Environmental Impact Study

6640 Wellington Road 19 & 53 Seventh Line, Belwood, Ontario, Canada

Prepared for:
BelCal Inc.
2907 Upper James Street, Mount Hope, Ontario

Prepared by:
Stovel and Associates Inc.
651 Orangeville Road, Fergus, Ontario

BelCal Inc.

SAI
PLANNING. AGROLOGY.
ENVIRONMENTAL.

1. INTRODUCTION

Stovel and Associates Inc. was retained by BelCal Inc. to complete an Environmental Impact Study (EIS) for a proposed subdivision in the Township of Centre Wellington (in the Hamlet of Belwood). The subject lands are approximately 38.35 ha in size and is located on Part of Lot 12, Concession 7. Wellington Road 19 ("WR19") abuts the property on the southeastern limits of the site and the 7th Line is located on the east/northeastern limits of the site (see Map 1).

In the context of this report, the lands in question are referred to as the site, subject lands or subject property.

BelCal Inc. proposes to develop a residential subdivision on the subject lands. The site is designated Hamlet, Core Greenlands and Greenlands in the County of Wellington Official Plan ("County OP"). Lands designated Hamlet may be used for residential purposes (see Map 2). An amendment to the County OP or the Township of Centre Wellington Official Plan ("Township OP") is not required (see Map 3).

The Township of Centre Wellington Zoning Bylaw ("Zoning Bylaw") zones much of the site as Agriculture (see Map 4). As part of the planning approvals process for the proposed development, BelCal Inc. is required to apply for a Zoning By-law Amendment ("ZBA"). A Plan of Subdivision will be submitted to the County of Wellington. Given that the site is located adjacent to significant natural heritage features, an EIS is a required documentation component as described below.

1.1 Purpose

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

Adjacent lands are considered to be:

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

Map 2 illustrates the subject lands in proximity to Core Greenland and Greenland areas. The mapping of these features is approximate.

1.2 Study Objectives

The objectives of this study are to:

a) a *description of the proposal, including* a *statement of purpose;*
b) a *description of the existing land use on the subject lands and adjacent lands, as well as the relevant land use regulations;*
c) *an identification of proposed land uses and activities and potential environmental impacts;*
d) a *delineation of any environmental constraint area on* a *site plan;*
e) a *description of the terrestrial and aquatic resources, natural and built landforms, surface and groundwater and other significant environmental features or functions on the site;*
f) a *statement of the relative environmental and ecological significance of the natural features and functions affected by the proposal;*

g) a *statement that there are no negative impacts on provincially significant natural heritage features and functions and* a *description of the means by which negative environmental impacts will be mitigated in other natural heritage areas;*
h) a *consideration of the potential to maintain, restore or where possible, improve the long-term ecological function and biodiversity of natural heritage systems;*
i) a *proposal for monitoring, where needed;*
j) *such additional concerns as the Township may consider relevant.*

(Township of Centre Wellington Official Plan,1999. Last Revision June 1, 2022. Policy E.1.3 - Pages 59 and 60).

This EIS does not present an assessment of the impact on groundwater resources and in particular existing private wells and municipal supply wells in the area or an assessment of the impact on groundwater resources. These considerations are examined in other related reports, including the Hydrogeologic Impact Assessment prepared by Groundwater Science Corp. (2023).

The proposed development was discussed at a pre-consultation meeting with the Township of Centre Wellington (January 23, 2023) and a preliminary meeting with the County of Wellington (June 2, 2023). A summary of the technical investigations and scope of study documentation was provided. At this meeting with The Township of Centre Wellington, it was confirmed that the onsite woodlot is part of a significant woodland, and an EIS would be required.

1.3 Methods

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

- Functional Servicing and Stormwater Management Report (WSP and Scheckenberger and Associates, 2023).
- Hydrogeologic Impact Assessment (Groundwater Science Corp. 2023).
- Preliminary Geotechnical Characterization (Vander Doelen and Chung, 2023).
- Conceptual Plan. (BelCal Inc. and Stovel and Associates Inc. 2023).
- Headwater Drainage Feature Assessment - Fluvial Geomorphology Components (Aqualogic Consulting, 2023).
- Preliminary Onsite Sewage Servicing Assessment (Crozier Consulting Engineers, 2023).

Prior to completing field investigations, relevant background data were reviewed documenting rare species in the County, the presence of significant natural heritage features onsite and within 120 m of the site, and rare species in the County of Wellington. This background data review provided requisite scoping for the environmental inventories. Surveys for bat habitat were not completed as all potential bat habitat will be protected in the proposed development plan.

The subject lands are primarily disturbed and/or used for agricultural purposes. The 2022 and 2023 crop was soybeans. The property has been cultivated for common field crop production over the past two decades. There are no natural or semi-natural vegetation communities located within the area proposed to be developed. Following the 2022 harvest, the site was ploughed to permit an archaeological investigation.

Therefore, the field investigations and vegetation community mapping component of the study concentrated mainly on natural heritage features located on adjacent lands to the proposed development area. Vegetation communities adjacent to the site were described using the Ecological Land Classification ("ELC") System (Lee, H. 2008). Vegetation community boundaries were established on an aerial photo-mosaic base map and field checked. Field studies on the site included: botanical inventories, wildlife inventories, and ELC mapping. These were completed in May to August 2022.

The wetland limits and driplines of the adjacent deciduous forests were flagged and surveyed. Staff from the GRCA confirmed the wetland limits onsite. The surveyed wetland limits and driplines of adjacent deciduous forests are shown on the Vegetation Communities Map and the Development Concept.

Table 1: Summary of Field Surveys (Belwood)

SURVEY TYPE	SURVEY PROTOCOL	DATES
General Site Character and Field Reconnaissance		03_18_2022
Ecological Land Classification	Lee H. 1998, 2008	05_24_2022 05_25_2022 09_30_2022
Vegetation Inventories	Comprehensive Search by ELC Polygon	05_24_2022 05_25_2022 06_10_2022 06_18_2022 06_21_2022 07_25_2022 07_27_2022 09_30_2022
Wetland Boundary Delineation	Ontario Wetland Evaluation System (Wetland Boundary Delineation)	09_30_2022
Wetland Boundary Inspection and Confirmation by GRCA	Inspection by Richard Baxter (GRCA)	10_14_2022
Amphibian Calling Surveys	Marsh Monitoring Program - Bird Studies Canada (March 2, 2014)	04_29_2022 05_24_2022 06_23_2022
Snapping Turtle Surveys	Visual Inspection of Potential Habitat Areas	05_25_2022 06_23_2022 06_25_2022
Breeding Bird Surveys	Bird Studies Canada	05_25_2022 06_10_2022 06_18_2022 06_21_2022

1.4 Description of the Development Proposal

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

- 25.81 ha will be used for 107 residential lots,
- 3.5 ha to remain as protected Woodland (plus an additional 10 m setback from the drip line)
- 5.05 ha for internal roads,
- 1.42 ha for Stormwater Management and Open Space.

The proposed residential subdivision is fully contained in the Hamlet boundary for Belwood. For the most part, the land that is proposed to be used for housing consists of existing tilled agricultural land. A draft plan of subdivision has been designed to ensure that the removal of trees in natural/semi-natural communities is minimized.

The proposed conceptual development plan includes the following:

- 107 lots (approximately 0.20 ha in size or larger),
- private individual wells (i.e., deep drilled wells into the bedrock aquifer),
- private individual septic systems with tertiary treatment,
- a public trail system that follows the westerly limits of the property,
- Open Space/Parkland area,
- landscaped lots by the builder, using native species in accordance with proposed agreements and Vegetation Management Plan that will be set out as a condition of Draft Plan Approval.

A primary design focus of the proposed development will be on the grading plan for the site. Grading on the site will be minimized, primarily restricted to road construction. A hybrid road profile will be used. To a large extent, existing grades and drainage patterns will be replicated in the grading plan. At-source infiltration of water from roof leaders within the subdivision will be employed, where possible. Soak-away pits and infiltration galleries will be used for storm water management. The proposed storm water management facilities will be well separated from existing wetlands and natural heritage features. Emphasis will be placed on ensuring that the water quality will not be degraded, and if possible, water quality will be improved.

The following paragraphs provide a summary of the findings of relevant technical reports prepared in support of the development proposal.

1.4.1 Traffic Impact Study

WSP completed a Traffic Impact Study (May 2023) to evaluate the potential impact caused by the development of the proposed site, which is located on the northwest corner of the intersection of WR 19 and 7th Line/North Broadway Street. Existing and future operation of this intersection was evaluated. The intersection is currently controlled by stop signs on the northbound and southbound (North Broadway Street and 7th Line, respectively). The intersection currently operates acceptably during weekday peak hours, with Level of Service B or better for all approaches during both peaks.

The proposed development includes 107 detached houses and is expected to add 106 trips to the road network during the weekday afternoon peak hour, with 68 entering the development and 38 leaving the development during this peak hour. Three road connections to the network are proposed: 2 on 7th Line and 1 on Wellington Road 19. Left turn lane warrant evaluation indicates that no left turn lanes will be required at these proposed access intersection locations, and capacity analysis indicates acceptable

intersection operation based on single lane approaches in each direction. Available sight distance at each of the proposed access locations was evaluated based on TAC Geometric Design Guidelines for Canadian Roads using road center line profiles for the 7th Line and Wellington Road 19, and it was found that each proposed access location has adequate sight distance. The intersection of Wellington County Road 19 and 7th Line/North Broadway Street is also expected to operate acceptably with the addition of site traffic and will not require any improvements to accommodate future traffic demand.

1.4.2 Hydrogeological Assessment

Groundwater Science Corp. completed a hydrogeologic assessment to address impacts related to servicing the proposed development. The assessment included Ontario Ministry of the Environment, Conservation and Parks (MECP) Procedure D-5-4: Technical Guideline for Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment (August 1996); and Procedure D-5-5: Technical Guideline for Private Wells: Water Supply Assessment (August 1996). The hydrogeologic study also provided an overall site characterization (e.g., high water table conditions) and impact analysis (e.g., water balance) to support engineering design components associated with the proposal.

The hydrogeologic study included a review of geologic conditions based on site borehole drilling and test pit results (completed by others); review of seasonal water level monitoring results over a one year period; monitoring well response tests and shallow groundwater quality sampling; a door to door water well survey; supervision during construction of 5 test (water supply) wells; supervision and monitoring during test well pump testing (per Procedure D-5-5) and water quality sampling; site characterization; nitrate loading calculations (per Procedure D-5-4); and, overall impact analysis of the proposed site servicing. The study indicated that private wells can be safely used to service the proposed subdivision and that nitrate loading is within acceptable levels when tertiary treatment systems are implemented on each of the proposed residential lots. Specific recommendations regarding the construction and use of private wells were provided.

In summary, based on the results of the hydrogeologic assessment, the proposed Belwood development site is suitable to support development of a 107-lot subdivision using private water wells and private sewage systems with tertiary treatment (i.e., Level IV achieving at least 65% nitrate removal) without causing negative impacts to the local groundwater resources or natural heritage features.

The hydrogeologic study made the following recommendations with respect to the proposed development:

- Tertiary sewage treatment systems capable of achieving at least 50% nitrate removal are to be provided to residences constructed as part of the proposed development.
- Private water wells servicing the proposed development are recommended to be completed within the bedrock aquifer and constructed according to all applicable regulations.
- Test well TW3 should be re-developed prior to use and re-sampled for arsenic. If arsenic concentrations persist at or near drinking water limits then the residence using this well should either be provided with adequate treatment to remove arsenic prior to household use, or alternate arrangements made to reduce the arsenic levels at the well (e.g., such as deepening the well followed by redevelopment and resampling).

1.4.3 Stormwater Management and Grading

WSP E&I Canada Limited (WSP) and Scheckenberger & Associates Ltd. (SAL) have prepared a Stormwater Management (SWM) Brief to provide details on the proposed SWM works for the subject development, and specifically how these works are intended to address the governing criteria of the Township of Centre Wellington (Township), GRCA and the Province of Ontario.

The conceptual SWM plan addresses the specific criteria and requirements associated with the management of stormwater runoff (quantity and quality), as well as the management of open water features

specific to watercourses and headwater drainage features (HDF). As part of the development of the overall SWM plan, Aqualogic conducted a complementary watercourse and headwater drainage feature assessment to support the planning and management of on-site drainage features.

As part of the proposed SWM plan, it is recommended that runoff quality be treated through a series of techniques, whereby a portion of the runoff from the private residential development sites could be captured through on-lot source controls, which could then combine with roadway runoff and be treated with conveyance controls through the roadside drainage system (enhanced grassed swales with gutter outlets). The roadway drainage system is proposed to be of a hybrid form, whereby the roadway would have short shallow ditches on one side, and a storm sewer and curbs/gutter outlets, to facilitate an "urban" feel while addressing the Provincial requirement for a treatment train of multiple best management practices. The combined treated residential and roadway runoff from the lands west of the Main reach will then discharge to one of two proposed Stormwater Management Facilities (SWMFs), where the runoff will be treated/detained. For the lands east of the Main watercourse, no SWMFs are proposed, however a subsurface storage system is proposed for both the north and south enclaves upstream of their discharge points to the Main watercourse (one for the north and one for the south development parcels) to promote peak flow and volume control for roadway runoff and also assist in treating runoff for water quality objectives, prior to discharge to the Main watercourse.

The previously noted two (2) SWMFs are also proposed to provide controls primarily for the management of flooding and secondarily for erosion control. The SWMF, as noted, can be either "wet" or "dry". Based on the currently proposed SWM plan which advocates for source and conveyance controls, it is suggested that the SWMFs would preferentially be dry. This form of SWMF would have reduced maintenance and also provide informal open space for the area residents, hence is considered preferred.

Volume control is being recommended to meet the "draft" guidance from MECP (2022). This amount of control for both the private and public lands is expected to adequately meet the needs of the site's erosion criteria. The MECP recommends a three-tier assessment and implementation process whereby Tier 1 (preferred) provides volume controls using measures at source, such as rain gardens and infiltration pits to capture and infiltrate the 90th percentile runoff event which for Belwood would be a 29 mm event. Further, volume controls can be achieved for the roadway system either through infiltration trenches constructed in appropriate locations along the roadside ditches (not in areas with shallow groundwater or high bedrock) or through subsurface systems located within the proposed SWMF.

1.4.4 Geotechnical Assessment

Chung & Vander Doelen Engineering LTD. ("CVD") conducted a preliminary geotechnical characterization for a residential subdivision proposed to be developed at 6640 Wellington Road 19 in Belwood, Ontario. The purpose of this investigation has been to determine the subsurface conditions and relevant soil properties at the subject site in order to provide preliminary geotechnical recommendations for the design and construction of site grading operations, internal roadways, site servicing, and residential foundations.

Twenty-seven (27) test pits were advanced to depths between 2.4 and 5.2m below existing grade to investigate and characterize the subsurface conditions across the site. The field work was conducted on June 22 and 23, 2022 under the supervision of CVD using a track-mounted excavator. The following was encountered during the investigations:

- Silty sand to gravelly sand
- Sandy silt to silt
- Clayey silt to silt, and
- Glacial till (20 of the 27 test pits were underlain by sandy silt till to clayey silt till).

Groundwater conditions were monitored during and at completion of the test pits. Twenty-one of the test pits remained dry at completion of excavation. Subsurface seepage was encountered at five test pits between depths ranging from 1.8 to 4.5m below existing grade.

Recommendations were provided by CVD addressing:

- General site grading
- Site grading for engineered fill construction,
- Site grading for wastewater leaching bed envelopes,
- Pavement design,
- Excavation and site servicing,
- Building foundations,
- Lateral earth pressures, and
- Percolation time.

1.4.5 Preliminary Onsite Sewage Servicing Assessment

Crozier Consulting Engineers (Crozier) completed a preliminary onsite sewage servicing assessment. This study was based on a review of relevant background information, including the CVD geotechnical assessment and preliminary nitrate loading calculations prepared by Groundwater Science Corp. Crozier estimated sewage flows for proposed residential dwellings ranging from 186 to 320 m2 in size. The preliminary sewage design flows were calculated in accordance with the Ontario Building Code (OBC). The preliminary design flows ranged from 1700L/day to 3300 L/day.

Sanitary servicing for the proposed development will be provided through individual Class 4 onsite sewage systems. Advanced treatment systems, such as the Waterloo Biofilter recirculating basket system were employed. Preliminary Type A dispersal bed sizing was calculated and then illustrated on the proposed lot layout for the site to ensure that OBC requirements could be satisfied. The proposed leaching bed footprints ranged from approximately 220 m2 to 432 m2.

2. DESCRIPTION OF THE ENVIRONMENT

2.1 Geology and Soils

The subject property is located within the physiographic region of Southern Ontario known as the Orangeville Moraine (*The Physiography of Southern Ontario.* Chapman and Putnam, 1984.). The moraine formed in an interlobate position between glacial ice of the Huron-Georgian Bay and Ontario lobes. High relief and hummocky topography are characteristics of the moraine. The moraine consists of a lower glacial fluvial layer of gravel and an upper glaciolacustrine unit of fine sand, silt and some varved sand and clay.

After deposition of the Orangeville Moraine, the margin of the Huron-Georgian Bay lobe melted back toward the northwest. Some of the meltwater that flowed from the ice front formed an ice-marginal channel in which outwash gravel was deposited. The channel is now occupied by the Grand River and Lake Belwood and the outwash forms a series of terraces along the northwestern shore of the lake. This deposit contains large resources of sand and crushable gravel and is an important local resource (ARIP 162. Page 11).

> *The bedrock subcropping in this area is reported to consist of the dolostone of the Guelph Formation. The Guelph Formation is part of* a *thick, regionally extensive, aquifer system (formerly characterized as the Guelph-Amabel aquifer) that includes underlying bedrock units generally consisting of the Eramosa Formation, Goat Island Formation and Gasport Formation (as currently identified)* (Groundwater Science Corp. Page 6).

