water mark must follow the protective provisions of the Fisheries Act by implementing the *DFO Measures to Protect Fish and Fish Habitat*. If all project undertakings can: prevent the death of fish, maintain riparian vegetation, carry out work on land only, maintain fish passage, ensuring property sediment control, and preventing entry of deleterious substances in water, then a Fisheries Act review and Authorization may not be required.

If proposed in-water works cannot integrate the DFO protective measures and have the potential to cause the harmful alteration, disruption or destruction of fish habitat (such as infilling of the watercourse) a DFO Request for Review document must be submitted to DFO for formal project assessment to determine the next steps in project compliance.

Additional project details are required to assess project compliance with the Fisheries Act.

6.2 Provincial Legislation

Endangered Species Act, 2007

One provincially threatened species was detected on the subject property, barn swallow. Appropriate breeding habitat (nest site on a structure) was not identified on site and therefore the project is in compliance with the act. No permit or approval is required from MECP for foraging habitat.

Provincial Policy Statement, 2020

In this EIS report, Section 5.1.1 (Provincially Significant Wetlands) contain recommendations that would permit the proposed development to proceed in a manner consistent the applicable sections of the Provincial Policy Statement (PPS).

6.3 Local and Other Regulatory Bodies

6.3.1 Durham Region Official Plan

Recommendations in Section 6.0 of this report outlines how the Official Plan policies have been satisfied and impacts minimized in order to be in compliant with the Durham Region Official Plan

6.3.2 Municipality of Clarington Official Plan

Recommendations in Section 5.0 (Impact Assessment and Recommendations) note the requirements and processes needed to be compliant with the Municipality of Clarington Official Plan. This EIS outlines those policies and includes measures to limit impacts on the key natural heritage features and key hydrologic features. A 30-meter VPZ is proposed from Bowmanville Creek.

The Natural Heritage System policies will also be met by the recommendations proposed. EIS has been completed and follows Table 3 of the natural heritage policy section of the MOC OP, that lists minimum vegetation protection zones from natural heritage features in a settlement area. That includes the required 15 metre minimum vegetation protection zone from a woodland/NHS in a settlement area. As a result, the development of this site outside of the VPZ areas will not have a significant impact on the key natural heritage features and their ecological functions. An updated EIS will be submitted at the site plan stage that includes a detailed assessment of stormwater, grading etc. on the natural features and ecological functions identified in this report. Mitigation measures will be included for the site specifics of the proposed development and if any passive uses are proposed within the VPZ or natural feature.

6.3.3 Central Lake Ontario Authority 42/06

A watercourse, Bowmanville Creek, was identified on the property. As such, the regulations of CLOCA are applicable to this site and a permit from CLOCA would be required. However as the conservation authority has a review role with Clarington, we have provided mitigation measures and recommendations to address any potential impacts on the watercourse and their ecological functions.

7. Summary of Recommendations

7.1 General

1. A 15 m buffer/VPZ shall be staked in the field from the dripline of the woodlands identified on site. No development or site alteration activities are to occur within this area (i.e., it is a “no touch” zone for construction).
2. This vegetation protection zone shall be enhanced with native species plantings/seeds in those areas where vegetation is currently absent.
3. A detailed sediment and erosion control plan will be completed for the site.
4. The overall existing drainage patterns for the lot will be maintained
5. Removal of vegetation within development envelopes and/or along construction access routes shall be done outside of the peak breeding bird season (April 15th – August 15th) as per Environment and Climate Change Canada’s guidelines.
6. The natural features form and function of Bowmanville Creek will be protected from development by a 30 m buffer from the highwater mark.
7. No in-water work between March 15th and July 15th and Oct 1st to May 31st in Bowmanville Creek.
8. Any areas outside of the buildings and built infrastructure shall be vegetated as soon as possible after construction to stabilize the soils and reestablish vegetation cover.
9. Where it is feasible, native trees, shrubs, grasses and/or wildflower seed mixes shall be used.
10. Client to obtain relevant permits from the Municipality of Clarington and the Ontario Ministry of Natural Resources and Forestry and/or the Ontario Ministry of the Environment, Conservation and Planning.

7.2 Species at Risk

1. Ensure that on-site personnel are aware of Species at Risk that may be found in the study area and are able to recognize these species and their habitat(s).
2. Daily ongoing observation for SAR, and all wildlife more generally, will be undertaken during construction by all personnel on site.
3. Silt fencing installed must not have an open plastic mesh or netting that could lead to entanglement of wildlife.

7.3 Sediment and Erosion Control

1. An Erosion and Sediment Control (ESC) Plan will be developed and implement for the site that minimizes risk of sedimentation of the bay and watercourse during all phases of the project.
2. The ESC will be reviewed by a professional biologist.
3. Track pads, concreate wash stations, refueling stations, and stockpile locations should be identified on the SEC plan and isolated using sediment control materials.
4. All sediment and erosion control products will be selected for the site based on the manufacturer’s product specifications. Product installation and maintenance will follow the manufactures guidelines.
5. Sediment control measures shall be installed prior to the commencement of work and shall be maintained throughout the project to prevent the entry/outward flow of sediment into the watercourse.
6. All sediment and erosion control measures shall be inspected daily during the construction phase and periodically thereafter to ensure they are functioning properly, maintained, and upgraded as required. Sediment fence to be checked regularly to ensure they are maintained and working properly. Accumulated silt and debris will be removed from the fence and site after every precipitation event.

