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Dundalk Eco Parkway
Environmental Impact Study (EIS)

Wilson Developments
569 Perth Street
Mount Forest ON N0G 2L1

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R.J. Burnside & Associates Limited
292 Speedvale Avenue West Unit 20
Guelph ON N1H 1C4 CANADA

December 22, 2023
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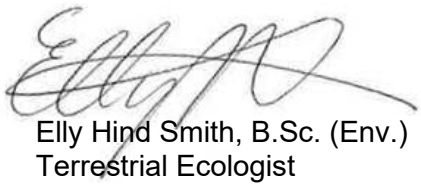
Record of Revisions

Revision	Date	Description
0	December 22, 2023	Initial Submission to GRCA and Township of Southgate

R.J. Burnside & Associates Limited

Report Prepared By:



Elly Hind Smith, B.Sc. (Env.)
Terrestrial Ecologist
EHS:js

Report Reviewed By:

Lorraine Adderley, M.Sc.
Project Coordinator – Terrestrial Ecologist
LJA:js

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1.0 Introduction

1.1 Background and Purpose

R.J. Burnside & Associates Limited (Burnside) has been retained by Wilson Developments ('the Client') to complete an Environmental Impact Study (EIS) for a proposed industrial and commercial development located on Eco Parkway, Dundalk, Part of Lots 235 and 236 Range 2 west of Toronto and Sydenham Road, Proton, in the Township of Southgate (herein referred to as the "subject lands"). Any area within 120 m of the subject lands is defined as the "adjacent lands." The location and limits of the subject lands are shown in Figure 1.

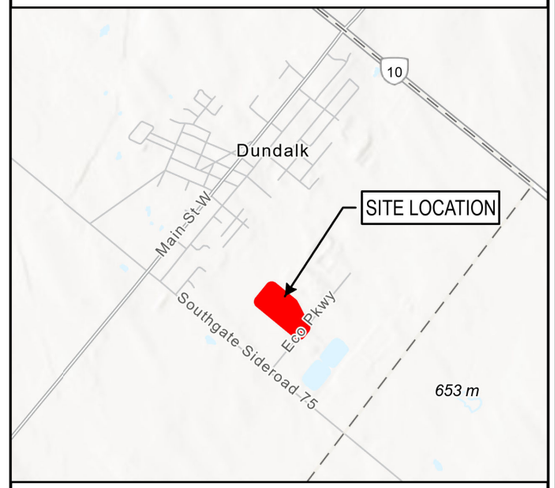
1.2 Scope of Work

This document was prepared in accordance with the approved TOR (Appendix A), Section 2.1 (Natural Heritage) of the Provincial Policy Statement (PPS; MMAH, 2020), the Natural Heritage Reference Manual (NHRM) for Natural Heritage Policies of the PPS, 2005 (MNR, 2010) and the Significant Wildlife Habitat Technical Guide (SWHTG; MNR, 2000). As such, the EIS includes:

- A review of applicable environmental policies and regulations affecting the subject lands.
- A review of existing secondary source data to identify any known natural features.
- Pre-submission consultation with various agencies to identify additional features and to confirm field study methodologies.
- A summary of detailed field assessments that were conducted.
- A description of the proposed development, including conceptual servicing and stormwater management measures.
- An assessment of potential impacts resulting from the proposed development.
- Recommended mitigating measures that will allow development to proceed in a manner that is consistent with local, regional, provincial, and federal policies and regulations.

The EIS is organized according to this approach. Each of the report sections corresponds with the above objectives.

Study Area



Sources:

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Datum: North American 1983	
Coord. System: NAD 1983 UTM Zone 17N	
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Client

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Figure Title

DUNDALK ECO PARKWAY - ENVIRONMENTAL IMPACT STUDY
SITE LOCATION

Drawn	Checked	Date	Figure No.
HN	LA	2023/12/06	1
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2.0 Planning and Environmental Policy Considerations

The following policies, Acts and regulations apply to features present on the subject lands.

2.1 Federal Species at Risk Act, 2002

The *Species at Risk Act, 2002* (SARA), provides protection for Species at Risk (SAR) and their habitat. Schedule 1 of SARA is considered the official list of wildlife SAR that receive legal protection under the Act and includes species that have been assessed by the Committee on the Status of Endangered Wildlife in Canada (COESWIC) as Extirpated, Endangered, Threatened or Special Concern (Government of Canada, 2017).

To ensure the protection of SAR, Section 32(1) and (2) of the SARA states:

> *(1) No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species, or a threatened species*
>
> *(2) No person shall possess, collect, buy, sell or trade an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species, or any part or derivative of such an individual*

And Section 33 of the SARA states:

> *No person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered or threatened species, or that is listed as an extirpated species if a recovery strategy has recommended reintroduction of the species into the wild in Canada*

SARA prohibitions pertaining to private lands include:

- Aquatic species listed on Schedule 1 as Endangered, Threatened or Extirpated.
- Migratory birds listed under the Migratory Birds Convention Act (MBCA) and listed on Schedule 1 as Endangered, Threatened or Extirpated.
- May apply through an order, to other species listed on Schedule 1 (i.e., not an aquatic or migratory bird species) as Endangered, Threatened or Extirpated, if provincial/territorial legislation or voluntary measures do not adequately protect the species and its habitat.

Although Environment and Climate Change Canada (ECCC) is the overall administrator of SARA, responsibility for implementation of the Act is shared by ECCC and the Canadian Wildlife Service, Parks Canada and Department of Fisheries and Oceans (DFO). On private lands, ECCC oversees matters related to migratory birds, while DFO oversees matters related to aquatic species. In most cases pertaining to non-aquatic species on private lands, provincial laws (e.g., the *Endangered Species Act, 2007*) provide protection for critical habitat (i.e., habitat that is necessary for the survival or recovery of a listed endangered, threatened, or extirpated species). Alternatively, SARA prohibitions can be applied by an order, as described above, or through federal legislation (including SARA).

2.2 Federal Migratory Birds Convention Act, 1994

The MBCA and Migratory Birds Regulations (MBR) are federal legislative requirement that are binding on members of the public and all levels of government, including federal and provincial governments. The legislation protects certain species[1], controls the harvest of others and prohibits the commercial sale of all species.

The MBCA has recently updated and modernized the MBR. The new MBR came into force on July 30, 2022. Further regulatory amendments are planned.

The previous regulations protected the nests of all migratory birds, at all times, for as long as they existed, which meant that many nests were protected when they no longer benefited migratory birds. The new MBR provides protection to migratory bird nests when they are considered to have a high conservation value for migratory birds.

The nests of all migratory bird species are protected when they contain a live bird or a viable egg. The nests of 18 species (listed in Schedule 1 of the regulations), whose nests are reused by migratory birds, continue to have year-round nest protection, unless they have been shown to be abandoned. To be considered abandoned:

- Minister must be notified, via an online registration system (Notice: Abandoned Nest Registry - Canada.ca) that the nest does not contain a live bird or viable egg; and
- Nest is to remain unused by migratory birds during the designated wait time for that species.
- Of the 18 species, three are known to commonly breed in Southern Ontario: Great Blue Heron, Green Heron and Pileated Woodpecker.

[1] *Bird species not regulated under the Act include: Rock Dove, American Crow, Brown-headed Cowbird, Common Grackle, House Sparrow, Red-winged Blackbird, and European Starling. In addition, raptors are not regulated under the MBCA. However, they are protected under provincial legislation which restricts and regulates the taking or possession of eggs and nests. Furthermore, if the species identified is protected under Ontario's ESA or the federal SARA, additional restrictions may apply.*

Permits are available under limited circumstances and mostly relate to egg or nest destruction, or relocation “for the purpose of reducing the danger that they are causing or are likely to cause to human health or public safety or the damage they are causing or are likely to cause to agricultural, environmental or other interests.” Environment Canada and the Canadian Wildlife Service have compiled nesting calendars that show the variation in nesting intensity, by habitat type and nesting zone, within broad geographical areas distributed across Canada. While this does not mean nesting birds will not nest outside of these periods, the calendars can be used to greatly reduce the risk of encountering a nest. Environment Canada advises avoidance as the best approach.

2.3 Provincial Planning Act, 1990

2.3.1 Provincial Policy Statement, 2020

The PPS (MMAH, 2020) provides general policies on land use patterns, resources, and public health and safety that guide development across Ontario. All planning decisions are required to be consistent with the applicable provisions of the PPS.

Note: *The Province is currently seeking input on a proposed PPS that would replace the existing PPS and A Place to Grow. Should the government adopt the proposed PPS, the government would consequentially revoke the PPS, 2020 and A Place to Grow, as well as amend regulations.*

On June 16, 2023, proposed updated natural heritage policies and related definitions were released by the government. It appears that there are very few changes proposed. The comment period was extended until August 4, 2023. The date when the proposed policies will come into effect remains unknown. For now, the current PPS remains in effect.

This report will address Section 1.8 (Energy Conservation, Air Quality and Climate Change) and Section 2.1 (Natural Heritage) of the PPS.

Section 1.8 Energy Conservation, Air Quality and Climate Change identifies opportunities for planning authorities to develop plans to prepare for and reduce the impacts of climate change:

> *1.8.1 Planning authorities shall support energy conservation and efficiency, improved air quality, reduced greenhouse gas emissions, and preparing for the impacts of a changing climate through land use and development patterns.*

These include land use and development patterns which:

> *promote design and orientation which maximizes energy efficiency and conservation, and considers the mitigating effects of vegetation and green infrastructure; and maximize vegetation within settlement areas, where feasible.*

Eight types of natural heritage features are identified in Sections 2.1.4 and 2.1.5 of the PPS where development and site alteration are not permitted, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions:

1. Significant Wetlands in Ecoregions 5E, 6E, and 7E.
2. Significant Coastal Wetlands.
3. Significant Wetlands in the Canadian Shield, north of Ecoregions 5E, 6E, and 7E.
4. Significant Woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River).
5. Significant Valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and St. Marys River).
6. Significant Wildlife Habitat (SWH).
7. Significant Areas of Natural and Scientific Interest (ANSIs).
8. Coastal wetlands in Ecoregions 5E, 6E, and 7E that are not subject to policy 2.1.4(b).

Sections 2.1.6, 2.1.7, and 2.1.8 identify three additional development and site alteration prohibitions and exemptions, as follows:

- Fish habitat, except in accordance with Provincial and Federal requirements.
- Habitat of Endangered and Threatened species, except in accordance with provincial and federal requirements.
- On adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6, unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features, or their ecological functions.

The presence, or potential presence, of these features as well as the policy and planning implications of these features for development, are discussed in detail in this report.

2.4 Provincial Endangered Species Act, 2007

The *Endangered Species Act, 2007* (ESA) provides protection for SAR and their habitat. The ESA is now administered by the Ministry of the Environment, Conservation and Parks (MECP) and provides policies for the protection of Extirpated, Endangered and Threatened species, as well as species of Special Concern. These four categories of species form the Species at Risk in Ontario (SARO) List, which are classified by the Committee on the Status of Species at Risk in Ontario (COSSARO). COSSARO is also responsible for maintaining criteria for assessing and classifying SAR.

The ESA helps protect species (Section 9) and their habitat (Section 10). Section 9(1)(a) of the ESA states:

> *no person shall kill, harm, harass, capture or take a living member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species.*

Section 10(1)(a) of the ESA states:

> *no person shall damage or destroy the habitat of a species that is listed on the Species at Risk in Ontario List as an endangered or threatened species.*

The ESA includes general habitat regulations, as well as species-specific habitat regulations. Species up listed to Endangered, or Threatened, automatically receive general habitat protection under the ESA. The province is then required to prepare a species recovery strategy and establish a habitat regulation according to requirements of the ESA.

Regulatory amendments under the ESA were issued by the province in 2022 which streamlines ESA Authorizations for activities that have “predictable effects and common and routine mitigation actions with well understood requirements to minimize adverse impacts”. Proponents are still required to avoid and minimize impacts on SAR and their habitats.

The use of a SAR Conservation Fund has been enabled for five designated conservation fund species when they seek permits and agreements related to these species (Eastern Whip-poor-will, Blanding’s Turtle), or register for conditional exemptions (Eastern Meadowlark, Bobolink, Butternut).

The SARO List is updated from time to time; therefore, it is the proponent’s responsibility to practice due diligence to ensure that the ESA and its regulations are not violated. It is also the proponent’s responsibility to be apprised of any amendments to the Act that may come into force for the duration of this project.

2.5 Grand River Conservation Authority, Ontario Regulation 150/06

The PPS (2020), described in Section 2.3.1 of this report, also outlines policies for managing development within, or adjacent to, natural hazard-prone lands. These policies are generally enacted through the *Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses* policies, administered by Conservation Authorities. Portions of the subject lands are located within GRCA Regulation limits. GRCA administers O. Reg. 150/06: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses under Section 28 of the *Conservation Authorities Act, 1990*. Through this regulation, GRCA has the ability to:

- Prohibit or regulate development in all areas within the jurisdiction of the Authority that are delineated as the "Regulation Limit" including:
    - Adjacent to, or close to the shoreline of the Great Lakes – St. Lawrence River System or to inland lakes that may be affected by flooding, erosion or dynamic beaches;
    - In river or stream valleys, wetlands, shorelines and hazardous lands; or
    - In other areas where development could interfere with the hydrologic function of a wetland, including area within 120 m of all provincially significant wetlands and wetlands greater than 2 ha in size, and areas within 30 m of wetlands.
- Require permission to develop in the aforementioned areas if, in the opinion of the authority, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land will not be affected by the development.

GRCA will assess any permit application in order to determine if the proposed works will affect regulated features, in accordance with their programs and policies. Any site alteration in the regulated area requires a permit from GRCA. Regulated areas on the subject lands include approximately 0.3 ha along Eco Parkway in the southwest portion of the parcel and 2.4 ha in the northwest portion, beginning in the wetland and extending into the meadow up to the large fencerow. These areas are regulated due to the presence of wetlands and floodplains that surround the subject lands.

2.6 Municipal Official Plans

2.6.1 Township of Southgate Official Plan

The Township of Southgate approved a new Official Plan (OP) on October 27, 2022, that conforms with Section 27.1 of the Planning Act, which requires this lower-tier OP to adhere to the upper-tier OP of Grey County. This OP determines land use designations and locations of natural heritage features. According to Schedule A (Land Use) – Map 2 (Dundalk Land Use), the subject lands are designated as Industrial, with a thin portion of the north-east property boundary designated as Hazard Land. Schedule C (Natural Heritage Features) shows the streams that run east and west on the adjacent

lands, as well as the wetland in the northwestern portion of the subject lands. Schedule D (Natural Heritage Core and Linkages) do not show any core natural heritage areas or linkages on, or adjacent to the subject lands.

3.0 Background Records Review and Agency Consultation

A comprehensive desktop assessment was completed to review existing natural heritage information available for the subject lands. All areas within 120 m of the subject lands were reviewed as part of the high-level assessment to identify significant natural heritage features located within, or directly adjacent, that may be impacted by future development.

Information reviewed included, but was not limited to, the following sources:

- Aerial photographic imaging and 1:10,000 Ontario Base Mapping (OBM).
- Ontario Hydrology Network (OHN) mapping.
- Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre (NHIC) database for significant species and designated natural features.
- Ontario Breeding Bird Atlas (OBBA) database for avian species records within the general area.
- Ontario Reptile and Amphibian Atlas (ORAA) database for herpetofauna species records within the general area.
- MNRF Land Information Ontario (LIO) database.
- MNRF Natural Heritage Areas Mapping (2020).
- GRCA-regulated features and mapping.
- Recolour Grey – County of Grey Official Plan (June 6, 2019).
- Township of Southgate Official Plan (October 27, 2022).
- Environmental Impact Study Guidelines and Submission Standards for Wetlands (GRCA 2005).
- Wetlands Policy (GRCA 2003).
- Provincial Policy Statement (PPS) (2020).
- *Provincial Endangered Species Act* (2007).
- *Federal Migratory Birds Convention Act, 1994* (MBCA) and the *Migratory Bird Regulations* (MBR).

The subject lands are in the jurisdiction of GRCA and Ministry of Natural Resources and Forestry (MNRF) Midhurst District Office. Species protected under the ESA are administered by the MECP Owen Sound District, Species at Risk Branch.

Online GRCA Regulation mapping shows portions of the subject lands are regulated. These areas are associated with unevaluated wetlands and hazardous lands (floodplains).

Terms of Reference (TOR) was submitted to GRCA on July 13 2, 2023. Chris Lorenz, Resource Planner at GRCA, reviewed the TOR and provided preliminary comments and background information on August 1, 2023. Background information received from GRCA indicated that an unclassified upper tributary of the Grand River flows within 20 m of the northeast boundary of the property. A cool water fish community has been documented in this watercourse. Information regarding the high-water table and possible SAR within the vicinity of the site was also included. See Appendix A for a copy of the correspondence.

3.1 Species at Risk and Species of Conservation Concern

Based on the background review and an information request from GRCA, the following candidate SAR and Species of Conservation Concern (SCC) were identified as potentially being present on,or adjacent to the subject lands (Table 1) prior to field investigations. For the purposes of this report, SAR are species listed as Endangered, Threatened or Special Concern by SARA (2002) or the ESA (2007). SCC are species determined to be Endangered, Threatened and Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), or ranked by the NHIC as provincially rare (S1-S3).