The Guelph formation consists mainly of buff coloured, irregular medium to massive bedded, fine to medium crystalline, sucrases dolostone (Liberty and Bolton, 1971; Telford 1976; ARIP 162. Page 30 *Chart* C-*Bedrock Resources* Summary). The formation is approximately 40 m in thickness. Based on a review of well records, the depth of overburden over the bedrock is 30-40 m.

A detailed description of the subsoil conditions associated with the site was provided in the Preliminary Geotechnical Characterization, conducted by Vander Doelen and Chung Associates Ltd. In general, the majority of the native deposits on the site consisted of glacial till, comprised of silt and clay. Deposits of sand were encountered above the glacial till at the northwest and north-central limits of the site.

One small sand borrow pit was identified in the northern portion of the site near the property boundary. It appears that sand/sandy gravel had been extracted and used for construction activities. Evidence of historic extraction activities north of the site on the abutting property was also observed. A second area of sand was encountered in the northwest portion of the site just south of the woodlot). This deposit was approximately 3-4 min depth and was underlain by silty clay till.

The surficial soils are mapped as Hillsburgh Fine Sandy Loam in the west-central portion of the site and Huron Loam in the east portion of the site. The Hillsburgh Fine Sandy Loam is well-drained, fine to medium sand material developed in stony moraine. These soils are susceptible to wind erosion and small stones often appear at the surface where soil loss has been severe. Both internal and external drainage is rapid. The Huron Loam is uniform in texture often containing up to 20-27 % of clay. Hence the soil is quite sticky when wet. The soil parent material is a greyish brown glacial till of fairly uniform texture and composition.

2.2 Hydrology

In the local area, the dominant watercourse is the Grand River. The Grand River is located approximately 200-300 south of the subject land. The river has been dammed, by the Shand Dam, and is managed by the Grand River Conservation Authority to control flood waters and to provide recreational opportunities. The man-made lake associated with the Grand River is called Belwood Lake.

As previously noted, a series of agricultural ditches have been excavated across the site. The north-south ditch is the most noteworthy of the ditches. This ditch has been excavated with an approximate slope of 2%. The drain from 7th Line has been excavated on a 0.5-1% slope.

The topography of the site is gently rolling with surficial flows in a north-northwest to south-southeast trending pattern. The height of the subject property occurs in the northwestern portion of the site and the north-central portion, approximately 456 MASL, and the lowest portion of the site is in the southeast at an approximate elevation of 427 MASL, (culvert on WR 19). The change in elevation across the site is approximately 29 m. Slope changes across the site and in the range of 2-10% except in the disturbed portion of the site where complex slopes in excess of 10-15% were noted.

There is an unnamed watercourse along the eastern portion of the site. This watercourse eventually drains in a North-to-South trending pattern, eventually draining into the Grand River, in the community of Belwood. The watercourse has been excavated to provide for farm drainage. A large culvert has been installed to provide for access for farm equipment. Further downstream, a small concrete dam structure has been installed.

Image 1 – Large Access Culvert Along North-South Watercourse.

Image 2 - Small concrete dam structure Along North-South Watercourse.

East of 7th Line, a similar agricultural drain crosses the municipal road and connects to the main North-South watercourse. This watercourse has been excavated for agricultural purposes. This watercourse drains farmlands east and northeast of 7th Line. A large culvert has been installed on 7th Line to allow for drainage of this agricultural drain onto the subject lands.

An East-West drain has been excavated to provide for agricultural drainage (slope ranges from 2-2.5%). Water drains from the woodlot in the Northwest portion of the site into the ditch via a series of surface and subsurface drains in an easterly trending pattern to the main North-South watercourse.

Image 3 - East-West Drainage Ditch.

Waterflow for all onsite watercourses/drains is intermittent; the East-West tributary remains dry for much of the year.

2.3 Biologic Resources

The subject property is located within the Ecodistrict 6E-1, otherwise known as the Stratford Ecodistrict (MNRF, 2018. *The Ecosystems of Ontario, Part 2: Ecodistricts TR-26).* The Ecodistrict is comprised of 80% pasture/cropland, 13% deciduous forest, and 7% other/other natural features.

Natural upland forest cover in this region is generally dominated by sugar maple, American beech, basswood, white ash, white oak, bur oak, eastern hemlock and eastern white pine. In lowland areas, silver maple, white elm, black ash, and eastern white cedar generally dominate. Wellington County has an estimated 18.2 % forest cover **(**MNR**,** 2002).

The Grand River and the Belwood Lake System is the most significant natural heritage feature in the local area. Belwood Lake was created as a result of the Shand Dam water control program. Initially constructed in 1942, stocking programs within the reservoir have resulted in a productive cool water fishery with pickerel, northern pike and yellow perch being feature species. Downstream of the dam, portions of the Grand River have been stocked with brown trout.

Tableland areas associated with the Grand River near Belwood have been reforested with coniferous species.

2.4 Aquatic Resources

The Headwater Drainage Feature Assessment (Aqualogic Consulting. 2023) provides a characterization of the onsite aquatic resources.

South of WR 19, the watercourse travels through the hamlet of Belwood and then ultimately discharges into Belwood Lake. Belwood Lake is a 12-kilometer-long reservoir created by the construction of the Shand

Dam in 1942. It offers boating, fishing, water-skiing, and swimming. Visitors can walk across the dam and view the reservoir waters as well as enjoy a vista of the Grand River valley far below.

Belwood Lake is a managed system that is used primarily for water control (flood control) but also for recreational purposes. Belwood Lake is a local fishing destination with yellow perch, northern pike and pickerel as targeted fish species. A variety of other fishes are also found in the Belwood Lake system. Immediately downstream of the Shand Dam, portions of the Grand River are managed as a catch-release fisheries with brown trout as the targeted species (*Fishery Management Plan Technical Report*, GRCA Page 75. May, 2001).

Belwood Lake is approximately 250 m south of the subject lands.

Background information provided by the GRCA (Email Correspondence with Ben Kissner March 18, 2022) indicates the presence of the following species in the box culvert at Wellington Road 19: rainbow darter, common shiner, common carp, white sucker, northern hog sucker, creek chub, rock bass, smallmouth bass, northern redbelly dace, hornyhead chub, golden shiner, northern pike, bluntnose minnow, yellow perch, brown bullhead, spottail shiner, pumpkinseed, johnny darter. As previously noted, a small concrete dam structure has been installed just north of WR 19 thus acting as a migratory barrier to fishes.

2.5 Vegetation Communities and Vascular Plants

The subject lands mainly comprise agricultural fields. Of the 38.7 ha, natural or semi-natural vegetation communities only comprise approximately 4.5 ha of the site. The woodlot in the northwest corner of the site is the most notable natural vegetation community on the site. This woodlot is approximately 3.5 ha in size and includes two small wetland pockets.

The following paragraphs summarize the results of vegetation surveys undertaken on March 18th (north woodlot), May 24 (north), June 10 (north), June 18 (south), June 21 (south), July 21/22 (final plants), August 25 (late season plants). This document uses the ELC codes from Lee. H. 2008 and focuses on the vegetation descriptions for ELC polygons as shown on the accompanying map (see Map 6).

Appendix A provides a table that describes the vegetation communities encountered on the subject land.

2.5.1 Notable Communities

There are three natural/semi-natural vegetation communities on the subject land that are considered significant:

- Upland hardwood woodlot (FODM5) in the northwest portion of the site. This community is dominated by Sugar Maple, with subdominant species including Black Cherry, Eastern Hemlock, White Ash and Bitternut Hickory. The woodlot is designated Greenland in the County of Wellington Official Plan.
- Thicket Swamp community (SWT/SWD) is mapped along the northeastern limits of site. An agricultural drain has been excavated along the eastern limits of this wetland unit. Based on a review of the County of Wellington Official Plan, this community has been designated Core Greenland.
- Coniferous Plantation (WOCM1) in the north-central portion of the site. This community is dominated by White Spruce, White Pine and Eastern White Cedar. Approximately 0.3 ha of this community has been designated Greenland in the County of Wellington Official Plan.

Image 4 - Upland hardwood woodlot (FODM5) in the northwest portion of the site.

Image 5 - Thicket Swamp community (SWT/SWD) is mapped along the northeastern limits of the site.

Image 6 - Coniferous Plantation (WOCM1) in the north-central portion of the site.

2.5.2. Vascular Flora

In total, 158 plant species were identified during site investigations within the subject property. A complete list of these species can be found in Appendix B. No provincially significant species were inventoried on the subject land. Most of the inventoried non-native species were found within the TAGM5, THDM2, THMM2, MEM and adjacent to the agricultural fields. This is indicative of adjacent ecological disturbances and edge effects that have been imposed on these features from adjacent open lands and historic land uses. Relatively fewer non-native species were observed within the Dry Fresh Sugar Maple Deciduous Forest Ecosite (FODM5).

2.6 Wildlife

2.6.1 Birds

Twenty-eight (28) species of birds were documented on the subject land during field surveys. Of these, 24 species displayed evidence of possible, probable or confirmed breeding within the subject land. Refer to Appendix C for a list of bird species recorded within the subject property and vicinity.

A singing male Eastern Wood-Pewee was recorded within FODM5 during the breeding bird survey. It is likely that this individual maintained a breeding territory within this woodland in 2022, indicating evidence of probable breeding. As a species of conservation**,** probable breeding habitat could be considered to be Significant Wildlife Habitat ("SWH").

Approximately 10-12 Wild Turkey were observed on lands northwesterly of the subject land. It is likely that the onsite seepage areas in the woodland could provide watering options for the Wild Turkeys. Therefore, FODM5 should be considered SWH.

2.6.2 Mammals

Direct observation or evidence of 7 species was observed on the site (Appendix D). This included White-tailed Deer (Odocoileus virginianus), for which direct observations were made and tracks observed within and adjacent to FOD. Several individual deer were observed foraging in the agricultural field next to FOD during the 2022 field season. All observed species are common and widespread on the landscape.

Three bat SAR, Little Brown Myotis, Northern Myotis and Tri-colored Bat, have potential to occur on the lands adjacent to the proposed development. Several potential bat roosting trees exist along the edge of FODM5. Following a conservative approach, these trees are assumed to represent possible roosting habitat

for SAR bats. These trees are located within the FODM5 and will not be negatively impacted by the proposed development. Impacts to bats that may be using these trees can be avoided through measures such as completing tree removal outside of the bat active period (April 1- September 30) or avoiding tree removal entirely through the use of appropriate setbacks to the forest edge.

2.6.3 Amphibians and Reptiles

Five (5) species were documented on or adjacent to the site during field surveys. It is assumed that all of these species are possible, provable or confirmed breeding with the study area. Refer to Appendix E for a list of amphibious species recorded within the subject property and vicinity.

No rare, threatened, or endangered amphibian species were recorded.

During the field inventories, specific attention was made to look for evidence of turtles specifically snapping turtles. No turtles or evidence of turtles was found onsite. No other reptiles were observed on the site.

2.7 Summary of Environmental Constraints, Planning Designations & Opportunities for Enhancement

Potential environmental constraints and opportunities include the following:

Northwest Woodlot (FODM5)

- This feature is considered Significant Woodland and Significant Wildlife Habitat.
- The area of the feature is approximately 3.5 ha in size.
- Current Designation is Greenland.
- Recommended that Greenland Designation be maintained and opportunities for ecological enhancement exist (additional native plantings within setback areas and in rear yard setbacks).

Wetland (SWM3-1)

- Wetland pocket (inclusion) located within Northwest Woodlot (FODM5).
- Current Designation is Greenland.
- Recommend the appropriate setbacks and ecological enhancements.

Wetland (SWT/SWD)

- Located in the Northeast portion of the site along the northern limits.
- Main N-S watercourse dissects this feature.
- Wetland is approximately 0.1 ha in size.
- Current Designation is Core Greenland.
- Recommended that Core Greenland Designation be maintained and opportunities for ecological enhancement exist (additional native plantings within setback areas and in rear yard setbacks).

Onsite Plantation (WOCM1)

- Located in northern portion of the site.
- Area is a plantation that was planted next to a former gravel pit.
- The plantation connects to the woodland system that extends north of the subject property.
- The plantation is approximately 0.3 ha in size.
- Current Designation is Greenland.
- This plantation may be removed and compensation for removal be provided through ecological restoration` plantings on the site (both in the northern portion next to FOD and in the northwestern portion next to FODM5). Portions of the plantation can be maintained in the rear yard setbacks, subject to the grading plan.

Onsite Plantation (TAGM1)

- This feature is located in the southeast portion of the site.
- The plantation area is situated next to the onsite drainage features.
- The total cumulative size of the plantation patches is approximately 1.0 ha.

- Part of the plantation is included in the Regulated Flood Plain of the GRCA and is subsequently designated Core Greenland.
- Other portions of the plantation are not designated Greenland or Core Greenland, and do not meet the criteria for designation.
- The plantation could be considered for potential open space / parkland and/or as part of the rear lotting for proposed lots. Management of the plantation will be required to ensure a safe, usable open space system.

Onsite Watercourse

- Guidance on the treatment of the onsite watercourses is provided in Aqualogic's report, including opportunities for enhancement. No further discussion of aquatic enhancement considerations is provided in this EIS.

Map 8 illustrates these environmental constraints and opportunities. For the most part, environmental constraints are primarily associated with the woodland/wetland feature that is located northwest of the site. The proposed development concept respects the key natural or semi-natural environmental systems. Appropriate setbacks have been identified on Map 8. The only encroachment occurs in the north-central portion of the site, where approximately 0.3 ha of low-quality habitat (coniferous plantation), i.e., WOCM1, is proposed to be removed to accommodate this development. To offset this loss of trees, it is proposed that the entire northerly property limit be replanted with native trees and shrubs. This planting program will focus on the 7.5 m rear yard setback of the proposed residential lots in this portion of the site. The net result of the proposed ecological enhancement program will be an increase in tree cover, comprised of native species. The total estimated increase in tree cover is over 2.4 ha.

2.8 Summary of Natural Heritage Features and Functions

The following table summarizes the functions associated with site and adjacent land areas

Table 2: Functions Associated with Site and Adjacent Lands

Function	Description/Relationship to Site
Groundwater Recharge	Recharge functions for local aquifer.
Groundwater Discharge	Discharge functions associated with the wetland communities and onsite drains (limited).
Groundwater Quality	Primarily related to the onsite wetlands and onsite drains.
Groundwater Quantity	Primarily related to the onsite wetlands and onsite drains.
Surface Water Storage and Conveyance	Primarily related to the onsite wetlands and onsite drains. As well, the tableland portions of the site (including the sandy hills) provide a recharge function during portions of the year
Surface Water Quality	Primarily related to the onsite wetlands and onsite drains.
Aquatic Habitat	Primarily related to the onsite drains at the southern extent of the site (below the onsite dam).
Terrestrial Habitat	Wetland and Forest lands on the subject land adjacent to site.
Linkages/Corridors	Lands adjacent to Wetland and Forest Systems. Limited function associated with onsite drainage/watercourses.

The reader is directed to the Groundwater Science Corp. report (2023) dealing with the recharge and discharge functions associated with the site. This report provides an overview of the groundwater and surface water functions and potential impacts of the proposed development on these functions.

With respect to aquatic habitat, the report prepared by Aqualogic provides a headwater assessment of the onsite watercourses. No further habitat enhancements are required to maintain aquatic habitat functions.

With regard to enhancements of terrestrial habitat and linkages, it is noted that the area adjacent to the proposed development in the northwest portion of the site is proposed to be enhanced with native tree and shrub plantings. The total area of proposed enhancements is estimated to be 2.7 ha. As a result of the revegetation program, the overall size of the contiguous woodland areas will increase thus enhancing wildlife habitat functions.

3. POTENTIAL IMPACTS OF DEVELOPMENT AND MITIGATION RECOMMENDATIONS

3.1 Potential Direct Impacts

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

Removal of Woodland or Wetland Areas

The proposed development will not result in the removal of any wetland communities. The proposed development will not result in the removal of portions of FODM5 (Polygon 10).

The development design has placed particular emphasis on avoiding natural heritage features and retaining a separation distance from the adjacent natural heritage features. The proposed development concept will focus on the existing agricultural fields and cultural landscape associated with the farmland and a former gravel pit.

The proposed development concept illustrates some limited backlotting into the northeast wetland system. This wetland has been previously disturbed by historic agricultural practices including the excavation of agricultural ditches and the stockpiling of soil in these areas. Appropriate rear yard setbacks have been developed to ensure no further development or grading is permitted adjacent to this wetland community. It is noted however, that the proposed development will result in the partial removal of a plantation, WOCM1. The plantation provides limited habitat functions. WOCM1 is considered distinct and of less ecological value than the more mature off-property woodland area. Provided that various recommended construction-stage and post-construction mitigation measures are implemented, as well as ecological enhancement and monitoring measures, no negative impacts to the off-property Significant Woodland area were anticipated as a result of the proposed development.

It is recognized that a pathway/trail system has been proposed in the northwest portion of the site. The trail will follow an existing skidder trail that his been used for decades for the movement of machinery. Where the trail crosses the wetland community, it is proposed that an elevated boardwalk be constructed. To a large extent, very few trees will need to be removed to facilitate construction of this trail system. It is recommended that as part of the subdivision approval process, the final delineation of the trail be set out as condition of draft plan approval. The routing of the trail will be completed to the satisfaction of municipal staff. If an agreement on routing and construction of the trail cannot be reached with municipal staff, the trail concept can be adjusted or removed entirely.

Disruption of Surface Water Flow to the Wetland Areas

The proposed development will not significantly alter surface water contribution to any adjacent wetland areas. These wetlands are located upgradient of the development area and disturbance of the sub-catchment area for these wetlands will not be altered. The stormwater design and the grading plan proposed for the development have emphasized the need to replicate existing drainage patterns as much as possible.