7. Disturbed soils will be immediately stabilized and re-vegetation with native species suitable for the site.
8. If sediment and erosion control measures are not functioning, the construction supervisor shall order the work to be stopped. No further work shall be carried out until the construction methods and/or the sediment control plan is adjusted to address the sediment/erosion problem(s). Such occurrences should be document by the site inspector and provided to a qualified biologist.
9. Construction should be undertaken during normal weather conditions, to the extent possible, and the project shall be designed to appropriate specifications to withstand variable weather conditions.
10. Erosion and sediment control measures will be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear.
11. Biodegradable sediment and erosion control products should be used over non-biodegradable products. Specifically, erosion control blankets.

7.4 Fish Protection (DFO measures to protect fish and fish habitat)

1. All work to avoid killing fish by means other than fishing.
2. No development within a 30m buffer of the high-water mark. The buffer will maintain riparian vegetation between areas of land activity and the high watermark of the shoreline and watercourses.
3. Maintain riparian vegetation by using existing trails or roads where possible and prevent soil compaction by using swamp pads or mats where possible.
4. No use of explosives in or near water. The use of explosives will be avoided in or near water to avoid damage to fish internal organs and eggs or larvae.
5. Respect MNRF fish timing windows to protect fish. No in-water work between March 15th and July 15th to protect spring spawning species and Oct 1st to May 31st for fall spawning fish species of Huycks Bay and its watercourse.
6. Carry out all works and activities by avoiding all work in or near water. No placement of fill or the temporary or permanent structures below the high-water mark unless permitted.
7. No disturbance of bank material or building structures in the area than may result in erosion or scouring.
8. All in-water activities and structures will not interfere with fish passage, movement or migration, constrict the channel width, or reduce flows.
9. The Project Manager/Contractor shall ensure proper sediment control and not allow any deleterious substances as defined in the Canadian Fisheries Act (such as silt), caused by the work, to enter or re-enter the watercourse or lake. See Sediment and Erosion Control section.
10. Should work conditions change such that it is possible that fish or fish habitat may potentially be negatively impacted, all works shall cease until the problem has been corrected or authorization has been obtained from the appropriate authorities

7.5 Operation of Machinery

1. No machinery shall enter the shoreline or watercourse.
2. All heavy equipment, machinery, and tools required for the work shall be regularly inspected, maintained and operated to avoid leakage of fuels and liquids and shall be stored in a manner that prevents any deleterious substance from entering the soil or nearby watercourses.
3. Vehicle and equipment refuelling and/or maintenance shall be conducted within a defined staging area 30 m from any waterbody. If 30 m is not achievable a portable spill containment berm may be used. Portable spill containment berms can be rented by companies such as Wise Environmental Solution Inc (W.I.S.E, 2017).

4. Any part of a vehicle and/or equipment entering the water will be free of fluid leaks and externally cleaned/degreased to prevent deleterious substances from entering the water.
5. Any stockpiled materials will be stored and stabilized away from the water above the high-water mark at a minimum of 30 m. Stockpiles will be enclosed by sediment fencing or installed down gradient for the purpose of preventing movement of sediment away from the stockpile.
6. The Project Manager/Contractor shall not allow any deleterious substances as defined in the Fisheries Act (such as silt), caused by the work, to enter or re-enter the watercourse.
7. An emergency spill kit shall be kept on site and employed immediately should a spill occur. In the case of a spill, the Ontario Spill Action Center shall be notified immediately at 1-800-268-6060 All provincial and federal regulations shall be adhered to.
8. Maintain an adequate supply of clean-up materials on-site. Construction crews will be fully trained in their use to ensure timely and effective responses to spill incidents.

7.6 Concrete Leachate

1. Concrete leachate is alkaline and highly toxic to fish and aquatic life. Measures will be taken to prevent any incidence of concrete or concrete leachate from entering any waterbody.
2. Ensure that all works involving the use of concrete, cement, mortars, and other Portland cement or lime-containing construction materials (concrete) will **not** deposit, directly or indirectly, sediments, debris, concrete, concrete fines, wash or contact water into any waterbody.
3. All concrete, sealants or other compounds used for this project shall be utilized according to the appropriate Product Technical Data Sheet, stating guidelines and methods for proper use, and provided by the manufacturer of the product.

8. Conclusion

GHD Limited has prepared this Environmental Impact Study report to address potential environmental issues associated with a proposed development located at 46 Stevens Road in the Town of Bowmanville, Region of Durham. The study site is located north of Highway 2 and east of Durham Regional Road 57.