Table 1: Candidate SAR and SCC on the Subject Lands or Adjacent Lands Based on Background Review

Common Name	Scientific Name	Provincial S-Rank[1]	Provincial SARO Status[2]	Federal COSEWIC Status[3]	Federal SARA Status[4]	Federal SARA Schedule[4]
Bobolink	*Dolichonyx oryzivorus*	S4B	THR	THR	THR	1
Chimney Swift	*Chaetura pelagica*	S3B	THR	THR	THR	1
Eastern Meadowlark	*Sturnella magna*	S4B, S3N	THR	THR	THR	1
Eastern Wood-Pewee	*Contopus virens*	S4B	SC	SC	SC	1
Monarch	*Danaus plexippus*	S2N, S4B	SC	END	SC	1
Little Brown Myotis	*Myotis lucifugus*	S3	END	END	END	1
Northern Myotis	*Myotis septentrionalis*	S3	END	END	END	1
Tri-colored Bat	*Perimyotis subflavus*	S3	END	END	END	1
Butternut	*Juglans cinerea*	S2	END	END	END	1
Midland Painted Turtle	*Chrysemys picta marginata*	S4	No status	SC	SC	1
Snapping Turtle	*Chelydra serpentina*	S4	SC	SC	SC	1
Western Chorus Frog	*Pseudacris maculata pop. 1*	S4	No status	THR (Great Lakes – St. Lawrence Population)	THR (Great Lakes – St. Lawrence Population)	1

[1]S-Rank: S1 to S3 are provincially tracked (S1-critically imperiled; S2-imperiled; S3-vulnerable)
[2]SARO: Official Species at Risk in Ontario list under the ESA, 2007
[3]COSEWIC: Committee on the Status of Endangered Wildlife in Canada
[4]SARA and Schedule: Species at Risk Act; The Act establishes Schedule 1 as the official list of wildlife SAR

Field investigations were completed in accordance with the approved TOR, which included documentation of any confirmed or candidate SAR and / or SAR habitat and are described in the detailed SAR Screening Table in Appendix B. Field methodologies and findings are detailed below. Provincially significant features, including SWH and SAR, are discussed further in Section 6.0.

3.2 Terrestrial Habitat

3.2.1 Wildlife

The following is a summary of potential wildlife habitat identified on the subject lands based on a review of background aerial imagery, databases, reports and data collected during the background review:

- Breeding bird habitat.
- SAR Bat maternity roosting habitat.
- SAR and Species of Conservation Concern (SCC).

SAR and SWH confirmed during Burnside's field investigations are summarized further in Section 6.0. SAR and SWH screening tables are provided in Appendix B.

3.2.2 Vegetation Communities and Species

Based on a review of GRCA, NHIC and MNRF mapping [2023].

The following is a summary of potential vegetation communities identified on the subject lands, based on a review of background aerial imagery, databases, reports and data collected during the background review:

- Wetland communities.
- Cultural habitats.
- Mixed forest.
- Locally rare flora.
- SAR and Species of Conservation Concern (SCC).

Vegetation communities were site confirmed during field investigations and are discussed in Section 5.4.1.

4.0 Field Methodology

4.1 Vegetation Communities and Species

As outlined in the approved TOR for the EIS, detailed surveys to characterize vegetation communities and species were conducted by Burnside for the entirety of the subject lands and the immediate adjacent lands, where possible. All species are described

according to nomenclature and S-ranks provided by the NHIC, current to September 19, 2023. Where nomenclature differs between databases or rarity lists, the Database of Vascular Plants of Canada (VASCAN) (Canadensys, 2023) was used as a reference for synonyms of plant names to current taxonomic standards.

4.1.1 Ecological Land Classification and Botanical Inventory

Surveys for ELC and botanical inventory were undertaken on June 15, 2023. Vegetation communities were assessed and described using the Ecological Land Classification System for Southern Ontario (Lee et al. 1998) and the updated Second Approximation 2008 codes (Lee, 2008). Species nomenclature is described according to the NHIC database (2023). All plant species observed on the subject lands have been analyzed for species rarity based on:

- Species' status as listed on the SARO list (updated September 12, 2023), under the ESA
- Species status, as determined by COSEWIC and listed under the SARA, 2002
- Species S-rank, as provided by the NHIC species lists (updated September 19, 2023)
- Rarity for GRCA
- Rarity for Grey County as listed in "A Checklist of Vascular Plants for Bruce and Grey Counties Ontario" (Owen Sound Field Naturalists, 2010).

A feature staking with GRCA occurred on August 3, 2023. The limits of the wetland at the north-west boundary of the subject lands were delineated in the field and surveyed.

4.2 Avifauna

4.2.1 Breeding Bird Surveys

Eastern Meadowlark and Bobolink are listed as Threatened under the ESA. These species were identified as having potential to be on the subject lands based on a background database review and the presence of grassland / cultural meadow habitat on the subject lands. Both species have similar habitat requirements and were surveyed concurrently.

Standard breeding bird surveys were completed by Burnside staff in combination with targeted surveys for Eastern Meadowlark and Bobolink. Surveys were conducted according to the Ontario Breeding Bird Atlas (OBBA) Instructions for General Atlassing and Appendices (April, 2021) and MNRF's Survey Protocol for Eastern Meadowlark in Ontario (August, 2013), tailored to the needs of this project. The methodology for both types of surveys is summarized below, in Table 2.

- Surveys were conducted between May 21 and July 3, which is the recommended date range for surveying Eastern Meadowlark and Bobolink (MNRF, August 2013).

- Surveys for Eastern Meadowlark and Bobolink were conducted three times and were evenly spaced throughout the survey period. Surveys were completed on June 7, June 22 and June 29
- Surveys were completed at four point count locations per survey period, all of which were used for targeted Eastern Meadowlark and Bobolink surveys.
- Surveys were conducted under the following weather condition requirements: counts were not completed if it was raining, if there was thick fog, or if winds were greater than 19 km per hour (i.e., >3 on the Beaufort Scale). Generally, weather conditions were conducive for auditory and visual surveys, with winds less than 19 km per hour, and no precipitation.
- Targeted Eastern Meadowlark and Bobolink point count locations were chosen based on good visibility of the surrounding fields/open areas. Per the protocol, the surveyor completed 10 minutes of passive observation and recorded all species observed or heard.
- All birds recorded, including level of breeding evidence are summarized in Appendix C.

Field data was collected using a mobile data collection app (Fulcrum) on an iOS device.

Table 2: Summary of Breeding Bird Survey Weather Conditions

Survey Date	Observers	Time of Day (Start/End) (24 hours)	Weather Conditions (Air Temp °C/Beaufort Sky Code[1] /Wind Scale[2])
June 7, 2023	Sylvia Radovic	06:15-09:52	Start: 13°C; End: 16°C Sky: 0 Wind: 2
June 22, 2023	Sylvia Radovic, Elly Hind-Smith	08:38-09:42	Start: 19°C; End: 21°C Sky: 0 Wind: 1
June 29, 2023	Sylvia Radovic	08:48-09:32	Start: 20°C; End: 24°C Sky: 0 Wind: 0

[1]NAAMP/ Beaufort Sky Codes
0 = clear (no cloud cover)
1 = partly cloudy (scattered or broken) or variable
2 = cloudy or overcast
3 = sandstorm, dust storm or blowing snow
4 = fog, smoke, thick dust, or haze
5 = drizzle or light rain
6 = rain
7 = snow or snow/rain mix
8 = showers
9 = thunderstorms

[2]Beaufort Wind Scale
0 = calm, smoke rises vertically (0-2 km/hr)
1 = Light air movement, smoke drifts (3-5)
2 = Slight breeze, wind felt on face; leaves rustle (6-11)
3 = Gentle breeze, leaves & twigs in constant motion (12-19)
4 = Moderate breeze, small branches moving, raises dust & loose paper (20-30)
5 = Fresh breeze, small trees begin to sway (31-39)
6 = Strong breeze, large branches in motion (40-50)

ELC Descriptions
MEFM1-1: Goldenrod Ford Meadow Type
MEGM3-5 Smooth Brome Graminoid Meadow Type
SWDM4-5: Poplar Mineral Deciduous Swamp Type
TAGM5: Fencerow

- Breeding Bird Station
- Exit Survey Station
- Candidate Leaf-off Snags
- Staked Wetland
- Staked Wetland 15m Setback
- Ecological Land Classification
- Eastern Meadowlark Habitat Loss (3.85ha)
- Study Area

Sources:

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Figure Title

DUNDALK ECO PARKWAY - ENVIRONMENTAL IMPACT STUDY
SAR STUDIES

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4.3 Bats

4.3.1 Leaf-off Surveys

The leaf-off survey was completed according to MECP's Treed Habitats – Maternity Roost Surveys protocol and Species at Risk Bats Survey Note (2022).

Leaf-off surveys are best performed during the fall to early spring, before leaves have started growing again, when visibility of cracks or crevices in tree snags is greatest. Leaf-off surveys were conducted on June 5, 2023 to identify potential bat maternity roosting habitat for Little Brown Myotis and Northern Myotis.

The following criteria were considered when identifying a candidate maternity roosting tree during this survey:

- Snag Height
- Presence of habitat characteristics
- Diameter at Breast Height (DBH)
- Within 10 m of another tree and/or snag
- Amount of peeling bark
- Cavity height
- Species
- Percent canopy cover
- Decay class

For each candidate tree, the above information was collected using Fulcrum and marked with a GPS waypoint, collected on an iOS device.

4.3.2 Leaf-on Surveys

The leaf-on survey was completed according to Guelph District Survey Protocol for Species at Risk Bats within Treed Habitats (April 2017).

Leaf-on surveys focus on identifying potential maternity roosting habitat of Tri-colored Bat. These surveys are conducted during late spring and summer, when leaves have reached maximum growth and when dead branches and leaf-clusters are easily located.

A leaf-on survey was conducted on June 19, 2023. According to the protocol, the following candidate trees are to be surveyed to determine suitability for maternity roosting habitat:

- Any Oak trees ≥10 cm DBH
- Any Maple trees ≥10 cm DBH if the tree included dead/dying leaf clusters
- Any Maple trees ≥25 cm DBH

Any such tree identified is assessed based on the following criteria:

- DBH
- Species
- Dead and dying leaf clusters (or snapped branch)

As with leaf-off surveys, for each candidate tree the above information was collected using Fulcrum and marked with a GPS waypoint.

4.3.3 Exit Surveys

Burnside staff completed two acoustic exit surveys on June 29 and July 10, 2023, to determine roosting status of trees identified through leaf-on and leaf-off surveys that are proposed to be removed for the development. Surveys were conducted by Burnside Ecologists using methods adapted from MECP protocol “Use of Buildings by Species at Risk Bats Survey Methodology (July 2018)” and MNRF protocol “Use of Buildings and Isolated Trees by Species at Risk Bats – Survey Methodology (October, 2014)”. Due to the positions of the snags within thin hedgerows and at the edge of the meadow, the trees were easily observed with unobstructed views. As such, they were treated as isolated trees and were surveyed using exit surveys with acoustic monitors.

Three survey stations were positioned within viewing distance of the snags. If bats were observed exiting, the number of bats were recorded. Echo Meter Touch 2 Pro Bat Call Detectors (heterodynes) were used to record calls at all stations. The purpose of the acoustic surveys is to identify the species of bat present, while the purpose of the visual observations is to identify how the bats are using the property (i.e., roosting, foraging for flyby).

Recordings from the Echo Meters were analyzed using the automatic identification feature of Wildlife Acoustics Kaleidoscope Pro v. 5.6.0 software. All calls, including “Noise” and “No ID” files were manually reviewed and verified.

Table 3: Exit Survey Weather Conditions

Station ID	Survey Date	Observers	Time of Day (Start/End) (24 hours)	Weather Conditions (Air Temp °C/Beaufort Sky Code[1] /Wind Scale[2])
1, 2, & 3	June 29, 2023	Sylvia Radovic, Mackenzie Dawson, & Ariana Burgener	21:00 / 22:30	Start: 21°C; End: 21°C Sky: 2 Wind: 2
1, 2, & 3	July 10, 2023	Sylvia Radovic, Mackenzie Dawson, & Ariana Burgener	21:00 / 22:30	Start: 23°C; End: 23°C Sky: 1 Wind: 2

[1]NAAMP/ Beaufort Sky Codes	[2]Beaufort Wind Scale
0 = clear (no cloud cover) 1 = partly cloudy (scattered or broken) or variable 2 = cloudy or overcast 3 = sandstorm, dust storm or blowing snow 4 = fog, smoke, thick dust, or haze 5 = drizzle or light rain 6 = rain 7 = snow or snow/rain mix 8 = showers 9 = thunderstorms	0 = calm, smoke rises vertically (0-2km/hr) 1 = Light air movement, smoke drifts (3-5) 2 = Slight breeze, wind felt on face; leaves rustle (6-11) 3= Gentle breeze, leaves & twigs in constant motion (12-19) 4= Moderate breeze, small branches moving, raises dust & loose paper (20-30); 5= Fresh breeze, small trees begin to sway (31-39) 6= Strong breeze, large branches in motion (40-50)

4.4 Incidental Wildlife Observations

General wildlife surveys were conducted concurrently with all field investigations. All observations and signs of species were recorded (e.g., tracks / trails, scat, burrows, dens, browse, vocalizations). The results are summarized in Section 5.7

5.0 Existing Conditions

5.1 Physiography and Topography

The subject lands are located entirely within the Dundalk Till Plain physiographic region. This region lies mainly between the Horseshoe Moraines and the Stratford Till Plain. The Dundalk Till Plain rises from 425 masl to 530 masl and consists of gently oscillating slopes. The north and west areas of the Till Plain consist of small drumlins, while the lands adjacent to the study area are small to medium glaciofluvial deposits. (Chapman and Putnam, 1984 and 2007).

The subject lands are flat draining to a wetland and a watercourse at the north and east of the subject lands. The highest elevation of 512 masl. occurs in the north part of the subject lands, with the lowest elevation of 510 masl occuring in the wetland and adjacent to the creek.

5.2 Geology

The subject lands are in the Guelph Formation, which consists of sucrosic and fossiliferous dolostone (Armstrong et al. 2007). The surficial geology is classified as 5b Till, which is stone-poor and sandy silt to silt-textured on Paleozoic terrain over the entire subject lands (OGS, 2003).

5.3 Soils and Infiltration Conditions

The subject lands are located on the Catfish Creek Till, which is highly calcareous, moderately stony and consists of a sandy to silt matrix (Armstrong and Dodge, 2007).

5.4 Vegetation Communities and Species

5.4.1 Ecological Land Classification

Ecological Land Classification mapping is shown on Figure 2.

Poplar Mineral Deciduous Swamp (SWDM4-5)

A deciduous swamp occupies the northwest border of the subject lands. Trembling Aspen (*Populus tremuloides*) is the dominant species in the canopy and subcanopy. Red-osier Dogwood (*Cornus sericea*) and Asters (*Symphyotrichum spp*.) are the most abundant species in the shrub and ground layer, respectively.

Goldenrod Forb Meadow (MEFM1-1)

This is the most predominant ecosite on the subject lands. The northern meadow is dominated by Goldenrods (*Solidago spp.*) and one young Scots Pine (*Pinus sylvestris*) is growing in the centre of the area. In the southern portion of the meadow, Asters (*Symphyotrichum spp. et al.*) and Goldenrods (*Solidago spp.)* co-dominate the ground layer with young Red-osier Dogwood *(Cornus Sericea)* in the shrub layer.

Fencerow (TAGM5)

There are two fencerows on the subject lands that divide the meadows into several fields. The northern hedgerow is dominated by Black Cherry (*Prunus serotina*), American Bittersweet (*Celastrus scandens*) and Red-osier Dogwood (*Cornus sericea*). There is also an even mix of Goldenrods (*Solidago spp*.) and Asters (*symphyotrichum spp*.) in the ground layer. The southern fencerow is dominated by Silver Maple (*Acer saccharinum*) in the canopy and Red-osier Dogwood (*Cornus sericea*) in the shrub layer.

Smooth Brome Graminoid Meadow (MEGM3-5)

The smooth brome meadow borders the road at the southeast end of the subject lands. Smooth Meadow Grass (*Poa pratensis*) is the dominant grass species in this ecosite. Poison ivy is present in areas that border the road and ATV trail.

5.4.2 Botanical Inventory

A detailed list of plants identified on the subject lands can be found in Appendix D. The following summarizes the flora observed on the subject lands and on the adjacent lands.

- Sixty (50) plant taxa were observed. Of those, 50 were identified to species, or subspecies level.
- All species observed are S5 (secure) or S4 (apparently secure) in Ontario.
- Of those species, 25 (50%) were native and 25 (50%) were non-native to Ontario.
- Zero (0) species were observed that are considered rare to Grey County.

5.5 Avifauna

5.5.1 Breeding Bird Surveys

A total of 29 resident bird species, exhibiting some level of breeding evidence (possible, probable, or confirmed) were observed on the subject lands during targeted breeding bird surveys in 2023 (see Appendix C).

Five species were observed on the subject lands during the breeding bird window, but no breeding evidence (i.e., suitable breeding habitat or breeding behavior) was recorded: Chimney Swift (*Chaetura pelagica*), Common Grackle (*Quiscalus quiscula*), Great Blue Heron (*Ardea herodias*), Mallard (*Anas platyrhynchos*) and Northern Flicker (*Colaptes auratus*).

According to MNRF's Significant Wildlife Habitat Technical Guide (2000), "area-sensitive" species are defined as species that require large areas of suitable habitat for long term population survival. Fragmentation of essential habitats can result in overall declines in populations. Three "area-sensitive" bird species were observed exhibiting breeding evidence on the subject lands during the breeding bird surveys: Savannah Sparrow (*Passerculus sandwichensis*), American Redstart (*Setophaga ruticilla*), and Eastern Meadowlark (*Sturnella magna*).

Two bird species, listed as both provincially and federally significant, were observed on the subject lands during breeding bird surveys: Chimney Swift and Eastern Meadowlark. SAR and SWH Screening Tables for the subject lands are included in Appendix B. The significance of Eastern Meadowlark is discussed in more detail in Section 6.1.

5.6 Bats

5.6.1 Leaf-off and Leaf-on Surveys

Thirteen (13) leaf-off trees were inventoried within the fencerows on the subject lands. Tree species were predominantly Silver Maple and Black Cherry. However, no bats were seen entering or exiting the candidate trees.