Removal of Wildlife or Aquatic Habitat

The proposed development will not result in the removal or disruption of wildlife or aquatic habitats. The proposed lots will remain setback from natural heritage features in the northwest portion of the site, thus ensuring that wildlife and aquatic habitat functions are retained. For lots that include portions of the

northeast wetland, restrictive zoning Environmental Protection (EP) is proposed to ensure that these areas are not disturbed. Also, rear yard setbacks for these lands will help to ensure separation from the development to the wetland edge. The individual site grading plans for these lots will be prepared to ensure that the setbacks are regarded. The Landscaping program for these lots will be developed to ensure that the setback areas are revegetated with biologically appropriate native trees and shrubs.

Summary of Direct Impacts

The proposed development will not result in any significant direct impacts on natural heritage functions.

3.2 Potential Indirect Impacts

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

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

Effects on Offsite Fish Habitat

Immediately south of the site, at the WR 19 culvert, background information from the GRCA indicates the presence of a variety of fish species. The proposed development is well separated from fish habitat associated with Belwood Lake. The intervening lands between the subject lands and Belwood Lake are included in the built- up area of the Hamlet of Belwood.

The main types of impacts that could occur on the fish habitat relate to decreased water quality, primarily associated with suspended sediments and nitrate loadings. The potential for increased nitrate loads into the creek system is not a significant concern given that proposed development will utilize septic systems with tertiary treatment systems specifically designed for enhanced nitrate removal. It is anticipated that the nitrate loadings from the residential development will be lower than the agricultural practices on the site. In addition, the proposed development contemplates limited site grading and any sediment can be contained by proper erosion control measures. As a condition of draft plan approval, an Erosion and Sediment Control Plan will be developed by the consulting engineer and implemented from the outset of construction.

Surface Water Storage and Conveyance

A primary concern is focused on the surface water storage and conveyance impacts associated with development on the subject property. To accommodate these types of concerns, particular emphasis was placed on stormwater management, i.e., at-source infiltration of water, limiting the amount of onsite grading through the implementation of a semi-urban cross-section for the internal road design. It is noted that site soils are well-drained. Therefore, the proposed development is not anticipated to have significant impact on the existing surface water storage and conveyance functions on the site.

Ground Water Recharge and Discharge

The ground water recharge functions of the site will remain the same or increase as a result of the proposed development. The onsite wetlands are well separated from the proposed development and will not be altered. The use of infiltration methods to control surface water runoff will assist in enhancing this function.

Environmental Linkages and Corridors

The setback areas for existing natural heritage features are proposed to be replanted with native trees and shrubs thus enhancing natural habitat and linkage functions. All wildlife habitat values associated with the local area are attributed to natural and semi-natural systems located on the perimeter of the proposed development.

Summary of Indirect Impacts

The proposed development is not anticipated to result in indirect impacts on natural heritage features and functions. Ecological enhancements are recommended to improve habitat and linkage functions. Potential improvements to onsite drainage features have been introduced in the Aqualogic report. Standard sediment control measures will be documented as a condition of draft plan approval and implemented during the construction program for the site (I.e., silt ponds and silt fence).

3.3 Mitigation and Enhancement Recommendations

In summary, the main method of minimizing impacts on the natural environment is through avoidance and enhancement. Design emphasis has been placed on avoiding significant natural heritage features associated with the site and also enhancing features and landscape linkages.

Setbacks

The setbacks are described as follows:

- A 30 m setback from the wetland communities in the northwest of the site has been used, except for lot 64 as described below.
- The rear lot line for lot 64 has been established at a distance of 15 m from the adjacent wetland. This setback is considered reasonable given that the wetland unit is defined by an existing agricultural ditch. When combined with a 7.5 m rear yard setback, the adjacent wetland community is protected by a cumulative 22.5 m setback. The intervening area can be reforested with native trees and shrubs.
- A 10 m setback from the dripline of the forest community in the northwest portion of the site has been established.
- Proposed lots 70, 71, 92 and 93 include the small wetland feature in the northeast portion of the site. The lot lines extend to the drain. The reason for this lot configuration is to avoid creating a small, isolated block that would need to be in public ownership. To ensure that there are no impacts on this wetland feature, a 20 m setback has been recommended. This setback will help to ensure that impacts on the adjacent wetland feature are minimized. No development or disturbance will occur within the setback area.
- The rear lot lines for lots 46, 47, and 57 are established at a location of 10 m from the dripline of the adjacent forest. When combined with a 7.5 m rear yard setback, the adjacent forest will be protected by a cumulative 17.5 m setback. The intervening area will be reforested with native trees and shrubs.
- A portion of the westerly side yard of lot 58 has been established at 7.5 m from the adjacent woodlot. This intervening area is highly disturbed with excavation activities associated with digging ditches and subsurface drainage works. A reduced setback is considered reasonable in this location.

As previously noted, the southerly and easterly portions of the onsite woodlot (FODM5) should be re-forested with native trees and shrubs. The size and type of ecological plantings should be explored in a Vegetation Management Plan to be prepared as a condition of Draft Plan of Subdivision.

Public Education

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

- Signage identifying the wetland area and forest system;
- A general information package on the responsibilities of living next to natural areas, pet control,

disposal of household/yard waste and excess yard fill and dealing with wildlife.

Landscaping

The landscaping program (i.e., vegetation management) for the proposed development is to be planned, with input from the Township of Centre Wellington, by a qualified Landscape Architect. The landscaping program for the site should include, as a minimum, the following: The use of biologically appropriate native vegetation for all tree and shrub species.

- The development of appropriate rear yard plantings along WR 19.
- The use of Open Space blocks, including an active trail system within the proposed development that is connected to the Hamlet of Belwood.
- The utilization of species in the rear lawns that are low maintenance and require minimal irrigation.

Monitoring

Pre-construction monitoring should focus on the following activities related to site preparation and regular:

- Installation/inspection of silt fencing.
- Silt fencing should be installed to mark the limits of site disturbance.
- Sediment and Erosion Control and Monitoring.

These activities are normally a part of the construction program and set out in a Sediment and Erosion Control Plan for stormwater management prepared by the site engineers. Monitoring of silt fencing and silt ponds will be an ongoing requirement.

Some vegetation along the north-south watercourse may need to be removed to facilitate site grading and/or construction of the stormwater management facility. Consideration of appropriate vegetation in the stormwater management areas will be addressed at the final stage. The limits of disturbance and construction protocols will be set out in a Site Alteration Permit, approved by the GRCA. This will be a condition of development.

Post construction monitoring will include sediment and erosion controls, as well as monitoring the health of planted vegetation (as part of the Vegetation Management program). Normal varieties for planted landscape materials should result in maintaining plant health for native trees and shrubs.

A Tree Inventory and Management Plan should be completed for WOCM1 and the remaining plantations that will be used for open space (Parks) systems. Recommendations from the Tree Management component will help to guide replacement plantings on the site and establishing appropriate work windows for tree removal to avoid breeding bird and active bat periods (i.e., April 1 to September 30).

3.4 Net Environmental Effects

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

(Note, the removal of 0.3 ha of plantation that is designated Greenlands in the County OP. This is to be offset by 2.7 ha of native tree and shrub plantings which could result in a net positive impact.)

Table 3: Net Environmental Impacts – Belwood

Ecological Function	Area Affected	Potential Effect	Mitigation	Net Effect
Groundwater Recharge	Recharge areas include most of the site.	Minimal	Stormwater management plan to replicate or enhance water recharge. Road profile for internal road to utilize infiltration potential to improve recharge and limit surface water discharge.	No negative impact
Groundwater Discharge	Discharge areas include wetland/seepage zones in the northwest woodland and the onsite drains.	Minimal	Enhanced infiltration, i.e., lot level controls	No negative impact
Water Quality	Drains/watercourses and wetland areas to a lesser extent	Minimal	Tertiary treatment systems to reduce Nitrogen loading on offsite areas. Nutrient loading to be reduced, as compared to agricultural systems. Implementation of vegetated buffers and erosion/sediment control measures to maintain or improve water quality. Onsite landscaping and Vegetation Management Plan to assist in nutrient uptake.	No negative impact, possible positive impact
Surface Water Storage and Conveyance	Onsite watercourses/drains and wetland areas	Minimal	Areas to be avoided where possible and development to be setback from these areas. Storage and Conveyance functions to be protected with maintenance of existing forest cover, vegetated buffers and ecological plantings.	No negative impact
Aquatic Habitat	Onsite watercourses/drains	Minimal	Fluvial geomorphological study conducted to identify significance of onsite watercourses/drains. North-South drain to be enhanced to provide for improvement in aquatic habitat and to enhance surface water storage function.	No negative impact and possible positive impact
Terrestrial Habitat	Wetland and Woodland Areas	None	Development envelopes to avoid wetland and woodland areas. Zoning setbacks to be drafted to ensure construction does not occur within woodland systems. Vegetated buffers to be implemented. Potential ecological enhancement areas identified.	No negative impact and possible positive impact
Linkages and Corridors	Lands adjacent to Wetland and Woodland Areas	Minimal	Potential ecological enhancement areas have been identified and could improve the overall connectivity of the site to adjacent natural heritage features.	No negative impact and possible positive impact

RECOMMENDATIONS AND CONCLUSIONS

Stovel and Associates Inc. were retained by BelCal Inc. to complete an Environmental Impact Study for a proposed residential subdivision in the Hamlet of Belwood (Township of Centre Wellington). As part of the approval process for the proposed development, a Zoning By-law Amendment and Plan of Subdivision are needed. Given the site's proximity to significant natural heritage features, primarily a significant forest community in the northwest portion of the site, an Environmental Impact Study is a requisite study requirement *(Township of Centre Wellington Official Plan. 1999, Revised June 1, 2022- Policy E.1.3 – Pages 59 & 60)*.

The ecological recommendations for the proposed development include the following:

- No development in existing forest/wetland community located in the northwest portion of the site.
- The use of appropriate setbacks to protect significant natural heritage features.
- The removal of 0.3 ha of a portion of a coniferous plantation (WOCM1) in the north-central portion of the site.
- To offset the loss of the coniferous trees in this plantation, ecological enhancements and additional tree and shrub plantings are proposed. The documentation of the planting program can be set out in Vegetation Management Plan. It is estimated that an overall net increase in the tree cover on the site will be over 2.4 ha.
- Maintenance of a 10 m setback from the dripline of adjacent woodlands north of the site.

- Incorporation of mandatory rear yard setbacks of 7.5 m in the proposed residential zoning for the subdivision. In areas next to natural heritage features, this 7.5 m rear yard setback would be planted with native trees and shrubs.
- The maintenance of existing plantations in the southern portion of the site. The proposed lot fabric has been designed to use these existing plantations as part of the rear yard setback/planting zone and/or used as part of the proposed onsite open space system.
- Public awareness education program set out in an environmental stewardship manual that will be prepared as a condition of draft plan approval.
- Erosion and sedimentation control.
- Monitoring program.

With the implementation of these recommendations, in conjunction with the recommended measures described in the Stormwater Management Plan, it is concluded that the proposed development will not result in any negative impacts on provincially significant natural heritage features or functions.

Sources:
Parcel Fabric: Wellington County, 2020. Teranet, 2002.
Orthophotography: MNR, 2010.
May include material ©2021 The Queen's Printer for Ontario, County of Wellington and the Grand River Conservation Authority.

Date Saved: 2023-03-06 5:10:20 PM

Site Location	Map 1

Part of Lot 12, Concession 7
Wellington County, Township of Centre Wellington
Environmental Impact Study

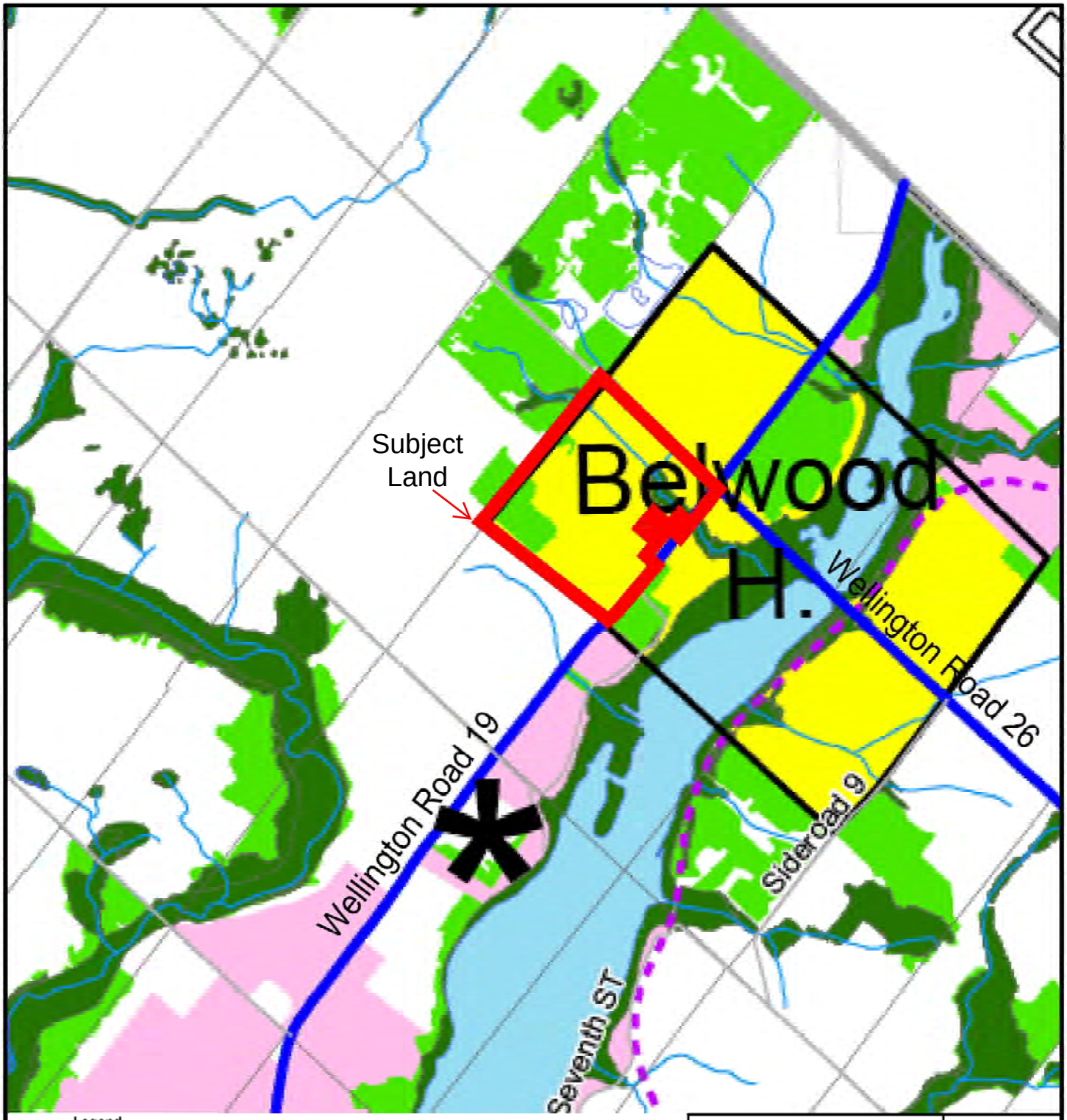
Stovel and Associates Inc.
651 Orangeville Road, Fergus On
N1M 1T9
P: 519-766-8042
E: stovel.associates@outlook.com

Client: BelCal Inc. | Date: 10-04-2023

N
W E
S

0 125 250 Meters

Scale: 1:7,000



Legend

The Greenlands System
- Core Greenlands
- Greenlands
- Earth Science ANSI

The Rural System
- Prime Agricultural
- Recreational
- Rural Employment Area
- PA Policy Area
- Community Planning Study Area

The Urban System
- H. Hamlet Area
- U.C. Urban Centre

Other
- Trail
- Landfill Site
- Montrose Water Management Protection Area
- Grand River Crossing
- D Deferral
- County Roads
- Provincial Highways
- Built Boundary

PDF Taken from The Wellington County Official Plan *Schedule A-1 "Centre Wellington"*.