The valley feature will be protected outside of the development envelope by a 15 m minimum vegetation protection zone (i.e., buffer) or the greater of a 15m from the stable top of bank (Figure 1).

Recommendations in Section 5.0 (Impact Assessment and Recommendations) note the requirements and processes needed to be compliant with the Municipality of Clarington Official Plan. This EIS outlines those policies and includes measures to limit impacts on the key natural heritage features and key hydrologic features. A 30-meter VPZ is proposed from Bowmanville Creek.

The Natural Heritage System policies will also be met by the recommendations proposed. EIS has been completed and follows Table 3 of the natural heritage policy section of the MOC OP, which lists minimum vegetation protection zones from natural heritage features in a settlement area. These include the required 15 metre minimum vegetation protection zone from a woodland/NHS in a settlement area. As a result, the development of this site outside of the VPZ areas will not have a significant impact on the key natural heritage features and their ecological functions..

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Appendix A

List of Significant Species by Community

APPENDIX A Plant Species by Community

Families and genera for the plant species found in this appendix are listed in taxonomic order. The species are listed alphabetically by scientific name within each genus.

Three standard reference works were used for the botanical nomenclature and taxonomy (Newmaster et. al., 1998; Gleason and Cronquist 1991; Voss 1980; 1985). Other published works for botanical names included; ferns (Cody and Britton 1989); grasses (Dore and McNeill 1980); orchids (Whiting and Catling 1986); shrubs (Soper and Heimburger 1982) and trees (Farrar 1995).

Total: Number of communities where plant species was recorded
X : Plant species recorded

Common Name	*Scientific Name*	Total	COMMUNITY NUMBE				
			1	2	3	4	5
WOOD FERN FAMILY	*DRYOPTERIDACEAE*						
Clinton's wood fern	*Dryopteris clintoniana*	1					X
ostrich fern	*Matteuccia struthiopteris*	4		X	X	X	X
sensitive fern	*Onoclea sensibilis*	2	X		X		
PINE FAMILY	*PINACEAE*						
Norway spruce	*Picea abies*	1			X		
white spruce	*Picea glauca*	2		X		X	
Colorado spruce	*Picea pungens*	1		X			
eastern hemlock	*Tsuga canadensis*	1					X
CYPRESS FAMILY	*CUPRESSACEAE*						
eastern white cedar	*Thuja occidentalis*	3		X		X	X
BUTTERCUP FAMILY	*RANUNCULACEAE*						
white baneberry	*Actaea pachypoda*	1				X	
wood anemone	*Anemone quinquefolia*	1					X
thimbleweed	*Anemone virginiana*	1	X				
tall buttercup	*Ranunculus acris*	2			X	X	
BARBERRY FAMILY	*BERBERIDACEAE*						
Japanese barberry	*Berberis thunbergii*	1				X	
southern blue cohosh	*Caulophyllum thalictroides*	1					X
MOONSEED FAMILY	*MENISPERMACEAE*						
moonseed	*Menispermum canadense*	1					X
MULBERRY FAMILY	*MORACEAE*						
white mulberry	*Morus alba*	1				X	
NETTLE FAMILY	*URTICACEAE*						
wood nettle	*Laportea canadensis*	1					X

Common Name	*Scientific Name*	Total	COMMUNITY NUMBER				
			1	2	3	4	5
WALNUT FAMILY	*JUGLANDACEAE*						
butternut	*Juglans cinerea*	3				X	X
black walnut	*Juglans nigra*	4		X	X	X	X
BEECH FAMILY	*FAGACEAE*						
American beech	*Fagus grandifolia*	1					X
red oak	*Quercus rubra*	3		X		X	X
BIRCH FAMILY	*BETULACEAE*						
yellow birch	*Betula alleghaniensis Britt.*	1					X
white birch	*Betula papyrifera*	1		X			
PINK FAMILY	*CARYOPHYLLACEAE*						
field chickweed	*Cerastium arvense ssp. strictum*	1			X		
bladder campion	*Silene vulgaris*	1				X	
BUCKWHEAT FAMILY	*POLYGONACEAE*						
curled dock	*Rumex crispus*	1		X			
LINDEN FAMILY	*TILIACEAE*						
American basswood	*Tilia americana*	2				X	X
VIOLET FAMILY	*VIOLACEAE*						
dog violet	*Viola conspersa*	2	X	X			
GOURD FAMILY	*CUCURBITACEAE*						
wild cucumber	*Echinocystis lobata*	2		X			X
WILLOW FAMILY	*SALICACEAE*						
white poplar	*Populus alba*	2				X	X
large-toothed aspen	*Populus grandidentata*	1				X	
trembling aspen	*Populus tremuloides*	3			X	X	X
sandbar willow	*Salix exigua*	1					X
MUSTARD FAMILY	*BRASSICACEAE*						
garlic mustard	*Alliaria petiolata*	2		X		X	
dame's rocket	*Hesperis matronalis*	4		X	X	X	X
field peppergrass	*Lepidium campestre*	1		X			
GOOSEBERRY FAMILY	*GROSSULARIACEAE*						
red currant	*Ribes rubrum*	2			X	X	