5.6.2 Exit Surveys

Table 4: Exit Survey Observations

Date	Station	Visual Observations	Species Identified with the Echo Meter Touch 2 Pro
June 29, 2023	1	One Eastern Red Bat seen flying overhead in the first half hour.	Eastern Red Bat & Hoary Bat
June 29, 2023	2	One Big Brown Bat seen flying over western end of hedgerow and into the field in the last half hour.	Big Brown Bat, Eastern Red Bat, & Little Brown Myotis
June 29, 2023	3	No bats visually observed.	Eastern Red Bat & Hoary Bat
July 10, 2023	1	No bats visually observed.	Big Brown Bat, Eastern Red Bat, & Hoary Bat
July 10, 2023	2	No bats visually observed on the subject lands. Bats seen foraging on adjacent lands when Little Brown Myotis calls detected.	Big Brown Bat & Little Brown Myotis
July 10, 2023	3	One Big Brown Bat seen flying along hedgerow in the last half hour.	Big Brown Bat & Hoary Bat

Table 5: Recorded Bat Calls

Station Information		Number of Recorded Events[1]							
Date	Station	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-Haired Bat	Eastern Small-footed Myotis	Little Brown Myotis	Northern Myotis	Tri-colored Bat
June 29, 2023	1	0	9	2	0	0	3	0	0
June 29, 2023	2	3	8	1	0	0	6	0	1
June 29, 2023	3	0	7	1	0	0	0	0	0
July 10, 2023	1	4	2	9	0	0	1	0	0
July 10, 2023	2	22	0	0	0	0	5	0	1
July 10, 2023	3	10	0	4	0	0	0	0	0
Total Verified Events		**39**	**26**	**16**	**0**	**0**	**11**	**0**	**0**
% of Verified Events		**42%**	**28%**	**17%**	**0%**	**0%**	**12%**	**0%**	**0%**

[1]Cells shaded green indicated a high probability that the species is present ($p < 0.05$).
Cells shaded orange indicated a moderated probability that the species is present ($p\ 0.05 < 0.1$).
Cells shaded red indicated a high probability of a false positive ($p > 0.1$).

Four species of bats were verified on the subject lands. Most of the bat call events detected were Big Brown Bat (42%), which is not at risk. Eastern Red Bat (28%) and Hoary Bat (17%), which are not protected, were verified at lower rates.

Little Brown Myotis (MYLU) (12%) is the only protected SAR bat that was detected during acoustic monitoring. A total of 23 MYLUC call events were detected at Exit Stations 1 and 2, over both surveys. Exit Station 2 detected the most calls, with 16 (70%) of the call events. Most calls occurred within a few minutes of each other. During the first survey, two MYLU calls were heard between 9:55 and 9:56, and four calls were heard between 10:22 and 10:23. During the second survey, all MYLUC calls occurred in the 10 minutes between 9:44 and 9:54. Due to the proximity of Exit Stations 1 and 2, and calls being detected so close together, it is likely that the same bats were being detected at both stations.

Although Little Brown Myotis were acoustically detected during the survey, they were not visually observed entering or exiting the features on the subject lands. As no bats were visually observed entering the trees, it can be concluded that the calls are from bats

foraging. Clusters of calls within a short period of time are likely from the same bat flying in loops and then leaving the site.

Two Tri-colored Bat calls were initially detected, however analysis with Kaleidoscope Pro v. 4.3.2 software determined there was a high probability of a false positive for both calls. As such, they are not considered present on the subject lands.

It is important to note that the number of calls identified through bioacoustics monitoring does not indicate a specific number of individuals; one individual could pass by one or more detectors several times in a night, resulting in a high number of calls.

5.7 Incidental Wildlife Observations

Incidental wildlife observations recorded by Burnside during field investigations are listed in Table 6, below.

MNRFs provincial ranks (i.e., S1 to S5) are used to set protection priorities for rare species and natural communities. Except for Monarch (*Danaus plexippus*), the remaining species observed are not listed as provincially and/or federally significant and are listed as secure, or apparently secure in Southern Ontario (in other words, they are ranked as S4 or S5, which is defined by MNRF as species that are common, widespread, and abundant in the province or uncommon but not rare).

Table 6: Incidental Wildlife Observations on the Subject Lands

Common Name	Scientific Name	Number Observed	S-Rank	Location/Comments
Ant	*Formicidae spp.*	N/A	N/A	SWDM4-5 Ant hills
Beaver	*Castor canadensis*	N/A	S5	SWDM4-5 Downed trees
Gray Treefrog	*Dryophytes versicolor*	1	S5	MEFM1-1 (Small Area)
Monarch	*Danaus plexippus*	1	S2N, S4B	MEFM1-1 (Large & Small Area) Milkweed on subject lands
Moth	*Lepidoptera spp.*	1	N/A	MEFM1-1 (Large Area)
Pileated Woodpecker	*Dryocopus pileatus*	N/A	S5	SWDM4-5 Cavities in downed tree

6.0 Identification of Provincially Significant Features

Significant Feature	Definition	Applicable to Subject Lands	Applicable to Adjacent Lands
Provincially Significant Wetlands	Section 6.0 of the PPS (MMAH, 2020) defines significant wetlands as "*an area identified as provincially significant by the Ministry of Natural Resources using evaluation procedures established by the province, as amended from time to time.*"	No PSW on the subject lands.	PSW as mapped by NHIC is located approximately 300 m east of the subject lands.
Significant Valleylands	The NHRM (MNR, 2010) provides criteria for identifying Significant Valleylands, including a variety of landform related functions and attributes as well as ecological features and functions. According to the NHRM a Significant Valleyland is defined as: *"a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year. Large, well-defined valleylands are often significant*	No Significant Valleylands on the subject lands.	No Significant Valleylands on adjacent lands.

Significant Feature	Definition	Applicable to Subject Lands	Applicable to Adjacent Lands
	landscape features essential to the character of an area". Additionally, the PPS (2020) defines Significant Valleylands as: *"ecologically important in terms of features, functions, representation, or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system".*		
Significant Woodlands	The Township Official Plan (2022) provides criteria for identifying significant woodlands: *"In order to be considered significant, a woodland shall be either greater than or equal to 40 hectares in size outside of settlement areas, or greater than or equal to four hectares in size within settlement area boundaries. If a woodland fails to meet the size criteria outside a settlement area, a woodland*	No Significant Woodlands on the subject lands	No Significant Woodlands on the adjacent lands.

Significant Feature	Definition	Applicable to Subject Lands	Applicable to Adjacent Lands
	can also be significant if it meets any two of the following three criteria: • *Another Significant Woodland exists within 30 metres;* • *The woodland overlaps with the boundaries of a Provincially Significant Wetland, Core Area, Significant Valleylands, or a Significant Areas of Natural and Scientific Interest; or* • *The interior habitat of the woodland is greater than eight hectares in size and has a 100 metre interior buffer on all sides.".*		
Significant Area of Natural and Scientific Interest	According to the PPS (MMAH, 2020), ANSIs are defined as: *"areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study, or education"* According to the NHRM (MNR, 2010), provincially significant ANSIs include	No ANSIs on the subject lands.	No ANSIs on adjacent lands.

Significant Feature	Definition	Applicable to Subject Lands	Applicable to Adjacent Lands
	some of the most significant and best examples of these features in the province, and only include ANSIs identified as provincially significant.		
Significant Wildlife Habitat	Determination of SWH is broadly categorized and described in the NHRM (MNR, 2010). Additionally, MNRF's SWHTG (MNR, 2000) and SWH Criteria Schedule for Ecoregion 6E (MNRF, 2015) are further supplemental documents intended to assist in identifying SWH. The four main categories of SWH are identified as: 1. Habitats of seasonal concentrations of animals. 2. Rare vegetation communities, or specialized habitat for wildlife. 3. Habitat of species of conservation concern. 4. Animal movement corridors. (Appendix B)	Confirmed • Special Concern and Rare Wildlife Species – Monarch (SC)	Candidate: • Waterfowl Stopover & Staging Areas (Terrestrial and Aquatic) • Shorebird Migratory Stopover Area • Raptor Wintering Area • Bat Maternity Colonies • Turtle Wintering Areas • Reptile Hibernaculum • Colony Nesting Bird Breeding Habitat (Tree/Shrubs) • Waterfowl Nesting Area • Woodland Raptor Nesting • Seeps and Springs • Amphibian Breeding Habitat (Woodland) • Woodland Area-Sensitive Bird Breeding Habitat

Significant Feature	Definition	Applicable to Subject Lands	Applicable to Adjacent Lands
			• Marsh Bird Breeding Habitat • Special Concern and Rare Wildlife Species • Amphibian Movement Corridor
Habitat of Endangered or Threatened Species	Burnside's background database review, consultation with agencies, and field investigations in 2023 revealed the potential for species listed as Endangered or Threatened under the ESA on the subject lands and adjacent lands (Appendix B).	Confirmed: • Eastern Meadowlark	Candidate: • Bobolink • Chimney Swift • Eastern Meadowlark

6.1 Habitat of Endangered or Threatened Species

6.1.1 Eastern Meadowlark

Four Eastern Meadowlark were recorded exhibiting territorial behavior on the subject lands during targeted breeding bird surveys. Breeding evidence was coded as "Probable" (permanent territory presumed through registration of territorial behaviour (song, etc.) on at least two days, a week or more apart, at the same place). According to the Bobolink and Eastern Meadowlark in Ontario Recovery Strategy (McCracken et al., 2013), it is recommended that the level of evidence needed to establish breeding occupancy be "probable" or "confirmed" breeding. Eastern Meadowlark were observed in two ecosites on the subject lands: MEFM1-1 (Goldenrod Forb Meadow) and MEGM3-5 (Smooth Brome Graminoid Meadow). Foraging and breeding habitat is present within these ecosites (combined area total is 4.05 ha).

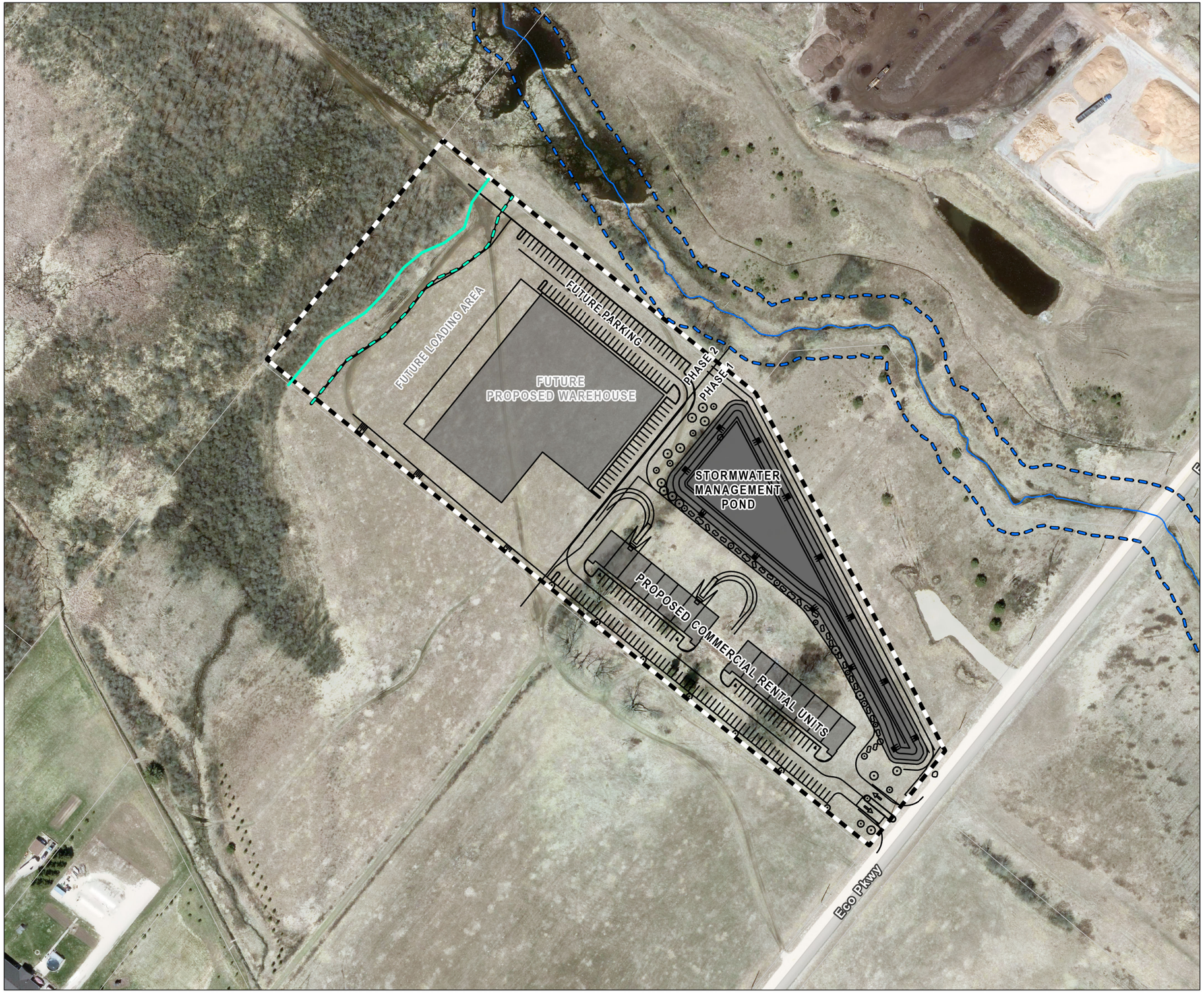
The subject lands were included in the Dundalk settlement area boundary in the Southgate Official Plan, in 2009. Therefore, the proposed development is eligible to remove Eastern Meadowlark habitat under exemptions outlined in O. Reg. 242/08, Section 23.2 of the ESA. Under these exemptions, within 12 months of the commencement of the activity, the proponent must create new habitat for Eastern Meadowlark, or if habitat for Eastern Meadowlark already exists in the outside area, enhance the existing habitat, by ensuring that the area meets the requirements of the Regulations. Because the development of land was designated as an area of settlement in an official plan of a municipality approved under the Planning Act before January 1, 2013, an area equal to the size of the habitat Eastern Meadowlark that the development activity is likely to damage or destroy will be created / enhanced.

A portion (0.20 ha) of MEFM1-1 will remain on the landscape because it is within the 15 m setback to the wetland feature north of the subject lands (see Section 7.0 below and Figure 2). Therefore, the area that will be removed by the development that must be created or enhanced is 3.85 ha. Before beginning any part of the development activity, a Development Plan must be prepared and submitted to the Ministry. Within 12 months of the commencement of the development activity:

- New habitat for Eastern Meadowlark must be created, or if habitat for Eastern Meadowlark already exists in the outside area, enhance the existing habitat by ensuring that the area meets the requirements of the Regulations.
- In each of the five years following the creation of the new habitat or the enhancement of the existing habitat, maintain the habitat as outlined in the Regulations.
- Habitat must be located in the same ecoregion as the area in which the development activity is to be carried out.
- Within 12 months of the commencement of the development activity:

- 50% to 80% of the habitat must be covered with at least three different grass species and the remainder of the habitat must be covered with forbs, or legumes.
- Among the grass species referred to above, at least one must grow greater than 50 cm high, under normal growing conditions.

All requirements under the ESA are being completed under separate cover.



Proposed Development

Staked Wetland (GRCA)

Staked Wetland 15m Setback

Watercourse (GRCA)

Watercourse 15m Setback

Study Area

Sources:

1. Ministry of Natural Resources and Forestry,© King's Printer for Ontario.
2. Natural Resources Canada,© His Majesty the King in Right of Canada.

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Figure Title

DUNDALK ECO PARKWAY - ENVIRONMENTAL IMPACT STUDY

PROPOSED DEVELOPMENT

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7.0 Delineation of Environmental Constraints

Based on the background review, field investigations and agency consultation, there are environmental constraints that must be taken into consideration for the proposed development. Figure 2 shows the environmental constraints and opportunities used to determine buffers and a suitable limit of development. These include:

- Wetland limit.

Per GRCA discussion, the following buffers have been applied to natural heritage features:

- 15 m from the limit of the staked unevaluated wetlands.

8.0 Proposed Development

The proposed development plan is detailed in Cobide Engineering's FSR (August 2023), and development plan drawings (November 2023) (Appendix E). The following sections provide a summary.

The development on the subject lands is proposed outside of the designated environmental features and buffers. These constraints are shown on Figure 2 and overlain on the proposed draft plan on Figure 3.

8.1 Water Balance

The draft water balance, completed by Burnside Hydrogeology (Appendix F), finds that in comparing the existing to proposed conditions on site that runoff will increase by 8.8% and infiltration will decrease by 74%, without mitigation measures. To mitigate some of these effects a Stormwater Management Plan has been created by Cobide Engineering in the Functional Servicing Report (FSR) (August 2023) (Appendix G).

8.2 Stormwater Management Plan

The subject property is currently vacant. The site is generally sloping from south to north, and west to east. There are no existing storm sewers on the property. The site mainly discharges into an existing ditch on the west side of Eco Parkway. The proposed development will be graded such that runoff is conveyed via storm sewer system and sheet flow to a new wet stormwater management pond in the northeast corner of the property. The outlet for the stormwater management pond will consist of a headwall, and a 300 mm dia. storm sewer c/w an orifice, that will then discharge into the existing ditch on the west side of Eco Parkway.

9.0 Preliminary Impact Assessment, Avoidance and Mitigation Measures

The following preliminary evaluation of environmental impacts and recommended mitigation measures is based on an assessment of the potential effects that could occur to natural heritage features and functions over the short and long term, following the implementation of the proposed Concept Plan. This section also identifies planning, design and construction practices that will pinpoint avoidance, mitigation and / or restoration opportunities as well as net effects and monitoring measures, if applicable. Net effects are defined as negative environmental effects of a project and related activities that will remain after mitigation and impact management measures have been applied.

This impact assessment is provided based on field investigations, the proposed Concept Plan and will need to be updated via an addendum upon completion of the Hydrogeological studies and report (Burnside, 2024). Development constraints are depicted on Figure 2.

10.0 Evaluation of Potential Impacts and Recommended Mitigation Measures

Potential impacts to species, natural heritage features and their functions, and the associated mitigation measures are detailed in Table 7.

Table 7: Impact Assessment and Recommended Mitigation Measures

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
Vegetation Communities	Direct effects of construction activities will include clearing and loss / injury of natural / naturalized herbaceous and woody vegetation, within the subject lands. Specifically, the following vegetation communities will be removed: MEFM1-1 (Goldenrod Fob Meadow Type): 3.85 ha TAGM5 (Fencerow) Potential indirect effects to the retained NHS may include:	**General Mitigation** Vegetation loss has been limited to areas of culturally derived vegetation and is a minimum of 15 m from the wetland and watercourse, respectively. Native species of plants, including those which support pollinator foraging, should be included when establishing planting plans for SWM planting and erosion and sediment control planting. **Compensation for Vegetation Loss**	There will be a permanent loss of 3.85 ha of meadow vegetation, and two deciduous fencerows on the subject lands. There will be a creation/enhancement of 3.85 ha of meadow habitat to compensate for lost Eastern Meadowlark habitat offsite. This habitat will be designed according to regulations under the ESA, in consultation with the MECP. There will be an overall net loss in trees, and an equalization of	Fencing shall be inspected regularly to ensure damage is repaired in a timely manner, and that sediment transport to offsite features and watercourses is minimized. A vegetation monitoring program will be developed to monitor the success of the Eastern Meadowlark compensation planting. Details of this monitoring program will be included in the development plan submitted to MECP.