County of Wellington Official Plan Land Use Designation | Map 2

Part of Lot 12, Concession 7
Wellington County, Township of Centre Wellington
Environmental Impact Study

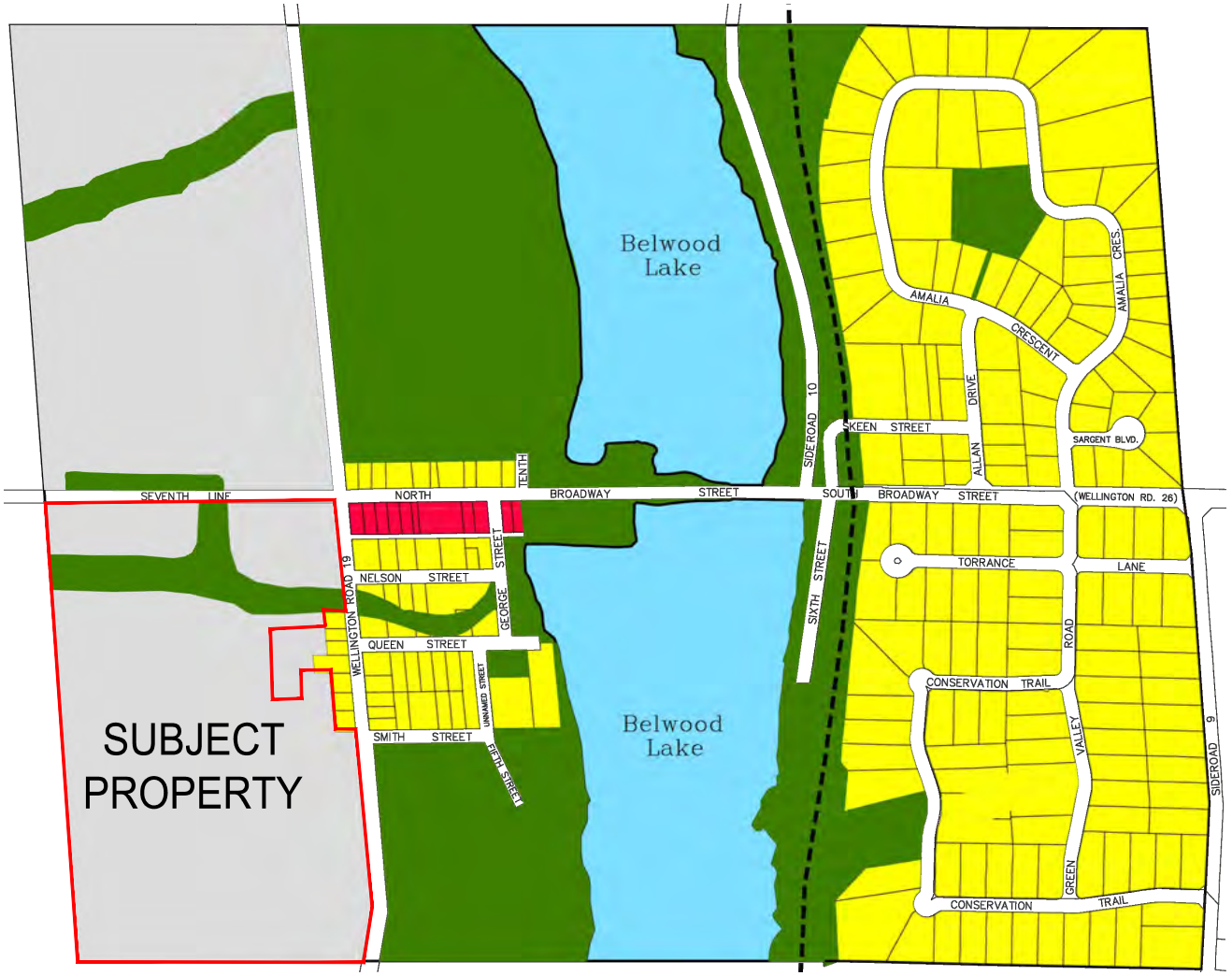
SAI Stovel and Associates Inc. 651 Orangeville Road, Fergus On N1M 1T9
P: 519-766-8042
E: stovel.associates@outlook.com

Client: BelCal Inc. | Date: 12-29-2022

N W E S

0 400 800 Meters

Scale: 1:20,000



LEGEND:
EXISTING DESIGNATIONS

- RESIDENTIAL LANDS
- CENTRAL BUSINESS DISTRICT
- GREEN SPACE
- FUTURE DEVELOPMENT
- URBAN CENTRE LIMITS
- TRAIL

Township of Centre Wellington Land Use Plan	Map 3

Part of Lot 12, Concession 7
Wellington County, Township of Centre Wellington
Environmental Impact Study

Stovel and Associates Inc.
651 Orangeville Road, Fergus On N1M 1T9
P: 519-766-8042
E: stovel.associates@outlook.com

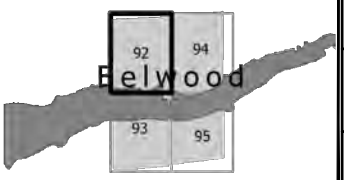
Client: BelCal Inc. | Date: 10-04-2023

0 200 400 Meters
Scale: Approx 1:10,000

PDF Taken from The Township of Centre Wellington *Schedule A-2 "Land Use Plan Belwood"*. Derived by Stovel and Associates Inc.

PDF Taken from The Township of Centre Wellington Zoning By-Law *Schedule A - Map 92 "Belwood"*. PDF Derived by Stovel & Associates Inc.

Zone Boundary
Environmental Protection
Environmental Protection Overlay
Heritage Area Overlay
Parcel Fabric
Floodplain
Flood Fringe
Waterbody
Watercourse
Road



Zoning By-Law: Schedule "A"	Map 4

Part of Lot 12, Concession 7
Wellington County, Township of Centre Wellington
Environmental Impact Study

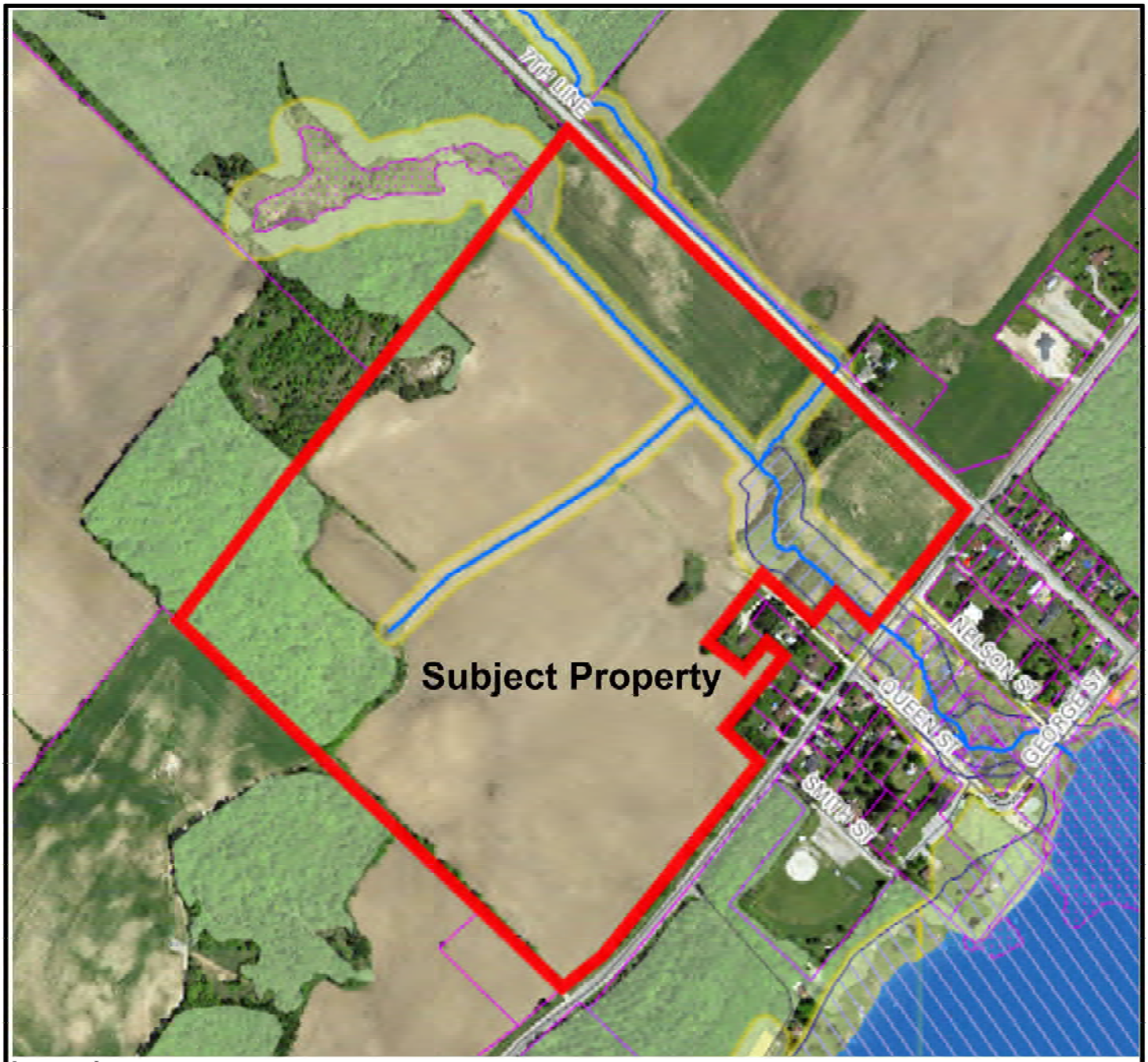
Stovel and Associates Inc.
651 Orangeville Road, Fergus On
N1M 1T9
P: 519-766-8042
E: stovel.associates@outlook.com

Client: BelCal Inc. | Date: 10-04-2023

0 100 200 Meters

Scale: 1:5,000

Path: O:\DATA_ENTERPRISE\ZONING\ARPA\Zoning_ByLaw_Maps\Zoning_ByLaw_Maps.aprx



Legend

- Regulation Limit (GRCA)
- Floodplain (GRCA)
  - Engineered
  - Estimated
  - Approximate
- Floodplain - Special Policy Area (GRCA)
- Slope Erosion (GRCA)
  - Steep
  - Oversteep
  - Toe
- Slope Valley (GRCA)
  - Steep
  - Oversteep
- Regulated Watercourse (GRCA)
- Regulated Waterbody (GRCA)
- Wetland (GRCA)
- Parcel - Assessment Public (MPAC/MNRF)
- Wooded Area (MNRF)
- **Subject Property**

Imagery Provided by Grand River Conservation Authority, 2022

GRCA Natural Features	Map 5

Part of Lot 12, Concession 7
Wellington County, Township of Centre Wellington
Environmental Impact Study

Stovel and Associates Inc.
661 Orangeville Road, Fergus On N1M 1T9
P: 519-766-8042
E: stovel.associates@outlook.com

Client: BelCal Inc. | Date: 03-08-2023

N W E S

0 125 250 Meters

Scale: 1:6,500

Map 6
Vegetation Communities

6640 Seventh Line/59 Wellington Road 19 Belwood, Ontario
Part of Lot 12, Concession 7
Geographic Township of West Garafraxa
Township of Centre Wellington
County of Wellington
PIN 71132-0234 (Part 1)

Polygon No.	Description of Vegetation Community
1	WOCM1 - Dry-Fresh Coniferous Woodland Ecosite
2	SWT/SWD - Thicket Swamp and Deciduous Swamp
3	THMM2 - Fresh-Moist Mixed Thicket Ecosite (Drain)
4	WODM5 - Fresh-Moist Deciduous Woodland Ecosite
5	WOCM1 - Dry Fresh Coniferous Woodland Ecosite
6	FOD - Deciduous Forest
7	SWT/SWD - Thicket Swamp / Deciduous Swamp
8	THDM2 - Dry-Fresh Deciduous Shrub Thicket Ecosite (Former)
9	SWM3-1 - Yellow Birch-Conifer Mineral Mixed Swamp Type
10	FODM5 - Sugar Maple Deciduous Forest Ecosite
11	TAGM5 - # 1 - Medium Mineral Fencerow Type
12	TAGM5 - # 2 - Medium Mineral Fencerow Type
13	CVR_3 Single Family Residential and CVR_4 Rural property
14	TAGM1 - Medium Mineral Coniferous Plantation Type
15	MEMM 3 - Dry - Fresh Mixed Meadow Ecosite
16	MEMM4 - Fresh-Moist Mixed Meadow Ecosite (Drain)
17	TAGM 1 - Medium Mineral Coniferous Plantation Type
	OAGM1 - Annual Row Crop

Legend

- Subject Property
- Regulated Watercourse
- 120m Site Boundary
- Limit of Vegetation Unit
- Dug Pond

Client: BelCal Inc.

Stovel and Associates Inc.
651 Orangeville Road,
Fergus ON
N1M 1T9
P: 519-766-8042
E: stovel.associates@outlook.com

Sources:

1. Topographical Information retrieved from GRCA Mapping & Van Harten (2022).
2. Satellite imagery retrieved from (2022) Microsoft Corporation.
3. Wetland Limits Confirmed by GRCA 2022. Surveyed Limits are Displayed on This Figure.

Date : 10/04/2023

0 100 200 Meters

Scale 1:3500

Group/Block	Area (±)	Land Use
Group A	4.22ha	Residential Lots
Group B	2.60ha	Residential Lots
Group C	6.12ha	Residential Lots
Group D	4.88ha	Residential Lots
Group E	2.16ha	Residential Lots
Group F	3.30ha	Residential Lots
Group G	2.49ha	Residential Lots
Block I	3.32ha	Open Space / Landscaped Area / Environmental Enhancements
Block J	1.42ha	Stormwater Management Facilities
Block K	0.26ha	Path / Trail
Block L	3.50ha	Existing Forest
Block M	5.28ha	Proposed Roadway
Block N	0.8ha	Existing Wooded Area

Group	Lot #'s	Average Lot Size (m^2) (±)	Minimum Lot Size (m^2) (±)	Minimum Lot Frontage (m) (±)
Group A	1-20	2111.46	1932.31	22.0
Group B	21-32	2165.80	2046.35	32.0
Group C	33-57	2449.11	2028.40	24.0
Group D	58-76	2569.63	2062.80	22.0
Group E	77-86	2163.88	2033.04	28.0
Group F	87-99	2541.14	2036.57	21.0
Group G	100-107	3117.36	2059.07	22.0

Map 7
Conceptual Plan

6640 Seventh Line Belwood, Ontario
Lot 12, Concession 7
Township of Centre Wellington
County of Wellington

Notes

1. All Coordinates Were Determined Using NAD83 CSRS - Zone 17.
2. Structural Locations Have Not Been Confirmed.
3. This is Not a Plan Of Survey.
4. Locations of Natural Features Have Been Extracted From The Government of Ontario: Land Information Ontario Open Data.
5. Aerial Imagery Provided By Microsoft Corporation @ 2022 Maxar CNES (2022) Distribution Airbus DS.
6. Distances Shown on This Plan Are Adjusted Ground Distances and Can Be Converted To Grid Distances by Multiplying by An Averaged Combined Scale Factor of 0.999636.
7. Coordinates on This Plan Are UTM, ZONE 17, NAD83 (CSRS-2010) Adjustment and Are Based on GPS Observations From a Network of Permanent GPS Reference Stations.

Legend

- Subject Lands
- Existing Lot Line
- Proposed Lot Line
- Proposed Roadway
- Open Space / Parkland / Environmental Ehancements
- Proposed Path / Trail
- Proposed Stormwater Management Facility
- Environmental Buffer
- Watercourse (G.R.C.A)
- Wetland (G.R.C.A)
- Floodplain (G.R.C.A)
- Wooded Area
- Existing Hard Wood Bush
- Lands Not Part Of Development
- Meander Belt (WSP)
- Hydro Pole
- Proposed Regulatory Limit

Client: Belcal Inc.

Stovel and Associates Inc.
651 Orangeville Road,
Fergus ON
N1M 1T9
P: 519-766-8042
E: stovel.associates@outlook.com

DRAFT

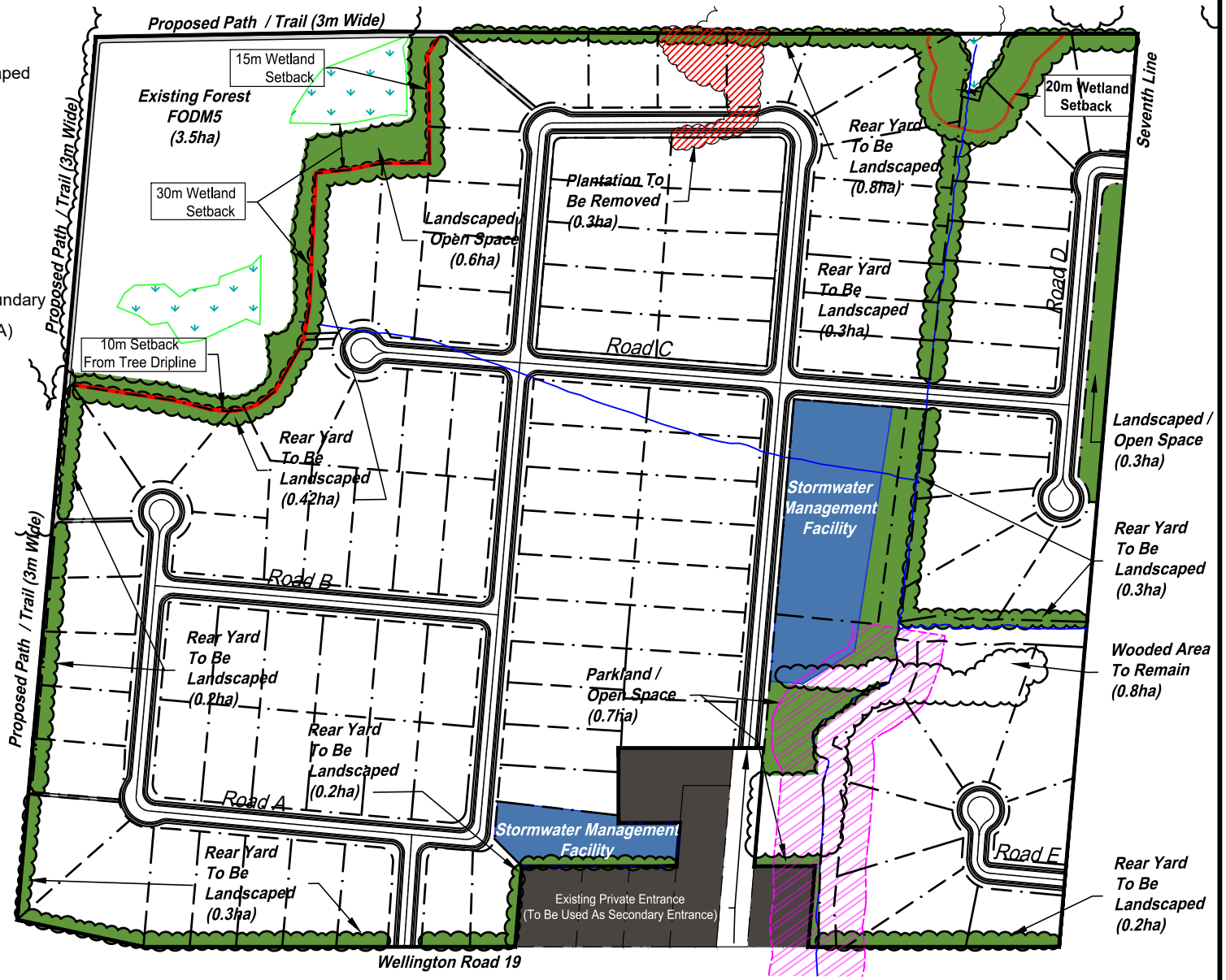
Date : 08/21/2023

0 100 200 Meters

Scale 1:3000

Legend

- Subject Lands
- Parcel Fabric
- Open Space / Landscaped Area
- Area of Removal
- Proposed Path / Trail
- Proposed Stormwater Management Facility
- Environmental Buffer
- Watercourse / Drain
- Surveyed Wetland Boundary
- Floodplain Limit (GRCA)
- Wooded Area
- Lands Not Part Of Development



Notes

1. All Coordinates Were Determined Using NAD83 CSRS - Zone 17.
2. Structural Locations Have Not Been Confirmed.
3. This is Not a Plan Of Survey.
4. Locations of Natural Features Have Been Extracted From The Government of Ontario: Land Information Ontario Open Data.
5. Aerial Imagery Provided By Microsoft Corporation @ 2022 Maxar CNES (2022) Distribution Airbus DS.
6. Distances Shown on This Plan Are Adjusted Ground Distances and Can Be Converted To Grid Distances by Multiplying by An Averaged Combined Scale Factor of 0.999636.
7. Coordinates on This Plan Are UTM, ZONE 17, NAD83 (CSRS-2010) Adjustment and Are Based on GPS Observations From a Network of Permanent GPS Reference Stations.