Common Name	*Scientific Name*	Total	COMMUNITY NUMBER				
			1	2	3	4	5
ROSE FAMILY	*ROSACEAE*						
common strawberry	*Fragaria virginiana*	2	X		X		
yellow avens	*Geum aleppicum*	4		X	X	X	X
wild crabapple	*Malus coronaria*	1		X			
apple	*Malus domestica*	1				X	
silverweed	*Potentilla anserina*	1					X
black cherry	*Prunus serotina*	4	X		X	X	X
choke cherry	*Prunus virginiana*	1					X
prickly rose	*Rosa acicularis*	1					X
wild red raspberry	*Rubus idaeus*	2				X	X
thimbleberry	*Rubus occidentalis*	5	X	X	X	X	X
purple-flowering raspberry	*Rubus odoratus*	1				X	
European mountain ash	*Sorbus aucuparia*	2		X	X		
PEA FAMILY	*FABACEAE*						
bird's-foot trefoil	*Lotus corniculatus*	2	X	X			
black medick	*Medicago lupulina*	3	X	X		X	
white sweet-clover	*Melilotus alba*	1		X			
red clover	*Trifolium pratense*	2	X	X			
white clover	*Trifolium repens*	2	X	X			
cow vetch	*Vicia cracca*	2	X	X			
EVENING PRIMROSE FAMILY	*ONAGRACEAE*						
dwarf enchanter's nightshade	*Circaea alpina*	3		X	X	X	
Canada enchanter's nightshade	*Circaea lutetiana L. ssp.canadensis*	1	X				
common evening primrose	*Oenothera biennis*	1		X			
DOGWOOD FAMILY	*CORNACEAE*						
alternate-leaf dogwood	*Cornus alternifolia*	1					X
red panicled dogwood	*Cornus foemina Miller ssp.racemosa*	1			X		
round-leaved dogwood	*Cornus rugosa*	3		X	X	X	
red-osier dogwood	*Cornus stolonifera*	1	X				
BUCKTHORN FAMILY	*RHAMNACEAE*						
European buckthorn	*Rhamnus cathartica*	4	X	X	X	X	
GRAPE FAMILY	*VITACEAE*						
Virginia creeper	*Parthenocissus inserta*	3		X	X		X
wild grape	*Vitis riparia*	4	X	X	X	X	
BUCKEYE FAMILY	*HIPPOCASTANACEAE*						
horse chestnut	*Aesculus hippocastanum*	1			X		
MAPLE FAMILY	*ACERACEAE*						
Manitoba maple	*Acer negundo*	5	X	X	X	X	X
Norway maple	*Acer platanoides*	1		X			
sugar maple	*Acer saccharum ssp.saccharum*	3		X	X	X	
CASHEW FAMILY	*ANACARDIACEAE*						
western poison-ivy	*Rhus rydbergii*	1			X		
staghorn sumac	*Rhus typhina*	3	X	X		X	

Common Name	*Scientific Name*	Total	COMMUNITY NUMBE				
			1	2	3	4	5
WOOD-SORREL FAMILY	*OXALIDACEAE*						
common yellow wood-sorrel	*Oxalis dillenii*	2	X	X			
TOUCH-ME-NOT FAMILY	*BALSAMINACEAE*						
spotted jewelweed	*Impatiens capensis*	1					X
indian balsam	*Impatiens glandulifera*	2			X	X	
GINSENG FAMILY	*ARALIACEAE*						
wild sarsaparilla	*Aralia nudicaulis*	1				X	
CARROT FAMILY	*APIACEAE*						
Queen-Anne's lace	*Daucus carota*	2	X	X			
cow parsnip	*Heracleum lanatum*	1			X		
wild parsnip	*Pastinaca sativa*	1	X				
MILKWEED FAMILY	*ASCLEPIADACEAE*						
common milkweed	*Asclepias syriaca*	2	X				X
swallow-wort	*Cynanchum rossicum*	5	X	X	X	X	X
NIGHTSHADE FAMILY	*SOLANACEAE*						
bitter nightshade	*Solanum dulcamara*	2		X			X
BORAGE FAMILY	*BORAGINACEAE*						
hound's-tongue	*Cynoglossum officinale*	1		X			
true forget-me-not	*Myosotis scorpioides*	1	X				
VERVAIN FAMILY	*VERBENACEAE*						
white vervain	*Verbena urticifolia*	1	X				
MINT FAMILY	*LAMIACEAE*						
ground ivy	*Glechoma hederacea*	3	X	X	X		
henbit	*Lamium amplexicaule*	2		X	X		
wild mint	*Mentha arvensis*	1			X		
spear mint	*Mentha spicata*	1					X
PLANTAIN FAMILY	*PLANTAGINACEAE*						
narrow-leaved plantain	*Plantago lanceolata*	1	X				
broad-leaved plantain	*Plantago major*	2	X	X			
OLIVE FAMILY	*OLEACEAE*						
white ash	*Fraxinus americana*	4		X	X	X	X
privet	*Ligustrum vulgare*	1		X			
lilac	*Syringa vulgaris*	1		X			
HAREBELL FAMILY	*CAMPANULACEAE*						
creeping bellflower	*Campanula rapunculoides*	2	X				X
MADDER FAMILY	*RUBIACEAE*						
white bedstraw	*Galium mollugo*	4	X	X	X	X	
HONEYSUCKLE FAMILY	*CAPRIFOLIACEAE*						
tartarian honeysuckle	*Lonicera tatarica*	3	X			X	X
TEASEL FAMILY	*DIPSACACEAE*						
wild teasel	*Dipsacus fullonum ssp.sylvestris*	1		X			