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
	• Erosion and sedimentation during construction. • Increased risk of invasive species colonizing due to disturbance and increased human presence, including informal yard waste disposal. • Human disturbance due to increased presence in development lands adjacent to NHS. • Increased lighting from adjacent commercial development.	The loss of the MEFM1-1 community necessitates compensation as Eastern Meadowlark habitat under the ESA. It is anticipated that this restoration area will be located nearby. The development plan for Eastern Meadowlark compensation habitat will be designed in coordination with MECP according to regulations under the ESA. **Construction Mitigation** The limits of the construction area should be delineated with silt fencing. Double-layer,	Meadow communities post-construction.	

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
		heavy-duty silt fencing should be placed at the limit of construction at NHS feature boundaries (i.e., wetland buffer, and construction boundary adjacent to the watercourse buffer). Single-layer silt fencing can be used the remainder of the site. The NHS shall be identified using signage on fencing. Construction activity should be contained to the development area of the site. No stockpiling or refueling should occur within 30 m of the NHS to prevent the transport of deleterious substances, or sediment.		

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
Watercourses and Wetlands	There is one staked wetland (SWDM4-5) community that will retained and buffered by 15 m. There is an offsite watercourse to the northeast that will be buffered by 15 m. Indirect impacts to SWDM4-5 and the watercourse may occur because of the construction activities, and the proposed development. These may include: • Reduction of contribution of surface and ground water to the feature due to reduced infiltration and the	**General Mitigation** The inclusion of the following LIDs should be incorporated to promote localized surface water infiltration, to maintain the existing water balance: • Directing rear roof leaders from single detached homes to splash pads in rear yard areas. • Rear lot infiltration trenches in select residential areas that are designed to accommodate the 10mm storm event. **Construction Mitigation**	No direct impacts to watercourses or wetlands are anticipated. Indirect effects of reduction of water contribution due to this site are anticipated to be negligible, given the large size of the contiguous wetland and its catchment area and the relatively size of the development lands.	Fencing shall be inspected regularly to ensure damage is repaired in a timely manner, and that sediment transport to offsite features and watercourses is minimized.

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
	direction of SWM outflows towards EcoParkway. • Erosion and sedimentation during construction could impact water quality and vegetation within the wetland and watercourse. • Increased risk invasive species colonizing in the wetland from disturbed soils on development lands. • Noise and human disturbance. • Increased lighting from adjacent commercial development.	The limits of the construction area should be delineated with silt fencing. Double-layer heavy-duty silt fencing should be placed along the limit of construction at NHS feature boundaries (i.e., watercourse and wetland buffers). A Construction Emergency Response and Communications Plan shall be developed and followed throughout the construction phase (including spill response plans). The Contractor shall develop spill prevention and contingency plans		

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
		during the construction phase. Spills should be immediately contained and cleaned up, in accordance with provincial regulatory requirements and the contingency plan. A hydrocarbon spill response kit should be on-site at all times during the work. Spills should be reported to the Ontario Spills Action Center at 1-800-268-6060. All requirements under the Ontario Water Resources Act, R.S.O. 1990, c. O.40 with respect to the quality of water discharging into natural receivers will be		

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
		met, including the following mitigation measures and best practices: • Any discharge from dewatering should outlet to a vegetated area at least 30 m from a significant natural feature, or watercourse, utilizing a sediment filter bag. • In the event of sediment discharge, all operations will stop immediately until the problem can be resolved. • If significant changes in water levels / seepage areas are noted, operations will		

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
		cease until water levels recover. No equipment refueling should occur within 30 m of the natural heritage features, and all stationary equipment should be outfitted with drip pans (i.e., secondary containment) to prevent / contain oil spills. Any stockpiled material shall be stored and stabilized a minimum of 30 m away from wetlands and watercourses. An Erosion and Sediment Control (ESC) Plan will be developed during detailed design, in		

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
		consultation with GRCA, and will conform to industry best management practices and recognized standard specifications, such as Ontario Provincial Standards Specification (OPSS). Erosion and sediment control measures will be used during construction to avoid / minimize the potential for off-site sedimentation into the adjacent NHS features. ESC measures shall be inspected weekly to confirm they are functioning and maintained, as required.		

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
		All disturbed areas of the worksite should be stabilized immediately, and re-vegetated as soon as conditions allow with a site-appropriate seed mix of native grasses and wildflowers, that includes Milkweed (*Asclepias* spp.).		
Wildlife and General Wildlife Habitat	Temporary displacement of, and disturbance to, wildlife and wildlife habitat during the construction phase (i.e., vegetation removals, noise, light trespass). Development may limit wildlife movement and reduce useable habitat. The development will permanently remove	**Construction Mitigation** If an animal or nesting bird is encountered during construction and does not move from the construction zone, the Contract Administrator shall be notified. If the construction activities are such that continuing work in the area would result in	The majority of higher quality wildlife habitat will be retained within the wetland in the protected NHS to the northwest, provided that wildlife is allowed to relocate during the construction phase, and move as needed, no net effect is anticipated to wildlife habitat.	A Biologist may be required on an as-needed basis during construction works if wildlife is trapped within the construction zone and requires removal and relocation to land outside of the construction zone. They may also be required on-site as needed should a

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
	upland meadow lands that some provincially common wildlife species are known to use for foraging and movement (e.g., Coyote, Red Fox, Raccoon, White-tailed Deer, small rodents). Avifauna, SWH and SAR habitat are discussed separately, below.	harm to wildlife, construction activities in that location shall temporarily stop and the Project Ecologist, MNRF or MECP shall be contacted for direction. All works shall stop immediately in the area and MECP contacted should a SAR be encountered within construction, or operational areas, to ensure compliance with the ESA. Avoid vegetation clearing or disturbance during sensitive times of the year for local wildlife (i.e., when many animals bear their young or migrate between wintering and		species that is protected under the *ESA* be identified within, or adjacent to the construction site. The Biologist may be required to confirm the presence and identification of a species prior to contacting MECP for further advice.

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
		summer habitats). The specific timing of the work should be determined, in consultation with the appropriate Agency. Generally, the following avoidance windows apply if working within any of these habitats: • Breeding birds and / or birds protected under the MBCA, 1994 (trees/shrubs/vegetation): April 1 to August 31. • Bats (trees/structures): April 1 to October 31.		
Avifauna and Area-Sensitive Species	Potential for disturbance or destruction of migratory breeding birds and their	**General Mitigation** To reduce the risk of contravening the	Direct removal of 3.85 ha of confirmed	An Avian Biologist may be required on-site as needed should a nesting migratory bird

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
	habitat (prohibitions under the *Migratory Birds Convention Act*, *1994*) during construction, including area-sensitive species. SWH and SAR habitat are discussed separately, below.	*Migratory Birds Convention Act, 1994*, timing constraints shall be applied to avoid any limited vegetation clearing (including grubbing) and/or structure works (construction, maintenance) during the breeding bird period – broadly from April 1 to August 31 for most species (regardless of the calendar year). Active nests (i.e., nests with eggs or young birds) of protected migratory birds, including SAR protected under the *Endangered Species Act (ESA), 2007*, cannot be destroyed at	Eastern Meadowlark breeding habitat. Habitat for other breeding birds, will be retained within the natural features within the swamp.	(or SAR protected under *ESA*) be identified within, or adjacent to, the construction site. The Avian Biologist may be required to confirm the presence and identification of an active nest and / or breeding bird before contacting MECP for further advice.

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
		any time of the year. The destruction of inactive nests for some species may also be prohibited. **Construction Mitigation** If a nesting migratory bird (or SAR protected under *ESA*) is identified within or adjacent to the construction site (or during operations and maintenance activities), and the activities are such that continuing works in that area would result in a contravention of the *Migratory Birds Convention Act, 1994* or *ESA*, all activities will stop and the Contract Administrator (with assistance from an		

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
		Avian Biologist) shall discuss mitigation measures with the Town. Should SAR be identified, all activities will stop and MECP will be contacted immediately to ensure compliance with the ESA. The Contract Administrator shall instruct the Contractor on how to proceed based on the mitigation measures established through discussions with the Town, MECP and / or Environment Canada.		
Significant Wildlife Habitat on the development lands	Direct impacts to the following categories of SWH within the development limits:	**General Mitigation** For Confirmed habitats within the development limits:	No net effects are anticipated. The proposed mitigation measures will adequately compensate for any	See Wildlife and General Wildlife Habitat.

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
	Confirmed habitat for Special Concern and Rare Wildlife Species: Monarch. Suitable habitats are present for all life-cycle processes of this species. Milkweed (*Asclepias* spp.), the host plant for the larval stage, is present in the meadow habitats to be removed.	Monarch: • Milkweed species should be included in all seed mixes used to revegetate areas, and for meadow compensation areas related to Eastern Meadowlark Habitat, to provide the host plant for larval Monarch. • A variety of spring, summer and fall flowering native species should be included in the seed mix to provide nectar for adult butterflies and other pollinators.	loss, or disturbance to Monarch habitat.	

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
Significant Wildlife Habitat Within the Retained Natural Features and the NHS	No direct impacts to SWH within the retained natural features and/or NHS are anticipated. Indirect impacts to the following categories of Candidate SWH within the retained natural features and / or NHS: • Waterfowl Stopover & Staging Areas (Terrestrial and Aquatic) • Shorebird Migratory Stopover Area • Raptor Wintering Area • Bat Maternity Colonies • Turtle Wintering Areas • Reptile Hibernaculum	**General Mitigation** See also Wildlife and General Wildlife Habitat. Currently, no intrusions into the retained natural features and / or NHS are proposed. The setbacks to features should be maintained. Opportunities for native deciduous tree and shrub plantings within any setbacks, or in the NHS, may be considered to increase tree cover on the subject lands to benefit bats, raptors, and woodland / shrub breeding birds.	No net effects are anticipated. No direct removal of SWH habitat in the retained natural features and/or NHS.	See Wildlife and General Wildlife Habitat.

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
	• Colony Nesting Bird Breeding Habitat (Tree / Shrubs) • Waterfowl Nesting Area • Woodland Raptor Nesting • Seeps and Springs • Amphibian Breeding Habitat (Woodland) • Woodland Area-Sensitive Bird Breeding Habitat • Marsh Bird Breeding Habitat • Special Concern and Rare Wildlife Species • Amphibian Movement Corridor	**Construction Mitigation** Prior to construction works commencing, installation of construction hoarding is recommended along the perimeter of natural features to prevent pedestrian access around the limit of construction. This includes all areas required for excavation and spoil stockpile, vehicle and worker access and material laydown in order to prevent any wildlife from attempting to access the construction zone during construction works - specifically, fencing shall be		

Environmental Component	Potential Environmental Effects	Avoidance, Mitigation and / or Restoration Measures	Net Effects	Recommended Monitoring Activities
		installed at the beginning of April or earlier.		
Habitat of Endangered and Threatened Species	3.85 ha of confirmed breeding habitat for Eastern Meadowlark will be removed as a part of the development. SAR Bats were detected using the adjacent NHS areas and foraging over the subject lands. No direct impacts are anticipated.	**Eastern Meadowlark** 3.85 ha of compensation habitat will be provided offsite as per Regulations under the ESA. **SAR Bats** No impacts to SAR Bats are anticipated so long as timing windows for tree removal to avoid harm to SAR bats are adhered to (tree removal November 1 to March 31).	No net effects anticipated. Direct removal of SAR habitat for Eastern Meadowlark will be compensated by the creation / enhancement of 3.85 ha of Eastern Meadowlark habitat offsite, as per ESA Regulations. Potential SAR Bat habitat offsite will be retained and protected by the 15 m wetland buffer.	Monitoring as required by the regulations to the ESA for the Eastern Meadowark compensation area will be required.

11.0 Summary

The subject lands are proposed to be developed for industrial purposes. The proposed development will consist of a large industrial building, two rental unit buildings, adjacent parking areas and an interior roadway. The existing conditions of the subject lands include an old field meadow, fencerows, and the edge of a wetland. Limited natural features from this wetland exist within the development limits and have been disturbed by anthropogenic activities and agricultural practices. A watercourse exists adjacent to the subject lands, to the north. No part of the watercourse, or its 15 m buffer, are within the subject lands. The old field meadows on site currently provide breeding habitat for Eastern Meadowlark. Because the subject lands were designated as an area of settlement in an official plan of a municipality approved under the Planning Act before January 1, 2013, the proposed development is eligible to remove Eastern Meadowlark habitat under exemptions outlined in O. Reg. 242/08, Section 23.2 of the ESA. Under these exemptions, within 12 months of the commencement of the activity, the proponent must create or enhance an equal area of for Eastern Meadowlark elsewhere.

The following summary highlights the natural heritage features present on the subject lands:

- Eastern Meadowlark Habitat
- Significant Wildlife Habitat – Species of Special Concern: Monarch
- Wetland

The evaluation of potential environmental impacts and recommended mitigation measures has been completed in consideration of the proposed development activities (see Section 10.0). Overall, the proposed Draft Plan is in general agreement with applicable natural heritage legislation and policies, with additional refinement of the design and supporting mitigation measures anticipated following the completion of the Hydrogeology Report and through consultation with regulatory agencies.

12.0 References

Armstrong, D.K. and Dodge, J.E.P. Paleozoic Geology Map of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 219

Bird Studies Canada (BSC). March 2001. Ontario Breeding Bird Atlas Guide for Participants. 45 pp.

Bird Studies Canada (BSC). 2009. Marsh Monitoring Program Participants Handbook for Surveying Amphibians. Published by Bird Studies Canada in cooperation with Environment Canada and the U.S. Environmental Protection Agency. 13 pp.

Cadman, M.D., et al. 2007. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706 pp.

Chapman, L.J. and Putnam, D.F. 1984. Physiography of Southern Ontario. Map P.2715 (coloured). Scale 1: 600 000.

Cobide Engineering. 2023. Wilson Developments Inc. Functional Servicing Report Eco Parkway Industrial Site Township of Southgate. (August, 2023)

Conservation Authorities Act. 1990. Royal Statutes of Ontario. Chapter C. 27.

COSEWIC. 2013. COSEWIC assessment and status report on the Little Brown Myotis Myotis lucifugus, Northern Myotis Myotis septentrionalis and Tri-colored Bat Perimyotis subflavus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxiv + 93 pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).

Department of Fisheries and Oceans Canada (DFO). 2017. Aquatic Species at Risk Maps. Accessed online at: http://www.dfo-mpo.gc.ca/species-especes/fpp-ppp/onsw-soon-22-eng.htm (July 25, 2023).

Endangered Species Act (ESA). 2007. Statues of Ontario, Chapter 6.

Environment Canada. 2015. Recovery Strategy for Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*) in Canada [Proposed]. Species at Risk Recovery Strategy Series. Environment Canada, Ottawa. ix + 110 pp.

Fisheries Act. 1985. Royal Statutes of Canada, Chapter F-14.

Government of Canada. 2023. Species at Risk Public Registry.

Lee, H.T, W.D. Bakowsky, J.L. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southcentral Region, Science Development and Transfer Branch. Technical Manual ELC-005.

McCracken, J.D., R.A. Reid, R.B. Renfrew, B. Frei, J.V. Jalava, A. Cowie and A.R. Couturier. 2013. Recovery Strategy for the Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. viii + 88 pp.

Migratory Birds Convention Act. 1994. Statutes of Canada, Chapter 22.

Ministry of Municipal Affairs and Housing (MMAH). 2020. Provincial Policy Statement (PPS) under the *Planning Act*.

Ministry of Natural Resources (MNR). 2010. Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Edition. Toronto: Queen's Printer for Ontario. 248 pp.

Ministry of Natural Resources and Forestry (MNRF). 2014. Significant Wildlife Habitat Mitigation Support Tool. Version 2014.

Ministry of Natural Resources and Forestry (MNRF). 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E.

Ministry of Natural Resources and Forestry (MNRF) (Guelph District). April 2017. Survey Protocol for Species at Risk Bats within Treed Habitats, Little Brown Myotis, Northern Myotis, and Tri-colored Bat.

Ministry of Natural Resources and Forestry (MNRF). Natural Heritage Information Centre (NHIC). Data pertaining to natural areas and provincially significant species obtained online at: http://www.giscoeapp.lrc.gov.on.ca/web/MNR/NHLUPS/NaturalHeritage/Viewer/Viewer.html.

Ontario Breeding Bird Atlas Records and Square Summaries (OBBA) (2001-2005). Obtained online at: http://www.birdsontario.org/atlas/squareinfo.jsp

Ontario Geological Survey 2000. Quaternary geology, seamless coverage of the Province of Ontario; Ontario Geological Survey, Data Set 14---Revised.

Ontario Geological Survey. 2003. Surficial Geology of Southern Ontario.

Ontario Geological Survey. 2010. Surficial geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128-REV

Ontario Ministry of Natural Resources (OMNR). 2000. Significant Wildlife Habitat Technical Guide (SWHTG) & Appendices. 151 pp.

Ontario Ministry of Natural Resources (OMNR). August 2013. Survey Protocol for Eastern Meadowlark (Sturnella magna) in Ontario. Species at Risk Branch, Peterborough. ii + 20 pp.

Ontario Reptile and Amphibian Atlas (ORAA). Data obtained online at: http://www.ontarionature.org/protect/species/reptiles_and_amphibians/index.php

Planning Act. 1990. Royal Statutes of Ontario, Chapter P. 13.

Species at Risk Act. 2002. Statutes of Canada, Chapter 29.

Watt, W. Robert and Caceres, M. Carolina. 1999. Managing for snags in the Boreal Forests of Northeastern Ontario. OMNR, Northeast Science & Technology. TN-016. 20pp.

