



# Grand Valley Business Park

## Environmental Impact Study

Prepared for:

Thomasfield Homes  
295 Southgate Drive  
Guelph, ON  
N1G 3M5

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**NATURAL RESOURCE SOLUTIONS INC.**

Aquatic, Terrestrial and Wetland Biologists

**Grand Valley Business Park  
Environmental Impact Study**

**Project Team**

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## 1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained by Thomasfield Homes in May 2021 to complete an Environmental Impact Study (EIS) for lands within the southeast extent of the Town of Grand Valley, Ontario (Map 1). A business park development is proposed for a portion of the site and will also include associated servicing and stormwater management. This EIS does not assess impacts relating to future development in the remaining area north of the business park or south of the business park.

This report characterizes the natural heritage features within the subject property and assesses potential impacts arising from the proposed development. The development area consists of two parcels; for the purpose of this report, these are referred to as a single subject property. A future watermain crossing of the Grand River (between the subject property and the existing servicing along Cooper Street or Main Street South) is also proposed. At this time, NRSI has not reviewed drawings that indicate the exact location of the watermain crossing and as such this component is addressed as a high-level concept. Mitigation measures to reduce impacts associated with the business park development are provided.

A collector road crossing of Boyne Creek was identified in the Town of Grand Valley Transportation Master Plan (Town of Grand Valley 2017a); the assessment of impacts relating to this collector road development is not included in this EIS and will be completed by others as part of a future application.

Due to the presence of Boyne Creek to the west of the subject property, and the Grand River to the north, a portion of the development area is regulated by the Grand River Conservation Authority (GRCA) under Ontario Regulation 150/06 and is identified in the Official Plan Schedule A-2 as Environmental Conservation (Town of Grand Valley 2017b).

Technical studies, relevant to other aspects of the development, such as planning, stormwater management, hydrogeology and engineering were prepared by the consulting team and have been used to help assess potential impacts to the natural features. This report should be read in conjunction with the studies outlined below. The consulting team is comprised of:

- GM BluePlan (Hydrogeology Study);
- GM BluePlan (Servicing and Stormwater Management Report);
- Astrid J. Clos Planning Consultants (Planning);

- HGC Engineering (Noise Study);
- Salvini Consulting (Transportation Study);
- AMICK Consultants Ltd. (Archaeological Study)
- NRSI (Natural Heritage Study)

## **1.1 Proposed Undertaking**

The proposed development will include site grading and the build-out of 7 business park lots as shown on the Grading Plan and Functional Servicing Report prepared by GM BluePlan (GM BluePlan 2021a, GM BluePlan 2021b). A future street connection will extend from the Moco subdivision to the west, crossing Boyne Creek and crossing the subject property. At this time, the street connection is proposed from the eastern development limit to Amaranth East Luther Townline.

A stormwater management (SWM) feature is proposed for the northwest corner of the subject property in an area that is currently at a low elevation and adjacent to Boyne Creek (Pond A). A second SWM feature is proposed in the southwest corner of the subject property (Pond B). Although Pond B would be constructed in conjunction with a future development application for the southern portion of the subject property, this feature is assessed in this report.

The development will also include servicing with a gravity sanitary sewer and watermain crossing of Boyne Creek. A second future watermain crossing of the Grand River is proposed for future installation. This future watermain is anticipated to extend from the northwestern SWM block, follow a section of the Upper Grand Trailway, cross the Grand River and connect to existing infrastructure in the vicinity of Cooper Street or Main Street South.

## **2.0 Project Scoping**

### **2.1 Study Area**

The study area includes the subject property where the development is proposed, and the lands within approximately 120m of the property to ensure contiguous and adjacent natural heritage features were considered. The general vicinity of the Grand River future watermain crossing has also been considered and is discussed based on an approximate and conceptual location for which a specific alignment has yet to be determined. The Study Area is indicated on Map 1.

The development is located at Part Lot 12, Concession 1 in the Township of East Luther Grand Valley. The subject property is approximately 65 hectares in area and are located west of Amaranth East Luther Townline and north of Dufferin Road 109. The northern parcel is bounded to the north by the Upper Grand Trailway. Agricultural fields, Boyne Creek and the Moco subdivision are present to the west.

Natural features within the subject property are limited to an area of conifer plantation and cultural meadow as well as a 100m section of Boyne Creek. Several short, sparsely treed hedgerows are present along the property boundaries and also sub-divide the annual row crop field. A section of a tributary to Boyne Creek (Tributary A) crosses the far southwest corner of the subject property and a series of 5 ephemeral surface drainage features traverse the property. Coniferous forest is present to the west of the subject property along the creek. Natural features along the river in the vicinity of the proposed sanitary sewer and watermain crossings include additional areas of coniferous forest, plantation, early successional deciduous forest and cultural meadow.

A rural residence is present on each of the two parcels that comprise the subject property and a third residence is present on a severed parcel in the northeast. Sheik Halal Farms (an abattoir) fronts onto Amaranth East Luther Townline and is not part of the subject property.

### **2.2 Terms of Reference and Agency Input**

An extensive review of background information and screening exercise was conducted by NRSI to determine if habitat for Species at Risk (SAR), Species of Conservation Concern (SCC), or Significant Wildlife Habitat (SWH) may occur in the study area. The results of this review were used to inform the Terms of Reference (TOR) for the Scoped EIS which was circulated to the Town of Grand Valley (Town) and GRCA on June 25, 2021 for review and comment. Town staff indicated that approval of the TOR by the GRCA would be sufficient to address any concerns on

behalf of the Town (Kluge pers. comm. 2021). The GRCA acknowledged receipt of the TOR with no additional comments on September 13, 2021 (Warner pers. comm. 2021). The TOR (GRCA copy), and the results of the screening exercises are provided in Appendix I.

The dripline and off-property wetland boundaries have not been field-verified with agency staff. These boundaries were delineated and surveyed by an NRSI biologist using a sub-10cm accuracy GPS backpack and the shapefiles have been provided to the team as well as the GRCA.

### **2.3 Relevant Policies, Legislation and Planning Studies**

Table 1 summarizes the legislation, policies and planning studies that are relevant to the proposed development in relation to the protection of natural heritage features within the Township of Grand Valley and Dufferin County. The specific implications of these policies to the study area are discussed in further detail in this report.



**Table 1. Relevant Policies, Legislation and Planning Studies**

Policy/Legislation	Description	Project Relevance
GRCA Ontario Regulation 150/06  (GRCA 2015)	<ul style="list-style-type: none"> <li>• Regulation issued under <i>Conservation Authorities Act</i>, R.S.O. 1990.</li> <li>• Through this Regulation, the GRCA has the responsibility to regulate activities in natural and hazardous areas (i.e., areas in and near rivers, streams, floodplains, wetlands, and slopes), and in areas where development could interfere with the hydrologic function of a wetland, including areas up to 120m of all Provincially Significant Wetlands (PSWs).</li> <li>• Section 3.25.8 of the Town Zoning by-law states “<i>All buildings and structures shall be located a minimum of 30 metres from the edge of a local, or unevaluated wetland.</i>”</li> </ul>	<ul style="list-style-type: none"> <li>• Lands regulated by the GRCA (watercourse, floodplain and wetland) are present within the study area.</li> <li>• Two small pockets of marsh (unevaluated and not indicated on online GRCA mapping) are present just beyond the northwest corner of the subject property, along Boyne Creek.</li> <li>• No PSWs are present within the study area including along the Grand River.</li> <li>• The proposed site grading and stormwater management includes the development of a SWM pond in the northwest, in close proximity to the wetlands and watercourse. This feature will be located outside of the floodplain.</li> <li>• The SWM pond will outlet to Boyne Creek by way of an outlet structure directing flow from the pond to the watercourse.</li> <li>• In accordance with the outlined policies, the SWM development must demonstrate that impacts to the wetland and watercourse will be avoided or appropriately mitigated. This includes maintaining wetland function and hydrology as well as avoidance of impacts to the watercourse including fish habitat.</li> <li>• The wetlands are hydrologically dependent on the creek corridor and do not appear to receive surface water input from the field.</li> <li>• The buffer provided for the wetlands and watercourse, as well as naturalization of the SWM block, provides an opportunity for naturalization plantings to mitigate development impacts.</li> <li>• Permitting from the GRCA must be obtained for proposed works within regulated areas and adjacent lands.</li> </ul>
Provincial Policy Statement (PPS)  (MMAH 2020)	<ul style="list-style-type: none"> <li>• Issued under the authority of Section 3 of the Planning Act and came into effect on May 1, 2020, replacing the 2014 PPS.</li> <li>• Section 2.1 of the PPS – Natural Heritage, establishes clear direction on the adoption of an ecosystem approach and the protection of resources that have been identified as ‘significant’.</li> <li>• Section 2.1.6 states that development and site alteration shall not be permitted in fish</li> </ul>	<ul style="list-style-type: none"> <li>• Based on a preliminary analysis and field surveys the study area does not contain significant wetlands, significant woodlands or Significant Wildlife Habitat.</li> <li>• Fish habitat is present within the subject property.</li> </ul>

Policy/Legislation	Description	Project Relevance
	<p>habitat except in accordance with provincial and federal requirements.</p> <ul style="list-style-type: none"> <li>• Section 2.1.7 states that development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.</li> <li>• Section 2.1.8 states that development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.</li> <li>• The Natural Heritage Reference Manual (MNR 2010) and the Significant Wildlife Habitat Technical Guide (MNR 2000, MNR 2012) were prepared by the MNR to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS.</li> </ul>	
<p>Canadian Fisheries Act  (Government of Canada 1985)</p>	<ul style="list-style-type: none"> <li>• Last amended in August 2019, the <i>Fisheries Act</i> provides for the conservation and protection of fish and fish habitat.</li> <li>• The Act prohibits the “harmful alteration, disruption or destruction of fish habitat” (HADD) and protects against the “death of fish, other than by fishing”.</li> <li>• The Department of Fisheries and Oceans (DFO) has developed an on-line, self-assessment tool, where proponents can determine whether their projects require DFO review based on the type of water body the work is occurring in and the nature of the proposed activity.</li> </ul>	<ul style="list-style-type: none"> <li>• Fish and fish habitat are present within the subject property, including year-round habitat within Boyne Creek and seasonal habitat within Tributary A, near the southwest corner of the subject property.</li> <li>• The proponent-led self-assessment may be required if project components (e.g. SWM facility outfall to Boyne Creek) have the potential to result in HADD.</li> </ul>

Policy/Legislation	Description	Project Relevance
<p><i>Endangered Species Act (ESA)</i></p> <p>(Government of Ontario 2007)</p>	<ul style="list-style-type: none"> <li>The ESA prohibits killing, harming, harassing or capturing of Endangered and Threatened species and protects their habitats from damage and destruction.</li> <li>Ontario Regulation 242/088 under the ESA applies to all species on the Species at Risk in Ontario List, as of June 2, 2017.</li> </ul>	<ul style="list-style-type: none"> <li>Based on the screening completed in the TOR, suitable habitat for Barn Swallow (<i>Hirundo rusitca</i>) is present in the study area.</li> <li>Trees within the hedgerows were assessed for potential SAR bat habitat; no suitable habitat is present.</li> <li>Based on field surveys, no SAR, including Barn Swallow, were documented from the subject property. Survey effort did not include either of the rural residences, which will not be impacted as part of the proposed development.</li> </ul>
<p><i>Migratory Birds Convention Act</i></p> <p>(Government of Canada 1994)</p>	<ul style="list-style-type: none"> <li>The MBCA protects migratory game birds, insectivorous birds, and several other migratory non-game birds from persecution in the form of harassment.</li> <li>The schedule of on-site work must consider the MBCA window, with timing of breeding bird season generally extending between late March to late August.</li> <li>“Incidental take” is considered illegal, with the exception of a permit obtained by the Canadian Wildlife Service.</li> </ul>	<ul style="list-style-type: none"> <li>Numerous species protected by the <i>Migratory Birds Convention Act</i> were identified in background screening for the study area and confirmed as present within the subject property during surveys.</li> <li>The timing of construction activities, in particular vegetation clearing of hedgerow trees and grading of the field, must have consideration for the MBCA.</li> </ul>
<p><i>Fish and Wildlife Conservation Act</i></p> <p>(Government of Ontario 1997)</p>	<ul style="list-style-type: none"> <li>The FWCA provides protection for certain bird species, not protected under the MBCA (i.e., raptors), as well as furbearing mammals and their dens or habitual dwellings, aside from the Red Fox (<i>Vulpes vulpes</i>) and Striped Skunk (<i>Mephitis mephitis</i>).</li> <li>The FWCA provides protection for fish</li> </ul>	<ul style="list-style-type: none"> <li>The timing of construction activities, in particular vegetation clearing, must have consideration for bird nesting and den sites for furbearing mammals.</li> <li>No dens (active or inactive) were noted within the subject property.</li> <li>Wildlife sweeps by a qualified biologist may be warranted prior to any “in-season” vegetation removals/clearing.</li> <li>Fish habitat is present on-site.</li> </ul>
<p>Grand Valley Official Plan</p> <p>(Town of Grand Valley 2017b)</p>	<ul style="list-style-type: none"> <li>The OP does not permit new developments or site alterations within or adjacent to Significant Woodlands, Environmentally Significant Areas or Streams.</li> <li>If developments or site alterations are being proposed within or adjacent to (within 120m of) Core Areas under the OP, an environmental impact assessment is required to ensure there will be no negative impacts on</li> </ul>	<ul style="list-style-type: none"> <li>The 7 industrial lots and associated roads are identified as Employment lands on Schedule A-2.</li> <li>Schedule A-2 identifies an Environmental Conservation layer (floodplain) that follows the Boyne Creek corridor and includes much of the conifer plantation. This layer includes the northwest corner of the agricultural field (Map 1).</li> <li>Schedule B-1 – Natural Heritage does not identify the presence of Locally Significant or Unevaluated Wetland; however, the</li> </ul>

Policy/Legislation	Description	Project Relevance
	<p>the natural features or their ecological functions.</p>	<p>presence of wetland was confirmed by NRSI biologists and therefore an Unevaluated Wetland is present.</p>
<p>Dufferin County Official Plan  (Dufferin County 2017)</p>	<ul style="list-style-type: none"> <li>• The Natural Heritage policies aim to protect, restore or where possible enhance natural heritage features and the environment and foster the creation of an enhanced and connected natural heritage system.</li> <li>• Development and site alteration are to be directed away from significant natural heritage features.</li> <li>• Natural heritage features and areas will be protected for the long-term.</li> <li>• Schedule E1 identifies a preliminary county-wide Natural Heritage System.</li> <li>• Development and site alteration will not be permitted in significant wetlands, and will not be permitted in significant woodlands, valleylands, SWH or ANSIs unless it can be demonstrated that there will be no negative impact on the feature or its ecological function.</li> </ul>	<ul style="list-style-type: none"> <li>• The conifer forest to the west of the subject property, as well as much of the treed area on the north side of the Grand River is identified in Schedule E1 (Natural Heritage System) as part of the OP Preliminary Natural Heritage System. The cultural plantation within the subject property is not part of the NHS.</li> </ul>
<p>Grand Valley Zoning By-law  (Town of Grand Valley 2018)</p>	<ul style="list-style-type: none"> <li>• The by-law establishes various zones as outlined in Schedules A-1, A-2 and A-3.</li> <li>• The Environmental Protection (EP) zone boundaries are intended to generally identify the location of potentially hazardous environmental features.</li> <li>• The boundaries of the EP Zone can be refined in consultation with the Conservation Authority. Where detailed resource mapping and/or site inspection occurs, this may result in a minor re-interpretation of the limits of the EP Zone boundary. Additionally, a technical evaluation, approved by the Conservation Authority may be used to further delineate the limits of the EP Zone.</li> </ul>	<ul style="list-style-type: none"> <li>• The Town Zoning By-law (Schedule A-1) identifies an Environmental Protection layer that includes treed areas along Boyne Creek and the Grand River. The riparian section along the south bank of the Grand River, north of the water treatment facility is identified as Open Space.</li> </ul>

Policy/Legislation	Description	Project Relevance
<p>Town of Grand Valley Tree By-law 2019-10</p> <p>(Town of Grand Valley 2019)</p>	<ul style="list-style-type: none"> <li>• A by-law outlining the manner in which the Town of Grand Valley will protect and enhance the tree canopy and natural vegetation in the Town.</li> <li>• The Town requires developers to include provisions for preserving, replacing and enhancing trees and natural vegetation in the approved plans.</li> </ul>	<ul style="list-style-type: none"> <li>• The clearing of isolated hedgerow trees will be required within the subject property. The proposed watermain and sanitary crossings may require tree clearing on the approach (on the banks) with directional drilling used to the extent possible.</li> <li>• Enhancement and mitigation measures relating to the servicing crossings will include naturalization plantings of disturbed areas. Tree removals will be compensated for.</li> <li>• The removal of trees will occur during the winter months to avoid impacts to wildlife (bird nesting and bat roosting).</li> </ul>

### **3.0 Field Methods**

NRSI biologists conducted a preliminary survey on June 11, 2021. During this survey the vegetation communities within the study area and the approximate location of the servicing crossings were characterized and mapped using Ecological Land Classification (ELC) (Lee et al. 1998). An inventory of vascular plants was completed for each ELC community including composition, dominance and uncommon species. Notes were taken regarding the soil type, site topography and evidence of human impacts.

An assessment of candidate SAR/SCC habitat and SWH was also completed to verify the presence or absence of habitats that had been identified in the TOR screening exercise (Appendix I). This assessment included an on-site review of trees that may provide habitat for bat roosting or bat maternity colonies. Anuran breeding habitat is not present within the study area. Including the broad footprint where the future watermain crossing of the Grand River is proposed.

The subject property dripline and wetland boundaries were surveyed by NRSI biologists, certified in the Ontario Wetland Evaluation System, using a backpack GPS unit. These boundaries have not been field-reviewed with agency staff; however, we are confident in their accuracy. The surveyed dripline and wetland boundary are indicated on Map 2.

Two breeding bird surveys were completed; June 11, 2021 and June 25, 2021. These area search surveys focused on the northern extent of the site and the hedgerow trees within the proposed business lot development area. The rural residences were not surveyed for the potential presence of Barn Swallow or bats as these structures are outside of the proposed development footprint.

An aquatic habitat assessment and backpack electrofishing surveys were completed on July 26, 2021 for the aquatic features within the subject property, including sections of Boyne Creek and Tributary A of Boyne Creek. These surveys were completed to determine the permanency of these features and to assess their use as fish habitat.

A site meeting was held with the Town, R.J. Burnside, Thomasfield Homes, A.J.C. Planning, GM BluePlan and NRSI on August 11, 2021. Options for the watermain crossing of the Grand River and for the Boyne Creek watermain and sanitary sewer crossing were discussed during this meeting.

## **4.0 Existing Conditions**

### **4.1 Soil, Terrain and Drainage**

The soil type across much of the subject property is Huron Loam (clay loam till) with a band of Tavistock alluvium (silt loam) across the southern parcel (Hoffman et al. 1964). To the northwest, the south bank of the Grand River (in the vicinity of the wastewater treatment plant outside of the subject property) is Guelph loam while the northern bank of the river is Caledon fine sandy loam over outwash gravel. Soil sampling during ELC surveys consistently encountered silt loam in the northern extent of the site where soil auger samples were collected within the natural features. The marsh beyond the northwest corner is underlaid by silt with soil mottling at 15-20cm depth and no standing water or signs of vernal pooling evident at the time of the first survey in June 2021.

The high elevation on the subject property is near the proposed road connection to Amaranth East Luther Townline in the vicinity of the abattoir (approximately 476 masl). The northern parcel directs surface water toward the northwest corner where it collects in the low end of the field (approximately 455 masl) and infiltrates, evaporates or sheet flows overland through the cultural meadow before reaching Boyne Creek. Overland flow from the field does not directly contribute to the water balance within the small adjacent marsh features beyond the northwest corner of the subject property. The southern parcel directs surface water toward an intermittent drainage feature that runs diagonally across the agricultural field to the south of the proposed development (approximately 468 masl at the western property boundary). Drainage patterns within the subject property are shown on Map 3. No seepage areas or springs were observed within the development area; however, seepage indicator species were noted from within and along the channel bed of Boyne Creek. Photographs of the site are provided in Appendix II.

## **4.2 Vegetation**

### **4.2.1 Vegetation Communities**

The following vegetation communities were delineated within the study area and are shown on Map 2.

#### **Scotch Pine Coniferous Plantation Type (CUP3-3)**

A Scotch Pine (*Pinus sylvestris*) plantation is the main natural feature within the subject property. This mature plantation is situated between the row crop field to the south and the elevated rail trail embankment to the north. The topography is moderately sloping toward

Boyne Creek. The plantation is over-stocked and a portion of the Scotch Pine are declining due to crowding of canopies. Young to mid-age Black Cherry (*Prunus serotina*) have established among the conifers and along the edge of the feature. European Buckthorn (*Rhamus cathartica*) is present along the perimeter of the plantation with shrub cover limited in the centre. Groundcover includes sparse Herb Robert (*Geranium robertianum*), Ox-eye Daisy (*Leucanthemum vulgare*) and Common Dandelion (*Taraxacum officinale*) among a dense carpet of pine needle duff. Due to the decline of coniferous tree cover, there is an opportunity to manage this feature in a manner that will support a transition toward mixed forest.

### **Coniferous Plantation (CUP3)**

An area of mid-age conifer plantation is present on the north side of the Grand River, in the vicinity of the proposed watermain crossing. The canopy is comprised of a mixture of Scotch Pine and White Pine (*Pinus strobus*). Black Cherry occurs sporadically among the conifers. Similar to the CUP3-3 community, the closed canopy and accumulated pine needles have limited the understorey and herbaceous layers. This community exhibits low diversity but contributes to contiguous tree cover along the Grand River which provides wildlife habitat and improves water quality.

### **Fresh - Moist White Cedar Coniferous Forest Type (FOC4-1)**

The calcareous soils along both Boyne Creek and the Grand River support dense stands of White Cedar (*Thuja occidentalis*) forest. Black Cherry and American Elm (*Ulmus americana*) occur among the dense swaths of conifer cover. Cedar is dominant in the canopy, sub-canopy and shrub layer with Herb Robert comprising a sparse groundcover under the deep shade. Areas of cultural meadow are often present along the edges of these forest stands.

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

The northern bank of the Grand River is lined with a band of mid-age Trembling Aspen (*Populus tremuloides*). The tree canopy is discontinuous with Reed Canary Grass (*Phalaris arundinacea*) forming much of the groundcover. This community is likely subject to seasonal disturbance including inundation and ice scour.

### **Hedgerows (H1-H7)**

The subject property contains 7 distinct hedgerow features. The hedgerows vary in length and are generally comprised of sparse Sugar Maple (*Acer saccharum*) and American Basswood (*Tilia americana*). As a result of agricultural land use, the fence lines are a monoculture of



Smooth Brome (*Bromus inermis*) with shrubs limited to occasional small thickets of Grey Dogwood (*Cornus racemosa*) and brambles (*Rubus* spp.). With the exception of H1 adjacent to the rail trail, the hedgerows do not provide a notable connection function between larger natural features on the landscape.

### **Cultural Meadow (CUM1)**

Cultural meadow is present within the subject property on both sides of Boyne Creek and extending on the north side of the Scotch Pine plantation. This community has limited plant diversity; drier areas of meadow are dominated by Smooth Brome with patches of New England Aster (*Symphotrichum novae-angliae*) and Canada Goldenrod (*Solidago canadensis*). The banks of both watercourses exhibit a band of damp meadow dominated by Reed Canary Grass with Lance-leaved Aster (*Symphotrichum lanceolatum*). The meadow vegetation serves an important role in stabilizing soils and maintaining water quality within Boyne Creek and the Grand River. Intermittent surface water flow across the northern extent of the agricultural field is directed through a 100-150m stretch of meadow before reaching the watercourse; an area that would likely erode and carry sediment-laden water to Boyne Creek in the absence of dense herbaceous cover.

### **Reed-canary Grass Mineral Meadow Marsh Type (MAM2-2)**

Where Boyne Creek outlets at the Grand River, the banks become poorly defined with a channel flanked on each side by Reed Canary Grass marsh. This area is private property and was assessed from the rail trail as well as from the north side of the river. Due to property access, the feature extent was not delineated but was mapped using air photography. This vegetation community is also present along Tributary A of Boyne Creek beyond the southwest corner of the subject property but was not mapped.

### **Mixed Mineral Meadow Marsh (MAM2)**

Two small areas of mixed marsh are present beyond the northwest corner of the subject property. Each appears to be a depression within the Boyne Creek floodplain that collects spring melt and may provide flood attenuation capacity during large rainfall events. Although these features were delineated with a backpack GPS, an extensive plant list was not compiled. Both are a mixture of Reed Canary Grass and wetland species including Purple-stemmed Aster (*Symphotrichum puniceum*), Spotted Joe-pye Weed (*Euthrochium maculatum*), Soft Rush (*Juncus effusus*) and wetland sedges (*Carex* spp.).