Common Name	*Scientific Name*	Total	COMMUNITY NUMBER				
			1	2	3	4	5
ASTER FAMILY	*ASTERACEAE*						
common ragweed	*Ambrosia artemisiifolia L.*	2	X	X			
common burdock	*Arctium minus*	2	X	X			
ox-eye daisy	*Chrysanthemum leucanthemum*	2	X	X			
chicory	*Cichorium intybus*	1		X			
Canada thistle	*Cirsium arvense*	2	X	X			
bull thistle	*Cirsium vulgare*	3	X	X	X		
daisy fleabane	*Erigeron annuus*	1		X			
Philadelphia fleabane	*Erigeron philadelphicus ssp. philadel*	2	X	X			
spotted joe-pyeweed	*Eupatorium maculatum*	1					X
boneset	*Eupatorium perfoliatum*	1					X
grass-leaved goldenrod	*Euthamia graminifolia*	1	X				
king devil hawkweed	*Hieracium x florbundum*	1			X		
black-eyed Susan	*Rudbeckia hirta*	2	X	X			
tall goldenrod	*Solidago altissima*	4	X	X	X	X	
Canada goldenrod	*Solidago canadensis*	1		X			
zig-zag goldenrod	*Solidago flexicaulis*	3			X	X	X
perennial sow-thistle	*Sonchus arvensis ssp.uliginosus*	1		X			
spiny-leaved sow thistle	*Sonchus asper*	3	X	X	X		
calico aster	*Symphyotrichum lateriflorum var.later*	2	X		X		
New England aster	*Symphyotrichum novae- angliae*	3	X	X	X		
purple-stemmed aster	*Symphyotrichum puniceum*	1	X				
common dandelion	*Taraxacum officinale*	4	X	X	X		X
coltsfoot	*Tussilago farfara*	1	X				
ARUM FAMILY	*ARACEAE*						
Jack-in-the-pulpit	*Arisaema triphyllum*	2				X	X
GRASS FAMILY	*POACEAE*						
awnless brome grass	*Bromus inermis ssp.inermis*	1			X		
orchard grass	*Dactylis glomerata*	2	X	X			
quack grass	*Elymus repens*	1		X			
timothy	*Phleum pratense*	1	X				
Kentucky blue grass	*Poa pratensis*	3	X	X	X		
LILY FAMILY	*LILIACEAE*						
orange day-lily	*Hemerocallis fulva*	1		X			
Canada mayflower	*Maianthemum canadense*	2				X	X
false Solomon's seal	*Smilacina racemosa*	1					X
Total Number of Plant Species	129		48	65	42	42	44

Number of Plant Species Per Community

Appendix B

List of Significant Plant Species

APPENDIX B List of Significant Plant Species

Plant species observed by NEA with significant status on national, provincial and relevant regional lists are listed with status codes and where applicable the most current year of publication. Three standard reference works were used for the botanical nomenclature and taxonomy (Newmaster et. al., 1998; Gleason and Cronquist 1991; Voss 1980; 1985). Other published works for botanical names included; ferns (Cody and Britton 1989); grasses (Dore and McNeill 1980); orchids (Whiting and Catling 1986); shrubs (Soper and Heimburger 1982) and trees (Farrar 1995).

NATIONAL RANKING
Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Government of Canada
Species at Risk Act (SARA), SCHEDULE 1 (Subsections 2(1), 42(2) and 68(2)), Government of Cana

PROVINCIAL RANKING
Species at Risk in Ontario (COSSARO), Government of Ontario
Provincial Rank (SRANK), Natural Heritage Information Center, Government of Onta

REGIONAL RANKING

Gartner CLOCA	Gartner Lee Associates, 1978
Varga GTA	Varga et al., 2001,GTA
Varga, Durham	Varga et al., 2001, Durham

STATUS CODES

COSEWIC **COSSARO** **SARA**	**END *** **THR *** **SC ***	- Endangered Species - Threatened Species - Species of Concern
SRANK	**S1** **S2** **S3**	- Extremely Rare - Very Rare - Rare to Uncommon
Regional Lists	**R** **RS** **EXP**	- Rare native species -Regional significant - Extirpated native species