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Appendix A

Approved TOR and Agency Correspondance

R.J. Burnside & Associates Limited 128 Wellington Street West Suite 301 Barrie ON L4N 8J6 CANADA
telephone (705) 797-2047 **fax** (519) 941-8120 **web** www.rjburnside.com

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July 13, 2023

Via: CLorenz@grandriver.ca

Mr. Chris Lorenz
Resource Planner
Grand River Conservation Authority
400 Clyde Road PO Box 729
Cambridge ON N1R 5W6

Dear Mr. Lorenz:

Re: Environmental Impact Study, Terms of Reference
Eco Parkway, Dundalk ON
Project No.: 300056110.0001

R.J. Burnside & Associates Limited (Burnside) has been retained by Wilson Developments to conduct an Environmental Impact Study (EIS) for a proposed industrial and commercial development located on Eco Parkway, Dundalk, Part of Lots 235 and 236 Range 2 west of Toronto and Sydenham Road, Proton, the Town of Southgate (herein referred to as the subject lands), shown on Figure 1. The approximate area of the parcel of land is 5 ha.

This letter provides the EIS's proposed Terms of Reference (TOR). At this time, we are seeking your input and would appreciate any comments on our approach and any additional information you may have that is relevant to our study.

Part I: Background Secondary Source Information

Burnside has reviewed the following existing background sources:

- Aerial photographic imaging and 1:10,000 Ontario Base Mapping (OBM).
- Ontario Hydrology Network (OHN) mapping.
- Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre (NHIC) database for significant species and designated natural features.
- Ontario Breeding Bird Atlas (OBBA) database for avian species records within the general area.
- Ontario Reptile and Amphibian Atlas (ORAA) database for herpetofauna species records within the general area.
- MNRF Land Information Ontario (LIO) database.
- MNRF Natural Heritage Areas Mapping (2020).
- GRCA-regulated features and mapping.
- Recolour Grey – County of Grey Official Plan (October 25, 2018).
- Township of Southgate Official Plan (May 4, 2022).
- Environmental Impact Study Guidelines and Submission Standards for Wetlands (GRCA 2005).
- Wetlands Policy (GRCA 2003).

- Provincial Policy Statement (PPS) (2020).
- *Provincial Endangered Species Act* (2007).
- *Federal Migratory Birds Convention Act*, 1994 (MBCA) and the Migratory Bird Regulations (MBR).

Based on this review, we have identified the following relevant information:

Unevaluated wetlands and woodlands exist at the north limits of the subject lands. The Melancthon Provincially Significant Wetland (PSW) Complex is located approximately 350 m away on the adjacent lands, to the south across Eco Park Way and to the west. Per the Town of Southgate's Official Plan, Schedule A, Map 2 (Land Use), the subject lands have been designated as Industrial, with Hazard Land at the north and east limits of the property. The Hazard Land coincides with the wetland and stream / river, as indicated in Schedule C (Natural Heritage Features). Similarly, the Grey County Official Plan shows the subject lands as Settlement Area and Hazard Lands. None of the other Official Plan schedules indicated any applicable environmental policies (i.e., core areas or linkages, significant natural features, etc.).

Table 1: Applicable Environmental Policies

Plan / Regulation	Land Use Designations
Endangered Species Act, 2007	Potential Species at Risk (SAR) identified in background review from the vicinity of the subject lands: • Barn Swallow (*Hirundo rustica*) • Bobolink (*Dolichonyx oryzivorus*) • Eastern Meadowlark (*Sturnella magna*) • Eastern Wood Pewee (*Contopus virens*) • Monarch (*Danaus plexippus*) • Snapping Turtle (*Chelydra serpentina*) • Little Brown Myotis (*Myotis lucifugus*) • Eastern Small-footed Myotis (*Myotis leibii*) • Northern Myotis (*Myotis septentrionalis*) • Tri-colored Bat (*Perimyotis subflavus*)
Town of Southgate Official Plan (October 2022)	Schedule A, Map 2 – Dundalk Land Use. Schedule C – Natural Heritage Features.
Recolour Grey – Grey County Official Plan (2019)	Schedule A, Map 2 – Land Use Types.
GRCA Regulated Areas (Ontario Regulation 150/06)	No watercourses are present on the subject lands. Wetlands are present at the northern limit of the site.
GRCA Wetlands Policy	An unevaluated wetland is located at the northern limit of the site. High groundwater recharge function, particularly in the north of the site.

Part II: Proposed EIS Methodology

Fieldwork Methodology

Based on the background review, the proposed fieldwork methodology for the EIS is summarized in Table 2, below. The proposed natural heritage surveys are to be completed in 2023.

Table 2: Summary of Existing Information, Fieldwork Completed and To Be Completed by Burnside in 2023 for Dundalk Eco Parkway EIS

Study Component	Existing Data	Fieldwork Requirements	Features / Areas to be Assessed	Survey Timing Window
Ecological Land Classification botanical inventory and identification of rare species	No known site-specific studies were previously completed.	Ecological Land Classification (ELC) in accordance with Lee *et al*. 1998. Botanical inventory and analysis of flora rarity (provincial, regional, and Grey County ranking as applicable).	The entire property and 50 m adjacent lands.	A single field survey between May and August 2023.
Identification and characterization of wildlife habitats and general wildlife observations	No known site-specific studies were previously completed.	Recording features present that may be considered wildlife habitats such as: • Dens • Reptile hibernacula • Structures • Uncapped chimneys • Foundations • Observations will be recorded during all site visits	The entire property and adjacent lands.	A single field survey between May and August 2023.

Study Component	Existing Data	Fieldwork Requirements	Features / Areas to be Assessed	Survey Timing Window
Breeding Bird Surveys	No known site-specific studies were previously completed. NHIC and OBBA indicate the potential for Bobolink and Eastern Meadowlark.	Three surveys were completed following the OBBA Guide for Participants (March 2001) and MNRF Survey Protocol for Eastern Meadowlark (2013).	The entire property and adjacent lands.	Between May 21, 2023 and July 3, 2023. Surveys must be conducted between dawn and 10 a.m.
SAR Bat Habitat Surveys	No known site-specific studies were previously completed.	One leaf-off survey and one leaf-on survey are to be completed following the Guelph District MNRF *Survey Protocol for Species at Risk Bats within Treed Habitats (*April 2017*).*	The entire property and adjacent lands.	Leaf-off survey (between fall and spring) and leaf-on survey (summer).
SAR Bat Acoustic Surveys	No known site-specific studies were previously completed.	Two surveys using handheld acoustic monitors at potential habitat locations.	Trees identified as potential habitat during leaf-off / leaf-on surveys.	June and early July 2023.
Wetland delineation	MNRF/LIO Wetland Mapping is available	A wetland delineation by an Ontario Wetland Evaluation System (OWES) certified evaluator (subsequently to be reviewed in the field by GRCA).	The entire property and adjacent lands.	Delineation between June and October 2023, followed by subsequent GRCA review.

Criteria for Determining the Significance, Sensitivity, and Rarity of Features Found On-Site.

In accordance with the Natural Heritage Reference Manual (NHRM) (MNR, 2010), habitats of endangered and threatened species are identified and evaluated based on provincial criteria.

The identification and evaluation of Provincially Significant Wetlands is undertaken by trained Ontario Wetland Evaluation System evaluators and is confirmed and mapped by the Ministry of Natural Resources and Forestry. An unevaluated wetland is present at the northern limit of the subject lands. The Melancthon PSW complex is present off-site, approximately 350 m to the southwest. Significant Woodlands are undertaken at the local planning level, using landscape-level data and criteria from the NHRM. No Significant woodlands are identified within the subject lands. Significant Wildlife Habitat (SWH) will be evaluated based on the Ecoregional Criteria for Ecoregion 6-E (MNRF, 2015).

Species rarity will be based on:

- Species' status under the *Endangered Species Act*, 2007.
- Species' S-Rank as provided on the NHIC database.
- A rarity for Grey County as listed in "A Checklist of Vascular Plants for Bruce and Grey Counties Ontario" (Owen Sound Field Naturalists, 2010).

The locations of all provincially rare species encountered will be recorded using GPS and included on the Figures (except those classified as Restricted Species). Locally rare species will also be recorded in the ELC unit in which they are found.

Analysis and Recommendations

The EIS will provide an analysis of potential impacts, recommend mitigation measures to minimize impacts and demonstrate conformity with all applicable natural heritage policies.

Specifically, the EIS will include the following:

- Biophysical description of the Site.
- Results of all field investigations including a description of ELC communities, botanical inventory, breeding bird surveys, wildlife surveys and wildlife habitat.
- Results of all SAR assessment surveys including results of Bobolink / Eastern Meadowlark presence / absence surveys and bat habitat and acoustic surveys.
- Mapping of ELC communities, natural heritage features, constraints to development, and the proposed development plan.
- SAR screening (for all potential SAR), based on existing and potential habitat.
- Identification of the significance of natural features at a Provincial and Regional level, with reference to standard information sources from the Province and GRCA.
- Identification of the environmental features potentially impacted by development.
- A general description of the proposed development.
- A demonstration of how and where the development can proceed, without a negative impact on the natural heritage features and their ecological functions.
- Incorporation of the results of the Hydrogeological Study to assess impacts on the quality and quantity of groundwater.
- Incorporation of the water balance study to evaluate potential post-development impacts to wetlands.
- Quantification of impacts on any natural heritage features that may result from the development.

- Identification of mitigation, enhancement, and ecological offsetting measures, where necessary.
- Conclusions demonstrating conformity with all applicable natural heritage policies, including GRCA policies, Township of Southgate, Grey County Official Plans, and the PPS.

Reporting

All findings will be summarized in a report, complete with figures.

Part III: Information Requests

We request the following information to assist in our study:

- Any relevant natural heritage or regulation GIS data not available from GRCA's open data website.
- Any additional records of natural features, flora, or fauna in the area.
- A copy of any locally rare species lists, or comment on which locally rare species list is preferred, in order to assist with the assessment of species significance and rarity.

In addition, we would like to schedule a site visit with you, at your earliest convenience, to confirm the wetland boundary to be staked and surveyed.

If you have any questions or comments regarding these Terms of Reference, please feel free to contact the undersigned.

Yours truly,

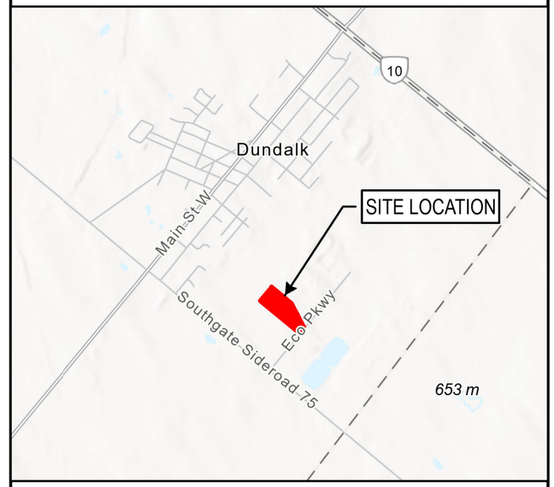
R.J. Burnside & Associates Limited

Lorraine Adderley, M.Sc., CERP
Project Coordinator – Terrestrial Ecologist
LJA:tm

Enclosure(s) Figure 1 – Site Location

cc: Josh Martino, Wilson Developments (enc.) (Via: Email)
Brad Wilson, Wilson Developments (enc.) (Via: Email)

Study Area



Sources:

1. Ministry of Natural Resources and Forestry,© King's Printer for Ontario.
2. Natural Resources Canada,© His Majesty the King in Right of Canada.

Disclaimer:

R.J. Burnside & Associates Limited and the above mentioned sources and agencies are not responsible for the accuracy of the spatial, temporal, or other aspects of the data represented on this map. It is recommended that users confirm the accuracy of the information represented.

This map is the product of a Geographic Information System (GIS). As such, the data represented on this map may be subject to updates and future reproductions may not be identical.

Datum: North American 1983	
Coord. System: NAD 1983 UTM Zone 17N	
Projection: Transverse Mercator	
Central Meridian: 81°0'0.00"W	
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Figure Title

DUNDALK ECO PARKWAY - ENVIRONMENTAL IMPACT STUDY

SITE LOCATION

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From: Chris Lorenz
To: Lorraine Adderley
Cc: Josh Martino; Brad Wilson
Subject: RE: Dundalk EcoParkway EIS TOR
Date: Tuesday, August 01, 2023 10:53:52 AM

Good morning Lorraine,

GRCA has reviewed your TOR and offer the following comments:

1. Distances of the proposed construction from confirmed wetland boundaries along with setbacks should be included on site plan/construction drawings at detailed design. It should be indicated that these wetland boundaries have been confirmed by GRCA staff, with the date noted.
2. Water balance study protocols, hydroperiod resolution (e.g. monthly), and proposed mitigations should be scoped to the sensitivity of the wetland and watercourse features present, as well as to the scale of the development. Discussion of proposed stormwater management as it relates to the water balance of the natural features present should be integrated into the EIS, as appropriate. Potential impacts that site grading, construction and dewatering activities may have on groundwater and surface flow towards the adjacent wetland and watercourse should be assessed.
3. The approved Terms of Reference should be included in the Appendices of the EIS.

GRCA also offer background information, as requested:

- An unclassified upper tributary of the Grand River flows within 20 m of the northeast boundary of the property. A cool water fish community has been documented in this watercourse:
    - Brook Stickleback (*Culaea inconstans*)
    - Central Mudminnow (*Umbra limi*)
    - Creek Chub (*Semotilus atromaculatus*)
    - Fathead Minnow (*Pimephales promelas*)
    - Johnny Darter (*Etheostoma nigrum*)
    - Northern Redbelly Dace (*Chrosomus eos*)
- The site provides moderate to high groundwater recharge function.
- The site has a high water table.
- There are records for the following species of conservation concern in the vicinity of the property:
    - Eastern Meadowlark (*Sturnella magna*)
    - Bobolink (*Dolichonyx oryzivorus*)
- Snapping Turtle (*Chelydra serpentina*)

Thanks Lorraine. Please let me know if you have any questions.

Chris

Chris Lorenz, M.Sc.
Resource Planner
Grand River Conservation Authority
519-621-2763 ext. 2236

From: Lorraine Adderley <Lorraine.Adderley@rjburnside.com>
Sent: Tuesday, July 25, 2023 10:23 AM
To: Chris Lorenz <clorenz@grandriver.ca>
Cc: Josh Martino <josh@wtlandlp.com>; Brad Wilson <brad@wilsoncorp.ca>
Subject: RE: Dundalk EcoParkway EIS TOR

Hi Chris,

I'm following up on my email from July 13. Have you had a chance to review the TOR?

I would like to schedule a wetland limit staking with yourself or other GRCA staff at your earliest availability. Please advise of some dates.

Kind regards,

Lorraine Adderley

Lorraine Adderley, MSc, CERP
Project Coordinator/Terrestrial Ecologist

R.J. Burnside & Associates Limited | www.rjburnside.com
Office: +1 800-265-9662 Direct: +1 705-797-4354

From: Lorraine Adderley
Sent: Thursday, July 13, 2023 3:28 PM
To: clorenz@grandriver.ca
Cc: Josh Martino <josh@wtlandlp.com>; Brad Wilson <brad@wilsoncorp.ca>
Subject: Dundalk EcoParkway EIS TOR

Hi Chris,

Attached, please find a proposed Terms of Reference for an EIS being prepared by R.J. Burnside & Associated Limited on behalf of Wilson Developments for a site on Eco Parkway in Dundalk.

We are seeking your input and approval on the proposed TOR for the EIS. Please note, we have already started some of the surveys to ensure we don't miss any timing windows this year.
The TOR letter also includes a request for background data from GRCA, if available.

I would also like to arrange a wetland limit staking visit with you sometime in the first two weeks of August. The limit has been pre-staked by an OWES-trained evaluator, but requires GRCA verification and a formal survey. Please advise of your availability.

Please review the document and if you have any questions or wish to discuss, do not hesitate to

contact me.

I look forward to your response,

Lorraine Adderley

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix B

SAR and SWH Screening Table

Background Review of Potential Species at Risk and Species of Conservation Concern on the Subject Lands and/or Adjacent Lands

COMMON NAME **(Source)	SCIENTIFIC NAME	Provincial S-RANK[1]	Provincial SARO Status[2]	COSEWIC[3]	Federal SARA Status[3]	Federal SARA Schedule[4]	Habitat Description[5]	Habitat Present on the Subject Lands and/or Adjacent Lands?
Birds								
Barn Swallow (Source: OBBA)	*Hirundo rustica*	S4B	SC	SC	THR	1	Prefers farmland, lake/river shorelines, wooded clearings, urban populated areas, rocky cliffs, and wetlands. Nests inside or on exterior of buildings; under bridges and in road culverts; on rock faces, and in caves, etc.[7]	None observed during breeding bird surveys (foraging or breeding) or any other surveys on the subject lands. Potential breeding habitat on adjacent lands where barn structures are present.
Bobolink (Source: OBBA, NHIC)	*Dolichonyx oryzivorus*	S4B	THR	THR	THR	1	Generally, prefers open grasslands and hay fields for nesting, typically featuring relatively tall vegetation. Sometimes uses large fields of winter wheat and rye in southwestern Ontario. Sensitive to vegetation structure and composition. Positively associated with high grass-to-forb ratios; moderate litter depth; tolerate wetter portions of fields compared to Eastern Meadowlark (EAME) and more likely to nest closer to field centres rather than field margins. Lower tolerance to presence of patches of bare ground. Appear to prefer larger fields than EAME.[8]	None observed during breeding bird surveys (foraging or breeding) or any other surveys on the subject lands. Candidate habitat potential on adjacent lands due to large mixed-agricultural fields.
Chimney Swift (Source: Burnside)	*Chaetura pelagica*	S3B	THR	THR	THR	1	Historically nested in large hollow trees, other tree cavities and cracks in cliffs. Currently, most are found in developed areas in large, uncapped chimneys. Proximity to lakes is also a preferred habitat feature as they will forage for flying insects close to water.[6]	Low habitat potential on subject lands, however, one individual was observed flying overhead during one breeding bird survey. There is some potential for suitable habitat on adjacent lands due to older rural properties that may have chimneys. The observed bird was likely foraging over the subject lands or making a flight to / from a body of water.
Eastern Meadowlark (Source: Burnside, OBBA, NHIC)	*Sturnella magna*	S4B, S3N	THR	THR	THR	1	Generally, prefers grassy pastures, meadows, and hay fields. Prefers moderately tall grass with abundant litter cover, a high proportion of grass cover, moderate forb density, low proportions of shrub and woody vegetation cover, and low percent of bare ground. Prefers to nest in drier sites and frequently nests around field margins.[8]	Probable breeding habitat on subject lands was identified during breeding bird surveys in meadow habitat units. Candidate habitat potential on adjacent lands due to large mixed-agricultural fields.
Eastern Wood-Pewee (Source: OBBA, NHIC)	*Contopus virens*	S4B	SC	SC	SC	1	Prefers open space near the nest in the form of forest edges, clearings, roadways, and water. Does not require large areas of woods but occurs less frequently in woodlots surrounded by development than in those without.[6]	None observed during breeding bird surveys (foraging or breeding) or any other surveys on the subject lands. Low habitat potential on adjacent lands due to highly fragmented woodlots and active development.