### **Deciduous Swamp (SWD)**

An area of deciduous swamp is present north of the rail trail, within the Grand River Floodplain. Soil mapping indicates that the area contains muck soils (Hoffman et al. 1964). A roadside assessment of this feature noted a mixture of American Elm, Trembling Aspen and declining or dead Ash (*Fraxinus* spp.).

### **Mixed Swamp (SWM)**

Similar to the deciduous swamp description above, the mixed swamp contains American Elm, Trembling Aspen and Ash with White Cedar interspersed.

### **Open Aquatic (OAO)**

A series of naturalizing aggregate pits are present on the northern bank of the Grand River. Assessed from a distance, these features appear to contain submerged and riparian vegetation and likely provide good habitat for waterfowl, anurans and turtles.

#### **4.2.2 Vascular Flora**

The vascular plant survey documented a total of 84 vascular plant species from the subject property. No provincially or regionally significant species were observed. In general, native species diversity is moderately diverse within the riparian areas along the creek and river. Diversity is low within the stands of White Cedar and the Scotch Pine plantation. The edges of natural features as well as the cultural meadow are a mixture of native species (asters and goldenrods) as well as cool season grasses.

European Buckthorn, an aggressive non-native shrub, is present sporadically along the edges of treed features. Purple Loosestrife (*Lythrum salicaria*), an invasive herbaceous species, occurs in small numbers along the watercourses.

A complete list of the vascular plant species reported for the subject property by NRSI biologists is provided in Appendix III.

### **4.3 Wildlife**

Wildlife species lists that include data collected through the background as well as species observations noted by NRSI biologists during surveys are provided in Appendix IV to Appendix VI.

#### 4.3.1 Birds

A total of 85 bird species are reported from the study area based on the OBBA (BSC et al. 2006). Breeding bird surveys, as well as incidental observations of birds within the study area, documented a total of 23 common bird species. Most of the bird activity was noted from the riparian corridor and conifer plantation including probable breeding evidence for Eastern Phoebe (*Sayornis phoebe*), Red-eyed vireo (*Vireo olivaceus*), Gray Catbird (*Dumetella carolinensis*), Song Sparrow (*Melospiza melodia*), Baltimore Oriole (*Icterus galbula*) and Common Yellowthroat (*Geothlypis trichas*), among others. Killdeer (*Charadrius vociferus*) were present among the row crop fields where the development is proposed.

Eastern Wood-pewee (*Contopus virens*), a species of Special Concern, was identified in the screening exercise (Appendix I) as potentially present within the study area. This species utilizes forest clearings and edges, both in natural and urban settings, with forest size ranging from small features to large tracts (Watt et al. 2020). Habitat for Barn Swallow, namely barns, outbuildings and residences, are present within the subject property but are not proposed for removal as part of this development. Neither of these species were observed during the surveys.

SWH for Bald Eagle and Osprey Nesting, Foraging and Perching Habitat was identified as potentially present in the screening exercise (Appendix I). This habitat type would be associated with the treed corridor along the Grand River and potentially the lower reach of Boyne Creek. Although both species are known from the vicinity of Grand Valley (BSC et al. 2006, iNaturalist 2021), field surveys did not observe Bald Eagle (*Haliaeetus leucocephalus*) or Osprey (*Pandion haliaetus*) including any signs of active or inactive nests.

A full list of bird species reported from the study area during 2021 surveys, is provided in Appendix IV.

#### 4.3.2 Herpetofauna

A total of 9 herpetofauna species are reported from the study area based on the Ontario Reptile and Amphibian Atlas data (Ontario Nature 2019). No reptiles or amphibians were documented from the subject property during the 2021 surveys.

Vernal pools or ponds that would provide potential habitat for breeding anurans are not present within the subject property. Although the bridge abutment associated with the rail trail crossing

of Boyne Creek has potential to provide reptile hibernacula habitat, this feature is well-removed from the proposed development and was not investigated in detail. The potential for turtle nesting within the agricultural field was considered; however, the silt-based substrates (as opposed to sandy soils) are not ideal for nesting and this section of Boyne Creek does not contain wetlands that would provide basking and overwintering habitat. No evidence of turtle nesting was observed during the 2021 surveys.

### **4.3.3 Mammals**

A total of 46 mammal species are reported from the study area based on the Ontario Mammal Atlas (Dobbyn 1994). During the surveys, NRSI biologists documented Porcupine (*Erethizon dorsatum*), Eastern Cottontail (*Sylvilagus floridanus*), White-tailed Deer (*Odocoileus virginianus*), Gray Squirrel (*Sciurus carolinensis*), Eastern Chipmunk (*Tamias striatus*) and Raccoon (*Procyon lotor*)

The Ontario Mammal Atlas identifies that several SAR bats have potential to be present within the study area. A search of the hedgerow trees within the proposed development area did not identify any potential cavity trees that could support SAR bat roosting or maternity colonies.

## **4.4 Aquatic Features**

Two main aquatic features exist within the subject property. These include Boyne Creek and Tributary A of Boyne Creek, as shown on Map 3. Boyne Creek was assessed at AHP-001, while Tributary A of Boyne Creek was assessed at AHP-002. Each of these features are described below. In addition to Boyne Creek and Tributary A, several ephemeral features were also identified based on aerial imagery and are included with the mapping as well.

### **Boyne Creek**

Boyne Creek is a permanent watercourse within the subject property that provides direct fish habitat. The feature flows northeast from its crossing of County Road 25 and intercepts the northwest corner of the subject property before flowing through a large culvert under the Upper Grand Trailway and outletting to the Grand River. Boyne Creek predominantly flows through actively cultivated agricultural lands, with lesser areas of fallow, regenerating fields and small woodland pockets. Within the subject property boundary, the floodplain and extent of natural vegetation is greater than 10m on both sides of the channel. In the southwest, the natural vegetation adjacent to the tributary is limited due to the presence of an active agricultural field.

The riparian and bank areas are comprised of meadow that includes a variety of terrestrial grasses and forbs, which heavily overhang the channel at narrow locations. Mature forest is also present on adjacent lands, but is generally set back from the channel.

Within the subject property Boyne Creek flows over a moderate gradient and gently meanders within the confines of the corridor. Due to the gradient of the channel, the majority of the assessed reach exhibits riffle habitat with some run habitat and small pools. At the time of the assessment wetted widths ranged from approximately 2.0 to 5.0m, with the channel widening just upstream from the Upper Grand Trailway. Water depths ranged from roughly 0.1 to 0.2m, and bank height extended up to approximately 0.7m at some locations. One large pool is present at the upstream extent of the assessed reach where the creek enters the subject property. At the time of the assessment the pool measured approximately 12m long and 6m wide, and had a maximum depth of 0.65m. Substrates within Boyne Creek are dominated by cobble and gravel with occasional boulders and lesser areas of sand and silt. The rocky substrates provide abundant in-stream cover for small-bodied fish in addition to the riffle and pool habitats and overhanging bank vegetation.

At the time of the assessment water temperature was 19°C, measured at 10:45 and with an air temperature of 27°C. This suggests a cool-warmwater thermal regime, which is supported by the fish community present, as described in Section 4.4.1 and shown in Table 2. Dissolved oxygen was measured at 7.7mg/L and 86%. Watercress (*Nasturtium officinale*) was observed in relatively low abundance along the east bank of the channel, downgrade from ELC community CUP3-3. Soils were also saturated at this location, suggesting potential groundwater seepage near this location.

### Tributary A

Tributary A travels flows northwest from its crossing of County Road 109 and intercepts the southwest corner of the subject property before connecting to Boyne Creek. Only a small portion of the feature was able to be assessed due to property access. North and south of County Road 109 the channel appears to be relatively small with a width of approximately 0.2 to 0.3m and was dry upstream and downstream of the road crossing on July 26, 2021. Tributary A exhibits intermittent characteristics. Exposed substrates were observed at a few locations within the channel indicating that water does flow through Tributary A at certain times of the year. Additionally, a large isolated pool is present, associated with the box culvert at the County

Road 109 crossing, which was measured at a maximum water depth of 0.75m. This pool appears to provide refuge habitat for fish during the summer months, confirmed through an electrofishing survey, which is detailed in Section 4.4.1. It is expected that when water is flowing within Tributary A fish may be able to navigate up to, and potentially beyond, County Road 109 from Boyne Creek and potentially the Grand River but when the channel is dry the pool is completely isolated. The water temperature within the pool was 19°C, measured at 13:00 and with an air temperature of 29.5°C, suggesting a cool-warmwater thermal regime. Additionally, the water was observed to have heavy filamentous algae growth and surface scum within a few areas, potentially due to high nutrient load from the surrounding agricultural landscape.

### Ephemeral Features

In addition to Boyne Creek and Tributary A, several ephemeral features were noted across the subject property based on a review of aerial imagery. Their approximated flow paths are shown on Map 3. During the July 26, 2021 assessment these features were observed to be dry and are likely to remain dry for the majority of the year. These features do not provide fish habitat and are only expected to convey surface flow during spring freshet from the surrounding agricultural landscape towards Boyne Creek.

#### **4.4.1 Fish Community**

Boyne Creek provides direct fish habitat including suitable spawning, foraging and rearing habitats for a variety of species. This was confirmed through an electrofishing survey conducted on July 26, 2021 at EMS-001 (Map 3). This survey confirmed the presence of 13 species of fish within Boyne Creek, specifically within the subject property, summarized in Table 2. Aquatic Resource Area data provided by the MNRF/GRCA (MNRF 2020) indicates the presence of two additional species as well. The species known from Boyne Creek exhibit either cool or warmwater thermal preferences and include a combination of highly tolerant and moderately tolerant species. None of the fish species identified from Boyne Creek are considered to be SAR and no SAR fish or mussels were identified during background review. Further, the Grand River and Boyne Creek at this location are not identified as habitat for aquatic SAR based on mapping available from Fisheries and Oceans Canada (DFO 2019).

Electrofishing was also conducted at EMS-002 within a large standing pool of water associated with Tributary A at the crossing of County Road 109. This survey confirmed the presence of

seven fish species within Tributary A. These species primarily exhibit a coolwater thermal preference.

**Table 2. Fish Species Identified Within the Subject Property**

Common Name	Scientific Name	Thermal Preference <sup>1</sup>	Tolerance <sup>1</sup>	NRSI (July 26, 2021)	GRCA (2003) <sup>2</sup>
<b>Boyne Creek (EMS-001)</b>					
Blacknose Dace	<i>Rhinichthys obtusus</i>	Coolwater	Intermediate	X	
Blackside Darter	<i>Percina maculata</i>	Coolwater	Intermediate	X	
Brook Stickleback	<i>Culaea inconstans</i>	Coolwater	Intermediate		X
Brown Bullhead	<i>Ameiurus nebulosus</i>	Warmwater	Intermediate	X	
Central Stoneroller	<i>Campostoma anomalum</i>	Coolwater	Intermediate	X	
Common Shiner	<i>Luxilus cornutus</i>	Coolwater	Intermediate	X	
Creek Chub	<i>Semotilus atromaculatus</i>	Coolwater	Intermediate	X	X
Johnny Darter	<i>Etheostoma nigrum</i>	Coolwater	Tolerant	X	
Mottled Sculpin	<i>Cottus bairdii</i>	Coldwater	Intermediate		X
Northern Hog Sucker	<i>Hypentelium nigricans</i>	Warmwater	Intermediate	X	
Northern Redbelly Dace	<i>Chrosomus eos</i>	Coolwater	Intermediate	X	
Rainbow Darter	<i>Etheostoma caeruleum</i>	Coolwater	Intolerant	X	
Rock Bass	<i>Ambloplites rupestris</i>	Coolwater	Intermediate	X	
Rosyface Shiner	<i>Notropis rubellus</i>	Warmwater	Intermediate	X	
White Sucker	<i>Catostomus commersonii</i>	Coolwater	Tolerant	X	
<b>Tributary A (EMS-002)</b>					
Brook Stickleback	<i>Culaea inconstans</i>	Coolwater	Intermediate	X	
Central Stoneroller	<i>Campostoma anomalum</i>	Coolwater	Intermediate	X	
Central Mudminnow	<i>Umbra limi</i>	Coolwater	Tolerant	X	
Creek Chub	<i>Semotilus atromaculatus</i>	Coolwater	Intermediate	X	
Fathead Minnow	<i>Pimephales promelas</i>	Warmwater	Tolerant	X	
Northern Redbelly Dace	<i>Chrosomus eos</i>	Coolwater	Intermediate	X	
White Sucker	<i>Catostomus commersonii</i>	Coolwater	Tolerant	X	

<sup>1</sup>Eakins R.J. 2021

<sup>2</sup>MNRF 2020



## **5.0 Significance and Sensitivity of Natural Features**

### **5.1 Wetlands**

The two small marsh features beyond the northwest corner of the subject property are approximately 0.06ha and 0.03ha in size and situated in a low area along the Boyne Creek floodplain. In review of the surface water flow patterns across the subject property, both confirmed in the field and using aerial imagery, it appears that overland flow from the field enters Boyne Creek to the north of these wetlands and does not directly contribute to their hydrology. It is likely that the marsh areas retain water during the spring melt period and receive additional surface flow input from a small catchment along the east side of the creek.

The marsh habitat does not contain significant plant species, but does provide habitat diversity along the creek corridor with a mixture of forest and other small marsh inclusions upstream and downstream of this location. The density of wetland forbs, many of which do not tolerate prolonged flooding, suggest that seasonal standing water within the wetland quickly infiltrates, evaporates or reaches the creek, but does not form a pool that would support anuran breeding or turtle basking habitat.

The cultural meadow vegetation between the eastern marsh unit and the subject property provides a dense cover of grasses and forbs. The meadow is approximately 6m to the property line where an old barbed wire fence delineates the boundary between the properties. Based on the field review of the site conditions, these marsh features are not significant and are not directly connected to the surface water flow patterns originating from the subject property. Photographs of the wetland in proximity to the field edge are provided in Appendix II.

Although a full wetland evaluation was not completed, several criteria to support a PSW designation would be very unlikely (MNR 2014). No SAR which utilizes wetland habitat were observed within the wetlands and the nearest existing PSW (for consideration of complexing) is much greater than 750m away (approximately 4.5km to the west).

### **5.2 Woodlands**

The Scotch Pine plantation is generally a low diversity feature with a declining canopy and poor regeneration due to overstocking and a dense band of European Buckthorn along the feature edge. Despite the low quality of the feature, it acts to buffer a section of Boyne Creek at the

culvert crossing beneath the Grand Valley Trailway. The plantation is part of a larger section of treed riparian habitat along the creek which is likely used by a variety of wildlife as a movement corridor. Although conifer stands are common in the vicinity of the subject property, a uniform-aged plantation such as this can provide roosting and refuge habitat for wildlife.

Given the declining condition of the plantation, the feature is not sensitive and there is opportunity to enhance both the plantation and the adjacent corner of the agricultural field that is identified as Environmental Conservation in the OP (Town of Grand Valley 2017b) as part of the floodplain.

The tree cover along the Grand River is a mixture of naturally-occurring White Cedar monoculture along the south bank and a combination of Trembling Aspen, Scotch Pine and White Pine on the north bank. These treed areas contribute to water quality improvement and wildlife movement, but do not exhibit notable diversity. The proposal to install a watermain beneath the Grand River may require localized vegetation clearing within these areas. Any vegetation clearing must have considerations for wildlife timing windows. The removal of any portion of woodland should compensate for the tree removal using native species plantings to ensure that the contiguous natural cover is maintained.

### **5.3 Watercourses and Fish Habitat**

Two primary aquatic features overlap with the subject property; Boyne Creek and Tributary A. Boyne Creek exists as a permanent feature and provides direct fish habitat. Tributary A exists as an intermittent feature that is anticipated to provide seasonal fish habitat between Boyne Creek and County Road 109, but also provides permanent refuge habitat through the presence of a large, isolated pool at the County Road 109 crossing. Both features exhibit cool-warmwater thermal regimes, as supported by water temperature measurements and the presence of both cool and warmwater fish species. Any proposed activities associated with the development of the subject property must consider the sensitivity of the systems as habitat for fish, mussels and aquatic invertebrates. For activities planned in the vicinity of Boyne Creek and Tributary A, in-water timing windows must be considered, depending on the approach to construction and the results of the DFO self-assessment (and potential DFO review).

Several ephemeral features are noted to be present across the subject property, primarily associated with active agricultural lands. During the aquatic habitat assessment that was completed on July 26, 2021 the observed portions of these features were dry and they are

expected to be dry for the majority of the year, likely only conveying sheet flow during spring freshet towards Boyne Creek. In addition to their ephemeral nature, due to the change in elevation from Boyne Creek to these features they do not provide fish habitat. However, surface flow across the subject property will still need to be managed appropriately through a stormwater management plan, which will need to consider maintaining or improving water quality to Tributary A and Boyne Creek in addition to the overall water balance for the site.

#### **5.4 Buffers**

In consideration of the applicable policy outlined in Table 1, and the characterization of the wetland, woodland and watercourse that occurred in 2021, a development buffer will be afforded to these features. The recommended minimum buffers are indicated on Map 4 as well as the civil drawing package (GM BluePlan 2021a).

In order to preserve the form and function of the small marsh features, NRSI recommend that a 10m no-touch buffer (or greater) be implemented. As the eastern marsh unit is approximately 6m beyond the property line, there is an existing cultural meadow buffer strip that will be maintained and is likely to succeed into shrub thicket and forest cover. The Pond A SWM feature design includes 3 tandem outlet pipes in the northwest part of the pond. The western-most outlet is greater than 15m from the eastern extent of the nearest marsh feature. The extent of the SWM block shown on Map 4 corresponds with the Environmental Conservation layer indicated on Schedule A-2 of the OP (Town of Grand Valley 2017b).

The White Cedar forest to the west of the subject property (FOC4-1), is also afforded a buffer similar to the wetland features. Due to the history of row crop agriculture which has likely severed tree roots along the field edge for some time, it is recommended that a 5m buffer (or greater) be implemented from the dripline of these trees. As discussed with respect to the wetlands, the northern edge of the SWM block reflects the Environmental Conservation layer which provides a buffer greater than 5m for these trees. For the Scotch Pine plantation, a 5m buffer is also recommended on account of the adjacent agricultural activities “root-pruning” the trees for many years. A 5m buffer from the plantation edge will be bordered by naturalization plantings associated with the SWM block resulting in a naturalized buffer to the plantation that will extend further than 5m.

With respect to the SWM outlet location, the eastern-most outlet is greater than 30m from the plantation. To the south of the plantation and east of the cedar forest, fill material will be graded

to increase the elevation for the SWM feature (essentially a berm with a maximum height of approximately 4.4m near the outlets). Beyond the eastern extent of the plantation the grading for the SWM feature is minimal, nearly matching grade where the maintenance laneway runs along the east edge of the 5m plantation buffer. The eastern extent of the SWM pond will require a grade cut of up to 7m; however, this grading is far-removed from the dripline buffer. The location of the proposed SWM block presents a significant gain in natural cover along the Boyne Creek corridor. The installation of a naturalization planting within the Environmental Conservation lands to the north of the pond, coupled with plantings surrounding the pond will create contiguous tree and shrub cover in an area currently in row crop agriculture and subject to soil erosion and nutrient-laden runoff.

The Town OP identifies that the width of a setback that protects the water quality should consider the development type, site drainage and slope and will be determined in consultation with the Conservation Authority (Town of Grand Valley 2017b). In recognition of the ecological sensitivity of the watercourses and fish habitat to disturbance, it is recommended that watercourse buffers be applied to Boyne Creek and Tributary A where they occur within the subject property (Map 4). These features have been identified as cool-warmwater features, which have been afforded a 15m buffer from both Pond A and Pond B. For Pond A, the outlet is greater than 25m from Boyne Creek with dense riparian vegetation that will be retained within the watercourse buffer and restored within the SWM pond footprint. For Pond B, the outlet is located just beyond the 15m watercourse buffer with dense riparian vegetation between the watercourse and outlet location.

## 6.0 Impact Analysis

Potential impacts arising from the proposed Grand Valley Business Park development are determined by comparing the details of these proposed development components with the characteristics of the existing natural features and their functions, as shown on Map 4. Where the development proposals overlap with natural features or their vegetation protection zones, impacts may arise. The following is a description of the types of impacts which will be discussed:

- Direct impacts to the natural features within the study area associated with disruption or displacement caused by the actual proposed 'footprint' of the undertaking.
- Indirect impacts associated with changes in site conditions such as drainage and water quantity/quality.
- Induced and cumulative impacts associated with impacts after the development components are constructed, such as subsequent interference with natural features as a result of increased use of the area and vicinity over time.

As the natural heritage constraints for the proposed development are focused in the northwest and southwest extent of the subject property, NRSI provided the wetland and dripline data to GM BluePlan and Astrid J. Clos Planning along with recommended buffers for these features as well as Boyne Creek and Tributary A.

The details relating to stormwater management for the site are outlined in the Stormwater Management Design Report (GM BluePlan 2021c). The site plan identifies two SWM features; Pond A in the northwest that will be constructed as part of the 7-lot business park development, and Pond B in the southwest that will be constructed as part of future build-out of the southern portion of the subject property. NRSI worked with GM BluePlan to identify appropriate natural feature buffers and to make adjustments to grading and SWM outlet locations that will preserve the quality and function of the adjacent natural features.

Pond A, in the northwest of the subject property, is designed with a bottom of pond elevation of 455.30 masl and a forebay elevation of 454.10 masl. The permanent pool elevation of 456.00 masl will result in a permanent water depth of 0.7m within the pond. The receiving end of the outlet pipes has an invert elevation of 457.00 masl. An emergency overflow weir is located in

the general location of the outlet pipes and would direct pond overflow to the same location as the pipe outlet. The 1.50m deep forebay and 1.55m tall forebay berm extends from the southwest end of the pond to reduce the energy of stormwater flow entering the pond and allow sediment to settle prior to the pond discharging to Boyne Creek during high rainfall and melt events. The SWM pond includes slopes with a maximum grade of 5:1 which presents an opportunity for naturalization plantings to be installed at locations away from the inlet and outlet features and allowing sufficient long-term equipment access along the 3.5m wide maintenance laneway. In the event that a trail connection is made between the SWM laneway and the Grand Valley Trailway, linking the business park to the trail network, plantings will have considerations for public safety and aesthetics.

Pond B, in the southwest of the subject property, will be smaller in capacity than Pond A. The northern extent of the feature will require cut grading of approximately 2m depth with the southern and western extent comprised of a berm with a maximum height of approximately 3m where it nears the 15m watercourse buffer. Similar to Pond A, stormwater entering the feature is directed into a forebay with a low berm also present to limit sediment-laden water from reaching the watercourse. A maintenance lane encircles the feature and the emergency overflow is located at the location of the two outlet pipes in the southwest corner. NRSI worked with GM BluePlan to ensure that the full 15m watercourse buffer was afforded, including the placement of the outflow features beyond this buffer.

The Functional Servicing Report (FSR) (GM BluePlan 2021b) outlines the pre- and post-development drainage conditions relating to stormwater management. Under existing conditions, 3 catchments totaling 54.85ha (Catchments 101, 102 and 103 in Figure No. 3 of the FSR) direct sheetflow to the northwest toward Boyne Creek. Catchment 104, 12.28ha in size, directs sheetflow toward Tributary A of Boyne Creek in the southwest. Catchment 105 is 2.64ha in size and directs sheetflow southeast toward the intersection of Amaranth East Luther Townline and County Road 109 which ultimately outlets to Tributary A of Boyne Creek via a roadside ditch.

Post-development modelling, as shown on Figure No. 4 of the FSR, indicates that Catchment 201 and 202 (the latter retaining the existing grade and drainage as the existing abattoir lot) will total 57.38ha in size with all stormwater flow directed to Pond A in the northwest. Catchment 203 at the far southern extent of the subject property is 10.21ha in size and will direct

stormwater to the future Pond B in the southwest. As these catchments are currently row crop agricultural fields, the proportion of impervious surface increases from 0% to more than 70% under the proposed development scenario that includes buildings, parking lots and roads.

The proposed SWM design will attenuate runoff directed to Boyne Creek to the flow rate under existing conditions during the 2, 5, and 100-year design storm events as well as during the Regional Storm (GM BluePlan 2021c). The design will also provide a long-term average removal of 80% of TSS on an annual loading basis from all runoff leaving the site.

The FSR (GM BluePlan 2021b) identifies that both Pond A and Pond B will function as hybrid wetland/wet ponds. Pond A will have a permanent pool of 0.7m while Pond B will have a shallower pool depth of 0.3m. Both SWM features will be constructed to convey major flows up to and including the 100-year storm event.

The construction of both SWM features will afford the full recommended buffer width for the wetlands, watercourse and treed features and the buffer areas present an opportunity for naturalization following construction.