0 75 150 Meters

Scale 1:4000

Environmental Net Benefits	Area (ha)
Ecological Plantings	± 2.7 ha
Proposed Removal	± 0.3 ha
Overall Net Gain	± 2.4 ha

Map 8 Environmental Constraints & Enhancements

6640 Seventh Line
Belwood, Ontario
Lot 12, Concession 7
Township of Centre Wellington
County of Wellington

Stovel and Associates Inc.
651 Orangeville Road,
Fergus ON
N1M 1T9
P: 519-766-8042
E: stovel.associates@outlook.com

APPENDIX A

VEGETATION COMMUNITY CHART

Polygon #	ELC Ecosite Type	ELC Description	Environmental Characteristics
1	**WOCM1**	**Dry-Fresh Coniferous Woodland Ecosite**	This polygon consists of a cultural plantation of White Spruce and Norway Spruce which is on adjacent lands north of the site. Vegetation found within this polygon consists of: • Trees: White Spruce, Norway Spruce, Basswood, Aspen Poplar, Apple. • Shrubs: Red Osier Dogwood, Chokecherry, Downy Hawthorn, Highbush Cranberry, Wild Red Raspberry. • Forbs and Grasses: Wild Carrot, Field Horsetail, Foam Flower, Virginia Creeper, Wild Strawberry, Woodland Strawberry, Purple Vetch, Canada Goldenrod, Gray Goldenrod, New England Asters, Purple-stemmed Aster, Rough Cinquefoil, Rye Grass, Mullein, Common Dandelion, Birds Foot Trefoil. Dense areas of Field Horsetail were noted in wetter soils approaching stream, Ostrich Fern, White Baneberry.
2	**SWT/SWD**	**Thicket Swamp and Deciduous Swamp**	Vegetation found in this unit is: • Trees: America Elm, Aspen Poplar, Basswood, E. White Cedar, Manitoba Maple, Balsam Poplar, Apple. • Shrubs: Red Osier Dogwood, Downy Hawthorn, Highbush Cranberry, Missouri Willow, Wild Red Raspberry, Bush Honeysuckle. • Forbs and Grasses: Little White Aster, New England Aster, Canada Goldenrod, Gray Goldenrod, Brown-eyed Susan, Wild Carrot, Honeysuckle, Common Mullein, Alfalfa, mosses on ground surface in wet soils, Rough Cinquefoil, Evening Primrose, Goatsbeard, Purple Vetch, Sow Thistle, Common Dandelion, Foam Flower.
3	**THMM2**	**Fresh-moist Mixed Thicket Ecosite**	Vegetation found within this polygon consists of: • Trees: Aspen Poplar, Manitoba Maple, Balsam Poplar, Basswood, feral Apple • Shrubs: Chokecherry, Wild Red Raspberry, Highbush Cranberry, Red Osier Dogwood • Forbs and Grasses: Wild Carrot, Field Horsetail, Colts Foot, Jewelweed, Teasel, Common Plantain, Field Mustard, Canada Thistle, Golden Alexander, Orchard Grass, Marsh Marigold, Curly Dock, Oxeye Daisy, Common Buttercup, Daisy Fleabane, Common Mullein, Field Horsetail, Catnip, Common St. John's Wort, Canada Hawkweed, Spotted Joe-Pye-Weed, Woolgrass, Broad-leaved Cattail, Path Rush
4	**WODM5**	**Fresh-Moist Deciduous Woodland Ecosite**	Vegetation found within this feature is: • Trees: Norway Spruce, Aspen Poplar, Green Ash, Sugar Maple, Basswood, Eastern White Cedar, American Elm, Apple, White Birch • Shrubs: Red Osier Dogwood, Chokecherry, Wild Black Currant, Bush Honeysuckle, Highbush Cranberry, Virginia Creeper, Downy Hawthorn, Riverbank Grape, Common Elderberry • Forbs and Grasses: Little White Aster, New England Aster, Canada Goldenrod, Gray Goldenrod, Brown-eyed Susan, Wild Carrot, Mullein, Alfalfa, Field Horsetail, Foam Flower, Birdsfoot Trefoil, Wild Strawberry, Purple Vetch, Rough Cinquefoil, Rye Grass, Panic Switch Grass, Reed Canary Grass, Wild Carrot, Common Mullein, Common Dandelion, Ostrich Fern, Green Ash, Blue Cohosh, Brown-eyed Susan, Purple Vetch, Teasel, Canada Thistle, Evening Primrose, Coltsfoot, Goatsbeard
5	**WOCM1**	**Dry-Fresh Coniferous Woodland Ecosite**	Vegetation found within this polygon consists of: • Trees: Norway Spruce, Balsam Poplar, Balsam Poplar, Scots Pine, White Spruce, Black Walnut, White Pine

			• Shrubs: Wild Red Raspberry, Riverbank Grape • Forbs and Grasses: Orchard Grass, Panic Switch Grass, Rye Grass, Common Mullein, Bladder Campion, Canada Hawkweed, Oxeye Daisy, Little White Aster, Canada Goldenrod, Gray Goldenrod, Mullein, Goatsbeard, Purple Vetch, Black Medick, Creeping Thyme, Antennaria sp., Alfalfa, Wild Strawberry, Daisy Fleabane, Bladder Campion, Common Plantain, Common Milkweed, Rye Grass, Common St. John's Wort, Wild Cucumber, Field Horsetail, Morning Glory, Common Viper's bugloss, Evening Primrose, Pearly Everlasting, Everlasting species, Wild Basil, Field Pussytoes, Panic Switch Grass.
6	**FOD**	**Deciduous Forest**	Vegetation found within this feature is: • Trees: Scots Pine, Norway Spruce, Aspen Poplar, Green Ash, Sugar Maple, Basswood, Eastern White Cedar, American Elm, Black Cherry, feral Apple • Shrubs: Red Osier Dogwood, Chokecherry, Wild Black Currant, Bush Honeysuckle, Highbush Cranberry, Virginia Creeper, Downy Hawthorn • Forbs and Grasses: Little White Aster, New England Aster, Canada Goldenrod, Grey Goldenrod, Brown-eyed Susan, Wild Carrot, Alfalfa, Field Horsetail, Foam Flower, Birdsfoot Trefoil, Wild Strawberry, Vetch, Canada Goldenrod, Gray Goldenrod, Little White Aster, Rough Cinquefoil, Rye Grass, Panic Switch Grass, Reed Canary Grass, Wild Carrot, Common Mullein, Common Dandelion, Ostrich Fern, Blue Cohosh, Brown-eyed Susan, Purple Vetch, Common Plantain, Evening Primrose, Virginia Creeper.
7	**SWT/SWD**	**Thicket swamp / Deciduous Swamp**	Vegetation found within this polygon consists of: • Trees: Sugar Maple, Green Ash, feral Apple, Aspen Poplar, Silver Maple, Black Walnut, White Birch, Manitoba Maple • Shrubs: Common Buckthorn, Wild Red Raspberry, Chokecherry, Bush Honeysuckle, Shining Willow, Downy Hawthorn • Forbs and Grasses: Little White Aster, New England Aster, Canada Goldenrod, Grey Goldenrod, Canada Hawkweed, Smooth Brome, Common Milkweed, Reed Canary Grass, Panic Switch Grass, Spotted Joe Pye Weed, Evening Primrose, Wild Carrot, Zig Zag Goldenrod, Purple-stemmed Aster, Wild Strawberry.
8	**THDM2**	**Dry-Fresh Deciduous Shrub Thicket Ecosite (Former)**	Vegetation found within this polygon consists of: • Trees: Green Ash (dead), Black Cherry (dead) • Shrubs: Red Osier Dogwood, Wild Red Raspberry, Highbush Cranberry, Riverbank Grape • Forbs and Grasses: Wild Carrot, Colts Foot, Jewelweed, Teasel, Common Plantain, Field Mustard, Canada Thistle, Orchard Grass, Curled Dock, Oxeye Daisy, Common Buttercup, Field Horsetail, Catnip, Panic Switch Grass, Rye Grass, Reed Canary Grass, Daisy Fleabane, Common Milkweed, Evening Primrose, Common Mullein, Little White Aster, Wild Strawberry.
9	**SWM3-1**	**Yellow Birch – Conifer Mineral Mixed Swamp Type**	Vegetation found within this polygon consists of: • Trees: Trembling Aspen, Balsam Poplar, Silver Maple, Apple, Sugar Maple, Manitoba Maple, Black Cherry, Yellow Birch, Eastern Hemlock, Eastern White Cedar, Red Maple, Mountain Maple, Green Ash, White Ash. • Shrubs: Shining Willow, Red Osier Dogwood, Common Buckthorn, Downy Hawthorn, Alternate-leaved Dogwood, Swamp Dewberry. • Forbs and Grasses: Smooth Brome, Common Milkweed, Wild Carrot, Sensitive Fern, Teasel, Purple Vetch, Oxeye Daisy, Jewelweed, New England Aster, Little White Aster, Purple Loosestrife, Spinulose Woodfern, White Baneberry, Bladder Campion, Canada Goldenrod, Common Blue Violet, Green Bog Orchid, Pennsylvania Sedge, White Avens, Canada Goldenrod.

10	**FODM5**	**Sugar Maple Deciduous Forest Ecosite**	Vegetation found within this polygon consists of: • Trees: Sugar Maple, American Beech, Black Cherry, Hop Hornbeam, Green Ash, Basswood, Aspen Poplar, Balsam Poplar, American Mountain Ash, Bitternut Hickory, Eastern Hemlock, Yellow Birch, Eastern White Cedar, Red Maple, White Ash. • Shrubs: Red Osier Dogwood, Alternate-leaved Dogwood, Chokecherry, Wild Red Raspberry, Smooth Gooseberry, Virginia Creeper, Bebb's Willow. • Forbs and Grasses: Herb Robert, Yellow Avens, White Baneberry, Sensitive Fern, Beggar Ticks, Red Trillium, White Trillium, Sharp-lobed Hepatica, Jewelweed, Field Horsetail, Round-lobed Hepatica, Common Blue Violet, Downy Yellow Violet, Wild Lilly of the Valley, Wild Strawberry, Virginia Waterleaf, Canada Goldenrod, Gray Goldenrod, Little White Aster, New England Aster, Smooth Brome, Orchard Grass, Wild Carrot, Colts Foot, Purple Vetch, Sensitive Fern, Ostrich Fern, Ebony Spleenwort, Spinulose Woodfern, Marginal Wood Fern, Bebb's Sedge, Pennsylvania Sedge, Jack In The Pulpit, Wild Ginger, Muhly's Sedge, Blue Cohosh, Wild Carrot, Smooth Goose Berry, Weak-stemmed Wood Sedge, Common Wood Sedge, Greater Bladder Sedge, Graceful Sedge, Curly-styled Wood Sedge, Common Woodland Sedge, Common Buttercup, Wild Leek, Yellow Avens, Common Beggar Ticks, Common Blue Violet, Bladder Campion, Smooth Brome, Orchard Grass, Coltsfoot, Bracken Fern, Wild Lily of the Valley, Trout Lily, Running Strawberry Bush
11	**TAGM5 - # 1**	**Medium Mineral Fencerow Type**	Vegetation found within this polygon consists of: • Trees: Sugar Maple, Black Cherry, Eastern White Cedar, Yellow Birch, Aspen Poplar, Norway Spruce, American Mountain Ash, Apple. • Shrubs: Downy Hawthorn, Alternate-leaved Dogwood, Red Osier Dogwood, Bush Honeysuckle, Highbush Cranberry, Choke Cherry, Common Elderberry, Wild Red Raspberry, Virginia Creeper, Riverbank Grape, Wild Rose. • Forbs and Grasses: Smooth Brome, Orchard Grass, Sensitive Fern, Jewelweed, Ostrich Fern, Curled Dock, Daisy Fleabane, Little White Aster, New England Aster, Canada Goldenrod, Gray Goldenrod, Yellow Avens, Wild Carrot, Purple Vetch, Common Burdock, Canada Thistle, Teasel.
12	**TAGM5 - # 2**	**Medium Mineral Fencerow Type**	Vegetation found within this polygon consists of: • Trees: Silver Maple. • Shrubs: - none inventoried. • Forbs and Grasses: Oxeye Daisy, Wild Carrot, Goats Beard, Little White Aster, New England Aster, Canada Goldenrod, Gray Goldenrod, Orchard Grass, Smooth Brome, Common Milkweed, Field Horsetail, Reed Canary Grass.
13	**Mixture of CVR_3 & CVR_4**	**Mixture of Single Family Residential and Rural property**	Vegetation found within this polygon consists of: • Trees: Norway Spruce, Eastern White Cedar, Sugar Maple, Basswood, Black Cherry, Aspen Poplar, Manitoba Maple, American Mountain Ash, Black Walnut. • Shrubs: Choke Cherry, Red Osier Dogwood, Virginia Creeper. • Forbs and Grasses: Smooth Brome, Celandine, Burdock, Black Nightshade, Goat's Beard, Common Buttercup, Day Lily, Common Mallow, Pineapple Weed, Foxtail Barley, Common Ragweed, Purple Vetch, Canada Goldenrod, Gray Goldenrod, Common St. John's Wort, Canada Thistle, Narrow-leaved Goldenrod, Black Nightshade, Celandine, Herb Robert, Common Milkweed.

14	**TAGM1**	**Medium Mineral Coniferous Plantation Type**	Vegetation found within this polygon consists of: • Trees: Green Ash, Scots Pine and Eastern White Cedar that appear to have been planted at an attempt at reforestation. There are also a number of Black Walnut trees in the fallow surround to the east. Some of these Walnut trees are quite large (30 – 40 cm dbh), appear to be planted and there are some smaller volunteer saplings and small trees surrounding them. There is one large Silver Maple in poor condition. • Shrubs: Wild Red Raspberry. • Forbs and Grasses: Smooth Brome, Daisy Fleabane, Celandine, Dame's Rocket, Black Nightshade.
15	**MEMM 3**	**Dry - Fresh Mixed Meadow Ecosite**	Vegetation found within this polygon consists of: • Trees: Norway Spruce, Eastern White Cedar, American Mountain Ash, Sugar Maple, Basswood, Black Cherry, Aspen Poplar, Black Walnut, Manitoba Maple, Apple. • Shrubs: Wild Red Raspberry, Chokecherry, Red Osier Dogwood, Virginia Creeper, Riverbank Grape • Forbs and Grasses: Smooth Brome, Celandine, Burdock, Black Nightshade, Goatsbeard, Day Lily, Purple-Stemmed Aster, Little White Aster, Dame's Rocket, Yellow Avens, Golden Alexander, Small-seeded False Flax, Sow Thistle, Common Buttercup, Dandelion, Common Plantain, Goats Beard, Purple Vetch, Common Ragweed, Common Mallow, Canada Hawkweed, Common Milkweed, New England Aster, Narrow-leaved Goldenrod The meadow area contains Smooth Brome, Little White Aster, New England Aster, Canada Goldenrod, Gray Goldenrod, Curled Dock, Burdock, Common Milkweed, Canada Hawkweed, Garlic Mustard, Daisy Fleabane, Oxeye Daisy Past this meadow area is the approach to 7th Line along the low ditch from the municipal drain at the road edge. Vegetation includes: • Trees: E. White Cedar, Norway Spruce, White Spruce, Black Walnut, Manitoba Maple, White Pine, Feral Apple, Aspen Poplar, Scot's Pine, Balsam Poplar • Shrubs: Red Osier Dogwood, Chokecherry, Wild Red Raspberry, Virginia Creeper, Riverbank Grape, Sandbar Willow • Forbs and Grasses: Little White Aster, Canada Goldenrod, Grey Goldenrod, Curled Dock, Burdock, Wild Carrot, Teasel, Catnip, Canada Hawkweed, Garlic Mustard, Purple-Stemmed Aster, Daisy Fleabane, Common Buttercup, Orchard Grass, Smooth Brome, Oxeye Daisy, Purple Vetch, Field Horsetail, Dandelion, Yellow Avens, Sow Thistle, Wild Cucumber, Golden Alexander, Black Nightshade
16	**MEMM4**	**Fresh-Moist Mixed Meadow Ecosite**	Vegetation found within this polygon consists of: • Trees: Norway Spruce, Balsam Poplar, Scot's Pine • Shrubs: Shining Willow, Wild Rose, Virginia Creeper, Bebb's Willow, Missouri Willow, Sandbar Willow • Forbs and Grasses: Tansy, Wild Carrot, Alfalfa, Common Dandelion, Burdock, Field Horsetail, Orchard Grass, Garlic Mustard, Canada Thistle, Black Medick, Oxeye Daisy, Narrow-leaved Goldenrod, Red Clover, Smooth Brome, Curled dock, Daisy Fleabane, Wild Carrot, Reed Canary Grass, Panic Grass, Tall Lungwort, Common St. John's Wort, Evening Primrose, Broad-leaved Cattail, Little White Aster, New England Aster, Gray Goldenrod, Canada Goldenrod, Celandine

17	**TAGM 1**	**Medium Mineral Coniferous Plantation Type**	Vegetation found within this polygon consists of: • Trees: Scot's Pine, Eastern White Cedar, feral Apple, Aspen Poplar, Norway Spruce • Shrubs: Chokecherry, Shining Willow, Sandbar Willow • Forbs and Grasses: Teasel, Curled Dock, Field Horsetail, Reed Canary Grass, Orchard Grass, Common Mullein, Sow Thistle, Smooth Brome, Daisy Fleabane, Oxeye Daisy, Canada Anemone, field Mustard, Wild Cucumber, Spotted Joe Pye Weed
No Polygon (Open Areas)	**OAGM1**	**Annual Row Crop**	Areas of agricultural lands which rotate crop types periodically. Constantly under cultivation.