COMMON NAME **(Source)	SCIENTIFIC NAME	Provincial S-RANK[1]	Provincial SARO Status[2]	COSEWIC[3]	Federal SARA Status[3]	Federal SARA Schedule[4]	Habitat Description[5]	Habitat Present on the Subject Lands and/or Adjacent Lands?
Upland Sandpiper (Source: OBBA, NHIC)	*Bartramia longicauda*	S2B	No status	No status	No status	N/A	Strong affinity to grassland habitats. Breeds mainly south and east of the Canadian Shield in southern Ontario. Nesting habitat includes unused pastures, old fields with scattered hawthorns, hayfields, and airports. [6]	None observed during breeding bird surveys (foraging or breeding) or any other surveys on the subject lands. Low potential on adjacent lands, as agricultural fields are still in use.
Fish								
Insects								
Monarch (Source: OIA)	*Danaus plexippus*	S2N, S4B	SC	END	SC	1	Throughout their life cycle, Monarchs use three different types of habitats. Only the caterpillars (larvae) feed on milkweed plants and are confined to meadows and open areas where milkweed grows. Adult butterflies can be found in more diverse habitats where they feed on nectar from a variety of wildflowers. Monarchs spend the winter in Oyamel Fir forests found in central Mexico. The largest threat to Ontario Monarchs is habitat loss and fragmentation at overwintering sites in central Mexico where forests are being logged and converted into agricultural fields and pastures. Widespread pesticide and herbicide use throughout the Monarch's range may also limit recovery.[9]	Habitat identified on the subject lands during breeding bird surveys as incidental wildlife. Milkweed is present on the subject lands as well. Candidate habitat on subject lands due to likely presence of milkweed.
Mammals								
Little Brown Myotis (Source: Burnside)	*Myotis lucifugus*	S3	END	END	END	1	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh).[11]	Individuals were detected foraging on the subject lands during bat exit surveys. The habitat potential on the subject lands is low for maternal roosting. Candidate habitat on the adjacent lands associated with the Melancthon Wetland Complex is likely where bats are coming from to forage.
Northern Myotis (Source: Burnside)	*Myotis septentrionalis*	S3	END	END	END	1	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Often associated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns etc.)[11]	None observed during bat exit surveys or other surveys on the subject lands. No habitat potential on adjacent lands.

COMMON NAME **(Source)	SCIENTIFIC NAME	Provincial S-RANK[1]	Provincial SARO Status[2]	COSEWIC[3]	Federal SARA Status[3]	Federal SARA Schedule[4]	Habitat Description[5]	Habitat Present on the Subject Lands and/or Adjacent Lands?
Tri-colored Bat (Source: Burnside)	*Perimyotis subflavus*	S3?	END	END	END	1	Overwintering habitat: Deepest parts of caves and mines where temperature is the least variable. Maternal Roosts: Less is known about roosts of Tri-colored Bats. Most roost sites found within forested habitats. May roost in clumps of dead foliage and lichens. In more anthropogenically modified landscapes, maternity roosts may be barns or similar human-made structures.[11]	None observed during bat exit surveys or other surveys on the subject lands. No habitat potential on adjacent lands.
Plants								
Reptiles and Amphibians								
Midland Painted Turtle (Source: ORAA)	*Chrysemys picta marginata*	S4	No Status	SC	SC	1	Generally, prefers waterbodies such as ponds, marshes, lakes and slow-moving creeks that have a soft bottom and provide abundant basking sites and aquatic vegetation.[10]	None observed during surveys on the subject lands. Candidate habitat potential on adjacent lands due to Melancthon Wetland Complex
Snapping Turtle (Source: ORAA, NHIC)	*Chelydra serpentina*	S4	SC	SC	SC	1	Generally, inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.[9]	None observed during surveys on the subject lands. Candidate habitat potential on adjacent lands due to Melancthon Wetland Complex
Western Chorus Frog (Source: ORAA)	*Pseudacris maculata*	S4	No status	THR (Great Lakes - St Lawrence population in Canada)	THR (Great Lakes - St Lawrence population in Canada)	*1*	The Western Chorus Frog is primarily a lowland terrestrial species. In marshes or wooded wetland areas, it is found on the ground or in low shrubs and grass. Like all other frogs, the Western Chorus Frog requires both terrestrial and aquatic habitats in close proximity. For breeding and tadpole development, it requires seasonally dry temporary ponds devoid of predators, particularly fish. It is very rarely found in permanent ponds. In southern Ontario, its range is bounded by the United States border in the south, Georgian Bay in the northwest, and south of Algonquin Park and up the Ottawa River valley to the vicinity of Eganville in the east.[7, 8, 10]	None observed during surveys on the subject lands. Candidate habitat potential on adjacent lands due to Melancthon Wetland Complex.

** Sources: Natural Heritage Information Centre (NHIC) database of records searched on July 5, 2023 (4 - 1x1 km Squares: 17NJ4990, 17NJ4890, 17NJ4989, 17NJ4889); Ontario Breeding Bird Atlas (2001-2005) searched on July 5, 2023 (3 – 10 x 10 km Squares 17NJ49, 17NJ59, 17NJ58); Ontario Reptile and Amphibian Atlas (ORAA) searched on July 5, 2023 (3 – 10 x 10 km Squares 17NJ49, 17NJ59, 17NJ58); MECP SARO List, updated on May 23, 2023 (MECP, 2023); R.J. Burnside & Associates (Burnside) observations during ecological field surveys in 2023.

[1]S-Ranks (provincial)
Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario (Please refer to: http://explorer.natureserve.org/nsranks.htm)

SX — Presumed Extirpated - Species or community is believed to be extirpated from the province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
SH — Possibly Extirpated (Historical) - Species or community occurred historically in the province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20–40 years. A species or community could become SH without such a 20-40 year delay if the only known occurrences in a province were destroyed or if it had been extensively and unsuccessfully looked for. The SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.
S1 — Critically Imperiled - Critically imperiled in the province or state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the province.
S2 — Imperiled - Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province.
S3 — Vulnerable - Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4 — Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5 — Secure - Common, widespread, and abundant in the province.
SNR — Unranked - Province conservation status not yet assessed.
SU — Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA — Not Applicable - A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S# — Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
S#? – Inexact or Uncertain - Denotes inexact or uncertain numeric rank.

Breeding Status Qualifiers
B – Breeding Conservation status refers to the breeding population of the species in the nation or state/province.
N – Nonbreeding Conservation status refers to the non-breeding population of the species in the province.
M – Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the province.

[2]**SARO *Endangered Species Act, 2007***
(provincial status from http://www.ontario.ca/environment-and-energy/how-species-risk-are-listed#section-3)
The provincial review process is implemented by the MNRF's Committee on the Status of Species at Risk in Ontario (COSSARO).

Extinct - A species that no longer exists anywhere.
Extirpated (EXT) - Lives somewhere in the world, and at one time lived in the wild in Ontario, but no longer lives in the wild in Ontario.
Endangered (END) - Lives in the wild in Ontario but is facing imminent extinction or extirpation.
Threatened (THR) - Lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it.
Special concern (SC) - Lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats.
Not at Risk (NAR) - A species that has been evaluated and found to be not at risk.
Data Deficient (DD) - A species for which there is insufficient information for a provincial status recommendation.

[3]**SARA (Federal *Species at Risk Act*) Status and Schedule (includes COSEWIC Status)**
The Act establishes Schedule 1, as the official list of wildlife species at risk. It classifies those species as being either Extirpated, Endangered, Threatened, or Special Concern. Once listed, the measures to protect and recover a listed wildlife species are implemented.

Extinct - A wildlife species that no longer exists.
Extirpated (EXT) - A wildlife species that no longer exists in the wild in Canada but exists elsewhere.
Endangered (END) - A wildlife species facing imminent extirpation or extinction.
Threatened (THR) - A wildlife species that is likely to become an endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern (SC) - A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
Data Deficient (DD) - A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
Not At Risk (NAR) - A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.

[4]**SARA Schedule**
Schedule 1: is the official list of species that are classified as extirpated, endangered, threatened, and of special concern.
Schedule 2: species listed in Schedule 2 are species that had been designated as endangered or threatened and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3: species listed in Schedule 3 are species that had been designated as special concern and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

The Act establishes Schedule 1 as the official list of wildlife species at risk. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern.

Species that were designated at risk by COSEWIC prior to October 1999 (Schedule 2 & 3) must be reassessed using revised criteria before they can be considered for addition to Schedule 1 of SARA. After they have been assessed, the Governor in Council may on the recommendation of the Minister, decide on whether or not they should be added to the List of Wildlife Species at Risk.

[5]**Sources:**
[6]Cadman, M.D., et al. (eds). 2007. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706 pp
[7]Species at Risk Public Registry https://species-registry.canada.ca/
[8]McCracken, J.D. et al. 2013. Recovery Strategy for the Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario, viii + 88 pp.
[9]SARO List Species Descriptions (Species at risk in Ontario | ontario.ca)
[10]Ontario Nature Reptile and Amphibian Atlas (ON Reptile & Amphibian Atlas (ontarioinsects.org))
[11]Environment Canada. 2015. Recovery Strategy for Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Tri-colored Bat (*Perimyotis subflavus*) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. Ix + 110 pp.
[12]Humphrey, C. 2017. Recovery Strategy for the Eastern Small-footed Myotis (*Myotis leibii*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. vii + 76 pp.
[13]MNRF. 2018. City of Niagara Falls Species at Risk Table. Guelph District.
[14]Department of Fisheries and Oceans (DFO) Aquatic Species at Risk found online at: http://www.dfo-mpo.gc.ca/species-especes/sara-lep/identify-eng.html.
[15]Fisheries and Oceans Canada (DFO). 2018. Management Plan for the Northern Brook Lamprey (*Ichthyomyzon fossor*), Great Lakes – Upper St. Lawrence populations, in Canada. *Species at Risk Act* Management Plan Series. Fisheries and Oceans Canada, Ottawa. vi + 33 pp.

Significant Wildlife Habitat Screening – Ecoregion 6E Criteria (2015)

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Table 1.1: Seasonal Concentration Areas of Animals					
Waterfowl Stopover & Staging Areas (Terrestrial) **Rationale:** Habitat important to migrating waterfowl.	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these ecosites.	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.	American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Mallard Northern Pintail Northern Shoveler American Wigeon Gadwall	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. • Any mixed species aggregations of 100 or more individuals required. • The flooded field ecosite habitat plus a 100-300 m radius area, dependent on local site conditions and adjacent land use is the SWH. • 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 Index #7** provides development effects and mitigation measures.	No potential on the subject lands. The ecosites are not present and the habitat criteria for Significant Wildlife Habitat are not present. Given the surrounding rural landscape, candidate habitat may be present on adjacent lands.
Waterfowl Stopover & Staging Areas (Aquatic) **Rationale:** 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.	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and SWM ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water).	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	**Studies carried out & verified presence of:** • Aggregations of 100 or more of listed species for 7 days, results in >700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH. • The combined area of the Ecological Land Classification (ELC) ecosites and a 100 m radius area is the SWH. • Wetland area and shorelines associated with sites identified within the SWHTG Appendix K are SWH. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • 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). • **SWHMiST Index #7** provides development effects and mitigation measures.	No potential on the subject lands. The ecosites are not present and the habitat criteria for Significant Wildlife Habitat are not present. Candidate habitat may be present on adjacent lands in the Melancthon Wetland PSW Complex.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
			Red-breasted Merganser Brant Canvasback Ruddy Duck		
Shorebird Migratory Stopover Area **Rationale**: High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	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.	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	**Studies confirming:** • Presence of 3 or more of listed species and >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). • Whimbrel stop briefly (<24 hrs.) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100 m radius area. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects". • **SWHMiST Index #8** provides development effects and mitigation measures.	No potential on the subject lands. The ecosites are not present and the habitat criteria for Significant Wildlife Habitat are not present. Candidate habitat present on adjacent lands in the Melancthon Wetland PSW Complex.
Raptor Wintering Area **Rationale**: Sites used by multiple species, a high number of individuals and used annually are most significant.	Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC.	• The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. • Raptor wintering sites (hawk/owl) need to be **>** 20 ha, with a combination of forest and upland. • Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands. • Field area of the habitat is to be wind swept with limited snow depth or accumulation. • Eagle sites have open water, large trees and snags available for roosting.	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl **Special Concern:** Short-eared Owl Bald Eagle	**Studies confirm the use of these habitats by:** • One or more Short-eared Owls or; One or more Bald Eagle or; At least 10 individuals and two of the listed hawk/owl species. • To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds. • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects."	No potential on the subject lands. The site is comprised of fields with small patches of young forest stands (woodlands) that would not qualify as SWH. Candidate habitat present on adjacent lands associated with the Melancthon Wetland PSW Complex which is comprised of some treed swamp communities adjacent to upland habitat.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
	Upland: CUM; CUT; CUS; CUW. Bald Eagle: Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).			• **SWHMiST Index #10 and #11** provides development effects and mitigation measures.	
Bat Hibernacula **Rationale:** Bat hibernacula are rare habitats in all Ontario landscapes.	**Bat Hibernacula may be found in these ecosites:** CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	• Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. • Active mine sites should not be considered as SWH. • The locations of bat hibernacula are relatively poorly known.	Big Brown Bat Tri-coloured Bat	• All sites with confirmed hibernating bats are SWH. • The habitat area includes a 200 m radius around the entrance of the hibernaculum for most development types and 1000 m for wind farms. • Studies are to be conducted during the peak swarming period (August to September). Surveys should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”. • **SWHMiST Index #1** provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The ecosites are not present and the habitat criteria for Significant Wildlife Habitat are not present.
Bat Maternity Colonies **Rationale:** Known locations of forested bat	Maternity colonies considered SWH are found in forested ecosites.	• Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario.	Big Brown Bat Silver-haired Bat	• Maternity Colonies with confirmed use by: – >10 Big Brown Bats – >5 Adult Female Silver- haired Bats	Potential habitat in the Silver Maple hedgerow on the subject lands was found to not be a maternal colony through acoustic monitoring surveys. Candidate habitat present on adjacent lands associated with the Melancthon Wetland