The FSR and civil plan drawings (GM BluePlan 2021a, 2021b) outline the approach to installing the sanitary sewer crossing of Boyne Creek. The 250mm diameter sanitary sewer will be installed beneath Boyne Creek via trenchless technology and will connect to existing sewer infrastructure near the sewage pumping station on the west side of Boyne Creek. The sanitary line will follow the street alignment to the western boundary of the subject property where it will then run north, in tandem with the stormwater infrastructure, to the western extent of the Pond A SWM block where it will then run west onto the neighbouring property and beneath Boyne Creek. Directional drilling equipment will have ample room to stage and perform the drilling procedure from both sides of the watercourse, where open conditions will not require tree and shrub removal. To the extent possible, a similar approach will be employed for the future watermain crossing of the Grand River, although given the width of treed riparian cover, some vegetation removal and open-trench installation may be required for the approaches to the river.

A summary of the potential impacts and recommended mitigation measures, relating primarily to the SWM features, service crossings of watercourses and sediment and erosion control during build-out, is provided in Table 3.

**Table 3. Summary of Natural Features, Potential Impacts and Recommended Mitigation**

Significant Natural Feature	Relevant Policies	Potential Impacts	Recommended Mitigation
Watercourse	<ul style="list-style-type: none"> <li>• GRCA Ontario Regulation 150/06 (GRCA 2015)</li> <li>• Fisheries Act (Government of Canada 1985)</li> <li>• Fish and Wildlife Conservation Act (Government of Ontario 1997)</li> <li>• Town of Grand Valley Official Plan (Town of Grand Valley 2017b)</li> <li>• Provincial Policy Statement (MMAH 2020)</li> </ul>	<p><b>Direct Impacts</b></p> <ul style="list-style-type: none"> <li>• Water temperature and quality could be altered as a result of the SWM outletting to the watercourse.</li> <li>• The SWM outlet will include a riprap-lined channel to direct SWM flow to Boyne Creek. A small area of the bank will be disturbed where the channel is constructed.</li> <li>• Directional drilling beneath Boyne Creek and the Grand River for the watermain and sanitary installation has the potential for bentonite to reach the surface during the bore installation.</li> </ul> <p><b>Indirect Impacts</b></p> <ul style="list-style-type: none"> <li>• Direction of run-off from the development will increase oil and grit entering the stormwater feature and potentially reaching the wetland.</li> </ul> <p><b>Induced Impacts</b></p> <ul style="list-style-type: none"> <li>• Grading in close proximity to the watercourse has the potential to introduce aggressive non-native species such as Common Reed.</li> </ul>	<ul style="list-style-type: none"> <li>• With exception of watermain works under Boyne Creek and the Grand River, a minimum buffer width of 15m will be afforded to the watercourse features. The nearest permanent constructed feature, the SWM pond outlets, will be approximately 25m from the watercourse at Pond A and just beyond the 15m buffer for Pond B with a combination of retained and re-instated dense herbaceous vegetation throughout these areas.</li> <li>• The SWM features have been designed to capture sediment within a forebay feature at the stormwater inlet to the ponds.</li> <li>• In order to prevent the movement of sediment toward the watercourses, the full extent of the grading area will be delineated by heavy-duty sediment fence, keyed-in and maintained to prevent the movement of sediment beyond the construction area. The location and design specifications of the proposed sediment fence are indicated on the grading plan and SWM report drawings (GM BluePlan 2021a, 2021c) These drawings also indicate the recommended natural feature buffer limits. In addition to the control of erosion on-site, the fence will ensure that equipment does not operate beyond the grading limit and buffers are protected during construction. This fence will be removed using non-intrusive methods once herbaceous ground cover has established and soils are stable.</li> <li>• During the construction of the SWM feature, all pooled surface water that requires pumping will utilize filter bags to ensure water entering the wetland is clean. Pumps should be maintained 30m or more from the wetland and filter bags should not be placed on slopes with bare soils that are prone to erosion. De-watering directly into the buffer or placement of the filter bag within the buffer will</li> </ul>



Significant Natural Feature	Relevant Policies	Potential Impacts	Recommended Mitigation
			<p>not be allowed. Proactive erosion control measures such as the excavation of swales, installation of check dams and seeding of bare soils with nurse crop within 30 days of being inactive should all be considered as means to minimize erosion and water turbidity.</p> <ul style="list-style-type: none"> <li>• The planting of trees and shrubs along the southern 5:1 slope of Pond A and Pond B will improve shading of the permanent pool which will help to maintain cooler water temperature within the pond and in turn will reduce the temperature of the occasional outflow to Boyne Creek during large storm events. These species should be tolerant of periodic inundation, in particular at lower elevations within the pond (Willows, Dogwoods, Nannyberry, Red Maple). Plantings along the southern edge of Pond B should consider potential impacts relating to salt spray and snow throw from ploughs operating on County Road 109.</li> <li>• Directional drilling may be used for the installation of the watermains and sanitary sewer line in order to avoid open trench installation. The drilling will be conducted at a suitable depth and within suitable substrates to protect the watercourses and prevent bentonite leaks. ESC fencing and Drilling works will be overseen by the contract administrator or a designated Environmental Monitor.</li> <li>• Develop a Spill Response Plan and maintain one or more spill kits on site at all times.</li> <li>• Equipment storage, re-fueling and maintenance is to occur in designated areas away from the natural features (&gt;30m, ideally in the vicinity of the business park lots, well-removed from the SWM pond and adjacent natural features and not in close proximity to any catchbasins once installed.</li> </ul>

Significant Natural Feature	Relevant Policies	Potential Impacts	Recommended Mitigation
			<ul style="list-style-type: none"> <li>In order to prevent the introduction of Common Reed or other non-native, invasive species, equipment should arrive on site clean and free of plant materials and mud. The Clean Equipment Protocol for Industry (Halloran et al. 2013) outlines methods for regularly cleaning of machinery tracks, blades, buckets both prior to arrival and upon departure from the site.</li> <li>A DFO self-assessment will be required for works within or in close proximity to a watercourse. Pending the results, timing windows may apply (including for directional drilling work).</li> </ul>
Wetland (off-property marsh)	<ul style="list-style-type: none"> <li>GRCA Ontario Regulation 150/06 (GRCA 2015)</li> <li>Town of Grand Valley Official Plan (Town of Grand Valley 2017b)</li> <li>Provincial Policy Statement (MMAH 2020)</li> </ul>	<p><b>Direct Impacts</b></p> <ul style="list-style-type: none"> <li>There will be no direct impacts to the small marsh features within the Boyne Creek floodplain.</li> </ul> <p><b>Indirect Impacts</b></p> <ul style="list-style-type: none"> <li>There is potential for changes to water quality reaching the wetland during construction. During construction there is potential for erosion and sediment deposition.</li> <li>As the wetlands are dependent on the Boyne Creek floodplain, we do not anticipate indirect impacts relating to changes in surface water patterns associated with the development.</li> <li>Dust from the construction site may have a temporary impact on wetland vegetation during construction.</li> </ul>	<ul style="list-style-type: none"> <li>A minimum buffer width of 10m will be afforded (approximately 6m of which is off-property). The no-touch buffer will be delineated by heavy duty sediment fence.</li> <li>In order to prevent the movement of sediment toward the marsh, the western and northern extent of the grading area will be delineated by heavy-duty sediment fence, keyed-in and maintained to prevent the movement of sediment beyond the construction area. The extent and design of the proposed sediment fence are indicated on the grading plan and SWM report drawings (GM BluePlan 2021a, 2021c). These drawings also indicate the recommended natural feature buffer limits. This fence will be removed once herbaceous ground cover has established and soils are stable.</li> <li>The natural feature buffer, including the floodplain, to the north of Pond A should be naturalized with a planting of native trees, shrubs and upland and lowland seed mixtures. All species used in the planting should be native to Dufferin County and appropriate to the site conditions (full sun, dry to mesic soil). A planting plan should be prepared and circulated to the agencies to indicate that details of the naturalization planting. The plantings should be monitored once annually for a period of 2 years</li> </ul>

Significant Natural Feature	Relevant Policies	Potential Impacts	Recommended Mitigation
		<ul style="list-style-type: none"> <li>• The re-fuelling of equipment, on-site storage of fuel or lubricants and the operation of machinery all have potential to cause spills that may infiltrate the soil or migrate toward the natural feature.</li> </ul> <p><b>Induced Impacts</b></p> <ul style="list-style-type: none"> <li>• Grading in close proximity to the retained natural feature has the potential to introduce aggressive non-native species such as Common Reed.</li> <li>• Local residents may create informal trails leading into the natural feature.</li> <li>• Dumping of yard waste and other materials into the feature may occur, resulting in additional non-native and potentially invasive vegetation species.</li> </ul>	<p>following installation with 1:1 woody stem replacement for survival below 70% (of the total stems) at the end of year 2. Although native trees and shrubs are also recommended for the manicured portion of the business park (Bur Oak, Hackberry, Red Maple, etc.), the use of non-native species may be acceptable as long as invasive species with potential to spread to natural areas are not utilized (i.e. Norway Maple, Forsythia, Periwinkle).</p> <ul style="list-style-type: none"> <li>• The construction of a SWM feature in close proximity to the watercourse corridor may result in wildlife movement into the pond. For future maintenance clean-out of the pond forebay (anticipated to be every 5 years for Pond A and every 3 years for Pond B), a wildlife salvage of fish and herpetofauna should be carried out by a qualified firm prior to the commencement of dredging works.</li> <li>• Bare soils, including soil stockpiles or graded slopes, should be stabilized using a nurse crop of Annual Rye (<i>Lolium multiflorum</i>) or Oats (<i>Avena sativa</i>) broadcast at 30kg/ha if soils are to remain bare for greater than 30 days. Any stockpiles should be maintained away from natural features and their buffers and ESC measures should be installed around their perimeter to prevent sedimentation.</li> <li>• During construction, ESC fence should be regularly inspected by an Environmental Monitor and/or on-site inspector, to ensure that it is functioning properly and any deficiencies (holes, sections un-keyed, excessive accumulation of silt) are addressed.</li> <li>• The ESC fence will limit the potential for wildlife (turtles, snakes and anurans) to enter the work site during construction. Should any wildlife be encountered within the fenced area of graded lands, crews will ensure that their presence is demarcated and an NRSI biologist will be contacted for further guidance.</li> </ul>

Significant Natural Feature	Relevant Policies	Potential Impacts	Recommended Mitigation
			<ul style="list-style-type: none"> <li>• Dust suppression measures (water truck, nurse crop, wind breaks using materials on site) should be implemented during construction during dry and/or windy periods, both to protect adjacent natural feature vegetation and for neighbouring residents.</li> <li>• All equipment should arrive on site clean and free of seeds, soil and debris that could introduce invasive species to the site. It is important that equipment used to excavate and grade the SWM features be clean as the potential for introduction of Common Reed is high given the level of disturbance.</li> </ul>
Woodland	<ul style="list-style-type: none"> <li>• Town of Grand Valley Official Plan (Town of Grand Valley 2017b)</li> <li>• Dufferin County Official Plan (Dufferin County 2017)</li> <li>• Provincial Policy Statement (MMAH 2020)</li> </ul>	<p><b>Direct Impacts</b></p> <ul style="list-style-type: none"> <li>• The removal of trees for the Grand River watermain crossing has potential to cause a notable direct impact.</li> <li>• The removal of hedgerow trees does not constitute an impact to woodland, but will require compensation under the Town tree by-law.</li> </ul> <p><b>Indirect Impacts</b></p> <ul style="list-style-type: none"> <li>• Vegetation removal for the watercourse crossings, if necessary, would result in a break in woodland cover which may have impacts on wildlife movement.</li> </ul> <p><b>Induced Impacts</b></p> <ul style="list-style-type: none"> <li>• Vegetation removal for the watercourse crossings, if necessary, could result in increased public access to the</li> </ul>	<ul style="list-style-type: none"> <li>• The use of directional drilling for servicing installation is intended to minimize the requirement for tree removal within the riparian area of Boyne Creek to the west of the subject property. In the event that vegetation clearing is necessary for a portion of the approach to the Grand River for the future watermain crossing, the existing open swath to the north of the sewage treatment plant should be considered to avoid or minimize tree removal.</li> <li>• To the extent possible, vegetation clearing should occur during the winter months. Within “simple habitat”, wildlife sweep/nest searches will be conducted prior to (within 48hrs) of any vegetation/tree clearing that must occur during the breeding bird season.</li> <li>• Any tree removal within the riparian forest communities along the watercourses will be compensated in-situ with native, site-appropriate woody species plantings intended to facilitate restoration of canopy conditions.</li> <li>• The plantation dripline buffer will be delineated and protected by heavy-duty sediment fence, keyed-in and maintained to prevent the movement of sediment or equipment beyond the construction area. The extent and</li> </ul>

Significant Natural Feature	Relevant Policies	Potential Impacts	Recommended Mitigation
		<p>creek or river via informal pathways within the cleared swath.</p>	<p>design of the proposed sediment fence are indicated on the grading plan and SWM report drawings (GM BluePlan 2021a, 2021c). The sediment fence along the south edge of the plantation will ensure that the fill grading that occurs for the creation of the SWM pond berm will not result in sediment deposition into the plantation. This fence will be removed once herbaceous ground cover has established and soils are stable.</p> <ul style="list-style-type: none"> <li>• The layout of Pond A affords a sufficient boundary that eliminates direct impacts to the conifer plantation.</li> <li>• Passive enhancement of the conifer plantation as part of the buffer naturalization is recommended. The planting of hardwoods and shrub species along the plantation edge will assist in dispersing native tree and shrub seed into the plantation and limiting the spread of European Buckthorn outward from the plantation. Due to the poor quality of the plantation and the risk associated with thinning to promote a conversion to hardwoods; we do not recommend any active restoration occur within the plantation.</li> <li>• A landscape plan for the business park is to include a variety of trees and shrubs where possible to replace lost canopy cover and avoid a monoculture. Plans should incorporate native species known to occur in the area and suited to the site conditions. Use of non-native species may be suitable within the developed portion of the property; however, invasive species known to compete with native vegetation and communities (i.e. Norway Maple) will be excluded from the planting. All naturalization plantings should be inspected at the end of a two-year warranty period to ensure good establishment has been achieved.</li> </ul>
Breeding Bird Habitat	<ul style="list-style-type: none"> <li>• Migratory Birds Convention Act (Government of Canada 1994)</li> </ul>	<p><b>Direct Impacts</b></p> <ul style="list-style-type: none"> <li>• Vegetation removal within the breeding bird season, namely the hedgerow trees within the</li> </ul>	<ul style="list-style-type: none"> <li>• Vegetation removal is recommended to occur outside of the breeding and nesting season for migratory birds as established by the Canadian Wildlife Service. The peak breeding period for birds in southern Ontario extends from</li> </ul>

Significant Natural Feature	Relevant Policies	Potential Impacts	Recommended Mitigation
	<ul style="list-style-type: none"> <li>Fish and Wildlife Conservation Act (Government of Ontario 1997)</li> </ul>	<p>proposed development limit, may result in incidental take of bird species protected under the MBCA and the removal of breeding habitat.</p> <p><b>Indirect Impacts</b></p> <ul style="list-style-type: none"> <li>Potential indirect impacts to wildlife in the retained natural areas may arise from noise and dust associated with construction activities and unnatural lighting resulting from the development. Noise and dust suppression associated with construction is anticipated to be temporary, therefore, significant impacts to wildlife are not expected.</li> </ul> <p><b>Induced Impacts</b></p> <ul style="list-style-type: none"> <li>Increased use of the natural area by users of the business park, feral domestic wildlife, and unauthorized trail/pathway construction.</li> </ul>	<p>approximately late March to late August (Government of Canada 2017).</p> <ul style="list-style-type: none"> <li>If grading is proposed during the bird breeding window, nest sweeps of individual trees may be conducted. Sweeps would be conducted by a qualified biologist and, should no active nests be encountered, a letter providing 48 hours clearance for grading works would be issued. The observation of an active nest will require a nest buffer to be applied until the young have fledged.</li> <li>In order to suppress dust, areas of bare soil can be moistened with water during construction activities to ensure that the amount of dust within the subject property is reduced. Topsoil stockpile locations should be in areas of lesser wind exposure and away from natural features and their buffers.</li> <li>Disturbed areas resulting in bare soil conditions should be kept to a minimum and re-vegetated with an approved seed mix in a reasonable timeframe in order to minimize dust.</li> <li>All machinery, storage and refueling to be maintained outside of the natural features and their demarcated buffers.</li> </ul>

## 7.0 Summary

NRSI was retained by Thomasfield Homes to prepare an EIS for the Grand Valley Business Park development in Grand Valley, Ontario. Natural features within the study area are limited to a coniferous plantation, several hedgerows and a section of Boyne Creek with associated forest, marsh wetland and cultural meadow within the riparian zone.

The proposed development includes the grading and build out of 7 industrial blocks with associated roadways and servicing. A stormwater feature located in the northwest of the subject property will receive and treat surface water runoff associated with the development with an outlet to Boyne Creek. A second stormwater feature located in the southwest of the subject property is proposed for construction during future build-out of the southern portion of the site. Two watermain installations are proposed; one that will cross Boyne Creek at the location of the sanitary sewer crossing to the west of SWM Pond A, and a future second watermain that would cross the Grand River and connect to existing infrastructure near Main Street South or Cooper Street.

This report summarizes the natural heritage features that are present, their significance, and provides an assessment of the impacts associated with the proposed development. Mitigation and enhancement measures are identified to minimize the impacts, protect sensitive natural features and enhance the natural heritage system along Boyne Creek.

Surveys conducted in 2021 did not identify any SAR or SCC within the study area. The background screening had identified potential habitat for Eastern Wood-pewee within the study area; however, this species was not documented during the surveys and suitable habitat is being retained and buffered as part of the overall development plan. None of the hedgerow trees within the development footprint exhibited cavities or crevices that could provide SAR bat habitat. The rural residences within the subject property were not surveyed for Barn Swallow nests or bat habitat as these buildings are not identified for removal at this time and will not be impacted by the proposed development. The SWH screening had identified potential for Bald Eagle and Osprey habitat as well as habitat for Special Concern or rare wildlife; neither were confirmed as present within the study area.

Direct impacts associated with the project include the removal of hedgerow trees and vegetation removal associated with the approach to the watermain and sanitary crossings as well as the SWM outlet structure at Boyne Creek. The watermain and sanitary crossing will utilize directional drilling to minimize the need for open trench installation of this infrastructure, limiting open trench works to areas of agricultural field. Given the span and alignment of the proposed Grand River watermain crossing; localized vegetation removal will likely be required in specific areas where the directional drilling equipment feeds the piping through. The ELC mapping and surveys have characterized where habitats of higher quality or sensitive in nature are located. In finalizing an alignment for the servicing, wetlands will be avoided and any disturbed areas will be re-seeded and planted using native species, where necessary.

Potential indirect impacts associated with the development include changes to water quality and quantity reaching Boyne Creek and ultimately the Grand River. During construction, there may be temporary disturbance to wildlife due to noise, light and ground vibration. The design of the stormwater ponds is intended to regulate water quality and quantity under the development scenario. The planting of native trees and shrubs, in particular on the south side of the stormwater ponds, will provide shading to the pond to help regulate water temperatures. Temporary impacts relating to erosion will be addressed through the installation and maintenance of sediment fence and the establishment of nurse crop and permanent herbaceous cover where grading occurred.

The development may have induced impacts to the retained natural features, including the establishment of non-native invasive species following construction. Although unlikely to be an issue for the business park development, future development of the lands to the north and south may result in an increase of people accessing the watercourse from various locations.

In consideration of the potential direct, indirect and induced impacts associated with the development, a series of mitigations are identified in Table 3. These include the establishment and naturalization of natural feature buffers, installation of sediment fence, use of nurse crops, adherence to wildlife timing windows, the development and implementation of a prescription to enhance the conifer plantation, implementation of a clean equipment protocol, on-going monitoring of ESA fence, oversight of the directional drilling and maintaining spill kits at all active work sites. With the exception of an inspection to assess the standard 2-year warranty



for any planted tree and shrub stock, NRSI does not recommend that any long-term environmental monitoring be required as part of this development.

The provided recommendations are intended to minimize the direct, indirect, induced and cumulative impacts that may arise during the proposed development and to ensure that mitigation measures are effective.

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**Appendix I**  
**Terms of Reference**

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June 25, 2021

2607

Laura Warner  
Grand River Conservation Authority  
400 Clyde Road  
Cambridge, ON N1R 5W6

**RE: Grand Valley Business Park  
Environmental Impact Study - Terms of Reference  
Part of Lot 32, Concession 1, Geographic Township of East Luther, Town  
of Grand Valley, County of Dufferin, Ontario**

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On behalf of Thomasfield Homes Ltd. I am pleased to provide the following Terms of Reference (TOR) for an Environmental Impact Study (EIS) for a proposed business park located in the Town of Grand Valley, Ontario, herein referred to as the subject property (Map 1).

**Project Background**

The EIS will consider the overall business park development and the associated buffering of natural features. At the request of the Town, the EIS will focus on the potential impacts and mitigation relating to the development of a stormwater management pond as well as a sanitary sewer crossing of Boyne Creek and a watermain crossing of the Grand River.

Where applicable, considerations relating to Species at Risk (SAR), administered by the Ministry of Environment, Conservation and Parks (MECP), may be required. Depending on the nature of the watercourse crossings, permitting or file review may be required by the Department of Fisheries and Oceans (DFO).

NRSI staff have reviewed the Draft Plan of Subdivision and the Conceptual Servicing Plan, provided by AJC Planning Consultants and GM BluePlan respectively. These drawings indicate the SWM block in the far northwest of the study area and the sanitary line crossing Boyne Creek to connect with the "MOCO Lands", generally to the south of the existing water treatment plant. The location of the watermain crossing of the Grand River has yet to be determined based upon the result of the EIS in order to minimize impacts.

We note the proximity of the proposed development to existing natural features and have scoped the following work plan to satisfy agency requirements. The EIS will characterize the natural features, identify any significant features, and recommend appropriate buffers or mitigation as necessary.

NRSI was retained in May 2021 by the landowner, Thomasfield Homes Ltd., to conduct a preliminary site assessment and to complete any time-sensitive surveys (namely, confirming the presence or absence of amphibian breeding habitat). During the preliminary assessment, NRSI staff characterized the natural features within the subject property and assessed adjacent lands from property lines or along the Upper Grand Trailway which runs along the northern property boundary.

This TOR outlines the steps required to complete the EIS in support of the proposed development, and consists of three phases:

1. Background information review;
2. Natural heritage characterization, and;
3. EIS reporting.

### **Project Scoping**

The EIS will provide background information, methods and findings of field surveys and an analysis of impacts that rely on a pre-defined set of geographical terms. This section aims to clarify important terms that will be used throughout the report.

The term *development area* refers to the location where construction will be required to facilitate the proposed development. This will include grading activities that may extend past the final developed footprint. On account of the watercourse crossing locations being subject to change, the development area is not yet finalized and will be determined through an iterative, multidisciplinary review and discussions. The development area will be a subset of the subject property.

The term *subject property* refers to the legal lands owned by the proponent, which is outlined on Map 1. The subject property is comprised of two adjacent parcels that are currently farmland.

The term *study area* refers to the subject property and lands within approximately 120m. As the alignment of the proposed sanitary sewer and watermain crossings of Boyne Creek and the Grand River have not been determined at this time, the study area will encompass a section of these watercourses and associated riparian lands. The study area also considers connected natural features which include:

- The contiguous riparian area along Boyne Creek and the Grand River which includes both treed features and cultural meadow;
- Consideration of existing and proposed site drainage, in particular the direction of surface water toward Boyne Creek in the northwest corner of the subject property.

The 120m radius that is included in the study area has been selected based on several policy definitions that must be considered during the development of an EIS. Primarily, the definition of “adjacent lands” provided in the Natural Heritage Reference Manual (MNR 2010), which requires the assessment of potential impacts on all relevant ecological receivers and wildlife habitat for any development within 120m.

Finally, the study area is nested within a broader geographical area for which a variety of available background information sources was reviewed. Legacy data has been collected from several atlases, which is available in a 10x10km grid, as well as the Natural Heritage Information database, which is available in a 1x1km grid (MNR 2020a).

### **Background Information Review**

#### **Collection and Review of Background Information**

NRSI has compiled available background information to inform this Terms of Reference.

Legacy data and policy documents reviewed include:

- Town of Grand Valley Official Plan (Town of Grand Valley 2017);
- Dufferin County Official Plan (Dufferin County 2017);
- Grand River Conservation Authority (GRCA) (2019) Interactive Mapping Tool;
- Natural Heritage Information Centre (NHIC) (MNR 2020a);
- Ministry of Environment, Conservation and Parks (MECP) Species at Risk;
- Government of Canada Species at Risk Act (SARA) Registry (2019);
- Ontario Breeding Bird Atlas (Bird Studies Canada (BSC) et al. 2006);
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2020);
- Mammal Atlas of Ontario (Dobbyn 1994);
- Ontario Odonata Atlas (NHIC 2021);
- Department of Fisheries and Oceans data; and
- Supporting documents relating to the MOCO Lands, as available.

Initial wildlife species lists for the study area were developed using these background sources. During the preliminary assessment, NRSI biologists confirmed the presence or absence of potentially suitable habitat for rare wildlife species.