***Year of Status Publication included in Code**

Other national or provincial codes not listed

Other Regional codes not listed

		NATIONAL RANKINGS		PROVINCIAL RANKINGS		REGIONAL RANKINGS				
Common Name	**Scientific Name**	**COSEWIC**	**SARA**	**COSSARO**	**SRank**	**Gartner CLOCA**	**Varga GTA**	**Varga, Durham**		
wood anemone	Anemone quinquefolia							R		
moonseed	Menispermum canadense							R		
butternut	Juglans cinerea	END Apr/14	END Mar/13	END Jun/14	S3?					
wild crabapple	Malus coronaria						R	R		
prickly rose	Rosa acicularis						R	R		
red panicled dogwood	Cornus foemina Miller ssp.racemos						R2	R		
cow parsnip	Heracleum lanatum						R	R		

Common Name	Scientific Name		COSEWIC	SARA	COSSARO	SRank	Gartner CLOCA	Varga GTA	Varga, Durham		
Plants with Ranking	**Total:** 7	**Status List Totals**	3	3	3		0	4	6	0	0

Appendix C

Bird Status Report - Comprehensive

APPENDIX C Bird Status Report - Comprehensive

Bird species observed by GHD are listed in the order followed the American Ornithologists' Union (AOU) Check-list of North American birds (7th edition, 1999, 47th Supplement). Common and scientific nomenclature are based on those used by AOU. Breeding status and breeding evidence code are listed when observed. Any significant status for a species on national and provincial lists is displayed as well as those from relevant regional lists.

List Status :	**END - endangered**	A wildlife species facing imminent extirpation or extinction.
	END-R -endangered regulated	A wildlife species facing imminent extirpation or extinction in Ontario which has been regulated under Ontario's Endangered Species Act (ESA).
	THR - threatened	A wildlife species likely to become endangered if limiting factors are not reversed.
	SC - special concern	A wildlife species that may become threatened or an endangered species because of a combination of biological characteristics and identified threats.
	YES - Area Sensitive	A wildlife species that requires large areas of suitable habitat in order to sustain their population numbers.

*** Other status levels are not displayed**

List Sources:	**COSEWIC**	The Committee on the Status of Endangered Wildlife in Canada, May 2018.
	COSSARO	The Committee on the Status of Species at Risk in Ontario, June 2018.
	SARA	Species At Risk Act, Schedule 1, Government of Canada, 2018.
	Area Sensitive	Significant Wildlife Technical Guide, Appendix C, OMNR, Oct. 2000
	Region 6	Southern Ontario Wetland Evaluation Appendix 11B, Version 3.2, March 2013

Breeding Status: (Observed By NEA)

B -species observed in breeding season in suitable habitat with some evidence of breeding (confirmed, probable or possible as per Ontario Breeding Bird Atlas, 2002).
F -species observed in breeding season but no evidence of breeding or suitable nest sites available on the study site (includes flyovers, migrants and foraging colonial breeders).
M -species observed outside of breeding season for that species and in area outside of the known breeding range for that species.

Breeding Evidence Code: (Observed By NEA)

OBSERVED
X -species observed in its breeding season (no evidence of breeding).

POSSIBLE BREEDING
H -species observed in its breeding season in suitable nesting habitat
S -singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat

PROBABLE BREEDING
P -pair observed in their breeding season in suitable nesting habitat
T -permanent territory presumed through registration of territorial song on at least 2days, a week or more apart, at the same place
D -courtship or display between a male and a female or 2 males, including courtship feeding or copulation
V -visiting probable nest site
A -agitated behaviour or anxiety calls of an adult
B -brood patch on adult female or cloacal protuberance on adult male
N -nest-building or excavation of nest hole

CONFIRMED BREEDING
DD -distraction display or injury feigning
NU -used nest or egg shell found (occupied or laid within the period of study)
FY -recently fledged young or downy young, including young incapable of sustained flight
AE -adults leaving or entering nest site in circumstances indicating occupied nest
FS -adult carrying fecal sac
CF -adult carrying food for young
NE -nest containing eggs
NY -nest with young seen or heard