APPENDIX B

PLANT LIST

APPENDIX 'B' - BELWOOD PROJECT		ELC POLYGON																	CONSERVATION		WET-	SENSI-	WEED-
REVISED-FINAL-PLANT LIST - October 22-2022		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Global	Provincial			
Scientific Name	*Common Name*																		GRANK	SRANK	NESS	TIVITY	INESS
Acer negundo	Manitoba Maple		X	X				X		X				X		X			G5	S5	-1	5	
Acer rubrum	Red Maple									X	X								G5	S5	-3		
Acer saccharinum	Silver Maple							X		X			X		X				G5T5	S5	-3	5	
Acer saccharum ssp. saccharum	Sugar Maple				X		X	X		X	X	X		X		X			G5T5	S5	3	4	
Acer spicatum	Mountain Maple									X									G5	S5	-3		
Actaea pachypoda	White Baneberry	X								X	X								G5	S5	5	6	
Alliaria petiolata	Garlic Mustard															X	X		GNR	SNA	0	0	-3
Allium tricoccum	Wild Leek										X								G5	S4	5		
Ambrosia artemisiifolia	Common Ragweed													X		X			GNR	SNA	0	0	
Anaphalis margaritacea	Pearly Everlasting					X													G5	S5	5	3	
Anaphalis sp.	Everlasting species					X													na	na	5	5	
Anemone americana	Round-lobed Hepatica										X								G5	S5	5	6	
Anemone canadensis	Canada Anemone																	X	G5	S5	-3	3	
Antennaria neglecta	Field Pussytoes					X													G5	S5	5	3	
Arctium minus ssp. minus	Common Burdock											X		X		X			GNRTNR	SNA	0/5?	5/8?	-2
Arisaema triphyllum Schott ssp. triphyllum	Jack-In-the-Pulpit										X								G5T5	S5	-2	5	
Asarum canadense	Wild Ginger										X								G5	S5	5	6	
Asclepias syriaca	Common Milkweed					X		X	X	X			X	X		X			G5	S5	5	0	
Asplenium platyneuron	Ebony Spleenwort										X								G5	S4	3	6	
Aster novae-angliae	New England Aster	X	X		X			X		X	X		X			X			G5	S5	-3	2	
Aster puniceus var. puniceus	Purple-stemmed Aster	X						X								X			G5T	S5	-5	6	
Betula alleghaniensis	Yellow Birch									X	X	X							G5	S5	0	6	
Betula papyrifera	White Birch				X			X											G5	S5			
Bidens frondosa	Common Beggar-ticks										X								G5	S5	-3	3	
Brassica rapa	Field Mustard			X					X									X	GNR	SNA	0/5?	0	-1
Bromus inermis ssp. inermis	Smooth Brome							X		X	X	X	X	X	X	X	X	X	GNR	SNA	5	0	-3
Calthus palustris	Marsh Marigold			X															G5	S5	-5		-1
Camelina microcarpa	Small-Seeded False Flax															X			GNR	SNA			
Carex bebbii	Bebb's Sedge										X								G5	S5	-5	3	
Carex blanda	Common Wood Sedge									X	X								G5	S5	0	3	
Carex gracillima	Graceful Sedge										X								G5	S5	3	4	
Carex intumesceens	Greater Bladder Sedge										X								G5	S5	-4		
Carex Laticulmis	Weak Stemmed Wood Sedge										X								G5	S5	5		
Carex rosea	Curly Styled Wood Sedge										X								G5	S5	5		
Carex muhlenbergia var. muhlenbergia	Muhly's Sedge										X								G5T5	S4S5	5	7	
Carex pensylvanica	Pennsylvania Sedge									X	X								G5	S5	5	5	
Carya cordiformis	Bitternut Hickory									X	X								G5	S3	0	6	
Caulophyllum thalictroides	Blue Cohosh				X		X				X								G4	S5	5	6	
Chelidonium majus	Celandine													X	X	X	X		GNR	SNR	5		-3
Chrysanthemum leucanthemum	Oxeye Daisy									X			X						G5	S5	5	0	-1
Cirsium arvense	Canada Thistle			X	X				X			X		X			X		GNR	SNA	3	0	-1
Clinopodium vulgare	Wild Basil					X													G5	S5	5	4	
Cornus alternifolia	Alternate-leaved Dogwood									X	X	X							G5	S5	5	6	
Cornus stolonifera	Red Osier Dogwood	X	X	X	X		X		X	X	X	X		X		X			G5	S5	-3	2	
Crataegus mollis	Downy Hawthorn	X	X		X		X	X		X		X							G5	S5	-2	4	0
Dactylis glomerata	Orchard Grass			X		X			X		X					X			GNR	SNA	3	0	0
Daucus carota	Wild Carrot	X	X	X	X		X	X	X	X	X		X				X		GNR	SNA	5	0	-2

	POLYGON	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17					
Dactylis glomerata	Orchard Grass			X					X		X	X	X			X	X	X	GNR	SNA	3		
Diervilla lonicera	Bush Honeysuckle		X		X		X	X				X							G5	S5	5	5	
Dipsacus fullonum	Teasel			X	X				X	X		X						X	GNR	SNA	5	0	-1
Dryopteris carthusiana	Spinulose Woodfern									X	X								G5	S5	-2		
Dryopteris marginalis	Marginal Woodfern									X	X								G5	S5	3	5	
Echinocystis lobata	Wild Cucumber					X										X		X	G5	S5	-2		
Echium vulgare	Common Viper's Bugloss					X													GNR	SNA	1		
Elymus sp.	Horticultural Rye					X													na	na	5	0	
Equisetum arvense	Field Horsetail	X		X	X	X	X		X		X		X			X	X	X	G5	S5	0	0	
Erigeron annuus	Daisy Fleabane			X		X			X			X			X	X	X	X	G5	S5	1	0	
Erythronium americanum	Trout Lily										X								G5	S5	5	5	
Euonymus obovatus	Running Strawberry Bush										X								G5	S4/S5	5	6	
Eupatorium maculatum	Spotted Joe-pye-weed			X				X											G5	S3/S4	0	8	
Euthamia graminifolia	Narrow Leaved Goldenrod													X		X			G5	S5	-2	2	
Fagus grandifolia	American Beech										X								G3	SNR	3		
Fragaria vesca ssp. americana	Woodland Strawberry	X																	G5	S5	4	4	
Fragaria virginiana ssp. virginiana	Wild Strawberry	X					X	X	X	X	X								G5	S5	1	0	
Fraxinus americana	White Ash																		G5	S5	3		
Fraxinus nigra	Black Ash								X	X	X								G5	S5	-4		
Fraxinus pennsylvanica	Green Ash				X		X	X	X	X	X				X				G5	S5	-3	3	
Geranium robertianum	Herb Robert									X	X			X					G5	SNA	5	0	-2
Geum aleppicum	Yellow Avens										X	X				X			G5	S5	-1		
Geum canadense	White Avens									X	X								G5	S5	0		
Hemerocalis fulva	Day Lily													X	X				GNR	SNA	5		-3
Hepatica acutiloba	Sharp-lobed Hepatica										X				X				G5	S5	5		
Hepatica nobilis var. obtusa	Round-lobed Hepatica										X								G5T5	S5	?	?	
Hesperis matronalis	Dames Rocket														X	X			G4C5	Exotic	5		-3
Hieracium canadense	Canada Hawkweed			X		X		X											G5	SNR	5		
Hordeum jubatum	Foxtail Barley													X					GNR	SNA	1		
Hydrophyllum virginianum	Virginia Waterleaf										X								G5	S5	-2		-1
Hypericum perforatum	Common St. John's-wort			X		X									X		X		GNR	SNA	5	0	
Impatiens capensis	Jewelweed			X					X	X	X	X							G5	S5	-3	4	
Ipomoea coccinea	Common Morning Glory					X													GNR	SNA	1	0	
Juglans nigra	Black Walnut					X		X						X	X	X			G5	S4	3	5	
Juncus tenuis	Path Rush			X															G5	S5	0	0	
Leucanthemum vulgare	Oxeye Daisy			X		X			X				X			X	X	X	G5	SE5	5	0	
Lythrum salicaria	Purple Loosestrife									X									GNR	SNA	1		
Lolium perenne	Ryegrass	X							X										GNR	SNA	1		
Lotus corniculatus	Bird's-foot Trefoil	X			X		X												GNR	SNA	1	0	
Maianthemum canadense	Wild-Lily-of-the-Valley										X								G5	S5	0	5	
Malus sp.	Feral Apple	X	X	X			X	X		X		X				X		X	NA	NA	0	5	
Malva neglecta	Common Mallow													X		X			GNR	SNA	1		
Matricaria discoidea	Pineappleweed													X					GNR	SNA	1		
Matteuccia struthiopteris	Ostrich Fern	X			X		X				X	X							G5	S5	-3	5	
Medicago lupulina	Black Medick					X											X		GNR	SNA	1	0	-1
Medicago sativa ssp. sativa	Alfalfa		X		X	X	X												GNRTNR	SNA	5	0	-1
Mertensia paniculata	Tall Lungwort																X		G5	S5	-3		
Nepeta cataria	Catnip								X							X			NNA	Exotic	1		-2
Oenothera biennis	Evening Primrose		X		X	X	X	X									X		G5	S5	3	0	
Onoclea sensibilis	Sensitive Fern									X	X	X							G5	S5	-3	4	

	POLYGON	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17					
Ostrya virginiana	Eastern Hop Hornbeam										X								G5	S5	4	4	
Panicum virgatum	Panic Switch Grass				X	X	X	X	X										G5	S4	-1	6	
Parthenocissus quinquefolia	Virginia Creeper	X			X		X				X	X		X		X	X		G5	S5	1	6	
Phalaris arundinacea	Reed Canary Grass				X		X	X	X				X				X	X	G5	S5	-4	0	
Picea abies	Norway Spruce	X				X	X					X		X		X	X		GNR	Exotic	3	0	-1
Picea glauca	White Spruce	X				X									X				G5	S5			
Pilosella caespitosa	Canada Hawkweed																		GNR	SNA	5	0	
Pinus strobus	Eastern White Pine					X									X	X			G5	S5	3	4	
Pinus sylvestris	Scot's Pine					X	X								X		X	X	NNA	Exotic	3		
Plantago major	Common Plantain			X		X	X		X							X			G5	S5	-1	0	-1
Platanthera huronensis	Green Bog Orchid																		G5	S5	-3		
Populus balsamifera	Balsam Poplar			X		X		X		X	X						X		G5	S5	-3	4	
Populus tremuloides	Aspen Poplar	X	X	X			X	X		X	X	X		X		X		X	G5	S5	0	2	
Potentilla norvegica	Rough Cinquefoil	X	X		X		X												GNR	SNA	5	0	
Prunus serotina	Black Cherry						X		X	X	X	X		X		X			G5	S5	3	3	
Prunus virginiana ssp. virginiana	Choke Cherry	X		X	X		X	X			X	X		X		X		X	G5	S5	1	2	
Pteridium aquilinum	Bracken Fern										X								G5	S5	3	2	
Ranunculus acris	Common Buttercup			X					X		X			X		X			G5	SNA	-2	0	
Rhamnus cathartica	Common Buckthorn									X									GNR	SNA	3	0	
Ribes americanum	Wild Black Currant				X		X												G5	S5	-3	4	
Ribes hirtellum	Smooth Gooseberry									X	X								G5	S5	-3	6	
Rosa rugosa	Wild Rose											X					X		G5	S5	3	0?	-1
Rubus hispidus	Swamp Dewberry									X	X								G5	S5	-3		
Rubus idaeus ssp. Idaeus	Wild Red Raspberry	X	X	X		X		X	X		X	X			X	X			G5T5	SE5	-2	0	
Rubus occidentalis	Black Raspberry																		GNR	SNA	5	2	
Rudbeckia triloba	Brown-eyed Susan		X		X		X												G5	S5	3	0	
Rumex crispus	Curled Dock			X					x							X	X	X	G?	SE5	-1	0	-2
Salix bebbiana	Bebb's Willow										X						X	X	G5	S5	-4	4	
Salix eriocephala	Missouri Willow		X														X		G5	S5	-3	4	
Salix exigua	Sandbar Willow															X	X		G5	S5	-3	4	
Salix lucida	Shining Willow							X		X								X	G5	S5	-4	5	
Sambucus canadensis	Common Elderberry				X							X							G5T5	S5	-2	5	
Scirpus cyperinus	Marsh Woolgrass			x												x		x	G5	S5	-5	4	
Silene latifolia	Bladder Campion					X				X									GNR	SNA	5	0	
Solanum nigrum	Black Nightshade													X	X				GNR	SNA	0	0	-1
Solidago canadensis	Canada Goldenrod	X	X		X	X	X			X	X	X	X			X	X		G5	S5	3	1	
Solidago flexicaulis	Zig-zag Goldenrod							X			X								G5	S5	3	6	
Solidago nemoralis ssp. nemoralis	Gray Goldenrod	X	X		X	X	X			X		X	X	X		X	X		G5T5	S5	5	2	
Soncha arvensis ssp. arvensis	Sow thistle		X													X		X	GNRTNR	SNA	1	0	
Sorbus americana	American Mountain Ash										X	X		X		X			G5	S5	-1	8	
Symphyotrichum lanceolatum	Little White aster				X	X	X	X	X	X	X	X	X			X	X		G5T5	S5	-2	3	
Symphyotrichum novae-angliae	New England Aster						x					X	X			X	X		G5	S5	-3	2	
Taraxacum officinale	Common Dandelion	X	X		X		X				X					X	X		G5	SNA	3	0	-2
Thuja occidentalis	Easterm White Cedar				X		X			X	X	X		X	X	X		X	G5	S5	-3	4	
Tiarella cordifolia	Foam Flower	X	X		X		X												G5	SNR	1		
Tilia americana	Basswood	X	X	X	X		X			X	X			X		X			G5	S5	3	4	
Tragopogon dubius	Goat'sbeard					X							X	X		X			GNR	SNA	5	0	
Trifolium pratense	Red Clover																X		GNR	SNA	2	0	
Trillium erectum	Red Trillium										X								G5	S5	1	6	

	POLYGON	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17					
Trillium grandiflorum	White Trillium										X								G5	S5	5	5	
Tsuga canadensis	Eastern Hemlock									X									G5	S5	3		
Tussilago farfara	Coltsfoot			X	X				X		X								GNR	Exotic	3		-2
Typha latifolia	Broad-leaved Cattail			X													X		G5	S5	-5	3	
Ulmus americana	American Elm		X	X			X												G5	S5	-2	3	
Verbascum thapsus	Common Mullein		X	X	X	X	X		X									X	GNA	Exotic	5		-2
Viburnum trilobum	Highbush Cranberry	X	X	X	X		X		X			X							G5T5	S5	-3	5	
Vicia americana	Purple Vetch	X	X		X	X	X			X		X		X		X			G5	S5	5	9	
Viola pubescens	Downy Yellow Violet										X								GNR	SNA	4		
Viola sororia	Common Blue Violet									X	X								G5	S5	1	4	
Vitis riparia	Riverbank Grape					X						X				X			G5	S5	3	3	
Zizia aurea	Golden Alexander			X												X			G5	S5	-2	0	

APPENDIX C

WILDLIFE SPECIES LIST – BIRDS

BELWOOD PROJECT					ELC POLYGON																Comments
WILDLIFE SPECIES LIST - SEPTEMBER 11, 2022		Conservation			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Common Name	*Scientific Name*	*G-RANK*	S-RANK	COSEWIC																		
APPENDIX 'C' - BIRDS																						
American Goldfinch	Spinus tristis	G5	S5B,SZN								X	X	X	X								sight-song
American Redstart	Setophaga ruticella	G5	S5B, SZN					X	X													sight
American Robin	Turdus migratorius	G5	S5B														X		X			sight-song
Black-capped Chickadee	Poecile atricapillus	G5	S5					X	X	X							X		X			sight-song
Black and White Warbler	Mniotilta varia	G5	S5B, SZN							X												sight-song
Blue Jay	Cyanocitta cristata	G5	S5											X	X		X		X		X	sight-song
Canada Warbler	Cardellina canadensis	G5	S4B, SZN	SC						X												sight-song
Chestnut-sided Warbler	Dendroica pensylvanica	G5	S5B							X										X		sight-song
Chipping Sparrow	Spizella passerina	G5	S5B,SZN																	X		sight-song
Downy Woodpecker	Picoides pubescens	G5	S5	NAR				X		X				X								sight-song
Eastern Kingbird	Tyrannus tyrannus	G5	S4B, SZN	NAR	X	X	X														X	sight-song
Eastern Wood Pewee	Contopus virens	G5	S5B, SZN	SC									X	X	X							sight-song
European Starling	Sturnus vulgaris	G5	SE														X		X			sight-song
Field Sparrow	Spizella pusilla	G5	S4B, SZN	NAR																X		sight-song
Gray Catbird	Dumatella carolinensis	G5	S4B, SZN	NAR							X	X	X	X								song
Hairy Woodpecker	Picoides villosus	G5	S5										X	X								sight-song
Northern Flicker	Colaptes auratus	G5	S5B, SZN										X	X	X							sight-song
Red-eyed Vireo	Vireo olivaceous	G5	S5B, SZN											X								song
Red-tailed Hawk	Buteo jamaicensis	S5	S5B, SZN	NAR											X	X						sight
Red-winged Blackbird	Agelaius phoeniceus	G5	S5B, SZN		X	X	X														X	sight-song
Savannah Sparrow	Passerculus sandwichensis	G5	S5B, SZN	SC								X								X		sight-song
Song Sparrow	Melospiza melodia	G5	S5B, SZN									X								X		sight-song
Tree Swallow	Tachycineta bicolor	G5	S5B, SZN										X	X	X							sight-song
Yellow Warbler	Dendroica petechia	G5	S5B, SZN										X	X	X				X		X	sight-song
Veery	Catharus fuscescens	G5	S5B, SZN										X	X								song
White Breasted Nuthatch	Sitta carolinensis	G5	S5							X	X		X	X								song
White Throated Sparrow	Zonotrichia albicollis	G5	S5B, SZN							X	X	X	X									song
Wild Turkey		G5	S5									X	X							X		sight-sign