The field-verified vegetation communities are shown on Map 2. Based on available background information, and results from these preliminary field surveys, a screening exercise was completed for potential Species at Risk (SAR) and Species of Conservation Concern (SCC) habitat (Appendix I), as well as potential Significant Wildlife Habitat (SWH) (Appendix II) to be present within the study area. The SAR and SCC screening exercise identified that potential habitat is present for Eastern Wood-pewee (*Contopus virens*). Additionally, there is potential that other unidentified SAR/SCC may be present within the natural features.

The SWH screening exercise ruled out many candidate SWH types based on the absence of suitable habitat within the study area. Habitat for Eastern Wood-pewee, if confirmed, would be considered SWH for Special Concern and Rare Wildlife Species (OMNR 2000; MNR 2015). Other commonly encountered candidate SWH features such as bat maternity colonies, seeps and springs or amphibian breeding habitat were not identified during the preliminary assessment.

Online mapping available through the GRCA (GRCA 2019) indicates that an unevaluated wetland is present approximately 50m north of the subject property boundary (Map 1). This swamp feature is separated from the property by the recreational trail and forest cover on the slope leading to the Grand River floodplain. Additionally, this wetland does not receive direct surface flow from the subject property (the west-facing aspect and the raised rail bed direct surface flow to the west toward Boyne Creek and not to this wetland). The nearest Provincially Significant Wetland (PSW) is more than 4.5km to the southeast of the subject property.

In review of the Town of Grand Valley Official Plan (Schedule B1) (Town of Grand Valley 2017), wooded areas and Boyne Creek are shown in the northwest extent of the study area as part of the Natural Heritage System. The extent of wooded features is also shown on Map 1. No other natural features are indicated in the study area on Schedule B1.



## **Natural Heritage Characterization**

This phase includes all field surveys, as well as a preliminary analysis of the field survey results to inform the development plan, including setbacks, buffers, and natural heritage constraints.

The vegetation communities within the study area were mapped by NRSI on June 11, 2021 (Map 2) and a general assessment of potential SAR and SWH was conducted. The driplines of treed features in the northwest extent of the property were delineated and surveyed by an NRSI biologist. Similarly, two small wetland features immediately east of Boyne Creek were characterized and surveyed. These surveyed lines are indicated on Map 2; neither has been field-verified by the Town or GRCA.

## **Field Surveys**

The following field surveys are anticipated to further characterize the natural features within the study area to inform the EIS:

- Vegetation inventory (1 survey, summer, to complement existing inventory and ELC);
- Early morning breeding bird surveys (2 surveys, June to early July);
- Aquatic Habitat Assessment and Fish Community Survey (1 survey, June-September);
- On-site review and confirmation of flagged natural feature boundaries (wetland with GRCA staff and Town staff may wish to review the dripline (1 survey).

During a May 10, 2021 call with representatives of the Town, it was discussed that a site walk with the team and agency staff may be beneficial to discuss concepts in the field. This meeting would be subject to the status of COVID-19.

## **Natural Feature Constraints Summary**

The results of the field surveys will be combined with the background information to provide the team with a preliminary development limit line to help guide the proposed development and afford the natural features suitable buffers. NRSI staff will recommend ideal crossing locations for the sanitary sewer and watermain, as well as a location for the SWM pond outlet. Based on the preliminary site visit, the constraint line will be comprised of a woodland dripline buffer and the watercourse and wetland buffers, coupled with the regulatory floodplain layer (whichever is greater).

Through our initial assessment of the site, it appears that an area of cultural meadow to the west of the conifer plantation presents an ideal location for the proposed SWM outlet where direct impacts to wetland and tree cover can be avoided. The location of sewer and watermain crossings of Boyne Creek and the Grand River respectively will consider an alignment and building envelope that minimizes impacts to natural features.

## **Environmental Impact Study**

### **Environmental Impact Study Report**

The EIS will characterize the natural features within the study area and identify development opportunities and constraints in accordance with the policies of the Town of Grand Valley Official Plan (2017), Dufferin County Official Plan (2017) and GRCA Ontario Regulation 150-06.

### **Natural Feature Characterization**

The natural feature assessment will form the existing conditions of the EIS, including survey results, natural feature delineations, and finalized SAR, SCC and SWH screenings.

Impact Analysis, Mitigations, and Other Recommendations

An impact analysis will be completed based on the proposed development plan and associated stormwater servicing plan. The analysis will consider potential direct (e.g., habitat removal), indirect (e.g., construction-related impacts, hydrological), and induced (e.g., post-construction human use) impacts on the existing natural features. The impact analysis will be prepared based on details of the proposed development, including grading details and the Stormwater Management Plan. NRSI will incorporate and summarize the results of the other technical studies and plans to be completed by other team members that are relevant to the impact analysis.

Recommendations will be provided to avoid, or otherwise minimize or mitigate adverse impacts to natural features associated with the proposed development. Where applicable, recommendations may be provided for construction- or post-construction monitoring, as well as ecological restoration, enhancement, or management.

The EIS will be submitted to the reviewing agencies as part of the development application package.

Should you have any questions or comments regarding this TOR, please do not hesitate to contact me.

Sincerely,  
Natural Resource Solutions Inc.



Patrick Deacon B.E.S.  
Terrestrial & Wetland Biologist

Encl.

SAR and SCC Screening Table  
SWH Screening Tables  
Map 1: Background Information  
Map 2: Vegetation Communities  
Site Concept Plan

Appendix I Species at Risk and Species of Conservation Concern Screening

Scientific Name	Common Name	S-RANK <sup>1</sup>	SARO <sup>2</sup>	COSEWIC <sup>3</sup>	SARA <sup>3</sup>	Background Source	Habitat Preference <sup>4</sup>	Suitable Habitat Present?	Carried Forward to EIS?	Rationale
<b>Birds</b>										
<i>Buteo lineatus</i>	Red-shouldered Hawk	S4B	NAR	NAR	Schedule 3	BSC et al. 2006	Moist, mature hardwood forests; woody swamps or wooded margins of marshes; wet bottomlands; restricted to mature, closed (>80%) closed forests; nests reused; requires a minimum of 10 ha of continuous forest to meet territorial requirements; prefers >100 ha of forest; tends to nest in interior.	No	No	Suitable habitat is not present within the study area.
<i>Contopus virens</i>	Eastern Wood-pewee	S4B	SC	SC	Schedule 1	BSC et al. 2006	Deciduous and mixed woodlots of varying size including small features. This species can be found in both urban and rural settings and prefers edge habitat.	Yes	Yes	Treed features within the study area may provide suitable habitat.
<i>Dolichonyx oryzivorus</i>	Bobolink	S4B	THR	T	Schedule 1	BSC et al. 2006	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha.	No	No	Hayfield or cultural meadow large enough to support Bobolink is not present.
<i>Hirundo rustica</i>	Barn Swallow	S4B	THR	T	Schedule 1	BSC et al. 2006	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water.	Yes	No	Suitable foraging habitat may be present, but there are no structures present that could provide nesting habitat.
<i>Hylocichla mustelina</i>	Wood Thrush	S4B	SC	T	Schedule 1	BSC et al. 2006	Carolinian and Great Lakes-St. Lawrence forest zones; undisturbed moist mature deciduous or mixed forest with deciduous sapling growth; near pond or swamp; hardwood forest edges; must have some trees higher than 12 m.	No	No	The study area does not contain sizable mature forest preferred by Wood Thrush.
<i>Riparia riparia</i>	Bank Swallow	S4B	THR	T	Schedule 1	BSC et al. 2006	Sand, clay or gravel river banks or steep riverbank cliffs; lakeshore bluffs of easily crumbled sand or gravel; gravel pits, road-cuts, grassland or cultivated fields that are close to water; nesting sites are limiting factor for species presence.	No	No	Suitable banks are not present within the study area.
<i>Sturnella magna</i>	Eastern Meadowlark	S4B	THR	T	Schedule 1	BSC et al. 2006	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size.	No	No	Hayfield or cultural meadow large enough to support Eastern Meadowlark is not present.
<b>Herpetofauna</b>										
<i>Chelydra serpentina serpentina</i>	Common Snapping Turtle	S3	SC	SC	Schedule 1	Ontario Nature 2019	Permanent or semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddybanks or bottoms. The species often uses soft soil or clean dry sand on south-facing slopes for nest sites and may nest at some distance from water.	No	No	Although Snapping Turtle may use the creek or river corridors for movement, suitable overwintering and basking habitats are not present within the study area.
<i>Chrysemys picta marginata</i>	Midland Painted Turtle	S4	NAR	SC	No Schedule	Ontario Nature 2019	Ponds, marshes and slow-moving creeks with muddy bottoms and basking sites available.	No	No	Suitable habitat is not present within the study area.
<b>Mammals</b>										
<i>Microtus pinetorum</i>	Woodland Vole	S3?	SC	SC	Schedule 1	Dobbyn 1994	In Ontario, the Woodland Vole lives in mature deciduous forest in the Carolinian region where there is a deep litter layer that allows it to burrow.	No	No	Rich forest with abundant leaf litter is not present.
<i>Myotis leibii</i>	Eastern Small-footed Myotis	S2S3	END			Dobbyn 1994	Roosts in rock piles, caves, buildings, under bridges and in hollow trees.	No	No	Suitable habitat is not present within the study area.

Scientific Name	Common Name	S-RANK <sup>1</sup>	SARO <sup>2</sup>	COSEWIC <sup>3</sup>	SARA <sup>3</sup>	Background Source	Habitat Preference <sup>4</sup>	Suitable Habitat Present?	Carried Forward to EIS?	Rationale
<i>Myotis lucifungus</i>	Little Brown Myotis	S5	END	E	Schedule 1	Dobbyn 1994	Uses caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in dark warm areas such as attics and barns; feeds primarily in wetlands, forest edges	No	No	Suitable habitat is not present within the study area.
<i>Myotis septentrionalis</i>	Northern Myotis	S3?	END	E	Schedule 1	Dobbyn 1994	Hibernates during winter in mines or caves; during summer males roost alone and females form maternity colonies of up to 60 adults; roosts in houses, man-made	No	No	Suitable habitat is not present within the study area.
<i>Perimyotis subflavus</i>	Tri-colored Bat	S3?	END	E	Schedule 1	Dobbyn 1994	During the summer, found in a variety of forested habitats. Day roosts and maternity colonies in older forest and occasionally in barns or other structures. Forage over water and along streams in the forest. Overwinter in caves.	No	No	Suitable habitat is not present within the study area.
<i>Taxidea taxus jacksoni</i>	American Badger	S2	END	E	Schedule 1	Dobbyn 1994	In Ontario, badgers are found in a variety of habitats, such as tall grass prairie, sand barrens and farmland. These habitats provide badgers with small prey, including groundhogs, rabbits and small rodents.	No	No	The soils in the Grand Valley area are not sandy and conducive to Badger dens. Badger are known from much further south (Waterloo Region) but Grand Valley is removed from their known range.

<sup>1</sup>NHIC 2021; <sup>2</sup>Government of Ontario 2021; <sup>3</sup>Government of Canada 2021; <sup>4</sup>OMNR 2000

Appendix II Significant Wildlife Habitat Assessment Tables

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Waterfowl Stopover and Staging Areas (Terrestrial)</b>					
<p><u>Rationale:</u> Habitat important to migrating waterfowl.</p>	<p>American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Mallard Northern Pintail Northern Shoveler American Wigeon Gadwall</p>	<p>CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.</p>	<p>Fields with sheet water during Spring (mid March to May). • Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available<sup>6xviii</sup>.</p> <p><u>Information Sources</u> • Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. • Reports and other information available from Conservation Authorities (CAs) • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Field Naturalist Clubs • Ducks Unlimited Canada • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area</p>	<p>Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"<sup>6cxi</sup> • Any mixed species aggregations of 100 or more individuals required. • The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependent on local site conditions and adjacent land use is the significant wildlife habitat<sup>6xviii</sup>. • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • SWHMiST<sup>6xix</sup> Index #7 provides development effects and mitigation measures.</p>	<p>Suitable habitat is not present within the study area.  <b>Not SWH</b></p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Waterfowl Stopover and Staging Areas (Aquatic)</b>					
<p><u>Rationale:</u> Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.</p>	Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked Duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	<ul style="list-style-type: none"> <li>• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify.</li> <li>• These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water).</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• Environment Canada</li> <li>• Naturalist clubs often are aware of staging/stopover areas.</li> <li>• OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging.</li> <li>• Sites documented through waterfowl planning processes (eg. EHJV implementation plan)</li> <li>• Ducks Unlimited projects</li> <li>• Element occurrence specification by Nature Serve: <a href="http://www.natureserve.org">http://www.natureserve.org</a></li> <li>• Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area</li> </ul>	<p>Studies carried out and verified presence of:</p> <ul style="list-style-type: none"> <li>• Aggregations of 100<sup>1</sup> or more of listed species for 7 days<sup>1</sup>, results in &gt; 700 waterfowl use days.</li> <li>• Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH<sup>cxix</sup></li> <li>• The combined area of the ELC ecosites and a 100m radius area is the SWH<sup>cxviii</sup></li> <li>• Wetland area and shorelines associated with sites identified within the SWHTG<sup>cxviii</sup> Appendix K<sup>cxix</sup> are significant wildlife habitat.</li> <li>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"<sup>ccxi</sup></li> <li>• Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded).</li> <li>• SWHMIST<sup>cxix</sup> Index #7 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Shorebird Migratory Stopover Area</b>					
<p><u>Rationale:</u> High quality shorebird stopover habitat is extremely rare and typically has a long history of use.</p>	Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin Whimbrel	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH.  <u>Information Sources</u> <ul style="list-style-type: none"> <li>• Western hemisphere shorebird reserve network.</li> <li>• Canadian Wildlife Service (CWS) Ontario Shorebird Survey.</li> <li>• Bird Studies Canada</li> <li>• Ontario Nature</li> <li>• Local birders and naturalist clubs</li> <li>• Natural Heritage Information Center (NHIC) Shorebird Migratory Concentration Area</li> </ul>	Studies confirming: <ul style="list-style-type: none"> <li>• Presence of 3 or more of listed species and &gt; 1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period)</li> <li>• Whimbrel stop briefly (&lt;24hrs) during spring migration, any site with &gt;100 Whimbrel used for 3 years or more is significant.</li> <li>• The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area<sup>cxlviii</sup></li> <li>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"<sup>ccxi</sup></li> <li>• SWHMIST<sup>cxix</sup> Index #8 provides development effects and mitigation measures.</li> </ul>	Suitable habitat is not present within the study area.  <b>Not SWH</b>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Raptor Wintering Area</b>					
<p><u>Rational:</u> Sites used by multiple species, a high number of individuals and used annually are most significant</p>	<p>Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl</p> <p><u>Special Concern:</u> Short-eared Owl Bald Eagle</p>	<p>Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class: Forest: FOD, FOM, FOC</p> <p>Upland: CUM, CUT, CUS, CUW</p>	<p>The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors.</p> <p>Raptor wintering sites need to be &gt; 20 ha<sup>cxviii, cxlix</sup> with a combination of forest and upland.<sup>xvi, xvii, xviii, xix, xx, xxi</sup> Least disturbed sites, idle/fallow or lightly grazed field/meadow (&gt;15ha) with adjacent woodlands<sup>cxlix</sup></p> <p>Field area of the habitat is to be wind swept with limited snow depth or accumulation.</p> <p>Eagle sites have open water, large trees and snags available for roosting</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• OMNRF Ecologist or Biologist</li> <li>• Field Natural Clubs</li> <li>• Natural Heritage Information Center (NHIC) Raptor Winter Concentration Area</li> <li>• Data from Bird Studies Canada</li> <li>• Reports and other information available from Conservation Authorities CAs.</li> </ul>	<p>Studies confirm the use of these habitats by:</p> <ul style="list-style-type: none"> <li>• One or more Short-eared Owls or; One or more Bald Eagles or; At least 10 individuals and two listed hawk/owl species</li> <li>• To be significant a site must be used regularly (3 in 5 years)<sup>cxlix</sup> for a minimum of 20 days by the above number of birds</li> <li>• The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area</li> <li>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"<sup>ccxi</sup></li> <li>• SWHMiST<sup>cxlix</sup> Index #10 and #11 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>



Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Bat Hibernacula</b>					
<p><u>Rationale</u> Bat hibernacula are rare habitats in Ontario landscapes.</p>	<p>Big Brown Bat Tri-coloured Bat</p>	<p>Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)</p>	<ul style="list-style-type: none"> <li>Hibernacula may be found in caves, mine shafts, underground foundations and Karsts.</li> <li>Active mine sites should not be considered as SWH</li> <li>The locations of bat hibernacula are relatively poorly known.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>OMNRF for possible locations and contact for local experts</li> <li>Natural Heritage Information Center (NHIC) Bat Hibernaculum</li> <li>Ministry of Northern Development and Mines for location of mine shafts.</li> <li>Clubs that explore caves (eg. Sierra Club)</li> <li>University Biology Departments with bat experts.</li> </ul>	<ul style="list-style-type: none"> <li>All sites with confirmed hibernating bats are SWH.</li> <li>The habitat area includes a 200m radius around the entrance of the hibernaculum<sup>ccviii, ccvii</sup> for most.</li> <li>Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects"<sup>ccv</sup></li> <li>SWHMIST<sup>ccix</sup> Index #1 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Bat Maternity Colonies</b>					
<p><u>Rationale:</u> Known locations of forested bat maternity colonies is extremely rare in all Ontario landscapes.</p>	<p>Big Brown Bat Silver-haired Bat</p>	<p>Maternity colonies considered SWH are found in forested Ecosites.</p> <p>All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM</p>	<p>Maternity colonies can be found in tree cavities, vegetation and often in buildings<sup>xxii, xxv, xxvi, xxvii, xxxi</sup> (buildings are not considered to be SWH).</p> <ul style="list-style-type: none"> <li>• Maternity roosts are not found in caves and mines in Ontario<sup>xxii</sup></li> <li>• Maternity colonies located in Mature deciduous or mixed forest stands<sup>ccix, ccx</sup> with &gt;10/ha large diameter (&gt;25cm dbh) wildlife trees<sup>ccvii</sup></li> <li>• Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3<sup>ccxiv</sup> or class 1 or 2<sup>ccxii</sup></li> <li>• Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred<sup>ccx</sup></li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• OMNRF for possible locations and contact for local experts</li> <li>• University Biology Departments with bat experts.</li> </ul>	<ul style="list-style-type: none"> <li>• Maternity Colonies with confirmed use by: <ul style="list-style-type: none"> <li>• &gt; 10 Big Brown Bats</li> <li>• &gt;5 Adult Female Silver-haired Bats</li> </ul> </li> <li>• The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecorelement containing the maternity colonies.</li> <li>• Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for wind Power Projects"<sup>ccv</sup></li> <li>• SWHMIS T<sup>cdix</sup> Index #12 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area. The abundance of White Cedar, and Scot's pine to a lesser extent, does not provide suitable cavity trees.</p> <p><b>Not SWH</b></p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Turtle Wintering Area</b>					
<p><u>Rationale:</u> Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant</p>	<p>Midland Painted Turtle</p> <p><u>Special Concern:</u> Northern Map Turtle Snapping Turtle</p>	<p>Snapping and Midland Painted Turtles - ELC Community Classes: SW, MA, OA and SA; ELC Community Series: FEO and BOO</p> <p>Northern Map Turtle - Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.</p>	<p>For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates.</p> <ul style="list-style-type: none"> <li>Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen<sup>cxix, cx, cxi, cxviii</sup>.</li> <li>Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>EIS studies carried out by Conservation Authorities.</li> <li>Local field naturalists and experts, as well as university herpetologists may also know where to find some of these sites.</li> <li>OMNRF ecologist or biologist</li> <li>Natural Heritage Information Center (NHIC)</li> </ul>	<ul style="list-style-type: none"> <li>Presence of 5 over-wintering Midland Painted Turtles is significant.</li> <li>One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant.</li> <li>The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH.</li> <li>Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May)<sup>cvii</sup></li> <li>Congregation of turtles is more common where wintering areas are limited and therefore significant<sup>cxix, cx, cxi, cxii</sup>.</li> <li>SWHMIST<sup>cxix</sup> Index #28 provides development effects and mitigation measures for turtle wintering habitat.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Snake Hibernaculum</b>					
<p><u>Rationale:</u> Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant</p>	<p><u>Snakes:</u> Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake</p> <p><u>Special Concern:</u> Milksnake Eastern Ribbonsnake</p> <p><u>Lizard:</u> <u>Special Concern</u> (Southern Shield population): Five-lined Skink</p>	<p>For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats.</p> <p>Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator.</p> <p>For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1 FOC3</p>	<p>• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. The existence of features that go below the frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH.</p> <p>• Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line<sup>xiv, i, ii, iii, cxii.</sup></p> <p>• Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover.</p> <p>• Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures cciii.</p> <p>Information Sources</p> <p>• In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g. old dug wells).</p> <p>• Reports and other information from CAs.</p> <p>• Local Field naturalists and experts, as well as university herpetologists may also know where to find some of these sites. clubs</p> <p>• Natural Heritage Information Center (NHIC)</p> <p>• OMNRF ecologist or biologist may be aware of locations of wintering skinks</p>	<p>Studies confirming:</p> <ul style="list-style-type: none"> <li>• Presence of snake hibernacula used by a minimum of five individuals of a snake sp. <u>or</u>; individuals of two or more snake spp.</li> <li>• Congregations of a minimum of five individuals of a snake sp. <u>or</u>; individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct).</li> <li>• <u>Note:</u> If there are Special Concern Species present, then site is SWH</li> <li>• <u>Note:</u> Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population [i.e. strong hibernation site fidelity]. Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30m buffer is the SWH<sup>i</sup></li> <li>• SWHMiST<sup>cxix</sup> Index #13 provides development effects and mitigation measures for snake hibernacula.</li> <li>• Presence of any active hibernaculum for skink is significant.</li> <li>• SWHMiST<sup>cxix</sup> Index #37 provides development effects and mitigation measures for five-lined skink wintering habitat.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Coloniality - Nesting Bird Breeding Habitat (Bank and Cliff)</b>					
<p><u>Rationale:</u> Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow populations are declining in Ontario.</p>	<p>Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)</p>	<p>Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns</p> <p>Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1</p>	<ul style="list-style-type: none"> <li>Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area.</li> <li>Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles.</li> <li>Does not include a licensed/permitted Mineral Aggregate Operation.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>Reports and other information available from CAs</li> <li>Ontario Breeding Bird Atlas<sup>ccv</sup></li> <li>Bird Studies Canada; <i>NatureCounts</i> <a href="http://www.birdscanada.org/birdmon/">http://www.birdscanada.org/birdmon/</a></li> <li>Field Naturalist clubs</li> </ul>	<p>Studies confirming:</p> <ul style="list-style-type: none"> <li>Presence of 1 or more nesting sites with 8<sup>ccvix</sup> or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season.</li> <li>A colony identified as SWH will include a 50m radius habitat area from the peripheral nests<sup>ccvii</sup></li> <li>Field surveys to observe and count swallow nests are to be completed during the breeding season</li> </ul> <p>Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"<sup>ccxi</sup></p> <ul style="list-style-type: none"> <li>SWHMIST<sup>cclix</sup> Index #4 provides development effects and mitigation measures</li> </ul>	<p>Suitable habitat is not present within the study area. The naturalized gravel pit to the north of the Grand River does not contain steep slopes.</p> <p><b>Not SWH</b></p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)</b>					
<p><u>Rationale:</u> Large Colonies are important to local bird population, typically sites are only known colony in area and are used annually.</p>	<p>Great Blue Heron Black-crowned Night-heron Great Egret Green Heron</p>	<p>SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1</p>	<p>• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15m from ground, near the top of the tree.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• Ontario Breeding Bird Atlas<sup>ccv</sup>, colonial nest records.</li> <li>• Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNR).</li> <li>• NHIC Mixed Wader Nesting Colony</li> <li>• Aerial photographs can help identify large heronries</li> <li>• Reports and other information available from CAs</li> <li>• MNRF District Offices</li> <li>• Local naturalist clubs</li> </ul>	<p>Studies confirming:</p> <ul style="list-style-type: none"> <li>• Presence of 5<sup>i</sup> or more active nests of Great Blue Heron or other listed species.</li> <li>• The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island &lt;15.0ha with a colony is the SWH<sup>cc, ccvii</sup></li> <li>• Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells</li> <li>• SWHMIST<sup>cxix</sup> Index #5 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Coloniality - Nesting Bird Breeding Habitat (Ground)</b>					
<p><u>Rationale:</u> Colonies are important to local bird populations, typically sites are only known colony in area and are used annually.</p>	<p>Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird</p>	<p>Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map).</p> <p>Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird)</p> <p>MAM1 – 6 MAS1 – 3 CUM CUT CUS</p>	<p>• Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas.</p> <p>• Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands.</p> <p><u>Information Sources</u></p> <p>• Ontario Breeding Bird Atlas<sup>ccv</sup>, rare/colonial species records.</p> <p>• Canadian Wildlife Service</p> <p>• Reports and other information available from CAs</p> <p>• Natural Heritage Information Center (NHIC) Colonial Waterbird Nesting Area</p> <p>• MNRF District Offices</p> <p>• Field naturalist clubs</p>	<p>Studies confirming:</p> <ul style="list-style-type: none"> <li>• Presence of &gt;25 active nests for Herring Gulls or Ring-billed Gulls, &gt;5 active nests for Common Tern or &gt;2 active nests for Caspian Tern<sup>l</sup>.</li> <li>• Presence of 5 or more pairs for Brewer's Blackbird.</li> <li>• Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant.</li> <li>• The edge of the colony and a minimum 150m area of habitat, or the extent of the ELC ecosites containing the colony or any island &lt;3.0ha with a colony is the SWH<sup>cc, ccvii</sup></li> <li>• Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"<sup>ccxi</sup></li> <li>• SWHMIST<sup>cxix</sup> Index #6 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Migratory Butterfly Stopover Areas</b>					
<p><u>Rationale:</u> Butterfly stopovers areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.</p>	<p>Painted Lady Red Admiral</p> <p><u>Special Concern:</u> Monarch</p>	<p>Combination of ELC Community Series: Need to have present one Community Series from each landclass:</p> <p><u>Field:</u> CUM CUS CUT</p> <p><u>Forest:</u> FOC FOM FOD CUP</p> <p>Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.</p>	<p>A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario<sup>cxlix</sup>.</p> <ul style="list-style-type: none"> <li>The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south<sup>xxvii, xxviii, xxxiv, xxxv, xxxvi</sup>.</li> <li>The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat cxlvi, cxlix.</li> <li>Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes<sup>xxxvii, xxxviii, xxxix, xl, xli</sup>.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>OMNRF (NHIC)</li> <li>Agriculture Canada in Ottawa may have list of butterfly experts.</li> <li>Field Naturalist Clubs</li> <li>Toronto Entomologists Association</li> <li>Conservation Authorities</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)<sup>xlii</sup>. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day<sup>xxxvi</sup>, significant variation can occur between years and multiple years of sampling should occur<sup>xi, xlii</sup>.</li> <li>Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD</li> <li>MUD of &gt;5000 or &gt;3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant.</li> <li>SWHMIST<sup>cxlix</sup> Index #16 provides development effects and mitigation measures.</li> </ul>	<p>The site is not located within 5km of Lake Ontario.</p> <p><b>Not SWH</b></p>



Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Landbird Migratory Stopover Areas</b>					
<p><u>Rationale:</u> Sites with a high diversity of species as well as high number are most significant</p>	<p>All migratory songbirds.  Canadian Wildlife Service Ontario website: <a href="http://www.on.ec.gc.ca/wildlife_e.html">http://www.on.ec.gc.ca/wildlife_e.html</a>  All migrant raptors species:  Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)</p>	<p>All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD</p>	<p>Woodlots need to be &gt;10 ha<sup>1</sup> in size and within 5km<sup>iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv</sup> of Lake Ontario.  • If multiple woodlands are located along the shoreline, those woodlands &lt;2km from Lake Ontario are more significant<sup>cxlix</sup> • Sites have a variety of habitats; forest, grassland and wetland complexes<sup>cxlix</sup>. • The largest sites are more significant<sup>cxlix</sup> • Woodlots and forest fragments are important habitats to migrating birds<sup>ccxvii</sup>, these features located along the shore and located within 5km of Lake Ontario are Candidate SWH<sup>cxlviii</sup>.</p> <p><u>Information Sources</u> • Bird Studies Canada • Ontario Nature • Local birders and naturalist club • Ontario Important Bird Areas (IBA) Program</p>	<p>Studies confirm: • Use of the woodlot by &gt;200 birds/day and with &gt;35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (Apr/May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"<sup>ccxi</sup> • SWHMiST<sup>cxlix</sup> Index #9 provides development effects and mitigation measures.</p>	<p>The site is not located within 5km of Lake Ontario.  <b>Not SWH</b></p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Deer Yarding Areas</b>					
<p><u>Rationale:</u>                      Winter habitat for deer is considered to be the main factor for northern deer populations. In winter, deer congregate in "yards" to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards typically represent 10-15% of an areas summer range.</p>	White-tailed Deer	<p>Note: OMNRF to determine this habitat.</p> <p>ELC Community Series providing a thermal cover component for a deer yard would include:                      FOM, FOC, SWM and SWC.</p> <p>Or these ELC Ecosites:                      CUP2 CUP3                      FOD3 CUT</p>	<p>• Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter.</p> <p>• The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%<sup>CXCIV</sup>.</p> <p>• OMNRF determines deer yards following methods outlined in "Selected Wildlife and Habitat Features: Inventory Manual"<sup>CXCV</sup></p> <p>• Woodlots with high densities of deer due to artificial feeding are not significant.</p>	<p>No Studies Required:</p> <ul style="list-style-type: none"> <li>• Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths &gt; 40cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH<sup>vi, vii, viii, ix, x, i</sup>.</li> <li>• Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNRF will be available at local MNRF offices or via Land Information Ontario (LIO).</li> <li>• Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNRF will complete these field investigations<sup>CXCV</sup>.</li> <li>• If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule.</li> <li>• SWHMiST<sup>CXIX</sup> Index #2 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area. Deer yarding areas have not been identified by MNRF in the surrounding area.</p> <p><b>Not SWH</b></p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Deer Winter Congregation Areas</b>					
<p><u>Rationale:</u> Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions<sup>ccviii</sup></p>	White-tailed Deer	<p>All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD</p> <p>Conifer plantations much smaller than 50ha may also be used.</p>	<ul style="list-style-type: none"> <li>• Woodlots will typically be &gt;100 ha in size. Woodlots &lt;100ha may be considered as significant based on MNRF studies or assessment.</li> <li>• Deer movement during winter in the southern areas of Eco-region 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands<sup>ccviii</sup>.</li> <li>• If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule.</li> <li>• Large woodlots &gt; 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha<sup>ccxxiv</sup>.</li> <li>• Woodlots with high densities of deer due to artificial feeding are not significant.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• MNRF District Offices</li> <li>• LIO/NRVIS</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>• Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF<sup>ccviii</sup>.</li> <li>• Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF<sup>i</sup>.</li> <li>• Studies should be completed during winter (Jan/Feb) when &gt;20cm of snow is on the ground using aerial survey techniques<sup>ccxxiv</sup>, ground or road surveys, or a pellet count deer density survey<sup>ccxxv</sup>.</li> <li>• If a SWH is determined for Deer Wintering Area of if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule.</li> <li>• SWHMiST<sup>ccxix</sup> Index #2 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

Significant Wildlife Habitat Assessment Tables

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community <sup>1</sup>	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes <sup>1</sup>	Habitat Description <sup>1</sup>	Detailed Information and Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Cliff and Talus Slopes</b>					
<p><u>Rationale:</u> Cliffs and Talus Slopes are extremely rare habitats in Ontario.</p>	<p>Any ELC Ecosite within Community Series:</p> <p>TAO CLO TAS CLS TAT CLT</p>	<p>A Cliff is vertical to near vertical bedrock &gt;3m in height.</p> <p>A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.</p>	<p>Most cliff and talus slopes occur along the Niagara Escarpment.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• The Niagara Escarpment Commission has detailed information on location of these habitats.</li> <li>• OMNRF District</li> <li>• Natural Heritage Information Center (NHIC) has location information on their website</li> <li>• Local naturalist clubs</li> <li>• Conservation Authorities</li> </ul>	<ul style="list-style-type: none"> <li>• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes<sup>lxviii</sup></li> <li>• SWHMIST<sup>cxlix</sup> Index #21 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community <sup>1</sup>	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes <sup>1</sup>	Habitat Description <sup>1</sup>	Detailed Information and Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Sand Barrens</b>					
<p><u>Rationale:</u> Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry.</p>	<p>ELC Ecosites: SBO1 SBS1 SBT1</p> <p>Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always &lt;60%.</p>	<p>Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.</p>	<p>Any sand barren area, &gt;0.5ha in size.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• OMNRF Districts.</li> <li>• Natural Heritage Information Center (NHIC) has location information on their website</li> <li>• Field naturalist clubs</li> <li>• Conservation Authorities</li> </ul>	<ul style="list-style-type: none"> <li>• Confirm any ELC Vegetation Type for Sand Barrens<sup>xxxviii</sup></li> <li>• Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover exotics)<sup>1</sup>.</li> <li>• SWHMiST<sup>cxlix</sup> Index #20 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

**Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.**

Rare Vegetation Community <sup>1</sup>	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes <sup>1</sup>	Habitat Description <sup>1</sup>	Detailed Information and Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Alvar</b>					
<p><u>Rationale:</u> Alvars are extremely rare habitats in Ecoregion 6E. Most alvars in Ontario are in Ecoregion 6E and 7E. Alvars in 6E are small and highly localized just north of the Palaeozoic-Precambrian contact.</p>	<p>ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2</p> <p>Five Alvar</p> <p>Indicator Species: 1) Carex crawei 2) Panicum philadelphicum 3) Eleocharis compressa 4) Scutellaria parvula 5) Trichostema branchiatum</p> <p>These indicator species are very specific to Alvars within Ecoregion 6E</p>	<p>An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoo geographically diverse, supporting many uncommon or relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover<sup>boxviii</sup>.</p>	<p>An Alvar site &gt; 0.5 ha in size<sup>boxv</sup>.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>Alvars of Ontario (2000), Federation of Ontario Naturalists<sup>boxvi</sup>.</li> <li>Ontario Nature – Conserving Great Lakes Alvars<sup>boxviii</sup>.</li> <li>Natural Heritage Information Center (NHIC) has location information on their website</li> <li>Field Naturalist clubs</li> <li>Conservation Authorities</li> </ul>	<p>Field studies identify four of the five Alvar indicator species<sup>boxv</sup>. <sup>boxix</sup> at a Candidate Alvar site is Significant.</p> <ul style="list-style-type: none"> <li>Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover are exotics sp.).</li> <li>The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses<sup>boxv</sup>.</li> <li>SWHMIST<sup>boxix</sup> Index #17 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

**Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.**

Rare Vegetation Community <sup>1</sup>	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes <sup>1</sup>	Habitat Description <sup>1</sup>	Detailed Information and Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Old Growth Forest</b>					
<p><u>Rationale:</u> Due to historic logging practices, extensive old growth forest is rare in the Ecoregion. Interior habitat provided by old growth forests is required by many wildlife species.</p>	<p>Forest Community Series: FOD FOC FOM SWD SWC SWM</p>	<p>Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.</p>	<p>Woodland Stands areas 30ha or greater in size or with at least 10 ha interior habitat assuming 100m buffer at edge of forest í.</p> <p>Information Sources</p> <ul style="list-style-type: none"> <li>• OMNRF Forest Resource Inventory mapping</li> <li>• OMNRF Forester, Ecologist or Biologist</li> <li>• Field Local naturalist clubs</li> <li>• Conservation Authorities</li> <li>• Sustainable Forestry License (SFL) companies will possibly know locations through field operations.</li> <li>• Municipal forestry departments</li> </ul>	<p>Field Studies will determine:</p> <ul style="list-style-type: none"> <li>• If dominant trees species of the ecosite are &gt;140 years old, then stand is Significant Wildlife Habitat<sup>cxlviii</sup></li> <li>• The stand will have experienced no recognizable forestry activities<sup>cxlviii</sup></li> <li>• The area of Forest Ecosites combined to make up the stand is the SWH.</li> <li>• Determine ELC Vegetation Type for forest stand<sup>bxviii</sup></li> <li>• SWHDSS<sup>cxlix</sup> Index #23 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community <sup>1</sup>	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes <sup>1</sup>	Habitat Description <sup>1</sup>	Detailed Information and Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Savannah</b>					
<p><u>Rationale:</u> Savannahs are extremely rare habitats in Ontario.</p>	<p>TPS1 TPS2 TPW1 TPW2 CUS2</p>	<p>A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%.</p>	<ul style="list-style-type: none"> <li>• No minimum size to site</li> <li>• Site must be restored or a natural site.</li> <li>• Remnant sites such as railway right of ways are not considered to be SWH.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• Natural Heritage Information Center (NHIC) has location information on their website</li> <li>• OMNRF Ecologists</li> <li>• Field naturalists clubs</li> <li>• Conservation Authorities</li> </ul>	<p>Field studies confirm one or more of the Savannah indicator species listed in<sup>bxxv</sup> Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 6E should be used<sup>cxlviii</sup>.</p> <ul style="list-style-type: none"> <li>• Area of the ELC Ecosite is the SWH.</li> <li>• Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover exotics sp.).</li> <li>• SWHMIST<sup>cxlix</sup> Index #18 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>



Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community <sup>1</sup>	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes <sup>1</sup>	Habitat Description <sup>1</sup>	Detailed Information and Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Tallgrass Prairie</b>					
<p><u>Rationale:</u> Tallgrass Prairies are extremely rare habitats in Ontario.</p>	<p>TPO1 TPO2</p>	<p>A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has &lt; 25% tree cover.</p>	<ul style="list-style-type: none"> <li>• No minimum size to site</li> <li>• Site must be restored or a natural site.</li> <li>• Remnant sites such as railway right of ways are not considered to be SWH.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• OMNR Districts</li> <li>• Natural Heritage Information Center (NHIC) has location information available on their website</li> <li>• Field naturalists clubs</li> <li>• Conservation Authorities</li> </ul>	<p>Field studies confirm one or more of the Prairie indicator species listed in<sup>boxv</sup> Appendix N should be present. Note: Prairie plant spp. list from Ecoregion 6E should be used<sup>boxviii</sup>.</p> <ul style="list-style-type: none"> <li>• Area of the ELC Ecosite is the SWH</li> <li>• Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover exotics).</li> <li>• SWHMiST<sup>boxix</sup> Index #19 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community <sup>1</sup>	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes <sup>1</sup>	Habitat Description <sup>1</sup>	Detailed Information and Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Other Rare Vegetation Communities</b>					
<p><u>Rationale:</u> Plant communities that often contain rare species which depend on the habitat for survival.</p>	<p>Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG<sup>cxviii</sup>. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.</p>	<p>Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.</p>	<p>ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M<sup>cxviii</sup></p> <p>The OMNR/NHIC will have up to date listing for rare vegetation communities.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• Natural Heritage Information Center (NHIC) has location information available on their website</li> <li>• OMNRF Districts</li> <li>• Field naturalists clubs</li> <li>• Conservation Authorities</li> </ul>	<p>Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG<sup>cxviii</sup>.</p> <ul style="list-style-type: none"> <li>• Area of the ELC Vegetation Type polygon is the SWH.</li> <li>• SWHMiST<sup>cxlix</sup> Index #37 provides development effects and mitigation measures.</li> </ul>	<p>NRSI biologists did not observe any other rare vegetation communities during the preliminary assessment.</p> <p><b>Not SWH</b></p>

Significant Wildlife Habitat Assessment Tables

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
Wildlife Habitat:		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Waterfowl Nesting Area</b>					
<u>Rationale:</u> Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4  Note: includes adjacency to Provincially Significant Wetlands	A waterfowl nesting area extends 120m <sup>cxlix</sup> from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120m of each individual wetland where waterfowl nesting is known to occur <sup>cxlix</sup> . • Upland areas should be at least 120m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites.  <u>Information Sources</u> • Ducks Unlimited staff may know the locations of particularly productive nesting sites. • OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. • Reports and other information available from CAs	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards, or • Presence of 10 or more nesting pairs for listed species including Mallards. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" <sup>ccxi</sup> • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120m <sup>cxlviii</sup> from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWHMiST <sup>cxlix</sup> Index #25 provides development effects and mitigation measures.	Suitable habitat is not present within the study area.  <b>Not SWH</b>

**Table 3. Characteristics of Specialized Wildlife Habitat for Eco-region 6E.**

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Bald Eagle and Osprey Nesting, Foraging and Perching Habitat</b>					
<p><b>Rationale:</b> Nest sites are fairly uncommon in Eco-region 6E are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.</p>	<p>Osprey</p> <p><u>Special Concern:</u> Bald Eagle</p>	<p>ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands</p>	<ul style="list-style-type: none"> <li>Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water.</li> <li>Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy.</li> <li>Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms).</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario.</li> <li>MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat.</li> <li>Nature Counts, Ontario Nest Records Scheme data.</li> <li>OMNRF Districts</li> <li>Sustainable Forestry License (SFL) companies will identify additional nesting locations through field operations.</li> <li>Check the Ontario Breeding Bird Atlas<sup>ccv</sup> or Rare Breeding Birds in Ontario for species documented</li> <li>Reports and other information available from CAs.</li> <li>Field naturalists clubs</li> </ul>	<p>Studies confirm the use of these nests by:</p> <ul style="list-style-type: none"> <li>One or more active Osprey or Bald Eagle nests in an area<sup>cxviii</sup>.</li> <li>Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH.</li> <li>For an Osprey, the active nest and a 300m radius around the nest or the contiguous woodland stand is the SWH<sup>ccvii</sup>, maintaining undisturbed shorelines with large trees within this area is important<sup>cxviii</sup>.</li> <li>For a Bald Eagle the active nest and a 400-800m radius around the nest is the SWH<sup>cv</sup>, <sup>ccvii</sup>. Area of the habitat from 400-800m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat<sup>cv</sup>.</li> <li>To be significant a site must be used annually. When found inactive, the site must be known to be inactive for &gt;3 years or suspected of not being used for &gt;5 years before being considered not significant<sup>ccvii</sup>.</li> <li>Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August.</li> <li>Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"<sup>ccxi</sup></li> <li>SWHMiST<sup>cxlix</sup> Index #26 provides development effects and mitigation measures</li> </ul>	<p>There may be suitable nesting or perching habitat for these species along the river (within the study area); however, suitable habitat is not present within the subject property. As the watermain crossing location has yet to be determined, this SWH type remains candidate, despite no stick nests being observed on the June 11, 2021 survey.</p> <p><b>Candidate SWH (within the study area, but not within subject property)</b></p>

**Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.**

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Woodland Raptor Nesting Habitat</b>					
<p><b>Rationale:</b> Nests sites for these species are rarely identified; these area sensitive habitats and are often used annually by these species.</p>	<p>Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk</p>	<p>May be found in all forested ELC Ecosites.</p> <p>May also be found in SWC, SWM, SWD and CUP3.</p>	<p>All natural or conifer plantation woodland/forest stands &gt;30ha with &gt;10ha of interior habitat<sup>lxviii, lxxix, xc, xci, xciii, xciv, xcv, xcvi, cxxiii</sup>. Interior habitat determined with a 200m buffer<sup>cxlviii</sup>.</p> <ul style="list-style-type: none"> <li>Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Cooper's hawk nest along forest edges sometimes on peninsulas or small off-shore islands.</li> <li>In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>OMNRF</li> <li>Check the Ontario Breeding Bird Atlas<sup>ccv</sup> or Rare Breeding Birds in Ontario for species documented.</li> <li>Check data from Bird Studies Canada</li> <li>Reports and other information available from CAs</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>Presence of 1 or more active nests from species list is considered significant<sup>cxlviii</sup>.</li> <li>Red-shouldered Hawk and Northern Goshawk – a 400m radius around the nest or 28ha area of habitat is the SWH<sup>ccvii</sup>.</li> <li>Barred Owl – a 200m radius around the nest is the SWH<sup>ccvii</sup>.</li> <li>Broad-winged Hawk and Coopers Hawk – a 100m radius around the nest is the SWH<sup>ccvii</sup>.</li> <li>Sharp-shinned Hawk – a 50m radius around the nest is the SWH<sup>ccvii</sup>.</li> <li>Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area.</li> <li>SWHMiST<sup>cdix</sup> Index #27 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

**Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.**

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Turtle Nesting Area</b>					
<p><b>Rationale:</b> These habitats are rare and when identified will often be the only breeding site for local populations of turtles</p>	<p>Midland Painted Turtle</p> <p><b>Special Concern:</b> Northern Map Turtle Snapping Turtle</p>	<p>Exposed mineral soil (sand or gravel) areas adjacent (&lt;100m)<sup>cxviii</sup> or within the following ELC Ecosites:</p> <p>MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1</p>	<p>• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals.</p> <p>• For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH.</p> <p>• Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels).</li> <li>• Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them.</li> <li>• Natural Heritage Information Center (NHIC)</li> <li>• Field Naturalist clubs and landowners</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>• Presence of 5 or more nesting Midland Painted Turtles</li> <li>• One or more Northern Map Turtle or Snapping Turtle nesting is a SWH<sup>i</sup></li> <li>• The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH<sup>cxviii</sup>.</li> <li>• Travel routes from wetland to nesting area are to be considered within the SWH<sup>cxlix</sup>.</li> <li>• Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method.</li> <li>• SWHMiST<sup>cxlix</sup> Index #28 provides development effects and mitigation measures for turtle nesting habitat.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

**Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.**

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Seeps and Springs</b>					
<p><b>Rationale:</b> Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.</p>	<p>Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.</p>	<p>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.</p>	<p>Any forested area (with &lt;25% meadow/field/pasture) within the headwaters of a stream or river system<sup>cxvii, cxlix</sup>.</p> <ul style="list-style-type: none"> <li>• Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species<sup>cxix, cxx, cxxi, cxxii, cxiii, cxiv</sup></li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• Topographical Map</li> <li>• Thermography</li> <li>• Hydrological surveys conducted by CAs and MOE</li> <li>• Field naturalists clubs and landowners</li> <li>• Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped.</li> </ul>	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> <li>• Presence of a site with 2 or more seeps/springs should be considered SWH.</li> <li>• The area of a ELC forest ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat<sup>cxlviii</sup></li> <li>• SWHMiST<sup>cxlix</sup> Index #30 provides development effects and mitigation measures</li> </ul>	<p>Suitable habitat is not present within the study area. Although the cedar-lined banks are often conducive to seepage features being present, none were observed during the preliminary assesment.</p> <p><b>Not SWH</b></p>

**Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.**

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Amphibian Breeding Habitat (Woodland)</b>					
<p><b>Rationale:</b> These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations.</p>	<p>Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog</p>	<p>All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD</p> <p>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.</p>	<ul style="list-style-type: none"> <li>• Presence of a wetland, pond or woodland pool (including vernal pools) &gt;500m<sup>2</sup> (about 25m diameter) <sup>ccvii</sup> within or adjacent (within 120m) to a woodland (no minimum size) <sup>chxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx</sup> Some small wetlands may not be mapped and may be important breeding pools for amphibians.</li> <li>• Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat <sup>cxviii</sup></li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records</li> <li>• Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property.</li> <li>• OMNRF District</li> <li>• OMNRF wetland evaluations</li> <li>• Field naturalist clubs</li> <li>• Canadian Wildlife Service Amphibian Road Call Survey</li> <li>• Ontario Vernal Pool Association: <a href="http://www.ontariovernalpools.org">http://www.ontariovernalpools.org</a></li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>• 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 individuals (adults or eggs masses) <sup>lxxi</sup> or 2 or more of the listed frog species with Call Level Codes of 3.</li> <li>• A combination of observational study and call count surveys <sup>cviii</sup> will be required during the spring March-June when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands.</li> <li>• The habitat is the woodland area plus a 230m radius of woodland area <sup>lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx, lxxi</sup> if a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is the be included in the habitat.</li> <li>• SWHMIST <sup>cxlix</sup> Index #14 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>



**Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.**

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Amphibian Breeding Habitat (Wetland)</b>					
<b>Rationale:</b> These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Tree frog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	ELC Community Classes SW, MA, FE, BO, OA and SA.  Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands.	<ul style="list-style-type: none"> <li>Wetlands &gt;500m<sup>2</sup> (about 25m diameter)<sup>ccvii</sup> supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats<sup>clxxxiv</sup>.</li> <li>Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators.</li> <li>Bullfrogs require permanent water bodies with abundant emergent vegetation.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>Ontario Herpetofaunal Summary Atlas (or other similar atlases)</li> <li>Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count.</li> <li>OMNRF Districts and wetland evaluations</li> <li>Reports and other information available from CAs.</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species and with at least 20 individuals (adults or eggs masses)<sup>lxxi, lxxiii</sup>, or 2 or more of the listed frog/toad species with Call Level Codes of 3. or; Wetland with confirmed breeding Bullfrogs are significant.</li> <li>The ELC ecosite wetland area and the shoreline are the SWH.</li> <li>A combination of observational study and call count surveys<sup>cviii</sup> will be required during spring (March to June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands.</li> <li>If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule.</li> <li>SWHMiST<sup>cdix</sup> Index #15 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

**Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.**

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Woodland Area-Sensitive Bird Breeding Habitat</b>					
<p><b>Rationale:</b> Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds.</p>	<p>Yellow-Bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren</p> <p>Special Concern: Cerulean Warbler Canada Warbler</p>	<p>All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD</p>	<ul style="list-style-type: none"> <li>Habitats where interior forest breeding birds are breeding, typically large mature (&gt;60 yrs old) forest stands or woodlots &gt;30 ha.<sup>cv, cxxxi, cxxxii, cxxxiii, cxxxiv, cxxv, cxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cli, clii, cliii, cliv, clv, clvii, clviii, clix</sup></li> <li>Interior forest habitats are at least 200m from forest edge habitat.</li> </ul> <p>Information Sources</p> <ul style="list-style-type: none"> <li>Local bird clubs</li> <li>Canadian Wildlife Service (CWS) for the location of forest bird monitoring.</li> <li>Bird studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to greatest value to interior species</li> <li>Reports and other information available from CAs.</li> </ul>	<ul style="list-style-type: none"> <li>Presence of nesting or breeding pairs of 3 or more of the listed wildlife species.</li> <li>Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH.</li> <li>Conduct field investigations in spring and early summer when birds are singing and defending their territories.</li> <li>Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"<sup>ccxi</sup></li> <li>SWHMiST<sup>cxlix</sup> Index #34 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