SOURCE: Ontario Breeding Bird Atlas March 2001

AOU Code	Common Name	Scientific Name	Observed Breeding Status	Breed Evidence Code	COSEWIC	COSSARO	SARA	Area Sensitive	Region 6		
TUVU	Turkey Vulture	*Cathartes aura*	B	None				No			
RTHA	Red-tailed Hawk	*Buteo jamaicensis*	B	H				No			
RBGU	Ring-billed Gull	*Larus delawarensis*	B	S				No			
MODO	Mourning Dove	*Zenaida macroura*	B	S				No			
CHSW	Chimney Swift	*Chaetura pelagica*	B	None	THR	THR	THR	No			
YBSS	Yellow-bellied Sapsucker	*Sphyrapicus varius*	B	S				Yes			
DOWO	Downy Woodpecker	*Picoides pubescens*	B	S				No			
HAWO	Hairy Woodpecker	*Picoides villosus*	B	H				No			
NOFL	Northern Flicker	*Colaptes auratus*	B	S				No			
EWPE	Eastern Wood-Pewee	*Contopus virens*	B	S	SC	SC	SC	No			
LEFL	Least Flycatcher	*Empidonax minimus*	B	S				No			
EAPH	Eastern Phoebe	*Sayornis phoebe*	B	S				No			
GCFL	Great Crested Flycatcher	*Myiarchus crinitus*	B	S				No			
REVI	Red-eyed Vireo	*Vireo olivaceus*	B	S				No			
BLJA	Blue Jay	*Cyanocitta cristata*	B	S				No			
AMCR	American Crow	*Corvus brachyrhynchos*	B	S				No			
TRES	Tree Swallow	*Tachycineta bicolor*	B	H				No			
BCCH	Black-capped Chickadee	*Poecile atricapillus*	B	S				No			
RBNU	Red-breasted Nuthatch	*Sitta canadensis*	B	S				Yes			
WBNU	White-breasted Nuthatch	*Sitta carolinensis*	B	H				No			
AMRO	American Robin	*Turdus migratorius*	B	S				No			
GRCA	Gray Catbird	*Dumetella carolinensis*	B	H				No			
EUST	European Starling	*Sturnus vulgaris*	B	H				No			
CEWX	Cedar Waxwing	*Bombycilla cedrorum*	B	P				No			
YEWA	Yellow Warbler	*Dendroica petechia*	B	S				No			
BWWA	Black-and-white Warbler	*Mniotilta varia*	B	S				No			
AMRE	American Redstart	*Setophaga ruticilla*	B	S				No			

CHSP	Chipping Sparrow	*Spizella passerina*	B	S				No			
SOSP	Song Sparrow	*Melospiza melodia*	B	S				No			
NOCA	Northern Cardinal	*Cardinalis cardinalis*	B	P				No			
RBGR	Rose-breasted Grosbeak	*Pheucticus ludovicianus*	B	S				No			
COGR	Common Grackle	*Quiscalus quiscula*	B	S				No			
BHCO	Brown-headed Cowbird	*Molothrus ater*	B	P				No			
AMGO	American Goldfinch	*Carduelis tristis*	B	P				No			
TOTAL SPECIES OBSERVED:	**34**	**BREEDING SPECIES OBSERVED:**	**34**		**2**	**2**	**2**	**2**	**0**	**0**	**0**

Appendix D

Fish Species List for Bowmanville Creek

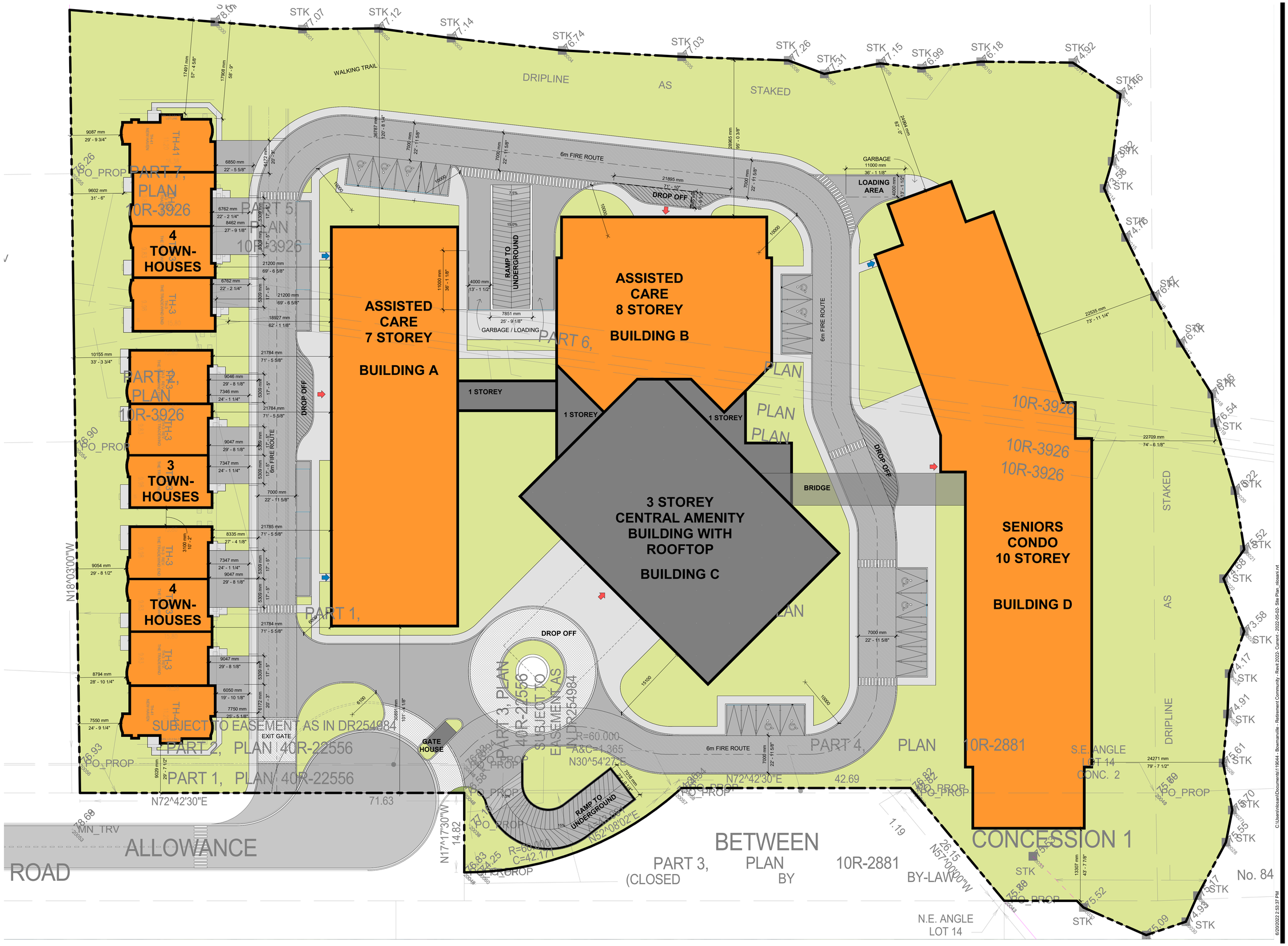
Appendix F *Fish Species List for Bowmanville Creek*