APPENDIX D

WILDLIFE SPECIES LIST – MAMMALS

BELWOOD PROJECT					ELC POLYGON																Comments
WILDLIFE SPECIES LIST - SEPTEMBER 11, 2022		Conservation			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Common Name	*Scientific Name*	*G-RANK*	S-RANK	COSEWIC																		
APPENDIX 'D' - MAMMALS																						
Cottontail Rabbit	Sylvilagus floridanus	G5	S5														X		X			sight
Coyote	Canis latrans	*G5*	S5					X	X			X										sign
Eastern Chipmunk	Tamias striatus	*G5*	S5								X		X	X								sight
Eastern Grey Squirrel	Sciurus carolinensis	*G5*	S5										X									sight
Porcupine	Erethizon dorsatum	*G5*	S5										X	X								sight
Raccoon	Procyon lotor	*G5*	S5					X	X	X												sign
White-tailed Deer	Odocoileus virginianus	*G5*	S5						X													sight-sign

APPENDIX E

WILDLIFE SPECIES LIST – AMPHIBIANS

BELWOOD PROJECT					ELC POLYGON																Comments
WILDLIFE SPECIES LIST - SEPTEMBER 11, 2022		Conservation			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Common Name	*Scientific Name*	*G-RANK*	S-RANK	COSEWIC																		
APPENDIX 'E' - AMPHIBIANS																						
American Toad	Anaxyrus americanus	G5	S5								X										sight
Western Chorus Frog	Pseudacris triseriata	*G5*	S5	NAR							X										song
Leopard Frog	Lithobates pipiens	*G5*	S5	NAR							X										sight
Pickerel Frog	Lithobates palustris	*G5*	S5	NAR							X										song
Spring Peeper	Pseudacris crucifer	*G5*	S5								X										song

TERMS AND DEFINITIONS FOR WILDLIFE SPECIES LIST:			
RARITY/POPULATION STATUS*			
National	**Provincial**		**Regional**
SARA (Species At Risk Act)	ESA (Endangered Species Act)	S-rank (Provincial Rarity)	Rare in county or regional municipality as determined by municipality
END - Endangered	END - Endangered	S1 - Critically imperiled	
THR - Threatened	THR - Threatened	S2 - Imperiled	
EXP - Extirpated	EXP - Extirpated	S3 - Vulnerable	
SC - Special Concern	SC - Special Concern	S4 - Apparently secure	
NAR - Not at Risk	NAR - Not at Risk	S5 - Secure	
DD - Data Deficient	DD - Data Deficient	SE - Exotic (non-native)	
		? - uncertain about status	
WILDLIFE SPECIES SENSITIVITY*			
HS Habitat-Sensitive	Wildlife that have very specific habitat requirements or are known to be intolerant to site disturbances		
AS Area-Sensitive	Wildlife that require large areas of suitable habitat to sustain their population numbers*		
** Based on description for area-sensitive species in Significant Wildlife Habitat Technical Guide (MNR 2000)*			
BREEDING EVIDENCE*			
Anurans (Frogs and Toads) Breeding Call Levels:			
L1 - Call Level 1	Calls of individual frogs or toads do not overlap and individuals can be counted		
L2 - Call Level 2	Calls of individuals sometimes overlap but the number of individuals can reasonably be counted		
L3 - Call Level 3	Calls are continous and overlapping and a count estimate is not possible		
Birds:			
NE - No Evidence	Species observed in its breeding season, but no breeding evidence observed		
PO - Possible	Indicated by presence of species or singing male during the breeding season in suitable habitat		
PR - Probable	Indicated by territorial/courtship displays, presence of mating pair, agitated behavior or nest building		
C - Confirmed	Indicated by presence of eggs, fledlings, distraction displays, active nest, fecal/food carrying, etc.		
NH - No Suitable Habitat	Species observed during mating season, but no suitable breeding habitat in study area		
OB - Observed	Species observed outside of the breeding season		
NB - Non-breeding Migrant	Migrant species (breeds outside of region containing study area)		
Other wildlife:			
CO - Confirmed	Indicated by presence of eggs, larvae, young, defensive behavior, active nest/den/spawning bed, etc.		
RS - Resident Species	Species expected to be breeding within the study area due to localized territory		
** Terminology for amphibians is based on Marsh Monitoring Program (BSC 2003). Terminology for birds/other wildlife is derived from the Ontario Breeding Bird Atlas (OBBA 2001).*			

APPENDIX F

SIGNIFICANT WILDLIFE HABITAT

BELWOOD PROJECT SIGNIFICANT WILDLIFE HABITAT

CRITERIA FOR SIGNIFICANT WILDLIFE HABITAT IN ECOREGION 6E

Criteria for the designation of SWH fall under 4 categories:

1.1 Seasonal Concentration Areas of Animals

1.2 Rare Vegetation Communities or Specialized Habitat for Wildlife
1.2.1 Rare Vegetation Communities
1.2.2 Specialized Habitat for Wildlife

1.3 Habitat for Species of Conservation Concern (Not including Endangered or Threatened Species)

1.4 Animal Movement Corridors

1.5 Exceptions for Eco-Region 6E
(Exceptions are candidate wildlife habitats that will have different criteria than what is proposed in the above schedules for an area within the Eco-region. The exceptions will be based on Eco-Districts and municipalities can apply the exception for the eco-district within their planning area.

SIGNIFICANT WETLANDS

The background information review and site investigations conducted as part of the EIS review revealed that there are no significant wetlands within 120 meters of the proposed development lands. Smaller pocket wetlands occur (ELC Polygons 2, 7, 9) within or associated with those site lands that contain stream corridors.

SIGNIFICANT WOODLANDS

The woodlands to the north of the subject lands are recognized as significant primarily because of size and landscape contiguity over a large area with woodlands on adjacent lands. (The County of Wellington has mapped these woodland areas as significant woodlands)

These woodlands contain species such as Sugar Maple, Silver Maple, White and Green Ash, Black Cherry, American Elm, Basswood, Hop Hornbeam and Eastern White Cedar.

SIGNIFICANT WILDLIFE HABITAT

A review of historical data from the Grand River Conservation Authority and the OMNRF was used along with site investigations at the study area to determine if this exists within or adjacent to the proposed development lands. Background data indicates the following having potential suitable habitat in the local area: Barn Swallows, SAR and SCC species, Bank Swallows, Eastern Meadowlark, Little Brown Myotis, Norther Myotis, Tri-Coloured Bat, Eastern Wood-Pewee and Wood Thrush. Wildlife habitat was investigated in the study area to identify candidate Significant Wildlife Habitat (SWH). The ELC community mapping completed for this EIS was used as the basis for determining the presence (or absence) of candidate SWH which includes Wild Turkey, Eastern Wood Peewee and Snapping Turtle.

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

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

SEASONAL CONCENTRATION OF ANIMALS

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

WINTER DEER YARDS

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

MOOSE LATE WINTER HABITAT

- Not applicable in Wellington County

COLONIAL BIRD NESTING SITES

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

WATERFOWL STOPOVER AND STAGING AREAS

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

WATERFOWL NESTING HABITAT

- Waterfowl nesting habitat occurs within the subject lands or the adjacent lands for Canada Geese.

SHOREBIRD MIGRATORY STOPOVER SITES

- No lands for shorebird migratory stop over occurs at the site lands.

LAND BIRD MIGRATORY STOP OVER AREAS

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

RAPTOR WINTERING AREAS

- There is potential for hawks such as Red-tailed hawk, Coopers Hawk and American Kestrel to find habitat at this site. All birds favor a landscape habitat mix of open fields, scrub land and woodlands. In this case with land use dominated by agriculture opportunities are limited and will be about the same in a developed state. It is noted that Red-tailed Hawks were seen flying over the site on a number of occasions in 2022. Since the surrounding regional landscape is largely rural and natural it is expected that raptors are commonly sighted.

WILD TURKEY WINTERING AREAS

- The only potential for Wild Turkey to winter here is the west-central area found in ELC polygons 7, 8, 9 and 10. These polygons have springs and mixed habitat with a high biodiversity of shrubs and trees for cover.

TURKEY VULTURE SUMMER ROOSTING AREAS

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

REPTILE HIBERNACULA

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

BAT HIBERNACULA

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

BULLFROG CONCENTRATION AREAS

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

MIGRATORY BUTTERFLY STOPOVER AREAS

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

WILDLIFE MOVEMENT CORRIDORS

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

RARE VEGETATION COMMUNITIES OR SPECIALIZED HABITAT

- RARE VEGETATION COMMUNITIES
    - No rare or unusual vegetation communities are found within the proposed development lands. Most of the land use is for agricultural purposes and the vegetation and ELC units within the subject lands and adjacent lands have been described as not significant in the foregoing.
- SPECIALIZED HABITAT FOR WILDLIFE
    - The Significant Wildlife Habitat Technical Guide (OMNR, 2000) identifies 12 categories for the evaluation of specialized habitat for wildlife:
    - Sites supporting area sensitive species:
        - No suitable habitat or surrounding habitat features were observed to support this ecological function within the subject lands or the adjacent lands. The majority of current land use within the subject lands is predominantly agricultural.
    - Forest stands providing a diversity of habitat:
        - The results of field studies indicate that the only forest stands of significance are in ELC polygons 7, 8, 9, and 10 and also on adjacent lands. The subject lands have only a very small fringe of woodland to the north and west.
    - Old Growth or mature forest stands:
        - There are no old growth characteristics, as defined by the Province for Old Growth Forests. Mature forest stands were found within ELC polygons 7, 8, 9 and 10 as well as the woodlands on adjacent lands.
    - Seeps and Springs:
        - There are seeps and clear springs associated with ELC polygons 7, 8, 9 and 10.
        - There is potential for these landscape features to have over wintering habitat for Wild Turkeys.
    - Woodlands Supporting Amphibian Breeding Ponds:
        - As noted earlier no open water was found at the site lands or on adjacent lands. Amphibian breeding habitat was not identified in the spring field season.
    - Special Woodland Feeding Habitat:
        - Game trails of white-tailed deer are found within the subject lands and the adjacent woodland to the north and west. However, there is no special woodland feeding habitat found in the subject lands or adjacent lands. No mast trees were found here.
        - It is not expected that development of the subject lands would negatively affect wildlife.
    - Osprey and specialized raptor nesting habitat:

        - No suitable habitat was found within the subject lands. However, Ospreys were observed nesting on a tall communications tower to the south west of the subject lands.
    - Turtle Nesting Habitat:
        - Habitat suitable for Snapping Turtles was found in the swamp lands in the south east but evidence of turtle nesting was not found within the subject lands or adjacent lands.
    - Special Moose Habitats:
        - Not applicable in Wellington County.
    - Mink and Otter Feeding/Denning Sites; Marten and Fisher Denning Sites:
        - No suitable habitat for Otter was found at the subject lands or adjacent lands.
        - Mink feeding and denning habitat was not found at the subject lands or adjacent lands.
    - Areas of High Diversity:
        - Areas of high diversity and specialized microhabitat were found in polygons 7, 8, 9, and 10 within the subject lands.
    - Cliffs and Caves:
        - No geological features of this nature were identified within the subject lands or the adjacent lands.

HABITAT OF SPECIES OF CONSERVATION CONCERN

FLORA

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

FAUNA

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

During Breeding Bird surveys, the Eastern Wood Peewee was detected singing in woodlands of polygons 7, 8, 9, and 10 and adjacent woodlands. This species is rated as S4B Provincially and is apparently secure.

Wild Turkeys were also found in polygons 7, 8, 9 and 10 and adjacent crop lands.

Monarch Butterflies were found associated with the same areas where Milkweed was flowering.

FISHERIES HABITAT

Section 34 of the Fisheries Act notes that, "…" fish habitat" means spawning grounds and nursery, rearing, food supply and migration areas on which fish depend on directly or indirectly in order to carry out their life processes …". Due to physical barriers to fish migration there is no significant fish habitat at this site.

NATURAL HERITAGE INFORMATION CENTRE

A search of the 1 km square information in the "Make A Map" function of the NHIC website revealed 2 species of conservation concern within 1 km of the subject lands. These species have the potential of being at the subject lands if adequate habitat is available. Overpage the results of 1 km squares searches for MAP squares 17NJ5349, 17NJ5348, 17NJ5449 and 17NJ448 are shown in their entirety from a Make A Map search.

- Eastern Meadowlark – S4B Secure: there is potential habitat at the bottom end of the site drainage but no birds were detected at any time in field surveys.
- Snapping Turtle – S3 Threatened: habitat with high potential for life cycle and overwintering is found in the main lower creek and associated floodplain. Despite extensive searches for this species and other turtles none were found in 2022. This species is known to be SC – "Special Concern" This designation means that the species lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination due to a combination of biological characteristics and identified threats.

SIGNIFICANT WILDLIFE HABITAT CRITERIA SCHEDULES

A review of the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January, 2015) indicates that the following significant wildlife habitat and related species may be found at this site.

Identification of Significant Wildlife Habitat

Raptor Wintering Area

There is potential for Red-tailed Hawk to over winter at the site lands.

The habitat association is with deciduous woodlands (FOD) and open lands where prey such as meadow voles or rabbits may be found.

The overall habitat provides a combination of fields and woodlands that provides roosting, foraging and resting habitats for wintering raptors. It is noted that Red-tailed hawks have been seen at this site from march to September.

Turtle Wintering Areas

There may be over wintering sites for Snapping Turtles in swamps with both standing and flowing water.

For most turtles wintering areas are in the same general areas as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates.

Over-wintering sites are permanent water bodies, large wetlands and bogs or fens with adequate dissolved oxygen.

The mapped ELC ecosite area with the over wintering turtles is the SWH.

It is noted that ditches and lower wetland areas on the main stream in the south east of the site were searched and no turtles were found.

Reptile Hibernaculum

Despite a concerted effort from March to September no snakes were found at the site. This is likely due to a lack of habitat in the agricultural fields.

Deer Yarding Areas

Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of snow and cold.

Despite a limited amount of potential SWH and deer at the site there is no mapped habitat for the site lands.

There could be SWH on larger forested areas on other lands to the north and north-east.

Deer Winter Congregation Areas

As above for Deer Yarding Areas.

Woodlots are below a typical threshold of recognized habitat.

Rare Vegetation Communities or Specialized Habitat for Wildlife

Seeps and Springs are typical of headwater areas and are often at the source of coldwater streams.

Wildlife associated with this habitat include: Wild Turkey, Ruffed Grouse, Spruce Grouse, White-tailed Deer and Salamander Spp.

Seeps/Springs are areas where ground water comes to the surface. Often, they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.

Habitat criteria includes any forested area (with <25% meadow/field/pasture within the headwaters of a stream or river system.

Seeps and springs that are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species.

It is noted that field studies which confirm the presence of a site with 2 or more seeps/springs should be considered SWH. This is the polygons 7, 8, 9 and 10 at this site where Wild Turkeys are found at all times of the year and in adjacent agricultural lands. Ruffed Grouse and White-tailed Deer are found on lands adjacent to subject lands to the north.

The area of an ELC forest ecosite or an ecoelement within the ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and ground water condition need to be considered in delineating the habitat.

Amphibian Breeding Habitat (Woodland)

These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations.

Wildlife associated with this habitat include: Eastern newt, Blue-spotted Salamander, Spotted Salamander, Gray Treefrog, Spring Peeper, Wood Frog.

ELC Ecosite Codes

Ecosites found at the Belwood site that have the requisite characteristics include SWT/SWD, THDM2, SWM3-1, FODM-5. Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians. These are in the same area at the toe of slope of the large FOD in polygon 10. The adjacent polygons 7, 8 and 9 may share this habitat.

It is noted that north of these polygons a pond has been excavated on neighboring forested lands. There are multiple springs in this area and it is the headwater of a stream that flows at different times of year. It is anticipated that this offsite pond provides amphibian breeding habitat.

A primary criterion is the presence of a wetland, pond or woodland pool (including vernal pools) >500 m2 (about 25 m diameter) within or adjacent (within 120 m) to a woodland (no minimum size). Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat.

Confirmed SWH (Defining Criteria)

Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individual (adults or egg masses or 2 or more of the listed frog species with Call Level Codes of 3.

A combination of observational study and call count surveys will be required during the spring (March – June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands.

The habitat is the wetland area plus a 230 m radius of woodland area.

HABITAT FOR SPECIES OF CONSERVATION CONCERN (NOT INCLUDING ENDANGERED OR THREATENED SPECIES

OPEN COUNTRY BIRD BREEDING HABITAT

This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.

The site species for this category includes Savannah Sparrow.

Habitat Criteria and Information Sources

Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing n the last 5 years)

Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older.

The indicator bird species are area sensitive requiring larger grassland areas than the common grassland species.

Defining Criteria

A field with 1 or more breeding Short-eared Owls is considered SWH.

The area of SWH is the contiguous ELC ecosite field areas.

Conduct field investigation of the most likely areas in spring and early summer when birds are singing and defending their territories.

Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects.

SHRUB/EARLY SUCCESSIONAL BIRD BREEDING HABITAT

This wildlife habitat is declining throughout Ontario and North America.

The site species for this category includes Field Sparrow.

Habitat Criteria and Information Sources

Large field areas succeeding to shrub and thicket habitats >10 ha in size.

Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years).

Shrub thickets habitats (>10 ha) are most likely to support and sustain a diversity of these species.

Shrub and thicket habitat sites considered significant should have a history of longevity, with abandoned fields or pasturelands.

Defining Criteria

Field Studies confirm:

Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species.

A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat.

The area of the SWH is the contiguous ELC ecosite field/thicket area.

Conduct field investigation of the most likely areas in spring and early summer when birds are singing and defending their territories.

Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects".

OTHER POTENTIAL SWH CHARACTERISTICS AND FEATURES.

Other potential SWH characteristics and features as described in the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January, 2015) are not included here due to a lack of necessary and defining criteria such as wildlife species or habitat characteristics.

APPENDIX G

RESUME & QUALIFICATIONS
CHRIS HART

CHRISTOPHER J. HART, M.Sc., M.L.A., OALA, CSLA

204-470 Wellington St
Kitchener, Ontario N2H 5L5
Tel: 519-574-5357
Email: hart.c3j@gmail.com

BIOGRAPHICAL INFORMATION: ENVIRONMENTAL BIOLOGIST/PROJECT MANAGER

Chris Hart is an Environmental Biologist and an experienced Project Manager who has worked with Conservation Authorities, Ministry of Natural Resources & Forestry and Environmental Consultants for over 20 years. Chris has experience with both qualitative and quantitative botanical field studies for scientific research (phytogeography and species typing) and habitat characterization for environmental planning projects and restoration projects. Chris is a specialist in the use of native plants and the management of natural areas for environmental restoration and habitat mitigation for a wide range of habitat types; he has specialized in wetland habitat.

Through a progressive range of regional projects Chris has been able to develop a truly regional perspective that lends itself to watershed and ecosystem restoration. Chris has 26 years of experience with the Public Interest Advisory Committee of the Niagara Escarpment Commission and understands the unique planning issues of the Niagara Escarpment Plan Area and the Ontario Greenbelt. Chris has experience with land development planning and design and N.E.C. Plan Amendment Applications as well as development peer reviews for conservation authorities and municipalities.

Chris has worked with E.A., E.I.S. and N.E.T.R. projects as a proponent and reviewer for 15 years. He has undertaken many field studies of both aquatic and terrestrial environments using recognized scientific protocols and those of the MNRF for S.A.R. He is primarily a botanist but can undertake wildlife studies for Breeding Birds, small mammals, bats and amphibians and reptiles for the provision of full E.I.S. reports. He has experience with radio-telemetry tracking of S.A.R. turtles, use of PIT Tags and data loggers. While not certified as an arborist Chris undertakes tree inventories and writes tree management plans.

Chris has a keen interest in natural heritage systems and natural areas management. He has experience with Environmental Restoration, Hydrology, Conservation Biology, Landscape Ecology, Ecological Land Classification (E.L.C.), Wetland Delineation (O.W.E.S.) and GIS analysis (ArcGIS). Chris is recognized for his writing ability, for every level of comprehension from the lay public to government scientists and managers. He is an able presenter and is comfortable meeting the public as well as providing presentations at conferences and large public open houses.

WORK EXPERIENCE:

Present) **<u>Independent Environmental Consultant</u>**

(12_2021 Chris provides consulting services for natural heritage assessment, management and environmental planning projects. He undertakes ELC Studies, Wetland Delineation, Woodland Delineation, Breeding Birds, Wetland Birds, Amphibian call monitoring and Botanical inventories. He works as a sub-consultant on consulting teams to provide technical support as an ecologist and environmental planner. He provides design services for environmental restoration, habitat mitigation and enhancement. Chris is affiliated with SAI Planning Consultants and provides scientific support to them on an ongoing basis.

12_2021) **<u>Lincoln Environmental Consulting – Ecologist</u>**

(12_2020 Chris provides management support to the Environmental Science and Planning group at LEC. This group provides consulting services for natural heritage assessment / management and environmental planning. Chris undertakes landscape analysis, natural habitat assessment and planning policy analysis. Chris also works on consulting teams to provide technical support as an ecologist and environmental planner for EA. EIS and NETR (aggregate license) projects. He contributes design services for environmental restoration, habitat mitigation and enhancement.

12_2020) Independent Environmental Consultant

(12_2015 Chris provided consulting services for natural heritage assessment, management and environmental planning projects. He undertook ELC Studies, Wetland Delineation, Woodland Delineation, Breeding Birds, Wetland Birds, Amphibian call monitoring, Botanical inventories. He worked as a sub-consultant on consulting teams to provide technical support as an ecologist and environmental planner. He provided design services for environmental restoration, habitat mitigation and enhancement.

2017 Professor at Fanshawe College, London - 2017)

Chris was a part-time Professor in the School of Design at Fanshawe College. He taught courses in Professional Practice and Presentation Skills.

12_2015) Senior Ecologist/Project Manager - Manager of Natural Science Services (AET Group Inc.)

(03_2011- Provided consulting services for natural heritage assessment and management, recreational systems, parkland development, cultural heritage resources, sustainable communities and social marketing practices. Chris worked with green infrastructure projects that provided recreation opportunities through trail access and linear corridors that linked SWM facilities with ESAs, parkland and other public lands. Chris was involved in all phases of project management and contract administration. Other project work included renewable Energy, ARA License Natural Environment Studies, Land Development EIS and monitoring of environmental effects. Other responsibilities included report writing, junior staff supervision and business development. (*Position was terminated when Environmental Group was closed by AET Group Inc*. in 2016)

10_2010) Planning Ecologist – Project Coordinator (Greenlands Centre Wellington – Contract)

(08_2008- Development of a Landscape Analysis for the Township of Centre Wellington incorporating urban green infrastructure, cultural heritage features, trails and recreational greenways. This project involved thesourcing and analysis of all relevant policy with respect to municipal and environmental planning at local, watershed and provincial levels. This project included a study of all urban and near-urban natural heritage features in detail with recommendations for planting and other habitat enhancement including management of invasive species, retirement of cultural landscapes, enhancement and restoration of stream corridors and strategic reforestation. Also produced was a set of "Development Guidelines for Sustainable Rural Communities".

06_2008) Area Biologist (Ontario Ministry of Natural Resources & Forestry- Contract)

(04_2007- Management and participation in a wide range of conservation programs involving fish and wildlife, species at risk, and land stewardship for rural lands. Coordinated the Canada Ontario Agreement program funding for environmental enhancement projects oriented to Great Lakes water quality enhancement. Undertook environmental restoration projects in rural and urban environments with private landowners and volunteers for municipal lands. Supervised and trained seasonal staff in field and administrative procedures. Represented MNR on technical and management committees involving regional municipalities and local conservation authorities. Field work included botanical studies, mapping and assessment of SAR habitat, radio-telemetry tracking of S.A.R.turtles and creation, maintenance and monitoring of turtle nesting habitat. Design projects included gravel pit restoration with S.A.R. turtle nesting habitat, pilot wetland creation and enhancement and stream corridor erosion control and reforestation.

03_2007) Ecologist/Project Manager (Maitland Valley Conservation Authority - Contract)

(12_2006- Developed and delivered a program for the promotion and implementation of environmental conservation projects for rural municipalities involving parks natural areas and water courses. Encouraged the protection, conservation, enhancement and restoration of these features. Also provided a new focus to promote energy efficient and sustainable landscapes with private rural landowners. Sourced funding and managed a wide variety of community environmental enhancement / restoration projects.

09_2006) **Ecologist/Project Manager (Grand River Conservation Authority - Contract)**

(01_2006- Coordinated a project involving the development of Grand River watershed regional trail systems. Responsibilities included renewing the administrative structure of the Grand Valley Trail Association, developing a feasible 5-year strategic plan, promoting new trails and trail linkages within the Grand Valley and to other external regional trail systems. Maintained liaison with planners and recreational specialists in all municipalities involved including Ministry of Health Promotion and Trail Groups.

01_2006) **Sustainable Landscape Specialist (Maitland Valley Conservation Authority - Contract)**

(02_2005- Developed and delivered educational materials and program workshops to teach the principles of environmental stewardship of natural areas and wildlife habitat enhancement on rural lands. Conducted farm tours and created environmental farm plans based on current best management practices and the principles of conservation biology and restoration ecology.

02_2005) **Ecologist/Project Manager (Ecoplans Ltd. - Contract)**

(02_2004 As a Biologist and Environmental Planner provided project management on development related projects by providing landscape analysis, field studies and planning solutions.

- Project management, Environmental Assessment and Environmental Impact Studies
- Biological field studies (ELC, G.I.S.), sub-watershed analysis, wetland delineation
- Design for environmental restoration and mitigation of development impacts

01_2004) **Ecologist/Project Manager (Conestoga-Rovers & Associates - Full Time)**

(12_1999- Provided design and management solutions on a project basis for the environmental cleanup of contaminated sites, design of mitigation and treatment wetlands at landfill sites and for agricultural runoff, stream channel bioengineering and erosion control.

- Project management, natural science field studies (ELC, G.I.S.), monitoring studies for Conformance reports, Environmental Assessment, Environmental Impact Studies

12_1999) **Independent Ecologist/Project Manager and Contractor**

(06_1996- Independent consulting Ecologist and specialty landscape contractor for environmental restoration, site reclamation, stream geomorphic analysis for fisheries habitat and bioengineering design, stream channel and ravine stabilization with bioengineering design, and conservation lands master planning. Continued many ongoing projects for Cumming Cockburn Ltd.

06-1996) **Senior Environmental Scientist / Landscape Architect (Cumming Cockburn Ltd. - Full Time)**

(11_1995- Project management for a wide variety of projects involving new residential development throughout Ontario, urban infrastructure, storm water management and erosion control.

- Project management, Environmental Assessment, Environmental Impact Studies
- Bioengineering designs, urban storm water naturalization design, tree saving plans
- Water quality monitoring net design, data analysis, report writing, public information centers
- Sub-watershed planning

11_1995) **Ecologist (Maitland Valley Conservation Authority - Full Time)**

(05_1991- Ecologist with a focus on landscape restoration and rural community development for the creation of public greenways, naturalized parks, wetland/wildlife pilot projects in Huron and Perth Counties (swamp restoration, agricultural drain habitat enhancement, millpond habitat enhancement); sourced grant funding and managed community projects

- Coordinated public planting programs for parks, greenway reforestation and renaturalization
- Secured grant funding, scheduled projects, sourced and requisitioned plants and supplies
- Conservation lands master planning including design for reforestation and renaturalization
- Large river channel manipulation for construction of fisheries habitat and stone placement

EDUCATION

M.L.A. University of Guelph, S.E.D.R.D., (Landscape Architecture/Planning))

M.Sc. University of Waterloo, Ecology (Botany/Limnology/Toxicology)

B.E.S. University of Waterloo, Joint Honours Geography/Biology

Courses: Low Impact Development - design course by Credit Valley Conservation, 2015
O.B.B.N. – Benthic Invertebrate Identification, 2014
O.M.N.R. - Aboriginal Relations Management Consultation, 2008
St. John's Ambulance - CPR/First Aid Level II, 2013, (Certificate)
O.M.N.R. - Ecological Land Classification System for Ontario, 2002, (Certificate)
O.M.N.R. - Ontario Wetland Evaluation System Training, 2001, (Certificate)
Wilfrid Laurier School of Business & Economics – Small Business Management, 1999

MEMBERSHIPS

- Ontario Association of Landscape Architects, Full Member (1992-current), Councilor (2013-2017); Secretary (2015-16); Treasurer (2016-17)
- Ontario Nature
- Field Botanists of Ontario
- Society of Canadian Ornithologists

PRESENTATIONS

- "Green Infrastructure and Active Lifestyles in Rural Ontario"
  Presented at the Grey to Green Conference
  Toronto, August 2014

- "Planning for Green Infrastructure in Rural Communities"
  A tour presented for the Ontario Association of Landscape Architects in Elora and Fergus, ON
  August 2014

- "A Landscape Analysis of the Township of Centre Wellington"
  Presented to Heritage Elora,
  November 2009

- "Sustainable Landscape Management"
  A workshop prepared and presented under contract to the Ecological
  Farmers Association of Ontario, Winter 2006

- "The Milton Mill Pond – Historic Mill Pond Restoration"
  Presented at the 14th Annual Conference of the Society for Ecological Restoration
  October, 2002, Niagara Falls, Canada.

- "Completing Ontario's Greenways"
  Presented jointly with Bryan Howard, Ontario Ministry of Natural Resources, at the Ontario Parks Heritage Symposium, Heritage Resources Center
  March, 1994, University of Waterloo, Canada.

- "Wooded Swampland Restoration with Hydroperiod Control"
  Presented jointly with Jane Bowles, Ph.D., University of Western Ontario, at the 54th Midwest Fish and Wildlife Conference -"In Pursuit of Ecosystem Integrity"
  December, 1992, Toronto, Canada

- "Wooded Swampland Restoration"
  Presented at the 4th Annual Conference of the Society for Ecological Restoration
  August, 1992, University of Waterloo, Canada

APPENDIX H

RESUME & QUALIFICATIONS
ROB STOVEL

ROBERT P. STOVEL, M.Sc., RPP, MCIP, P.Ag.

EDUCATION

M.Sc, Rural Planning, University of Guelph, 1988.

B.A. Geography, (Resources Management), Wilfrid Laurier University, 1986.

MEMBERSHIPS

Member of the Ontario Institute of Agrologists.
Member of the Ontario Professional Planners Institute and the Canadian Institute of Planners.
Member of the Ontario Stone, Sand and Gravel Association.

POSITIONS HELD

1995 - Present: Stovel and Associates Inc., Fergus, Ontario - President.

1993 - 1995: Ecological Services For Planning Ltd., Guelph, Ontario - Senior Project Manager.

1988 - 1992: Ecological Services For Planning Ltd., Guelph, Ontario - Environmental Planner.

1986 - 1987: Environmental Consultant. Waterloo, Ontario.

EXPERIENCE

- extensive project experience in environmental assessments, environmental management plans and ecological enhancement plans in Ontario. These projects have required considerable government and non-government agency liaison, interdisciplinary team coordination and the integration of a variety of scientific disciplines.

Environmental Assessments

- prepared the ecological and agricultural components for municipal road projects in King Township and the City of Stratford.

- prepared agricultural impact assessments for provincial road projects in the County of Essex and the County of Peterborough.

- coordinated environmental assessment projects for waste management master plans in Victoria County, Essex County, Peterborough County and the Regional Municipality of Haldimand-Norfolk (agricultural component).

- prepared route selection reports for the proposed development of an 8" pipeline in Orillia. This project received provincial approval at the Ontario Energy Board in 1994.

- managed the environmental constraint mapping and geotechnical selection component of Ontario Hydro's construction of a 500 kV transmission line from Lennox to Bowmanville. This transmission line was constructed in 1992.

Environmental Inventories and Monitoring

- designed and implemented wetland vegetation monitoring programs for proposed aggregate and estate residential developments.

- designed a transplanting and propagation plan for Carex jamesii.

- completed the required seminar on the Ontario Wetland Evaluation System and the Wetland Environmental Impact Study; Technical Manual.

- completed surveys for the following wetlands: Orangeville Reservoir Wetland Complex, Hayesland-Christie Wetland Complex, Dalrymple Lake Wetland Complex, Star Wetland Complex, Eramosa River-Blue Springs Creek Wetland Complex, Orillia Filtration Swamp, Philips Lake Wetland Complex, Mossington Park Wetland Complex, Cranberry/Oil Well Bog, Humber River Marshes Wetland Complex, Speed River Wetland Complex and the Beaverton River Wetland Complex.

- managed deer wintering surveys in Ramara Township, Carden Township, Erin Township and Puslinch Township.

- coordinated fisheries inventories for coldwater and warmwater systems in Ontario (e.g., Eramosa River, Speed River, West Credit River, Dalrymple Lake, Warnock Lake, Caledon Creek, Greenock Creek and Spencer Creek).

- prepared terrestrial enhancement plans for a deer wintering area in Puslinch Township.

- completed forestry evaluations for woodland areas in Wellington County, Simcoe County and the Regional Municipalities of York, Peel and Hamilton-Wentworth.

- managed bird surveys in various Southern Ontario municipalities.

- coordinated vegetation surveys for alvar communities in Simcoe County, Victoria County and the Regional Municipality of Hamilton-Wentworth.

- completed vegetation management plan for alvar communities and upland forest communities for a proposed quarry in the Regional Municipality of Hamilton-Wentworth.

Subwatershed Planning

- participated in subwatershed planning studies in Laurel Creek, Grindstone Creek and Nichol Drain No. 2.

- completed historic vegetation mapping programs in Caledon Creek Subwatershed.

Aggregate Applications

- certified to prepare site plans under Section 8.4 of the Aggregate Resources Act.

- assisted in the preparation of environmental plans and agricultural rehabilitation plans for the proposed Batterman Pit (Grey County), Puslinch Pit, Caledon Sand & Gravel Inc. Pit and Shoemaker Pit.

- conducted environmental evaluations and agricultural appraisals for various aggregate operations in southern Ontario.

- assisted in the preparation of Environmental Impact Studies for the proposed expansions of the Ospringe Pit, the Darrington Pit and Flamboro Quarries.

- prepared Level 1 & 2 Natural Environment and Environmental Impact Statements for aggregate developments in Simcoe County, Wellington County and the Regional Municipalities of York, Halton, Waterloo and Hamilton-Wentworth. These reports were prepared in accordance with the policy requirements of the Aggregate Resources Act (Technical Study Requirements), Wetland Policy Statement, Provincial Policy Statement and/or local/regional Official Plans.

- prepared applications for Certificate of Approvals for pit and quarry operations in southern Ontario.