Significant Wildlife Habitat Assessment Tables

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Marsh Bird Breeding Habitat</b>					
<p><u>Rationale:</u> Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.</p>	<p>American Bittern Virginia Rail Sora Common Gallinule American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan</p> <p><u>Special Concern:</u> Black Tern Yellow Rail</p>	<p>MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1</p> <p>For Green Heron: All SW, MA and CUM1 sites.</p>	<ul style="list-style-type: none"> <li>Nesting occurs in wetlands</li> <li>All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present<sup>ccv</sup>.</li> <li>For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>Contact OMNRF, wetland evaluations are a good source of information.</li> <li>Field naturalist clubs</li> <li>Natural Heritage Information Center (NHIC) Records</li> <li>Reports and other information available from CAs.</li> <li>Ontario Breeding Bird Atlas<sup>ccv</sup></li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species<sup>1</sup>.</li> <li>Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH<sup>1</sup>.</li> <li>Area of the ELC ecosite is the SWH</li> <li>Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats.</li> <li>Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"<sup>ccxi</sup>.</li> <li>SWHMiST<sup>ccxix</sup> Index #35 provides development effects and mitigation measures</li> </ul>	<p>Suitable habitat is not present within the study area. The very small wetlands near the northwest of the property are too small and do not contain standing water.</p> <p><b>Not SWH</b></p>

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Open Country Bird Breeding Habitat</b>					
<p><u>Rationale:</u> 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.</p>	<p>Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow</p> <p><u>Special Concern:</u> Short-eared Owl</p>	<p>CUM1 CUM2</p>	<p>Large grassland areas (includes natural and cultural fields and meadows) &gt;30 ha <sup>cbx, cbi, cbii, cbiii, cbiv, cbv, cbvi, cbvii, cbviii, cbix</sup>. 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 in the last 5 years)<sup>1</sup>.</p> <p>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.</p> <p>The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• Agricultural land classification maps, Ministry of Agriculture.</li> <li>• Ask local birders</li> <li>• Ontario Breeding Bird Atlas<sup>ccv</sup></li> <li>• Reports and other information available from CAs.</li> </ul>	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> <li>• Presence of nesting or breeding of 2 or more of the listed species.</li> <li>• A field with 1 or more breeding Short-eared Owl is to be considered SWH.</li> <li>• The area of SWH is the contiguous ELC ecosite field areas.</li> <li>• Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories.</li> <li>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"<sup>ccxi</sup>.</li> <li>• SWHMiST<sup>cxix</sup> Index #32 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Shrub/Early Successional Bird Breeding Habitat</b>					
<p><u>Rationale:</u> This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records cxcix.</p>	<p><u>Indicator spp.:</u> Brown Thrasher Clay-coloured Sparrow</p> <p><u>Common spp.:</u> Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher</p> <p><u>Special Concern:</u> Yellow-breasted Chat Golden-winged Warbler</p>	<p>CUT1 CUT2 CUS1 CUS2 CUW1 CUW2</p> <p>Patches of shrub ecosites can be complexed into a larger habitat for some bird species.</p>	<p>Large field areas succeeding to shrub and thicket habitats &gt;10ha<sup>cbiv</sup> in size.</p> <ul style="list-style-type: none"> <li>• Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years)<sup>1</sup>.</li> </ul> <p>Shrub thicket habitats (&gt;10 ha) are most likely to support and sustain a diversity of these species<sup>cbxi</sup>.</p> <p>Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• Agricultural land classification maps Ministry of Agriculture</li> <li>Local bird clubs</li> <li>• Ontario Breeding Bird Atlas<sup>ccv</sup></li> <li>• Reports and other information available from CAs</li> </ul>	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> <li>• Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species<sup>1</sup>.</li> <li>• A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat.</li> <li>• The area of the SWH is the contiguous ELC ecosite field/thicket area.</li> <li>• Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories</li> <li>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"<sup>ccxi</sup></li> <li>• SWHMIST<sup>cxix</sup> Index #33 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Terrestrial Crayfish</b>					
<p><u>Rationale:</u> Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. <small>ccii</small></p>	<p>Chimney or Digger Crayfish: (<i>Fallicambarus fodiens</i>) Devil Crawfish or Meadow Crayfish: (<i>Cambarus Diogenes</i>)</p>	<p>MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM</p>	<p>Wet meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish.</p> <ul style="list-style-type: none"> <li>• Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water.</li> <li>• Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed.</li> </ul> <p>Information Sources</p> <ul style="list-style-type: none"> <li>• Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998</li> </ul>	<p>Studies Confirm:</p> <ul style="list-style-type: none"> <li>• Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites<sup>ccii</sup></li> <li>• Area of ELC Ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH</li> <li>• Surveys should be done April to August during in temporary or permanent water</li> </ul> <p>Note the presence of burrows or chemistry are often the only indicator of presence, observance or collection of individuals is very difficult<sup>ccii</sup></p> <ul style="list-style-type: none"> <li>• SWHMIST<sup>ccix</sup> Index #36 provides development effects and mitigation measures.</li> </ul>	<p>Suitable habitat is not present within the study area.</p> <p><b>Not SWH</b></p>

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Special Concern and Rare Wildlife Species</b>					
<p><u>Rationale:</u> These species are quite rare or have experienced significant population declines in Ontario.</p>	<p>All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre.</p>	<p>All plant and animal element occurrences (EO) within a 1 or 10km grid.</p> <p>Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.</p>	<p>When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites<sup>xxviii</sup>.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• Natural Heritage Information Centre (NHIC) will have the Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data.</li> <li>• NHIC Website: "Get Information": <a href="http://nhic.mnr.gov.on.ca">http://nhic.mnr.gov.on.ca</a></li> <li>• Ontario Breeding Bird Atlas<sup>ccv</sup></li> <li>• Expert advice should be sought as many of the rare spp. have little information available about their requirements.</li> </ul>	<p>Studies Confirm:</p> <ul style="list-style-type: none"> <li>• Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable.</li> <li>• The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs to be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat.</li> <li>• SWHMIST<sup>cdix</sup> Index #37 provides development effects and mitigation measures.</li> </ul>	<p>The preliminary visit noted suitable habitat may be present for Eastern Wood-pewee; however, none were noted to be present. Continued surveys (birds, fish and vegetation) will determine if other SCC may be present.</p> <p><b>Candidate SWH</b></p>

Significant Wildlife Habitat Assessment Tables

Table 5. Characteristics of Animal Movement Corridors for Ecoregion 6E.

	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Amphibian Movement Corridors</b>					
<p><b>Rationale:</b>                      Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.</p>	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	Corridors may be found in all ecosites associated with water. • Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1.	Movement corridors between breeding habitat and summer habitat <sup>cxixiv, cxov, cxovi, cxovii, cxoviii, cxoix, cxox, cxoxi</sup> Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule <sup>i</sup> . <u>Information Sources</u> • MNRF District Office • Natural Heritage Information Center NHIC • Reports and other information available from CAs • Field Naturalist Clubs	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant <sup>cxix</sup> . • Corridors should have at least 15m of vegetation on both sides of waterway <sup>cxlix</sup> or be up to 200m wide <sup>cxlix</sup> of woodland habitat and with gaps <20m <sup>cxlix</sup> . • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat <sup>cxlix</sup> . • SWHMiST <sup>cxlix</sup> Index #40 provides development effects and mitigation measures.	Although Boyne Creek and the Grand River may facilitate the movement of wildlife, it does not appear that wetlands are present along Boyne Creek aside from the two small features shown on Map 2. Similarly, the unevaluated wetland north of the recreation trail, within the Grand River floodplain is somewhat removed from other wetlands along the river.  <b>Not SWH</b>



**Table 5. Characteristics of Animal Movement Corridors for Ecoregion 6E.**

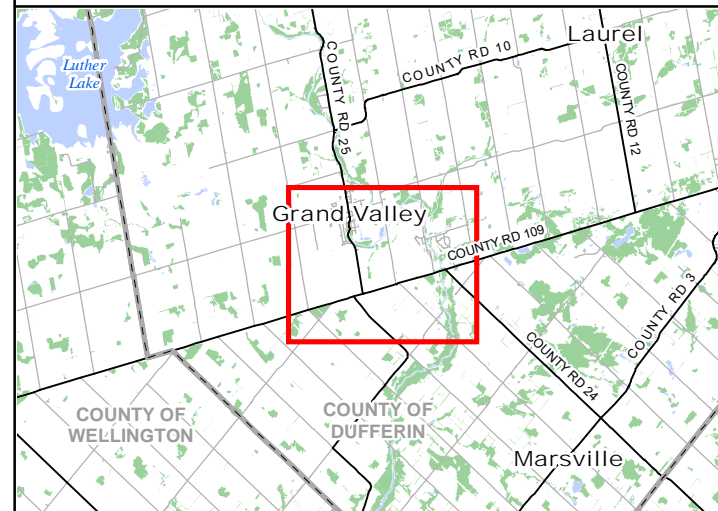
	Wildlife Species <sup>1</sup>	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes <sup>1</sup>	Habitat Criteria and Information Sources <sup>1</sup>	Defining Criteria <sup>1</sup>	Assessment Details
<b>Wildlife Habitat: Deer Movement Corridors</b>					
<p><u>Rationale:</u> Corridors important for all species to be able to access seasonally important life-cycle habitats or to access new habitat for dispersing individuals by minimizing their vulnerability while travelling.</p>	White-tailed Deer	<p>Corridors may be found in all forested ecosites.</p> <p>A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors.</p>	<p>Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule<sup>1</sup>.</p> <ul style="list-style-type: none"> <li>A deer wintering habitat identified by the OMNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion <sup>clxxxii, clxxxiii, cxlix, cxcliv</sup>.</li> <li>Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges).</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>MNRF District Office</li> <li>Natural Heritage Information Center (NHIC)</li> <li>Reports and other information available from CAs</li> <li>Field Naturalist Clubs</li> </ul>	<ul style="list-style-type: none"> <li>Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas.</li> <li>Corridors that lead to a deer wintering yard should be unbroken by roads and residential areas.</li> <li>Corridors should be at least 200m wide<sup>cxlix</sup> with gaps &lt;20m<sup>cxlix</sup> and if following riparian area with at least 15m of vegetation on both sides of waterway<sup>cxlix</sup>. Shorter corridors are more significant than longer corridors<sup>cxlix</sup></li> <li>SWHMiST<sup>cxlix</sup> Index #39 provides development effects and mitigation measures.</li> </ul>	<p>Although Boyne Creek and the Grand River may facilitate the movement of deer, tree cover along Boyne Creek diminishes to the west of the study area. The tree cover along the Grand River is a continuous stand of White Cedar.</p> <p><b>Not SWH</b></p>

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556000

558000

# Grand Valley Business Park Background Information



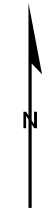
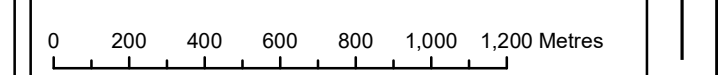
**Legend**

- Study Area (120m)
- Subject Property
- Aquatic Resource Area (ARA) Survey Point
- Utility Line
- Primary Road
- Secondary Road
- Permanent Watercourse
- Intermittent Watercourse
- Waterbody
- ANSI, Life Science
- Unevaluated Wetland
- Wetland (GRCA)
- Wooded Area
- Natural Heritage System (NHS)
- Regulatory Floodplain (GRCA)
- Regulation Limit (GRCA)



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Project: 2607 Date: June 8, 2021	NAD83 - UTM Zone 17 Size: 11x17" 1:20,000
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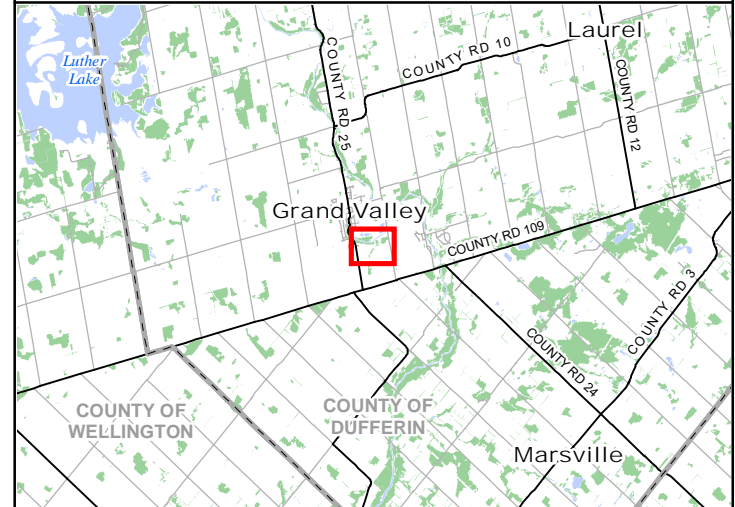


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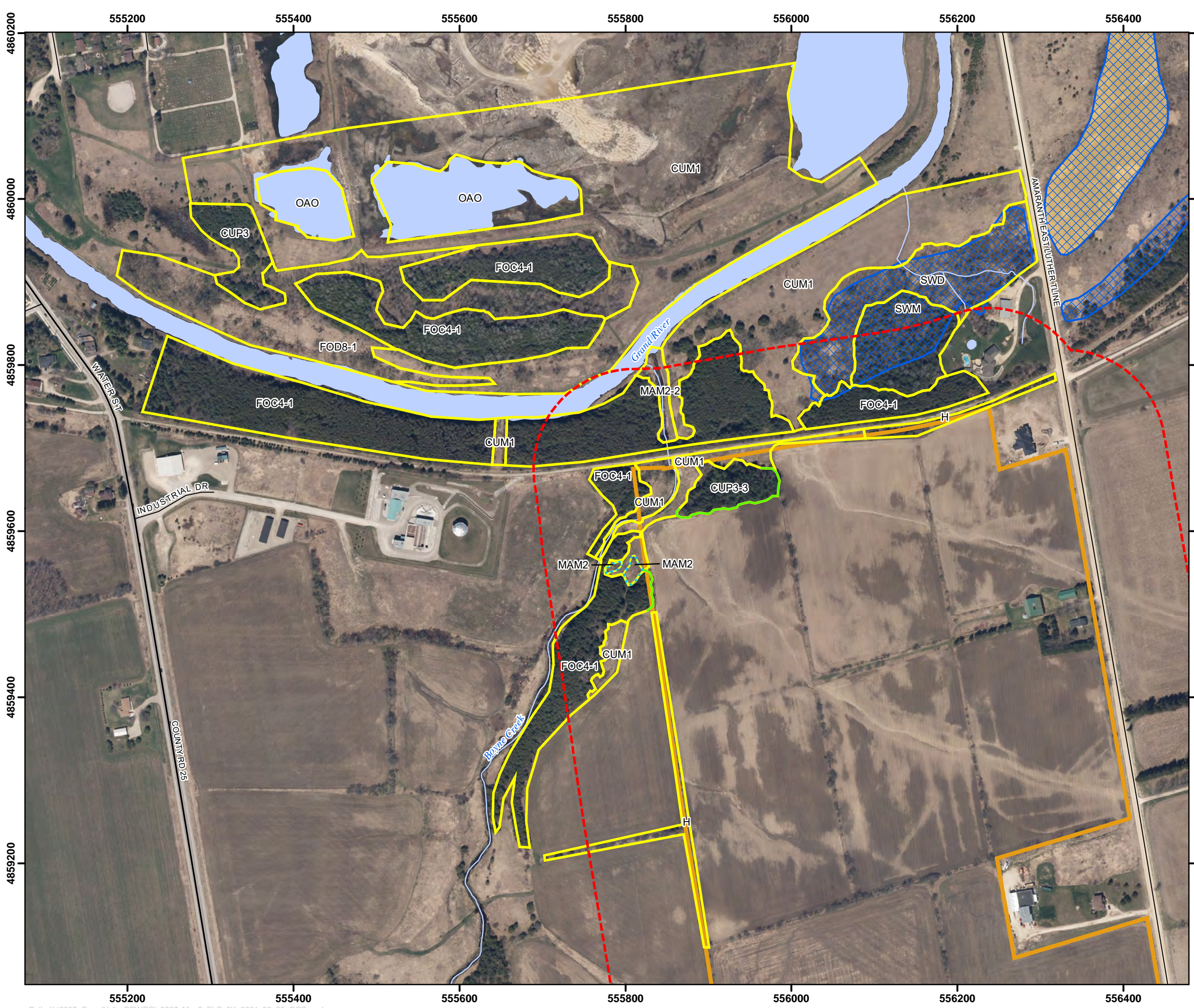
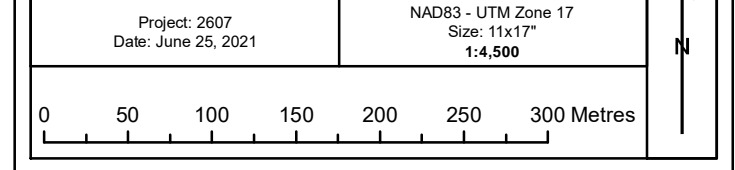
# Grand Valley Business Park Vegetation Communities



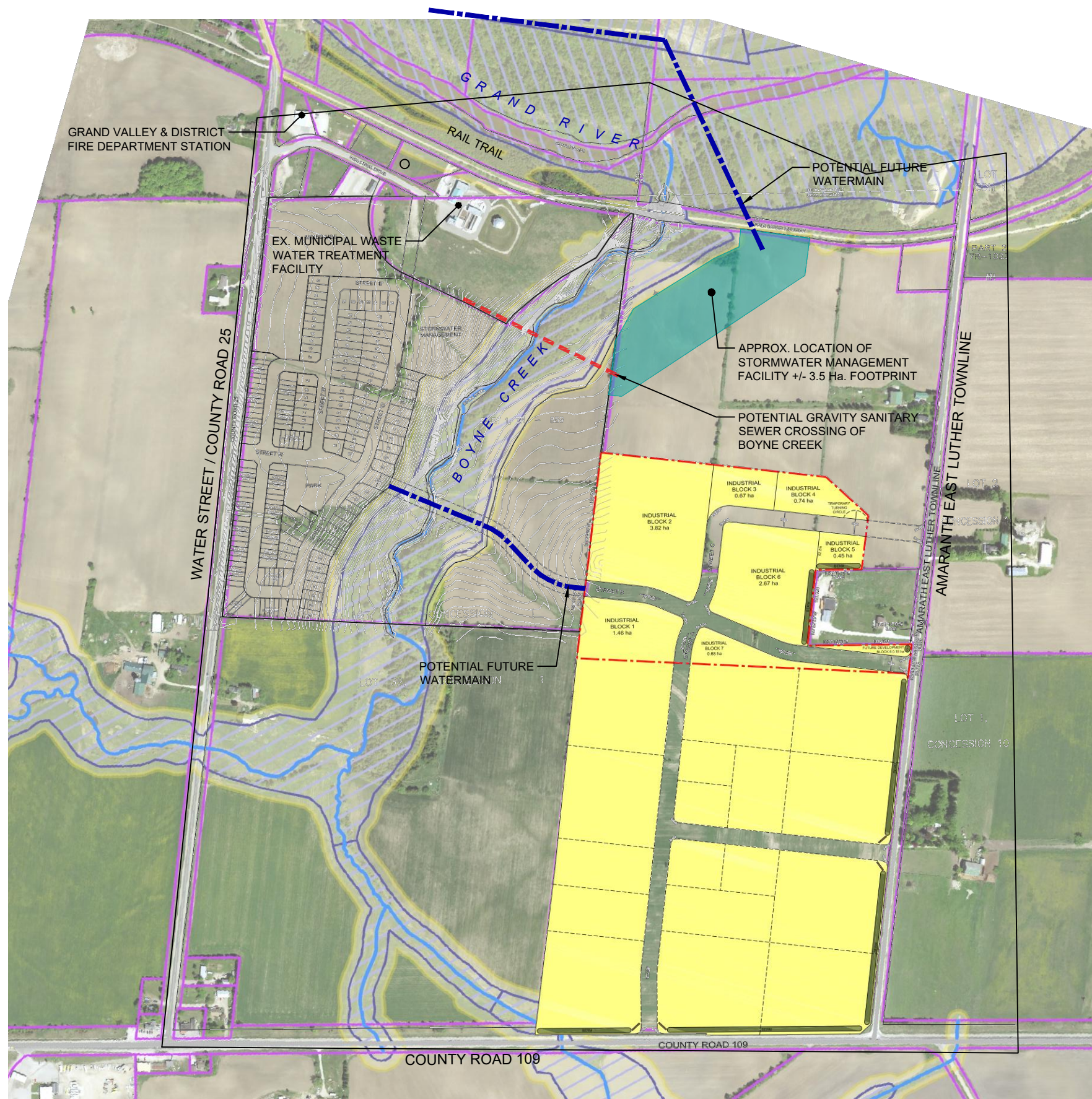
- Legend**
- Study Area (120m)
  - Subject Property
  - Primary Road
  - Secondary Road
  - Permanent Watercourse
  - Waterbody
  - Unevaluated Wetland
  - Wetland (GRCA)
  - NRSI Surveyed Wetland (June 11, 2021)
  - NRSI Surveyed Dripland (June 11, 2021)
  - Ecological Land Classification (ELC)
  - ELC Inclusion
- (CUM1) Mineral Cultural Meadow Ecosite  
 (CUP3) Coniferous Plantations  
 (CUP3-3) Scotch Pine Coniferous Plantation Type  
 (FOC4-1) Fresh - Moist White Cedar Coniferous Forest Type  
 (FOD8-1) Fresh - Moist Poplar Deciduous Forest Type  
 (H) Hedgerow  
 (MAM2-2) Reed-canary Grass Mineral Meadow Marsh Type  
 (OAO) Open Aquatic  
 (SWD) Deciduous Swamp  
 (SWM) Mixed Swamp



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FILE:W:\Guelph\117-2017\117184 - Thomasfield Industrial Lands Pre-Engineering\5 Work in Progress\Drafting\117184\_FSR.dwg LAYOUT:Figure 1  
 LAST SAVED BY: Mbaillie, 4/26/2021 1:17:28 PM PLOTTED BY: Michelle Baillie - GM BluePlan 4/26/2021 1:32:30 PM



Conceptual  
 Servicing Plan  
 Thomasfield Lands  
  
 Town of Grand  
 Valley

**LEGEND**

-  GRCA REGULATION LIMIT
-  GRCA REGULATED WATERCOURSE
-  ENGINEERED FLOODPLAIN LIMIT
-  ESTIMATED FLOODPLAIN LIMIT
-  SANITARY SEWER ALIGNMENT
-  WATERMAIN ALIGNMENT

**NOTE:**  
 CONCEPTUAL DRAFT PLAN OF SUBDIVISION AS  
 PREPARED BY ASTRID J CLOS.  
 DATED APRIL 23, 2021

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 OF THE INFORMATION CONTAINED ON  
 THIS MAP. ANY INTERPRETATIONS OR  
 CONCLUSIONS DRAWN FROM THIS MAP  
 ARE THE SOLE RESPONSIBILITY OF THE  
 USER.

Figure No. A



**Appendix II**  
**Subject Property Photographs**

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**Photograph 1:** Scotch Pine plantation in northwest corner of subject property.



**Photograph 2:** Fresh - Moist White Cedar Coniferous Forest beyond the northwest corner of the subject property, the Mixed Mineral Meadow Marsh features along the edge of the White Cedar to the right.



**Photograph 3:** South-facing view of Boyne Creek from the rail trail. The plantation to the left and proposed SWM location and buffer lands visible within soybean field.



**Photograph 4:** Location of the proposed future road and future watermain crossing of Boyne Creek.



**Photograph 5:** Swath of Cultural Meadow north of the rail trail, leading to the Grand River, where municipal water treatment outfall was installed.



**Photograph 6:** Grand River at approximate location of proposed future watermain crossing.





**Photograph 7:** Lands to the north of the Grand River, owned by Thomasfield Homes, where the future watermain is proposed to cross and connect with existing infrastructure.