Family	Common Name	Scientific Name	Thermal Regime	Spawning Season
Catostomidae	White Sucker	*Catostomus commersonii*	Coolwater	Spring (April-June)
Centrarchidae	Largemouth Bass	*Micropterus salmoides*	Warmwater	Spring (May-June)
	Pumpkinseed	*Lepomis gibbosus*	Warmwater	Spring-summer (May-August)
	Rock Bass	*Ambloplites rupestris*	Coolwater	Spring (May-June)
	Smallmouth Bass	Micropterus dolomieu	Coolwater	Spring (May-June)
Cottidae	Mottled Sculpin	*Cottus bairdii*	Coolwater	Spring (April-May)
Cyprinidae	Bluntnose Minnow	*Pimephales notatus*	Warmwater	Summer (June-August)
	Common Shiner	*Luxilus cornutus*	Coolwater	Spring (May-June)
	Creek Chub	*Semotilus atromaculatus*	Coolwater	Spring (May-June)
	Eastern Blacknose Dace	*Rhinichthys atratulus*	Coolwater	Spring (May-June)
	Longnose Dace	*Rhinichthys cataractae*	Coolwater	Spring-summer (May-July)
	Spotfin Shiner	*Cyprinella spiloptera*	Warmwater	Summer (June-August)
Fundulidae	Banded Killifish	*Fundulus diaphanus*	Coolwater	Summer (June-August)
Gasterosteidae	Brook Stickleback	*Culaea inconstans*	Coolwater	Spring-summer (May-July)
Gobiidae	Round Goby	*Neogobius melanostomus*	Coolwater	Spring-summer (May-July)
Ictaluridae	Brown Bullhead	*Ameiurus nebulosus*	Warmwater	Spring (May-June)
Percidae	Johnny Darter	Spring (May-June)	Spring (May-June)	Spring (May-June)
	Johnny Darter/Tesselated Darter	*E. nigrum/E. olmstedi*	Coolwater	Spring (May-June)
	Logperch	*Percina caprodes*	Warmwater	Spring (May-June)
	Rainbow Darter	*Etheostoma caeruleum*	Coolwater	Spring (April-June)
	Yellow Perch	*Perca flavescens*	Coolwater	Spring (April-May)
Salmonidae	Brown Trout	*Salmo trutta*	Coldwater	Fall (October-November)
	Brook Trout	*Salvelinus fontinalis*	Coldwater	Fall (September-November)
	Chinook Salmon	*Oncorhynchus tshawytscha*	Coldwater	Fall (September-October)
	Rainbow Trout	*Oncorhynchus mykiss*	Coldwater	Spring (March-May)

Note: Fish species listed under OMNR 2012 obtained from the Aquatic Resource Area Survey (OMNR, 2019) .Fish species spawning season obtained from the *Ontario Freshwater Fishes Life History Database* (Eakins, 2019).

Appendix E

Site Plan Villages at Steven Green by Kingsway Arms



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NO.	ISSUED	DATE
1	CLIENT REVIEW	2019-08-08
2	CLIENT REVIEW	2019-08-27
3	CLIENT REVIEW	2019-09-13
4	CLIENT REVIEW	2022-05-13
5	CLIENT REVIEW	2022-05-27
6	CLIENT REVIEW	2022-06-01

SEAL

CONSTRUCTION NORTH TRUE NORTH

VILLAGES AT STEVEN GREEN BY KINGSWAY ARMS

51 STEVENS ROAD,
BOWMANVILLE, ONTARIO

SHEET NAME

SITE PLAN

START DATE	2019-08-05
DRAWN BY	CMC, NAL
CHECKED BY	JM
SCALE	1 : 300
PROJECT NO.	119044
DRAWING	A001

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