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
maternity colonies are extremely rare in all Ontario landscapes.	**All ELC ecosites in ELC Community Series:** FOD FOM SWD SWM	• Maternity colonies located in Mature deciduous or mixed forest stands with >10/ha large diameter (>25 cm dbh) wildlife trees. • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. • 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.		• The area of the habitat includes the entire woodland, or a forest stand ELC ecosite or an ecoelement containing the maternity colonies. • Evaluation methods for maternity colonies should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”. • SWHMiST Index #12 provides development effects and mitigation measures.	PSW Complex and surrounding forest communities.
Turtle Wintering Areas **Rationale:** Generally, sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	Snapping and Midland Painted Turtles. **ELC Community Classes:** SW, MA, OA and SA **ELC Community Series:** FEO and BOO For Northern Map Turtle: Open water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	• For most turtles, wintering areas are in the same general area as their core habitat. Water must be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen. • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH.	Midland Painted Turtle **Special Concern:** Northern Map Turtle Snapping Turtle	• Presence of 5 over-wintering Midland Painted Turtles is significant. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant. • 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. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (September–October) or spring (March–May). • Congregation of turtles is more common where wintering areas are limited and therefore significant. • **SWHMiST Index #28** provides development effects and mitigation measures for turtle wintering habitat.	No potential on the subject lands. The ecosites are not present and the habitat criteria for Significant Wildlife Habitat is not present. Candidate habitat present on adjacent lands associated with the Melancthon Wetland PSW Complex and other unevaluated wetlands in the area.
Reptile Hibernaculum	For all snakes, habitat may be found in any ecosite other	• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of	**Snakes**: Eastern Gartersnake Northern Watersnake	**Studies confirming:**	No potential on the subject lands as the habitat criteria is not present.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Rationale: Generally, sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	than very wet ones. Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats. Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator. For Five-lined Skink, ELC Community Series of FOD and FOM and ecosites: FOC1 and FOC3.	features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line. • 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 groundcover. • Five-lined Skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures.	Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake **Special Concern:** Milksnake Eastern Ribbonsnake **Lizard: Special Concern:** (Southern Shield population): Five-lined Skink	• Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (e.g., foundation or rocky slope) on sunny warm days in Spring (April/May) and Fall (September/October). • **Note**: If there are Special Concern Species present, then site is SWH. • **Note:** 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 near hibernacula. The feature in which the hibernacula is located plus a 30 m radius area is the SWH. • **SWHMiST Index #13** provides development effects and mitigation measures for snake hibernacula. • Presence of any active hibernaculum for Skink is significant. • SWHMiST Index #37 provides development effects and mitigation measures for five-lined Skink wintering habitat.	Candidate habitat present on adjacent lands associated with the Melancthon Wetland PSW Complex. The surrounding rural landscape likely contains features suitable for reptile hibernacula such as old barn foundations, stone fences, etc.
Colonially - Nesting Bird Breeding Habitat (Bank & Cliff) **Rationale:** 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 population are	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles. Cliff faces, bridge abutments, silos, barns. **Habitat found in the following ecosites:** CUM1 CUT1 CUS1 BLO1 BLS1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation.	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	**Studies confirming:** • Presence of 1 or more nesting sites with 8 or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50 m radius habitat area from the peripheral nests. • Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • **SWHMiST Index #4** provides development effects and mitigation measures.	No potential on the subject or adjacent lands. The ecosites are not present and the habitat criteria for Significant Wildlife Habitat are not present.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
declining in Ontario.	BLT1 CLO1 CLS1 CLT1				
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs) **Rationale:** Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• 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 15 m from ground, near the top of the tree.	Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	**Studies confirming:** • Presence of 2 or more active nests of Great Blue Heron or other listed species. • The habitat extends from the edge of the colony and a minimum 300 m radius or extent of the Forest ecosite containing the colony or any island <15.0 ha with a colony is the SWH. • 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. • **SWHMiST Index #5** provides development effects and mitigation measures.	No potential on the subject lands. The ecosites are not present and the habitat criteria for Significant Wildlife Habitat are not present. Candidate habitat present on adjacent lands associated with the Melancthon Wetland PSW Complex.
Colonially - Nesting Bird Breeding Habitat (Ground) **Rationale;** Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1;50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird). MAM1 – 6 MAS1 – 3 CUM CUT	• Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. • Brewers Blackbird colonies are found loosely on the ground in low bushes in close proximity to streams and irrigation ditches within farmlands.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	**Studies confirming:** • Presence of > 25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern. • Presence of 5 or more pairs for Brewer's Blackbird. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant. • The edge of the colony and a minimum 150 m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0 ha with a colony is the SWH. • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects". • **SWHMiST Index #6** provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The ecosites are not present and the habitat criteria for Significant Wildlife Habitat is not present. Breeding records for Brewer's Blackbird are mainly restricted to the north shore of Lake Huron and Georgian Bay, as well as Sudbury/Manitoulin Island and NW Ontario; no breeding records currently exist for Southern and Eastern Ontario.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
	CUS				
Migratory Butterfly Stopover Areas **Rationale:** Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	Combination of ELC Community Series; need to have present one Community Series from each land class. <u>Field</u>: CUM CUT CUS <u>Forest</u>: FOC FOD FOM CUP Anecdotally, a candidate site for butterfly stopover will have a history of butterflies being observed.	• 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 Erie or Ontario. • 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. • 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. • 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.	Painted Lady Red Admiral <u>Special Concern</u> Monarch	**Studies confirm:** • The presence of Monarch Use Days (MUD) during fall migration (August/October). 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, significant variation can occur between years and multiple years of sampling should occur. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. • MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant. • **SWHMiST Index #16** provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present. The subject lands are greater than 5 km from Lake Ontario.
Landbird Migratory Stopover Areas **Rationale:** Sites with a high diversity of species as well as high numbers are most significant.	**All ecosites associated with these ELC Community Series:** FOC FOM FOD SWC SWM SWD	• Woodlots >10 ha in size and within 5 km of Lake Ontario. • If woodlands are rare in an area of shoreline, woodland fragments 2-5 ha can be considered for this habitat. • If multiple woodlands are located along the shoreline those Woodlands <2 km from Lake Ontario are more significant. • Sites have a variety of habitats; forest, grassland and wetland complexes. • The largest sites are more significant. • Woodlots and forest fragments are important habitats to migrating birds, these features located along the shore and located within 5 km of Lake Ontario are Candidate SWH.	All migratory songbirds. Canadian Wildlife Service Ontario website: http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D-1 All migrant raptors species: *Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997.* Schedule 7: Specially Protected Birds (Raptors)	**Studies confirm:** • Use of the habitat by >200 birds/day and with >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 (April/May) and fall (August/October) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects". • **SWHMiST Index #9** provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat is not present. The subject lands are greater than 5 km from Lake Ontario.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Deer Yarding Areas **<u>Rationale:</u>** Winter habitat for deer is considered to be the main limiting 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.	**Note:** MNRF to determine this habitat. **ELC Community Series** providing a thermal cover component for a deer yard would include: FOM FOC SWM SWC **Or these ELC ecosites:** CUP2 CUP3 FOD3 CUT	• 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 20 cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30 cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter. • 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%. • MNRF determines deer yards following methods outlined in “Selected Wildlife and Habitat Features: Inventory Manual". • Woodlots with high densities of deer due to artificial feeding are not significant.	White-tailed Deer	**No Studies Required:** • Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths > 40 cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH. • Deer Yards are mapped by MNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by MNRF will be available at local MNRF offices or via Land Information Ontario (LIO). • 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. • 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. • SWHMiST Index #2 provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present. No deer yarding areas were identified by the MNRF.
Deer Winter Congregation Areas **Rationale:** Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in	**All Forested ecosites with these ELC Community Series:** FOC FOM FOD SWC SWM SWD	• Woodlots will typically be >100 ha in size. Woodlots <100 ha may be considered as significant based on MNRF studies or assessment. • 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. • If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule. • Large woodlots > 100 ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha. • Woodlots with high densities of deer due to artificial feeding are not significant.	White-tailed Deer	**Studies confirm:** • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF. • 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. • Studies should be completed during winter (January/February) when >20 cm of snow is on the ground using aerial survey techniques, ground or road surveys. or a pellet count deer density survey. • If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions.	Conifer plantations much smaller than 50 ha may also be used.			area, then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • **SWHMiST Index #2** provides development effects and mitigation measures.	
Table 1.2.1: Rare Vegetation Communities					
Cliffs and Talus Slopes **Rationale;** Cliffs and Talus Slopes are extremely rare habitats in Ontario.	**Any ELC ecosite within Community Series:** TAO CLO TAS CLS TAT CLT	• A Cliff is vertical to near vertical bedrock >3 m in height. • A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.		• Most cliff and talus slopes occur along the Niagara Escarpment. • Confirm any ELC Vegetation Type for Cliffs or Talus Slopes. • **SWHMiST Index #21** provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present.
Sand Barren **Rationale;** Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry.	**ELC ecosites:** SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always ≤ 60%.	• Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. 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%.		• A sand barren area >0.5 ha in size. • Confirm any ELC Vegetation Type for Sand Barrens. • Site must not be dominated by exotic or introduced species (<50% vegetative cover is exotic sp.). • **SWHMiST Index #20** provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present.
Alvar **Rationale;** Alvars are extremely rare	ALO1 ALS1 ALT1 FOC1 FOC2	• 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		**Field studies that identify:** • An Alvar site > 0.5 ha in size. • Four of the five Alvar Indicator Species at a Candidate Alvar site is Significant.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
habitats in Ecoregion 6E.	CUM2 CUS2 CUT2-1 CUW2 **Five Alvar Indicator Species:** *Carex crawei* *Panicum philadelphicum* *Eleocharis compressa* *Scutellaria parvula* *Trichostema brachiatum* These indicator species are very specific to Alvars within Ecoregion 6E.	associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover. • Alvar is particularly rare in Ecoregion 6E where the only known sites are found in the western islands of Lake Erie.		• Site must not be dominated by exotic or introduced species (<50% vegetative cover is exotic sp.). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses. • **SWHMiST Index #17** provides development effects and mitigation measures.	
Old Growth Forest **Rationale;** Due to historic logging practices and land clearance for agriculture, old growth forest is rare in the Ecoregion 6E.	**Forest Community Series:** FOD FOC FOM SWD SWC SWM	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.		**Field Studies will determine:** • If dominant trees species are >140 years old, then the area containing these trees is SWH. • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut stumps will not be present). • The area of forest ecosites combined or an eco-element within an ecosite that contains the old growth characteristics is the SWH. • Determine ELC vegetation types for the forest area containing the old growth characteristics. • **SWHMiST Index #23** provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present.
Savannah **Rationale:**	TPS1 TPS2 TPW1	A Savannah is a tallgrass prairie habitat that has tree cover between 25–60%.		**Field studies confirm:**	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Savannahs are extremely rare habitats in Ontario.	TPW2 CUS2			• No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. • One or more of the Savannah indicator species listed in Appendix N should be present. **Note**: Savannah plant spp. list from Ecoregion 6E should be used. • Area of the ELC ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover is exotic sp.). • **SWHMiST Index #18** provides development effects and mitigation measures.	
Tallgrass Prairie **Rationale:** Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	• No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway Right of Ways (ROW) are not considered to be SWH. • A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover.		**Field studies confirm:** • One or more of the Prairie indicator species listed in Appendix N should be present. **Note:** Prairie plant spp. list from Ecoregion 6E should be used. • Area of the ELC ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover is exotic sp.). • **SWHMiST Index #19** provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present.
Other Rare Vegetation Communities **Rationale:** Plant communities that often contain rare species which depend on the habitat for survival.	• Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG. • Any ELC ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.		• ELC ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in Appendix M. • The MNRF/Natural Heritage Information Centre (NHIC) will have up to date listing for rare vegetation communities. **Field studies should confirm:** • If an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG. • Area of the ELC Vegetation Type polygon is the SWH. • **SWHMiST Index #37** provides development effects and mitigation measures.	No potential on the subject lands. No rare vegetation communities were identified during ELC field surveys or other field investigations. Candidate habitat present on adjacent lands, but none have been identified during desktop assessment and background review.

Table 1.2.2: Specialized Habitats for Wildlife considered Significant Wildlife Habitat

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Waterfowl Nesting Area **Rationale;** Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.	**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 (PSW).	• A waterfowl nesting area extends 120 m from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120 m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur. • Upland areas should be at least 120 m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40 cm dbh) in woodlands for cavity nest sites.	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	**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”. • 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 120 m from the wetland and will provide enough habitat for waterfowl to successfully nest. • **SWHMiST Index #25** provides development effects and mitigation measures.	No potential on the subject lands. While adjacent wetland ecosites are present, no waterfowl were recorded during breeding bird surveys completed on the subject lands in 2023. Candidate habitat on adjacent lands features a mosaic of upland and wetland habitats associated with the Melancthon Wetland PSW Complex and surrounding rural landscape. OBBA records of waterfowl for the area include several of the wildlife species listed: Blue-winged teal, Gadwall, Hooded Merganser, and Mallard.
Bald Eagle & Osprey Nesting, Foraging & Perching Habitat **Rationale;** Nest sites are fairly uncommon in Eco-region 6E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and	**ELC Forest Community Series:** FOD FOM FOC SWD SWM and SWC (directly adjacent to riparian areas – rivers, lakes, ponds and wetlands.	• Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top of a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree’s canopy. • Nests located on man-made objects are not to be included as SWH (e.g., telephone poles and constructed nesting platforms).	Osprey **Special Concern** Bald Eagle	**Studies confirm the use of these nests by**: • One or more active Osprey or Bald Eagle nests in an area. • 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. • For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH, maintaining undisturbed shorelines with large trees within this area is important. • For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. Area of the habitat from 400-800 m is dependent on-site lines from the nest to the development and inclusion of perching and foraging habitat. • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present. No large bodies of water are present (rivers, lakes).

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
scarcity of habitat.				• Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid-March to mid-August. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • **SWHMiST Index #26** provides development effects and mitigation measures.	
Woodland Raptor Nesting Habitat **Rationale:** Nests sites for these species are rarely identified; these are area sensitive habitats and are often used annually by these species.	May be found in all forested ELC ecosites. **May also be found in:** SWC SWM SWD and CUP3	• All natural or conifer plantation woodland/forest stands >30 ha with >10ha of interior habitat. Interior habitat determined with a 200 m buffer. • 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 Coopers Hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest.	Northern Goshawk Cooper’s Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	**Studies confirm:** • Presence of 1 or more active nests from species list is considered significant. • Red-shouldered Hawk and Northern Goshawk – A 400 m radius around the nest or 28 ha area of habitat is the SWH (the 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest). • Barred Owl – A 200 m radius around the nest is the SWH. • Broad-winged Hawk and Coopers Hawk– A 100 m radius around the nest is the SWH. • Sharp-Shinned Hawk – A 50 m radius around the nest is the SWH. • 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. • **SWHMiST Index #27** provides development effects and mitigation measures.	No potential on the subject lands. The habitat criteria for Significant Wildlife Habitat are not present. Candidate habitat present on adjacent lands associated with forest communities and the Melancthon Wetland PSW Complex (treed swamp).
Turtle Nesting Areas **Rationale;** These habitats are rare and when identified will often be the only breeding site for local populations of turtles.	**Exposed mineral soil (sand or gravel) areas adjacent (<100 m) or within the following ELC ecosites:** MAS1 MAS2 MAS3 SAS1 SAM1	• 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. • 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. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.	Midland Painted Turtle <u>Special Concern Species:</u> Northern Map Turtle Snapping Turtle	**Studies confirm:** • Presence of 5 or more nesting Midland Painted Turtles. • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH. • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100 m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH. • Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30-100 m area of habitat.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
	SAF1 BOO1 FEO1			• 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. • **SWHMiST Index #28** provides development effects and mitigation measures for turtle nesting habitat.	
Seeps and Springs **Rationale:** Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.	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.	• Any forested area (with <25% meadow/field/ pasture) within the headwaters of a stream or river system. • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species.	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	**Field Studies confirm:** • Presence of a site with 2 or more seeps/springs should be considered SWH. • The area of a ELC forest ecosite or an ecoelement within 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. • **SWHMiST Index #30** provides development effects and mitigation measures.	Potential on the subject and adjacent lands due groundwater recharge areas, forested ecosite, and headwaters.
Amphibian Breeding Habitat (Woodland) **Rationale:** These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations.	All ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD 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	• Presence of a wetland, pond or woodland pool (including vernal pools) >500 m^2 (about 25 m diameter) within or adjacent (within 120 m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat.	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	**Studies confirm:** • 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) or 2 or more of the listed frog species with Call Level Codes of 3. • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the wetland area plus a 230 m radius of woodland area. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. • **SWHMiST Index #14** provides development effects and mitigation measures.	No potential on the subject lands. The habitat criteria for Significant Wildlife Habitat are not present. Candidate habitat is present on adjacent lands where the presence of wetlands is within and adjacent to woodlands.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
	migrating amphibians.				
Amphibian Breeding Habitat (Wetlands) **Rationale;** Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Central Ontario landscapes.	**ELC Community Classes:** SW MA FE BO OA and SA. Typically, these wetland ecosites will be isolated (>120 m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g., Bull Frog) may be adjacent to woodlands.	• Wetlands >500 m^2 (about 25 m diameter), 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. • 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. • Bullfrogs require permanent water bodies with abundant emergent vegetation.	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	**Studies confirm:** • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3 or; Wetland with confirmed breeding Bullfrogs are significant. • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • 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. • **SWHMiST Index #15** provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present.
Woodland Area-Sensitive Bird Breeding Habitat **Rationale:** Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior	**All ecosites associated with these ELC Community Series:** FOC FOM FOD SWC SWM SWD	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs. old) forest stands or woodlots >30 ha. • Interior forest habitat is at least 200 m from forest edge habitat.	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 **Special Concern:** Cerulean Warbler Canada Warbler	**Studies confirm:** • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. • **Note**: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH. • Conduct field investigations in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • **SWHMiST Index #34** provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present Candidate habitat present on adjacent lands associated with forested/treed swamp ecosites.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
forest song birds.					
Table 1.3: Habitat for Species of Conservation Concern considered Significant Wildlife Habitat					
Marsh Breeding Bird Habitat **Rationale;** Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 **For Green Heron:** All SW, MA and CUM1 sites	• Nesting occurs in wetlands. • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present. • 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.	American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan **Special Concern:** Black Tern Yellow Rail	**Studies confirm:** • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes breeding by any combination of 5 or more of the listed species. • **Note**: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH. • Area of the ELC ecosite is the SWH. • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • **SWHMiST Index #35** provides development effects and mitigation measures.	No potential on the subject lands. The habitat criteria for Significant Wildlife Habitat are not present. None of the species listed were recorded during breeding bird surveys completed in 2023. Candidate habitat present on adjacent lands associated with forested/treed swamp ecosites.
Open Country Bird Breeding Habitat **Rationale;** 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.	CUM1 CUM2	• Large grassland areas (includes natural and cultural fields and meadows) >30 ha. • 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). • Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. • The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species.	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow **Special Concern** Short-eared Owl	**Field Studies confirm:** • Presence of nesting or breeding of 2 or more of the listed species. • A field with 1 or more breeding Short-eared Owls is to be considered SWH. • The area of SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • **SWHMiST Index #32** provides development effects and mitigation measures.	No potential on the subject or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Shrub/Early Successional Bird Breeding Habitat **Rationale;** 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.	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species.	• Large field areas succeeding to shrub and thicket habitats >10 ha in size. • Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e., no row-cropping, haying or live-stock pasturing in the last 5 years). • Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species. • Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands.	**Indicator Spp:** Brown Thrasher Clay-coloured Sparrow **Common Spp.** Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher **Special Concern:** Yellow-breasted Chat Golden-winged Warbler	**Field Studies confirm:** • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species. • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as SWH. • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • **SWHMiST cxlix Index #33** provides development effects and mitigation measures.	No potential on the subject lands. The habitat criteria for Significant Wildlife Habitat are not present.
Terrestrial Crayfish **Rationale:** Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare.	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM CUM1 with inclusions of above meadow marsh or swamp ecosites can be used by terrestrial crayfish.	• Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for Terrestrial Crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can’t be too moist. Can often be found far from water. • 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.	Chimney or Digger Crayfish (*Fallicambarus fodiens*) Devil Crayfish or Meadow Crayfish (*Cambarus diogenes*)	**Studies Confirm:** • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites. • Area of ELC ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done April to August in temporary or permanent water. **Note** the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult. • **SWHMiST Index #36** provides development effects and mitigation measures.	No potential on the subject lands. The habitat criteria for Significant Wildlife Habitat are not present. Candidate habitat present on adjacent lands associated with wetland ecosites.
Special Concern and	All plant and animal Element	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal	**Studies Confirm:**	

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Rare Wildlife Species **Rationale:** These species are quite rare or have experienced significant population declines in Ontario.	Occurrences (EO) within a 1 or 10 km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.	species; linking candidate habitat on the site needs to be completed to ELC ecosites.	species. Lists of these species are tracked by the NHIC.	• 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. • 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 be easily mapped and cover an important life stage component for a species e.g., specific nesting habitat or foraging habitat. • **SWHMiST Index #37** provides development effects and mitigation measures.	Candidate habitat on the subject and adjacent lands. Monarch (S2N) was observed as an incidental wildlife observation on the subject lands in the meadow communities.
Table 1.4.1: Animal Movement Corridors					
Amphibian Movement Corridors **Rationale;** Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	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. • 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.	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	• 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. • Corridors should have at least 15 m of vegetation on both sides of waterway or be up to 200 m wide of woodland habitat and with gaps <20 m. • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat. • **SWHMiST Index #40** provides development effects and mitigation measures.	No potential on the subject lands. The habitat criteria for Significant Wildlife Habitat are not present. Candidate habitat present on adjacent lands associated with forest communities and the Melancthon Wetland PSW Complex.
Deer Movement Corridors **Rationale:** Corridors important for all species to be able to access seasonally important life-cycle habitats or to access new habitat for	Corridors may be found in all forested ecosites. A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors.	Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule. • A deer wintering habitat identified by the MNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion. • Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges).	White-tailed Deer	• Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas. • Corridors that lead to a deer wintering habitat should be unbroken by roads and residential areas. • Corridors should be at least 200 m wide with gaps <20 m and if following riparian area with at least 15 m of vegetation on both sides of waterway. • Shorter corridors are more significant than longer corridors, SWHMiST Index #39 provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat are not present.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
dispersing individuals by minimizing their vulnerability while travelling.					
Table 1.5.1: Significant Wildlife Habitat Exceptions for Ecodistricts within EcoRegion 6E					
6E-14 **Mast Producing Areas** **Rationale:** The Bruce Peninsula has an isolated and distinct population of black bears. Maintenance of large woodland tracts with mast-producing tree species is important for bear.	**All Forested habitat represented by ELC Community Series**: FOM FOD	• Woodland ecosites >30 ha with mast-producing tree species, either soft (cherry) or hard (oak and beech). • Black bears require forested habitat that provides cover, winter hibernation sites, and mast- producing tree species. Forested habitats need to be large enough to provide cover and protection for black bears.	Black Bear	**All woodlands >30 ha with a 50% composition of these ELC Vegetation Types are considered significant:** FOM1-1 FOM2-1 FOM3-1 FOD1-1 FOD1-2 FOD2-1 FOD2-2 FOD2-3 FOD2-4 FOD4-1 FOD5-2 FOD5-3 FOD5-7 FOD6-5 SWHMiST Index #3 provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria and ecosites for Significant Wildlife Habitat are not present.
6E- 17 **Lek** **Rationale:** Sharp-tailed grouse only occur on Manitoulin Island in Ecoregion 6E, Leks are an important habitat to maintain their /*population.	CUM CUS CUT	• The Lek or dancing ground consists of bare, grassy or sparse shrubland. There is often a hill or rise in topography. • Leks are typically a grassy field/meadow >15 ha with adjacent shrublands and >30 ha with adjacent deciduous woodland. Conifer trees within 500 m are not tolerated. • Grasslands (field/meadow) are to be >15 ha when adjacent to shrubland and >30 ha when adjacent to deciduous woodland. • Grasslands are to be undisturbed with low intensities of agriculture (light grazing or late haying).	Sharp-tailed Grouse	• Studies confirming Lek habitat are to be completed from late March to June. • Any site confirmed with sharp-tailed grouse courtship activities is considered significant. • The field/meadow ELC ecosites plus a 200 m radius area with shrub or deciduous woodland is the Lek habitat. • SWHMiST cxlix Index #32 provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria and ecosites for Significant Wildlife Habitat are not present.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	Habitat Criteria	Wildlife Species	Defining Criteria	Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?
		• Leks will be used annually if not destroyed by cultivation or invasion by woody plants or tree planting.			