**Appendix III**  
**Vascular Plant Species Reported from the Study Area**

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Scientific Name	Common Name	CC	CW	Weed	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Wellington-Dufferin	NHIC Data	NRSI Observed
		Oldham et al. 1995			MNRF 2021		Gov. of Canada 2021			Riley 1989	MNRF 2021	
<b>Pteridophytes</b>	<b>Ferns &amp; Allies</b>											
<b>Dryopteridaceae</b>	<b>Wood Fern Family</b>											
<i>Matteuccia struthiopteris</i> var. <i>pensylvanica</i>	Ostrich Fern	5	0		S5							X
<b>Equisetaceae</b>	<b>Horsetail Family</b>											
<i>Equisetum arvense</i>	Field Horsetail	0	0		S5							X
<b>Gymnosperms</b>	<b>Conifers</b>											
<b>Cupressaceae</b>	<b>Cypress Family</b>											
<i>Thuja occidentalis</i>	Eastern White Cedar	4	-3		S5							X
<b>Pinaceae</b>	<b>Pine Family</b>											
<i>Pinus strobus</i>	Eastern White Pine	4	3		S5							X
<i>Pinus sylvestris</i>	Scots Pine	0	3	-3	SE5							X
<b>Dicotyledons</b>	<b>Dicots</b>											
<b>Aceraceae</b>	<b>Maple Family</b>											
<i>Acer negundo</i>	Manitoba Maple	0	0		S5							X
<i>Acer saccharinum</i>	Silver Maple	5	-3		S5							X
<i>Acer saccharum</i>	Sugar Maple	4	3		S5							X
<b>Apiaceae</b>	<b>Carrot or Parsley Family</b>											
<i>Daucus carota</i>	Wild Carrot	0	5	-2	SE5							X
<i>Pastinaca sativa</i>	Wild Parsnip	0	5	-3	SE5							X
<b>Asclepiadaceae</b>	<b>Milkweed Family</b>											
<i>Asclepias syriaca</i>	Common Milkweed	0	5		S5							X
<b>Asteraceae</b>	<b>Composite or Aster Family</b>											
<i>Achillea millefolium</i>	Common Yarrow	0	3	-1	SE5?							X
<i>Arctium minus</i>	Common Burdock	0	3	-2	SE5							X
<i>Artemisia vulgaris</i>	Common Wormwood	0	5	-1	SE5							X
<i>Cirsium arvense</i>	Creeping Thistle	0	3	-1	SE5							X
<i>Erigeron philadelphicus</i>	Philadelphia Fleabane	1	-3		S5							X
<i>Eurybia macrophylla</i>	Large-leaved Aster	5	5		S5							X
<i>Leucanthemum vulgare</i>	Oxeye Daisy	0	5	-1	SE5							X
<i>Solidago canadensis</i>	Canada Goldenrod	1	3		S5							X
<i>Solidago gigantea</i>	Giant Goldenrod	4	-3		S5							X
<i>Symphotrichum ericoides</i> var. <i>ericoides</i>	White Heath Aster	4	3		S5							X
<i>Symphotrichum lanceolatum</i>	Panicled Aster	3	-3	0	S5							X
<i>Symphotrichum novae-angliae</i>	New England Aster	2	-3		S5							X
<i>Taraxacum officinale</i>	Common Dandelion	0	3	-2	SE5							X
<i>Tragopogon pratensis</i>	Meadow Goat's-beard	0	5	-1	SE5							X
<b>Balsaminaceae</b>	<b>Touch-me-not Family</b>											
<i>Impatiens capensis</i>	Spotted Jewelweed	4	-3		S5							X
<b>Boraginaceae</b>	<b>Borage Family</b>											
<i>Cynoglossum officinale</i>	Common Hound's-tongue	0	5	-1	SE5							X

Scientific Name	Common Name	CC	CW	Weed	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Wellington-Dufferin	NHIC Data	NRSI Observed
<i>Myosotis laxa</i>	Small Forget-me-not	6	-5		S5							X
<b>Brassicaceae</b>		<b>Mustard Family</b>										
<i>Cardamine pensylvanica</i>	Pennsylvania Bittercress	6	-3		S5							X
<i>Hesperis matronalis</i>	Dame's Rocket	0	3	-3	SE5							X
<i>Thlaspi arvense</i>	Field Penny-cress	0	5	-1	SE5							X
<b>Caprifoliaceae</b>		<b>Honeysuckle Family</b>										
<i>Lonicera tatarica</i>	Tatarian Honeysuckle	0	3	-3	SE5							X
<i>Viburnum lentago</i>	Nannyberry	4	0		S5							X
<b>Caryophyllaceae</b>		<b>Pink Family</b>										
<i>Silene vulgaris</i>	Bladder Campion	0	5	-1	SE5							X
<b>Convolvulaceae</b>		<b>Morning-glory Family</b>										
<i>Convolvulus arvensis</i>	Field Bindweed	0	5	-1	SE5							X
<b>Cornaceae</b>		<b>Dogwood Family</b>										
<i>Cornus alternifolia</i>	Alternate-leaved Dogwood	6	3		S5							X
<i>Cornus sericea</i>	Red-osier Dogwood	2	-3		S5							X
<b>Fabaceae</b>		<b>Pea Family</b>										
<i>Lotus corniculatus</i>	Garden Bird's-foot Trefoil	0	3	-2	SE5							X
<i>Medicago lupulina</i>	Black Medic	0	3	-1	SE5							X
<i>Trifolium pratense</i>	Red Clover	0	3	-2	SE5							X
<i>Trifolium repens</i>	White Clover	0	3	-1	SE5							X
<i>Vicia cracca</i>	Tufted Vetch	0	5	-1	SE5							X
<i>Quercus macrocarpa</i>	Bur Oak	5	3		S5							X
<b>Geraniaceae</b>		<b>Geranium Family</b>										
<i>Geranium robertianum</i>	Herb-Robert	2	3	-2	S5							X
<b>Lamiaceae</b>		<b>Mint Family</b>										
<i>Glechoma hederacea</i>	Ground Ivy	0	3	-2	SE5							X
<b>Lythraceae</b>		<b>Loosestrife Family</b>										
<i>Lythrum salicaria</i>	Purple Loosestrife	0	-5	-3	SE5							X
<b>Onagraceae</b>		<b>Evening-primrose Family</b>										
<i>Oenothera biennis</i>	Common Evening-primrose	0	3		S5							X
<b>Oxalidaceae</b>		<b>Wood Sorrel Family</b>										
<i>Oxalis stricta</i>	Upright Yellow Wood-sorrel	0	3		S5							X
<b>Plantaginaceae</b>		<b>Plantain Family</b>										
<i>Plantago lanceolata</i>	English Plantain	0	3	-1	SE5							X
<i>Plantago rugelii</i>	Rugel's Plantain	1	0		S5							X
<b>Ranunculaceae</b>		<b>Buttercup Family</b>										
<i>Anemonastrum canadense</i>	Canada Anemone	3	-3		S5							X

Scientific Name	Common Name	CC	CW	Weed	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Wellington-Dufferin	NHIC Data	NRSI Observed
<i>Clematis virginiana</i>	Virginia Virgin's-bower	3	0		S5							X
<i>Ranunculus acris</i>	Tall Buttercup	0	0	-2	SE5							X
<i>Thalictrum pubescens</i>	Tall Meadow-rue	5	-3		S5							X
<b>Rhamnaceae</b>		<b>Buckthorn Family</b>										
<i>Rhamnus cathartica</i>	Common Buckthorn	0	0	-3	SE5							X
<b>Rosaceae</b>		<b>Rose Family</b>										
<i>Fragaria virginiana ssp. virginiana</i>	Wild Strawberry	2	3		S5							X
<i>Malus pumila</i>	Common Apple	0	5	-1	SE4							X
<i>Physocarpus opulifolius</i>	Eastern Ninebark	5	-3		S5							X
<i>Potentilla norvegica</i>	Norwegian Cinquefoil	0	0		S5							X
<i>Potentilla recta</i>	Sulphur Cinquefoil	0	5	-2	SE5							X
<i>Prunus nigra</i>	Canada Plum	4	3		S4							X
<i>Prunus serotina</i>	Black Cherry	3	3		S5							X
<i>Prunus virginiana</i>	Choke Cherry	2	3		S5							X
<i>Rubus idaeus ssp. strigosus</i>	Wild Red Raspberry	2	3		S5							X
<i>Sorbus aucuparia</i>	European Mountain-ash	0	5	-2	SE4							X
<b>Rubiaceae</b>		<b>Madder Family</b>										
<i>Galium mollugo</i>	Smooth Bedstraw	0	5	-2	SE5							X
<i>Galium palustre</i>	Marsh Bedstraw	5	-5		S5							X
<b>Salicaceae</b>		<b>Willow Family</b>										
<i>Populus balsamifera</i>	Balsam Poplar	4	-3		S5							X
<i>Populus tremuloides</i>	Trembling Aspen	2	0		S5							X
<i>Salix euxina</i>	Crack Willow	0	0	0	SE							X
<b>Ulmaceae</b>		<b>Elm Family</b>										
<i>Ulmus americana</i>	American Elm	3	-3		S5							X
<b>Urticaceae</b>		<b>Nettle Family</b>										
<i>Urtica dioica ssp. gracilis</i>	Slender Stinging Nettle	2	0		S5							X
<b>Valerianaceae</b>		<b>Valerian Family</b>										
<i>Valeriana officinalis</i>	Common Valerian	0	3	-1	SE3							X
<b>Vitaceae</b>		<b>Grape Family</b>										
<i>Vitis riparia</i>	Riverbank Grape	0	0		S5							X
<b>Monocotyledons</b>		<b>Monocots</b>										
<b>Alismataceae</b>		<b>Water-plantain Family</b>										
<i>Sagittaria latifolia</i>	Broad-leaved Arrowhead	4	-5		S5							X
<b>Cyperaceae</b>		<b>Sedge Family</b>										
<i>Carex stipata</i>	Awl-fruited Sedge	3	-5		S5							X
<i>Eleocharis erythropoda</i>	Red-stemmed Spikerush	4	-5		S5							X
<b>Poaceae</b>		<b>Grass Family</b>										
<i>Bromus inermis</i>	Smooth Brome	0	5	-3	SE5							X

Scientific Name	Common Name	CC	CW	Weed	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Wellington-Dufferin	NHIC Data	NRSI Observed
<i>Dactylis glomerata</i>	Orchard Grass	0	3	-1	SE5							X
<i>Elymus repens</i>	Creeping Wildrye	0	3	-3	SE5							X
<i>Phalaris arundinacea</i>	Reed Canary Grass	0	-3		S5							X
<i>Phleum pratense</i>	Common Timothy	0	3	-1	SE5							X
<i>Poa palustris</i>	Fowl Bluegrass	5	-3		S5							X
<i>Poa pratensis ssp. pratensis</i>	Kentucky Bluegrass	0	3		SE5							X
<b>Total</b>											<b>0</b>	<b>84</b>

**Appendix IV**  
**Bird Species Reported from the Study Area**

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Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	OBBA*	NHIC Data**	NRSI: Highest Breeding Evidence	June 11, 2021	June 25, 2021
		MNRF 2021		Government of Canada 2021			BSC et al. 2006	MNRF 2021			
<b>Anatidae</b>	<b>Ducks, Geese &amp; Swans</b>										
<i>Anas crecca</i>	Green-winged Teal	S4					PO				
<i>Anas platyrhynchos</i>	Mallard	S5					PR				
<i>Branta canadensis</i>	Canada Goose	S5					CO				
<i>Spatula discors</i>	Blue-winged Teal	S4					PR				
<b>Phasianidae</b>	<b>Partridges, Grouse &amp; Turkeys</b>										
<i>Meleagris gallopavo</i>	Wild Turkey	S5					CO				
<b>Columbidae</b>	<b>Pigeons &amp; Doves</b>										
<i>Columba livia</i>	Rock Pigeon	SNA					PO				
<i>Zenaidura macroura</i>	Mourning Dove	S5					PR		PO		H
<b>Trochilidae</b>	<b>Hummingbirds</b>										
<i>Archilochus colubris</i>	Ruby-throated Hummingbird	S5B					PO				
<b>Rallidae</b>	<b>Rails, Gallinules &amp; Coots</b>										
<i>Porzana carolina</i>	Sora	S4B					PO				
<b>Charadriidae</b>	<b>Plovers &amp; Lapwings</b>										
<i>Charadrius vociferus</i>	Killdeer	S5B,S5N					PR		PR	H	H
<b>Scolopacidae</b>	<b>Sandpipers &amp; Allies</b>										
<i>Actitis macularia</i>	Spotted Sandpiper	S5					PR				
<i>Gallinago delicata</i>	Wilson's Snipe	S5B					PO				
<i>Scolopax minor</i>	American Woodcock	S4B					PO				
<b>Ardeidae</b>	<b>Hérons &amp; Bitterns</b>										
<i>Ardea herodias</i>	Great Blue Heron	S4					CO				
<b>Cathartidae</b>	<b>Vultures</b>										
<i>Cathartes aura</i>	Turkey Vulture	S5B					PO		X	X	
<b>Accipitridae</b>	<b>Hawks, Kites, Eagles &amp; Allies</b>										
<i>Accipiter cooperii</i>	Cooper's Hawk	S4	NAR	NAR	NS	No schedule	PO				
<i>Accipiter striatus</i>	Sharp-shinned Hawk	S5	NAR	NAR	NS	No schedule	PO				
<i>Buteo jamaicensis</i>	Red-tailed Hawk	S5	NAR	NAR	NS	No schedule	PO				
<i>Buteo lineatus</i>	Red-shouldered Hawk	S4B	NAR	NAR	SC		PO				
<i>Circus hudsonius</i>	Northern Harrier	S4B	NAR	NAR	NS	No schedule	CO				
<b>Strigidae</b>	<b>Typical Owls</b>										
<i>Megascops asio</i>	Eastern Screech-Owl	S4	NAR	NAR	NS	No schedule	PR				
<b>Alcedinidae</b>	<b>Kingfishers</b>										
<i>Megasceryle alcyon</i>	Belted Kingfisher	S4B					CO		PO	H	
<b>Picidae</b>	<b>Woodpeckers</b>										
<i>Colaptes auratus</i>	Northern Flicker	S4B					PO				
<i>Dryobates pubescens</i>	Downy Woodpecker	S5					PO		PO		H
<i>Dryocopus pileatus</i>	Pileated Woodpecker	S5					PO				
<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	S5B					CO				



Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	OBBA*	NHIC Data**	NRSI: Highest Breeding Evidence	June 11, 2021	June 25, 2021
<b>Falconidae</b>		<b>Caracaras &amp; Falcons</b>									
<i>Falco sparverius</i>	American Kestrel	S4					PO				
<b>Tyrannidae</b>		<b>Tyrant Flycatchers</b>									
<i>Contopus virens</i>	Eastern Wood-Pewee	S4B	SC	SC	SC	Schedule 1	PO	OB			
<i>Empidonax alnorum</i>	Alder Flycatcher	S5B					PO				
<i>Empidonax minimus</i>	Least Flycatcher	S4B					PO				
<i>Empidonax traillii</i>	Willow Flycatcher	S5B					PO				
<i>Myiarchus crinitus</i>	Great Crested Flycatcher	S4B					PO				
<i>Sayornis phoebe</i>	Eastern Phoebe	S5B					CO		PR	S	S
<i>Tyrannus tyrannus</i>	Eastern Kingbird	S4B					CO				
<b>Vireonidae</b>		<b>Vireos</b>									
<i>Vireo gilvus</i>	Warbling Vireo	S5B					PO				
<i>Vireo olivaceus</i>	Red-eyed Vireo	S5B					CO		PR	S	S
<b>Corvidae</b>		<b>Crows &amp; Jays</b>									
<i>Corvus brachyrhynchos</i>	American Crow	S5B					CO		PO	H	
<i>Cyanocitta cristata</i>	Blue Jay	S5					CO		PR		A
<b>Alaudidae</b>		<b>Larks</b>									
<i>Eremophila alpestris</i>	Horned Lark	S5B					CO				
<b>Hirundinidae</b>		<b>Swallows</b>									
<i>Hirundo rustica</i>	Barn Swallow	S5B	THR	T	T	Schedule 1	CO				
<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S4B					CO				
<i>Riparia riparia</i>	Bank Swallow	S4B	THR	T	T	Schedule 1	CO				
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow	S4B					CO				
<i>Tachycineta bicolor</i>	Tree Swallow	S4B					CO		X		X
<b>Paridae</b>		<b>Chickadees &amp; Titmice</b>									
<i>Poecile atricapillus</i>	Black-capped Chickadee	S5					CO		PR	H	H
<b>Sittidae</b>		<b>Nuthatches</b>									
<i>Sitta canadensis</i>	Red-breasted Nuthatch	S5					PO				
<b>Troglodytidae</b>		<b>Wrens</b>									
<i>Troglodytes aedon</i>	House Wren	S5B					PO				
<i>Troglodytes hiemalis</i>	Winter Wren	S5B					PO				
<b>Regulidae</b>		<b>Kinglets</b>									
<i>Regulus satrapa</i>	Golden-crowned Kinglet	S5B					PO				
<b>Turdidae</b>		<b>Thrushes</b>									
<i>Catharus fuscescens</i>	Veery	S4B					PR				
<i>Hylocichla mustelina</i>	Wood Thrush	S4B	SC	T	T	Schedule 1	PR				
<i>Turdus migratorius</i>	American Robin	S5B					CO		PO		S
<b>Mimidae</b>		<b>Mockingbirds, Thrashers &amp; Allies</b>									
<i>Dumetella carolinensis</i>	Gray Catbird	S4B					PO		PR	H	H
<i>Toxostoma rufum</i>	Brown Thrasher	S4B					CO				

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	OBBA*	NHIC Data**	NRSI: Highest Breeding Evidence	June 11, 2021	June 25, 2021
<b>Sturnidae</b>		<b>Starlings</b>									
<i>Sturnus vulgaris</i>	European Starling	SNA					CO		X		X
<b>Bombycillidae</b>		<b>Waxwings</b>									
<i>Bombycilla cedrorum</i>	Cedar Waxwing	S5B					PR		PO	H	
<b>Passeridae</b>		<b>Old World Sparrows</b>									
<i>Passer domesticus</i>	House Sparrow	SNA					CO				
<b>Fringillidae</b>		<b>Finches &amp; Allies</b>									
<i>Haemorhous mexicanus</i>	House Finch	SNA					PO				
<i>Haemorhous purpureus</i>	Purple Finch	S4B					PO				
<i>Spinus tristis</i>	American Goldfinch	S5B					CO		PO	H	X
<b>Emberizidae</b>		<b>New World Sparrows &amp; Allies</b>									
<i>Melospiza georgiana</i>	Swamp Sparrow	S5B					PO				
<i>Melospiza melodia</i>	Song Sparrow	S5B					CO		PR	S	S
<i>Passerculus sandwichensis</i>	Savannah Sparrow	S4B					PR				
<i>Pooecetes gramineus</i>	Vesper Sparrow	S4B					PO				
<i>Spizella pallida</i>	Clay-colored Sparrow	S4B					PO				
<i>Spizella passerina</i>	Chipping Sparrow	S5B					CO				
<i>Zonotrichia albicollis</i>	White-throated Sparrow	S5B					PR				
<b>Icteridae</b>		<b>Troupials &amp; Allies</b>									
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	S4					CO		PR	S	A
<i>Dolichonyx oryzivorus</i>	Bobolink	S4B	THR	T	T	Schedule 1	PR	OB			
<i>Icterus galbula</i>	Baltimore Oriole	S4B					PO		PR	S	S
<i>Molothrus ater</i>	Brown-headed Cowbird	S4B					PR		PR	S	H
<i>Quiscalus quiscula</i>	Common Grackle	S5B					CO		PO	S	X
<i>Stumella magna</i>	Eastern Meadowlark	S4B	THR	T	T	Schedule 1	PR	OB			
<b>Parulidae</b>		<b>Wood Warblers</b>									
<i>Geothlypis trichas</i>	Common Yellowthroat	S5B					PR		PR	S	S
<i>Leiothlypis ruficapilla</i>	Nashville Warbler	S5B					PO				
<i>Mniotilta varia</i>	Black-and-white Warbler	S5B					PO				
<i>Parkesia noveboracensis</i>	Northern Waterthrush	S5B					PO				
<i>Seiurus aurocapilla</i>	Ovenbird	S4B					PR				
<i>Setophaga coronata</i>	Yellow-rumped Warbler	S5B					PO				
<i>Setophaga petechia</i>	Yellow Warbler	S5B					PR				
<i>Setophaga ruticilla</i>	American Redstart	S5B					PO				
<i>Setophaga virens</i>	Black-throated Green Warbler	S5B					PO				
<b>Cardinalidae</b>		<b>Cardinals, Grosbeaks &amp; Allies</b>									
<i>Cardinalis cardinalis</i>	Northern Cardinal	S5					CO		PR	S	S
<i>Passerina cyanea</i>	Indigo Bunting	S4B					PO				
<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	S4B					PR				
<b>Total</b>							<b>85</b>	<b>3</b>	<b>23</b>	<b>17</b>	<b>19</b>

**Appendix V**  
**Herpetofauna Species Reported from the Study Area**

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Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	ORAA	NHIC Data	NRSI Observed
		MNRF 2021		Government of Canada 2021			Ontario Nature 2019	MNRF 2021	
<b>Turtles</b>									
<i>Chelydra serpentina</i>	Snapping Turtle	S4	SC	SC	SC	Schedule 1	X	X	
<i>Chrysemys picta marginata</i>	Midland Painted Turtle	S4		SC	NS	No schedule	X		
<b>Snakes</b>									
<i>Storeria occipitomaculata</i>	Red-bellied Snake	S5					X		
<b>Frogs and Toads</b>									
<i>Anaxyrus americanus</i>	American Toad	S5					X		
<i>Hyla versicolor</i>	Gray Treefrog	S5					X		
<i>Pseudacris crucifer</i>	Spring Peeper	S5					X		
<i>Lithobates clamitans</i>	Green Frog	S5					X		
<i>Lithobates pipiens</i>	Northern Leopard Frog	S5	NAR	NAR	NS	No schedule	X		
<i>Lithobates sylvaticus</i>	Wood Frog	S5					X		
<b>Total</b>							<b>9</b>	<b>1</b>	<b>0</b>

**Appendix VI**  
**Mammal Species Reported from the Study Area**

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Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Ontario Mammal Atlas	NRSI Observed
		MNRF 2021		Government of Canada 2021			Dobbyn 1994	
<b>Didelphimorphia</b>	<b>Opossums</b>							
<i>Didelphis virginiana</i>	Virginia Opossum	S4					X	
<b>Eulipotyphla</b>	<b>Shrews, Moles, Hedgehogs, and Allies</b>							
<i>Blarina brevicauda</i>	Northern Short-tailed Shrew	S5					X	
<i>Condylura cristata</i>	Star-nosed Mole	S5					X	
<i>Parascalops breweri</i>	Hairy-tailed Mole	S4					X	
<i>Sorex cinereus</i>	Masked Shrew	S5					X	
<i>Sorex fumeus</i>	Smoky Shrew	S5					X	
<i>Sorex palustris</i>	Water Shrew	S5					X	
<b>Chiroptera</b>	<b>Bats</b>							
<i>Eptesicus fuscus</i>	Big Brown Bat	S4					X	
<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S4					X	
<i>Lasiurus borealis</i>	Eastern Red Bat	S4					X	
<i>Lasiurus cinereus</i>	Hoary Bat	S4					X	
<i>Myotis leibii</i>	Eastern Small-footed Myotis	S2S3	END				X	
<i>Myotis lucifugus</i>	Little Brown Myotis	S3	END	E	E	Schedule 1	X	
<i>Myotis septentrionalis</i>	Northern Myotis	S3	END	E	E	Schedule 1	X	
<i>Perimyotis subflavus</i>	Tri-colored Bat	S3?	END	E	E	Schedule 1	X	
<b>Lagomorpha</b>	<b>Rabbits and Hares</b>							
<i>Lepus americanus</i>	Snowshoe Hare	S5					X	
<i>Lepus europaeus</i>	European Hare	SNA					X	
<i>Sylvilagus floridanus</i>	Eastern Cottontail	S5					X	X
<b>Rodentia</b>	<b>Rodents</b>							
<i>Castor canadensis</i>	Beaver	S5					X	
<i>Erethizon dorsatum</i>	Porcupine	S5					X	X
<i>Glaucomys sabrinus</i>	Northern Flying Squirrel	S5					X	
<i>Marmota monax</i>	Woodchuck	S5					X	
<i>Microtus pennsylvanicus</i>	Meadow Vole	S5					X	
<i>Microtus pinetorum</i>	Woodland Vole	S3?	SC	SC	SC	Schedule 1	X	
<i>Mus musculus</i>	House Mouse	SNA					X	
<i>Napaeozapus insignis</i>	Woodland Jumping Mouse	S5					X	
<i>Ondatra zibethicus</i>	Muskrat	S5					X	
<i>Peromyscus leucopus</i>	White-footed Mouse	S5					X	
<i>Peromyscus maniculatus</i>	Deer Mouse	S5					X	
<i>Rattus norvegicus</i>	Norway Rat	SNA					X	
<i>Sciurus carolinensis</i>	Eastern Gray Squirrel	S5					X	X
<i>Synaptomys cooperi</i>	Southern Bog Lemming	S4					X	
<i>Tamias striatus</i>	Eastern Chipmunk	S5					X	X
<i>Tamiasciurus hudsonicus</i>	Red Squirrel	S5					X	

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Ontario Mammal Atlas	NRSI Observed
<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S5					X	
<b>Canidae</b>		<b>Canines</b>						
<i>Canis latrans</i>	Coyote	S5					X	
<i>Vulpes vulpes</i>	Red Fox	S5					X	
<b>Felidae</b>		<b>Felines</b>						
<i>Lynx rufus</i>	Bobcat	S4					X	
<b>Mephitidae</b>		<b>Skunks and Stink Badgers</b>						
<i>Mephitis mephitis</i>	Striped Skunk	S5					X	
<b>Mustelidae</b>		<b>Weasels and Allies</b>						
<i>Mustela erminea</i>	Ermine	S5					X	
<i>Mustela frenata</i>	Long-tailed Weasel	S4					X	
<i>Neovison vison</i>	American Mink	S4					X	
<i>Taxidea taxus jacksoni</i>	American Badger	S1	END	E	E	Schedule 1	X	
<b>Procyonidae</b>		<b>Raccoons and Allies</b>						
<i>Procyon lotor</i>	Northern Raccoon	S5					X	X
<b>Ursidae</b>		<b>Bears</b>						
<i>Ursus americanus</i>	American Black Bear	S5	NAR	NAR	NS	No schedule	X	
<b>Artiodactyla</b>		<b>Deer and Bison</b>						
<i>Odocoileus virginianus</i>	White-tailed Deer	S5					X	X
<b>Total</b>							<b>46</b>	<b>6</b>

Species List Legend

Provincial Ranks									
<b>SRANK</b>									
<b>S1</b>	Critically Imperiled	<b>S4</b>	Apparently Secure	<b>S#?</b>	Uncertain Rank	<b>SNR</b>	Unranked	<b>NP</b>	Not Provided
<b>S2</b>	Imperiled	<b>S5</b>	Secure	<b>SX</b>	Presumed Extirpated	<b>SU</b>	Unrankable		
<b>S3</b>	Vulnerable	<b>S#S#</b>	Status is Between Ranks	<b>SH</b>	Possibly Extirpated (Historical)	<b>SNA</b>	Not Applicable		
<b>SARO</b>									
<b>END</b>	Endangered	<b>SC</b>	Special Concern	<b>DD</b>	Data Deficient				
<b>THR</b>	Threatened	<b>NAR</b>	Not at Risk	<b>EXP</b>	Extirpated				
<b>Federal Ranks</b>									
<b>COSEWIC and SARA</b>									
<b>E</b>	Endangered	<b>SC</b>	Special Concern	<b>NS</b>	No Status	<b>N-A</b>	Non-Active	<b>EX</b>	Extirpated
<b>T</b>	Threatened	<b>NAR</b>	Not at Risk	<b>DD</b>	Data Deficient	<b>X</b>	Extinct		
<b>SARA Schedule</b>									
<b>Schedule 1</b>	Extirpated, Endangered, Threatened, Special Concern Species officially protected under SARA								
<b>Schedule 2</b>	Endangered, Threatened species not yet re-assessed using revised criteria; may be considered for inclusion to Schedule 1								
<b>Schedule 3</b>	Special Concern species not yet re-assessed using revised criteria; may be considered for inclusion to Schedule 1								



**Maps**

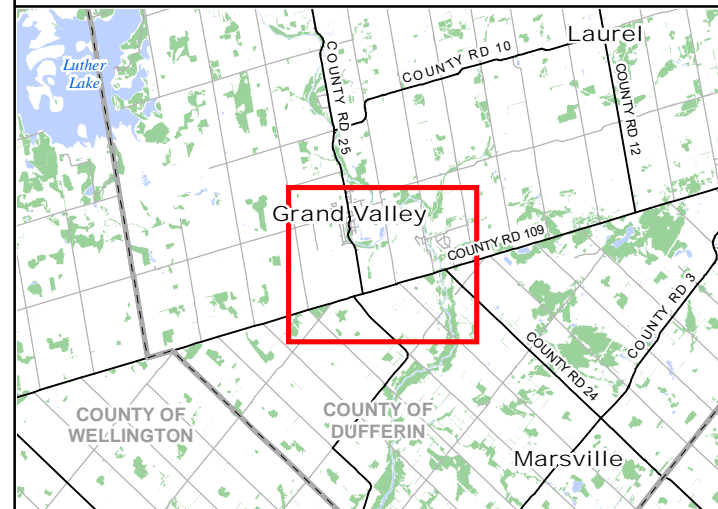


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# Grand Valley Business Park Study Area and Natural Features



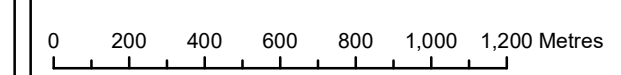
### Legend

- Study Area (120m)
- Subject Property
- Utility Line
- Primary Road
- Secondary Road
- Permanent Watercourse
- Intermittent Watercourse
- Waterbody
- ANSI, Life Science
- Unevaluated Wetland
- Wetland (GRCA)
- Wooded Area (OLIW)
- Natural Heritage System (OLIW)
- Regulatory Floodplain (GRCA)
- Regulation Limit (GRCA)



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Project: 2607 Date: November 8, 2021	NAD83 - UTM Zone 17 Size: 11x17" 1:20,000
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4860000

4858000

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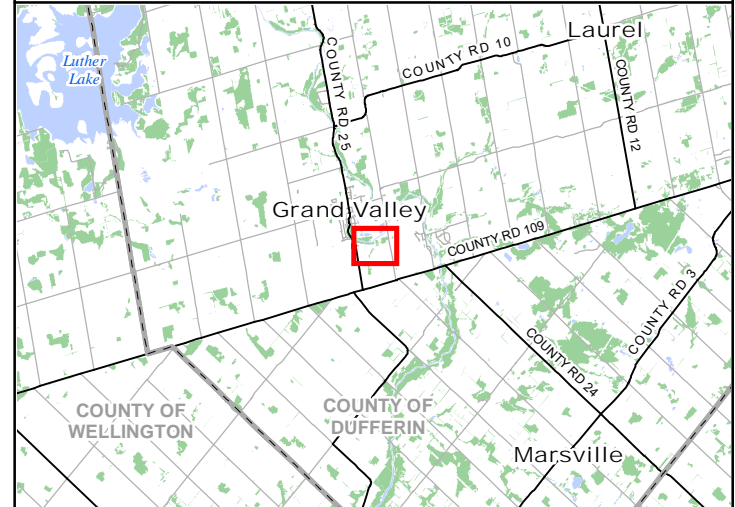
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# Grand Valley Business Park Vegetation Communities



**Legend**

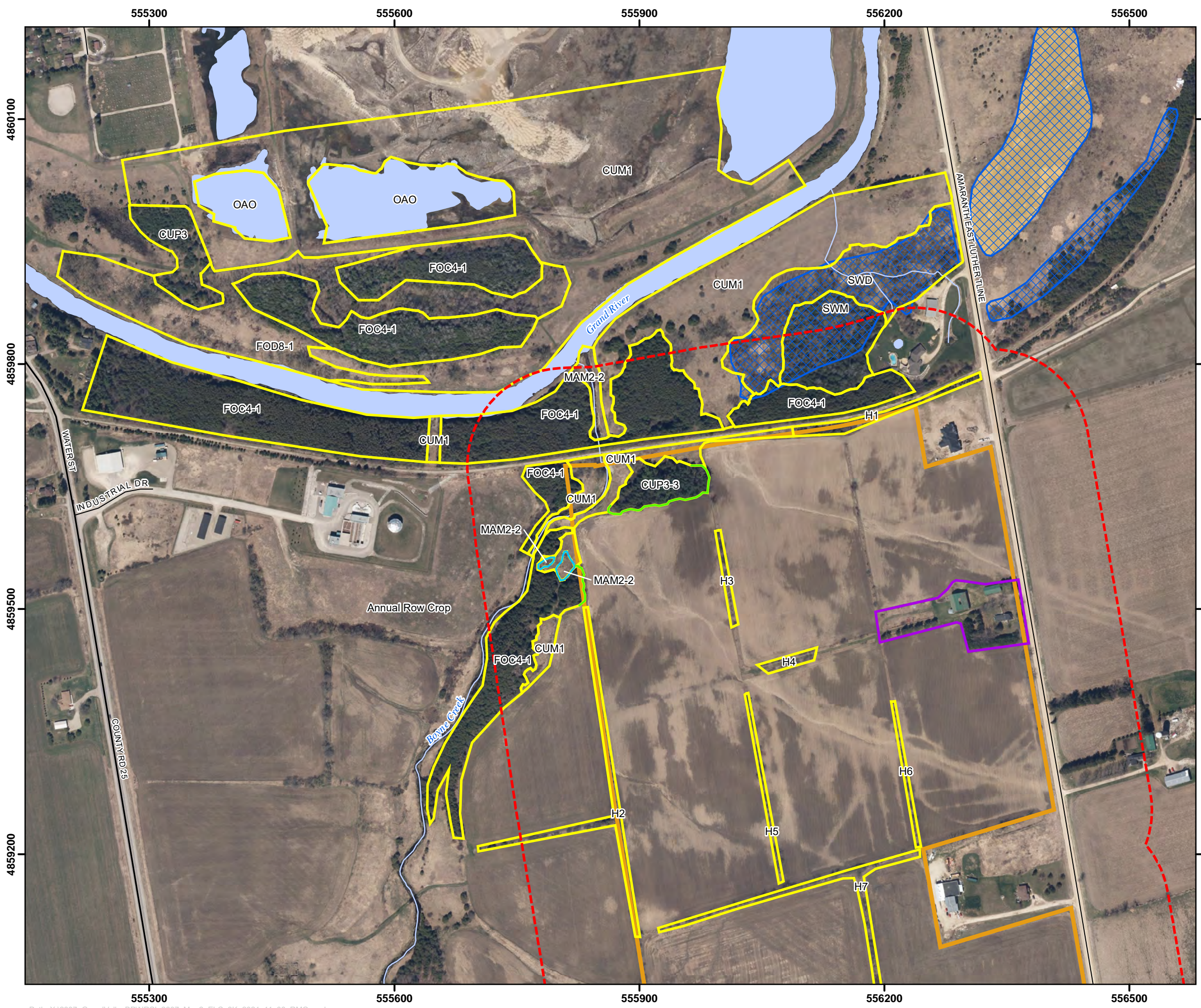
- Study Area (120m)
- Subject Property
- Rural Residence
- Primary Road
- Secondary Road
- Permanent Watercourse
- Waterbody
- Unevaluated Wetland
- Wetland (GRCA)
- NRSI Surveyed Wetland (June 11, 2021)
- NRSI Surveyed Dripland (June 11, 2021)
- Ecological Land Classification (ELC)
- ELC Inclusion
- (CUM1) Mineral Cultural Meadow Ecosite
- (CUP3) Coniferous Plantations
- (CUP3-3) Scotch Pine Coniferous Plantation Type
- (FOC4-1) Fresh - Moist White Cedar Coniferous Forest Type
- (FOD8-1) Fresh - Moist Poplar Deciduous Forest Type
- (H) Hedgerow
- (MAM2-2) Reed-canary Grass Mineral Meadow Marsh Type
- (OAO) Open Aquatic
- (SWD) Deciduous Swamp
- (SWM) Mixed Swamp

**NATURAL RESOURCE SOLUTIONS INC.**  
Aquatic, Terrestrial and Wetland Biologists

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Project: 2607 Date: November 9, 2021	NAD83 - UTM Zone 17 Size: 11x17" 1:4,600
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0 50 100 150 200 250 300 Metres



555600

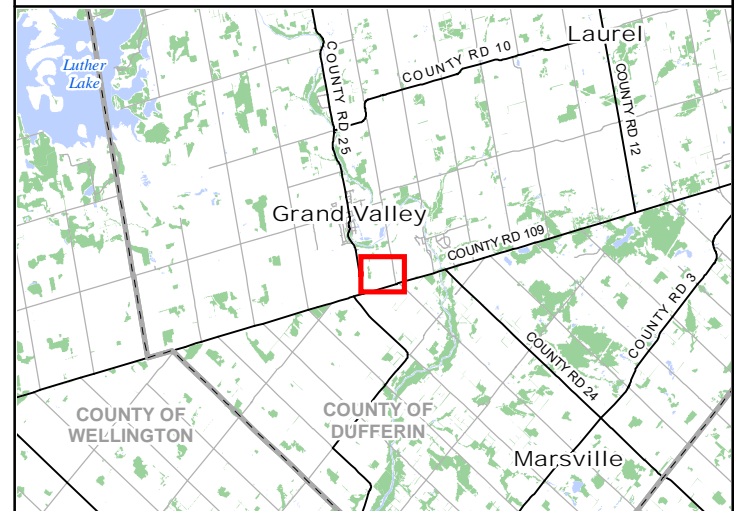
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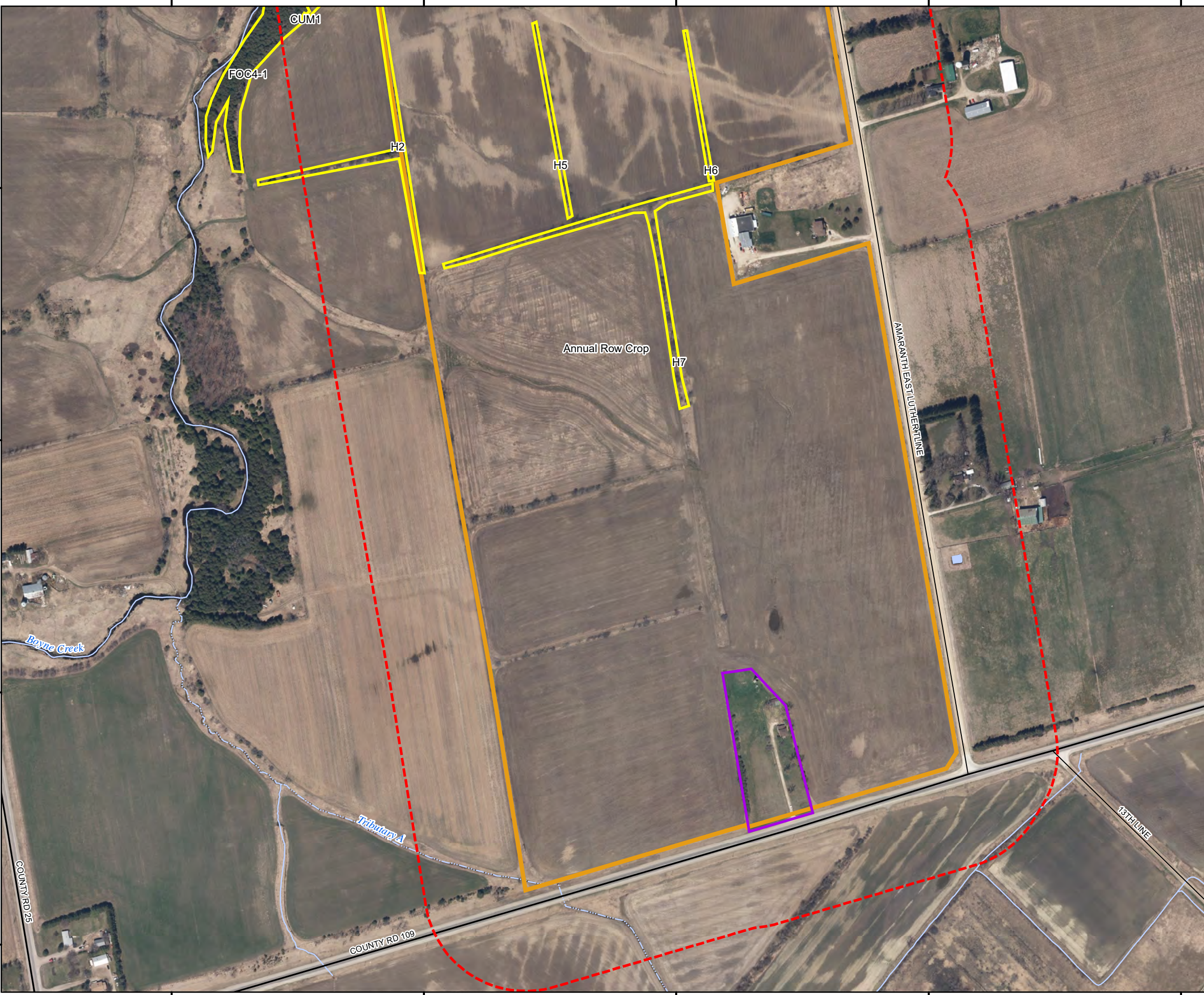
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# Grand Valley Business Park Vegetation Communities



### Legend

- Study Area (120m)
- Subject Property
- Rural Residence
- Primary Road
- Secondary Road
- Permanent Watercourse
- Intermittent Watercourse
- Waterbody
- Ecological Land Classification (ELC)
  - (CUM1) Mineral Cultural Meadow Ecosite
  - (FOC4-1) Fresh - Moist White Cedar Coniferous Forest Type
  - (H) Hedgerow



555600

555900

556200

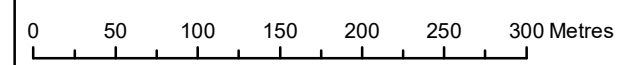
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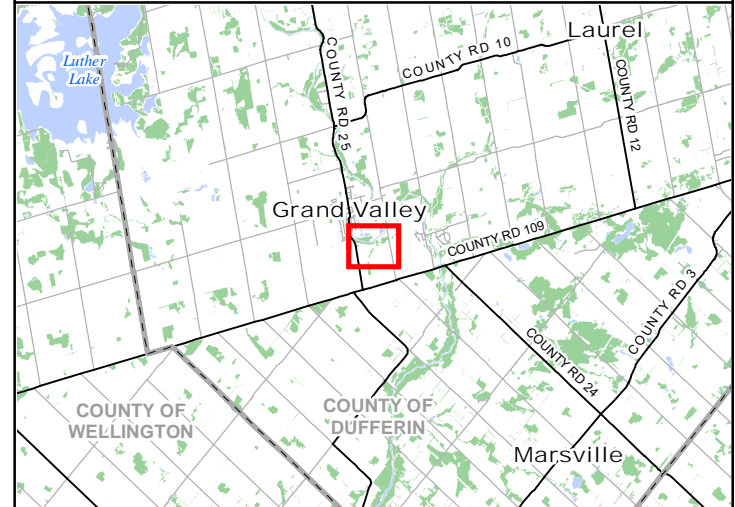
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Project: 2607 Date: November 9, 2021	NAD83 - UTM Zone 17 Size: 11x17" 1:4,600
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# Grand Valley Business Park Natural Heritage Constraints and Opportunities



**Legend**

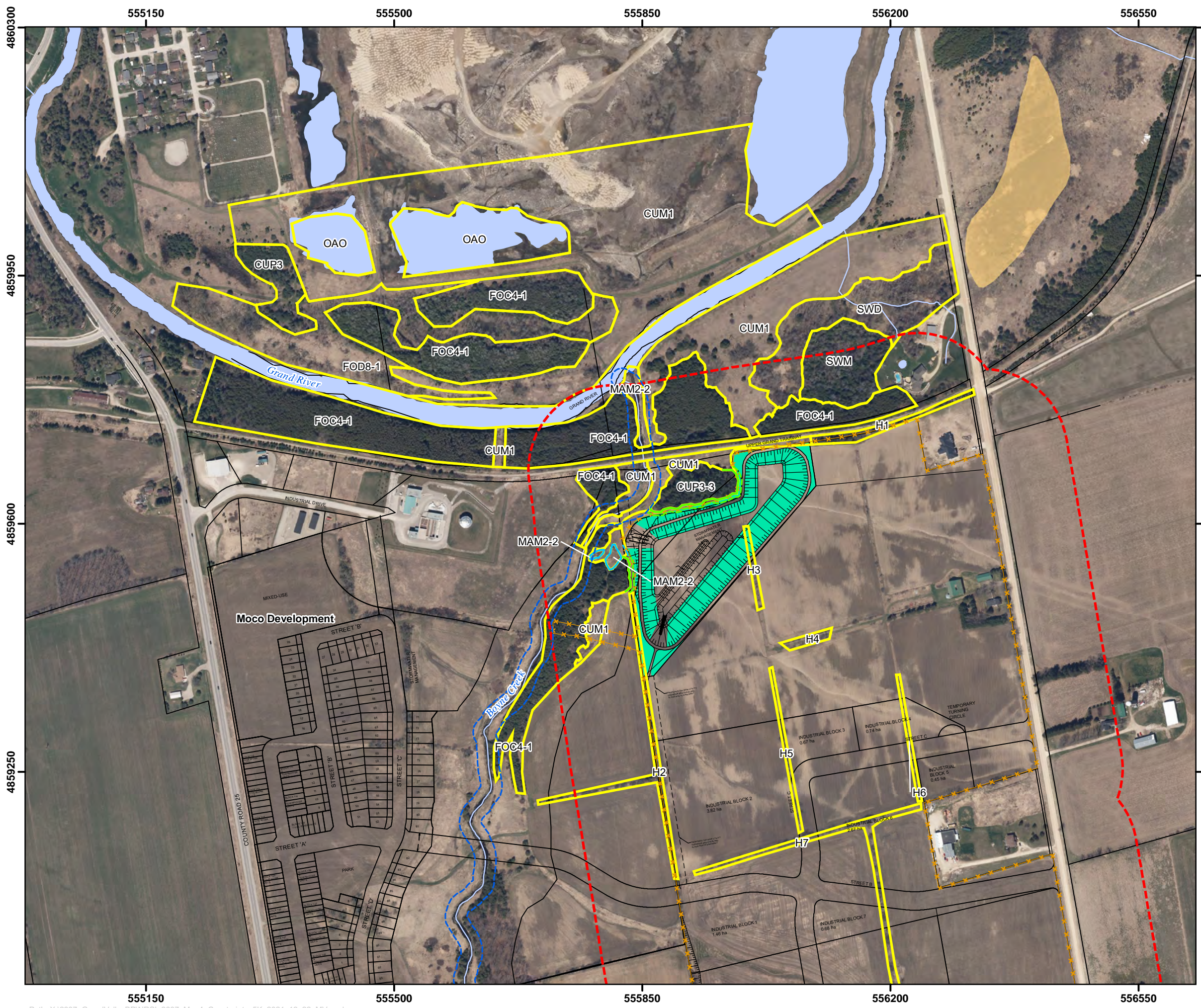
- Study Area (120m)
- Proposed Site Plan
- Silt Fence
- Permanent Watercourse
- Waterbody
- Unevaluated Wetland
- NRSI Surveyed Wetland (June 11, 2021)
- NRSI Surveyed Dripland (June 11, 2021)
- Watercourse Buffer (15m)
- Wetland Buffer (10m)
- Dripline Buffer (5m)
- Naturalization Planting
- Ecological Land Classification (ELC)
- ELC Inclusion

(CUM1) Mineral Cultural Meadow Ecosite  
 (CUP3) Coniferous Plantations  
 (CUP3-3) Scotch Pine Coniferous Plantation Type  
 (FOC4-1) Fresh - Moist White Cedar Coniferous Forest Type  
 (FOD8-1) Fresh - Moist Poplar Deciduous Forest Type  
 (H) Hedgerow  
 (MAM2-2) Reed-canary Grass Mineral Meadow Marsh Type  
 (OAO) Open Aquatic  
 (SWD) Deciduous Swamp  
 (SWM) Mixed Swamp

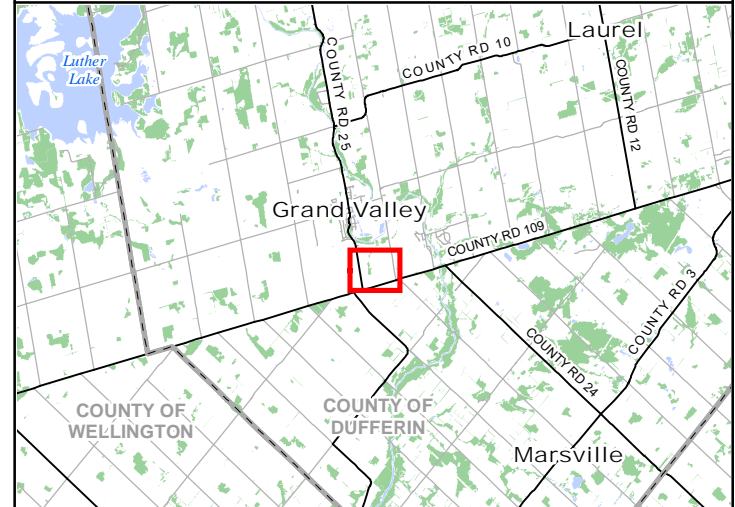


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Project: 2607 Date: December 22, 2021	NAD83 - UTM Zone 17 Size: 11x17" 1:5,300



# Grand Valley Business Park Natural Heritage Constraints and Opportunities



- Legend**
- Study Area (120m)
  - Proposed Site Plan
  - Silt Fence
  - Permanent Watercourse
  - Intermittent Watercourse
  - Waterbody
  - Unevaluated Wetland
  - Watercourse Buffer (15m)
  - Naturalization Planting
  - Ecological Land Classification (ELC)
    - (CUM1) Mineral Cultural Meadow Ecosite
    - (FOC4-1) Fresh - Moist White Cedar Coniferous Forest Type
    - (H) Hedgerow



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Project: 2607 Date: December 22, 2021	NAD83 - UTM Zone 17 Size: 11x17" 1:5,300