BURNSIDE

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Appendix C

Breeding Bird Summary Table

Breeding Bird Survey Summary Table

Common Name	Scientific Name	Provincial SRANK[1]	Provincial SARO (Endangered Species Act, 2007)[2]	Federal COSEWIC[3]	Federal SARA (Species At Risk Act)[3]	Federal SARA Schedule[4]	Provincial MNRF Area Sensitive Species[5]	Highest Number Recorded (All Habitat Units Combined)						Comments
								BB1	BB2	BB3	BB4	Highest Number Recorded (All Habitat Units Combined)	Highest Recorded Breeding Evidence[6]	
Alder Flycatcher	*Empidonax alnorum*	S5B								1	1	2	PROBABLE, T	
American Crow	*Corvus brachyrhynchos*	S5							2	2	2	6	POSSIBLE, S	
American Goldfinch	*Spinus tristis*	S5						1	4	4	2	11	PROBABLE, T	
American Redstart	*Setophaga ruticilla*	S5B					x		1	1	1	3	POSSIBLE, S	
American Robin	*Turdus migratorius*	S5						2	2	2	2	8	POSSIBLE, S	
Baltimore Oriole	*Icterus galbula*	S4B						1				1	POSSIBLE, S	
Cedar Waxwing	*Bombycilla cedrorum*	S5							2	1		3	PROBABLE, T	
Chimney Swift	*Chaetura pelagica*	S3B	THR	THR	THR	1			1			1	OBSERVED, X	Flyover
Chipping Sparrow	*Spizella passerina*	S5B, S3N							4		1	5	POSSIBLE, S	
Common Grackle	*Quiscalus quiscula*	S5						1				1	OBSERVED, X	Flyover
Common Yellowthroat	*Geothlypis trichas*	S5B, S3N						1	3	3	3	10	PROBABLE, T	
Eastern Kingbird	*Tyrannus tyrannus*	S4B								1	1	2	POSSIBLE, S	
Eastern Meadowlark	*Sturnella magna*	S4B, S3N	THR	THR	THR	1	x	1		1	2	4	PROBABLE, T	
European Starling	*Sturnus vulgaris*	SNA									5	5	POSSIBLE, S	
Gray Catbird	*Dumetella carolinensis*	S5B, S3N								1		1	POSSIBLE, S	

Common Name	Scientific Name	Provincial SRANK[1]	Provincial SARO (Endangered Species Act, 2007)[2]	Federal COSEWIC[3]	Federal SARA (Species At Risk Act)[3]	Federal SARA Schedule [4]	Provincial MNRF Area Sensitive Species[5]	Highest Number Recorded (All Habitat Units Combined)						Comments
								BB1	BB2	BB3	BB4	Highest Number Recorded (All Habitat Units Combined)	Highest Recorded Breeding Evidence[6]	
Great Blue Heron	*Ardea herodias*	S4							1			1	OBSERVED, X	Flyover
House Wren	*Troglodytes aedon*	S5B							1		1	2	POSSIBLE, S	
Mallard	*Anas platyrhynchos*	S5								1		1	OBSERVED, X	Flyover
Mourning Dove	*Zenaida macroura*	S5						2				2	POSSIBLE, S	
Northern Cardinal	*Cardinalis cardinalis*	S5									1	1	POSSIBLE, S	
Northern Flicker	*Colaptes auratus*	S5									1	1	OBSERVED, X	
Red-winged Blackbird	*Agelaius phoeniceus*	S5						4	5	3	4	16	PROBABLE, T	
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S5B							1		1	2	POSSIBLE, S	
Savannah Sparrow	*Passerculus sandwichensis*	S5B, S3N					x	2			2	4	PROBABLE, T	
Song Sparrow	*Melospiza melodia*	S5						4	4	2	3	13	PROBABLE, T	
Tree Swallow	*Tachycineta bicolor*	S4, S5B									1	1	POSSIBLE, S	
Warbling Vireo	*Vireo gilvus*	S5B							1	1	1	3	POSSIBLE, S	
Yellow Warbler	*Setophaga petechia*	S5B						2	3	2	3	10	PROBABLE, P	
Yellow-rumped warbler	*Setophaga coronata*	S5B, S4N									1	1	POSSIBLE, S	
TOTAL SPECIES	**29**													

Appendix C - Breeding Bird Survey Summary Table
300056110 – Dundalk EcoPark

[1]S-Ranks (provincial)
Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario (Please refer to: Conservation Status Categories | NatureServe Explorer)

SX — Presumed Extirpated - Species or community is believed to be extirpated from the province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
SH — Possibly Extirpated (Historical) - Species or community occurred historically in the province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20–40 years. A species or community could become SH without such a 20–40-year delay if the only known occurrences in a province were destroyed or if it had been extensively and unsuccessfully looked for. The SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.
S1 — Critically Imperiled - Critically imperiled in the province or state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the province.
S2 — Imperiled - Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province.
S3 — Vulnerable - Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4 — Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5 — Secure - Common, widespread, and abundant in the province.
SNR — Unranked - Province conservation status not yet assessed.
SU — Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA — Not Applicable - A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S# — Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
S#? – Inexact or Uncertain - Denotes inexact or uncertain numeric rank.

Breeding Status Qualifiers
B – Breeding Conservation status refers to the breeding population of the species in the nation or state/province.
N – Nonbreeding Conservation status refers to the non-breeding population of the species in the province.
M – Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the province.

[2]SARO *Endangered Species Act, 2007*
(provincial status from http://www.ontario.ca/environment-and-energy/how-species-risk-are-listed#section-3)
The provincial review process is implemented by the MNRF's Committee on the Status of Species at Risk in Ontario (COSSARO).

Extinct - A species that no longer exists anywhere.
Extirpated (EXT) - Lives somewhere in the world, and at one time lived in the wild in Ontario, but no longer lives in the wild in Ontario.
Endangered (END) - Lives in the wild in Ontario but is facing imminent extinction or extirpation.
Threatened (THR) - Lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it.
Special concern (SC) - Lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats.
Not at Risk (NAR) - A species that has been evaluated and found to be not at risk.
Data Deficient (DD) - A species for which there is insufficient information for a provincial status recommendation.

[3]SARA (Federal *Species at Risk Act*) Status and Schedule (includes COSEWIC Status)
The Act establishes Schedule 1, as the official list of wildlife species at risk. It classifies those species as being either Extirpated, Endangered, Threatened, or Special Concern. Once listed, the measures to protect and recover a listed wildlife species are implemented.

Extinct - A wildlife species that no longer exists.
Extirpated (EXT) - A wildlife species that no longer exists in the wild in Canada but exists elsewhere.
Endangered (END) - A wildlife species facing imminent extirpation or extinction.
Threatened (THR) - A wildlife species that is likely to become an endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern (SC) - A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
Data Deficient (DD) - A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
Not At Risk (NAR) - A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.

[4]SARA Schedule
Schedule 1: is the official list of species that are classified as extirpated, endangered, threatened, and of special concern.
Schedule 2: species listed in Schedule 2 are species that had been designated as endangered or threatened and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3: species listed in Schedule 3 are species that had been designated as special concern and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

The Act establishes Schedule 1 as the official list of wildlife species at risk. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern.

Species that were designated at risk by COSEWIC prior to October 1999 (Schedule 2 & 3) must be reassessed using revised criteria before they can be considered for addition to Schedule 1 of SARA. After they have been assessed, the Governor in Council may on the recommendation of the Minister, decide on whether or not they should be added to the List of Wildlife Species at Risk.

[5]Source: Ontario Ministry of Natural Resources. 2000. *Significant Wildlife Habitat Technical Guide* & Appendices.

[6]Ontario Breeding Bird Atlas - Breeding Evidence Codes

Observed	
X	Species observed in its breeding season (no breeding evidence).

Possible	
H	Species observed in its breeding season in suitable nesting habitat.
S	Singing male(s) present, or breeding calls heard, in suitable nesting habitat in breeding season.

Probable	
P	Pair observed in suitable nesting habitat in nesting season.
T	Permanent territory presumed through registration of territorial behaviour (song, etc.) on at least two days, a week or more apart, at the same place.
D	Courtship or display, including interaction between a male and a female or two males, including courtship feeding or copulation.
V	Visiting probable nest site
A	Agitated behaviour or anxiety calls of an adult.
B	Brood Patch on adult female or cloacal protuberance on adult male.
N	Nest-building or excavation of nest hole.

Confirmed	
DD	Distraction display or injury feigning.
NU	Used nest or egg shells found (occupied or laid within the period of the survey).
FY	Recently fledged young (nidicolous species) or downy young (nidifugous species), including incapable of sustained flight.
AE	Adult leaving or entering nest sites in circumstances indicating occupied nest.
FS	Adult carrying fecal sac.
CF	Adult carrying food for young.
NE	Nest containing eggs.
NY	Nest with young seen or heard.

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix D

Plant List

SCIENTIFIC_NAME	Native?	OWES Wetland Plant List	Bruce-Grey (OSFN 2010)	P1 (SWDM4-5)	P2 (MEFM1-1)	P3 (TAGM5)	P4 (MEFM1-1)	P5 (TAGM5)	P6 (MEGM3-5)	SORTING COLUMN
Acer ginnala	I					X				x
Arctium minus	I						X			x
Bromus inermis	I		*	X		X	X			x
Dactylis glomerata	I		*		X		X		X	x
Daucus carota	I		*		X		X		X	x
Hesperis matronalis	I		*			X	X			x
Leucanthemum vulgare	I		*	X	X					x
Lolium pratense	I		*	X						x
Lotus uliginosus	I			X	X	X				x
Malus pumila	I		*			X				x
Myosotis discolor	I		*	X						x
Phleum pratense ssp. pratense	I		*						X	x
Pilosella caespitosa	I		*		X					x
Pinus sylvestris	I		p,b,g		X		X			x
Plantago lanceolata	I		*		X					x
Potentilla indica	I			X						x
Ranunculus acris	I	S	*	X	X	X			X	x
Rhamnus cathartica	I	S				X		X		x
Sorbus aucuparia	I		E			X				x
Taraxacum officinale	I		*	X	X		X		X	x
Trifolium pratense	I		*	X		X				x
Trifolium repens	I		*			X				x
Tussilago farfara	I	S	*				X			x
Valeriana officinalis	I		E				X		X	x
Vicia cracca	I		*	X	X	X	X		X	x
Acer saccharinum	N	I	p,b,g					X		x
Asclepias syriaca	N		p,b,g	X	X		X		X	x
Carex gracillima	N	S	p,b,g	X	X					x
Celastrus scandens	N		p,b,g			X			X	x
Cornus sericea	N		p,b,g	X	X	X	X	X	X	x
Equisetum arvense	N	S	p,b,g	X			X			x
Erigeron annuus	N		p,b,g	X						x
Fragaria virginiana	N		p,b,g	X	X				X	x
Matteuccia struthiopteris var. pensylvanica	N		p,b,g				X			x
Mentha canadensis	N					X	X		X	x
Oenothera biennis	N		(p,b,g)		X		X		X	x
Parthenocissus quinquefolia	N		p,b,g	X	X	X				x
Phalaris arundinacea var. arundinacea	N		p,b,g	X	X					x
Poa pratensis	N		*	X					X	x
Populus balsamifera	N	S	p,b,g	X						x
Populus tremuloides	N	S	p,b,g	X						x
Prunus serotina	N		p,b,g			X				x
Rubus idaeus	N		p,b,g			X	X			x
Salix bebbiana	N	I	p,b,g		X					x
Salix discolor	N	I	p,b,g	X	X		X			x
Salix petiolaris	N	I	p,b,g	X	X					x
Scirpus atrovirens	N	S	p,b,g	X						x
Toxicodendron radicans var. rydbergii	N		p,b,g						X	x
Viburnum lentago	N	S	p,b,g	X						x
Vitis riparia	N		p,b,g					X		x
Abutilon theophrasti	I									
Acalypha gracilens	I									
Acanthospermum hispidum	I									
Acer campestre	I									
Acer platanoides	I									
Acer pseudoplatanus	I									
Achillea filipendulina	I									
Achillea millefolium	I		p,b,g							
Achillea ptarmica	I									
Achyranthes japonica	I									
Achyranthes japonica var. hachijoensis	I									
Aconitum napellus	I									
Aconitum variegatum	I									
Acorus calamus	I	I								
Actinidia arguta	I									
Adonis annua	I									
Aegilops cylindrica	I									
Aegopodium podagraria	I									
Aesculus hippocastanum	I									

Aesculus parviflora	I									
Aesculus pavia	I									
Aethusa cynapium	I									
Agrimonia eupatoria	I									
Agropyron cristatum	I									
Agropyron cristatum ssp. pectinatum	I									
Agropyron fragile	I									
Agrostemma githago	I									
Agrostemma githago var. githago	I									
Agrostis capillaris	I									
Agrostis gigantea	I									
Agrostis stolonifera	I	S								
Ailanthus altissima	I									
Ajuga chamaepitys	I									
Ajuga genevensis	I									
Ajuga reptans	I									
Akebia quinata	I									
Alcea pallida	I									
Alcea rosea	I									
Alchemilla filicaulis	I									
Alchemilla filicaulis ssp. filicaulis	I									
Alchemilla mollis	I									
Alchemilla monticola	I									
Alkekengi officinarum	I									
Alliaria petiolata	I									
Allium carinatum	I									
Allium carinatum ssp. carinatum	I									
Allium cepa	I									
Allium oleraceum	I									
Allium sativum	I									
Allium sativum var. sativum	I									
Allium schoenoprasum var. schoenoprasum	I									
Allium tuberosum	I									
Allium vineale	I									
Alnus glutinosa	I	S								
Alopecurus carolinianus	I									
Alopecurus geniculatus	I	S								
Alopecurus pratensis	I									
Althaea hirsuta	I									
Althaea officinalis	I	S								
Alyssum alyssoides	I									
Amaranthus albus	I									
Amaranthus blitoides	I									
Amaranthus blitum	I									
Amaranthus blitum ssp. blitum	I									
Amaranthus blitum ssp. emarginatus	I									
Amaranthus caudatus	I									
Amaranthus cruentus	I									
Amaranthus hybridus	I									
Amaranthus hybridus ssp. hybridus	I									
Amaranthus hybridus ssp. quitensis	I									
Amaranthus hypochondriacus	I									
Amaranthus palmeri	I									
Amaranthus powellii	I									
Amaranthus powellii ssp. bouchonii	I									
Amaranthus powellii ssp. powellii	I									
Amaranthus retroflexus	I									
Amaranthus spinosus	I									
Amaranthus tuberculatus var. rudis	I									
Amorpha fruticosa	I									
Ampelopsis glandulosa	I									
Anchusa azurea	I									
Anchusa officinalis	I									
Anemone blanda	I									
Anemone ranunculoides	I									
Anethum graveolens	I									
Angelica sylvestris	I									
Anoda cristata	I									
Anthemis arvensis	I									
Anthemis cotula	I									
Anthoxanthum odoratum	I									
Anthriscus caucalis	I									
Anthriscus cerefolium	I									
Anthriscus sylvestris	I									

Anthyllis vulneraria	I									
Antirrhinum majus	I									
Apera interrupta	I									
Apera spica-venti	I									
Aquilegia vulgaris	I									
Arabidopsis thaliana	I									
Arabis caucasica	I									
Aralia elata	I									
Aralia spinosa	I									
Arctium lappa	I									
Arctium tomentosum	I									
Arenaria serpyllifolia	I									
Arenaria serpyllifolia var. serpyllifolia	I									
Arenaria serpyllifolia var. tenuior	I									
Argemone mexicana	I									
Aristida oligantha	I									
Aristolochia clematitis	I									
Armoracia rusticana	I									
Arrhenatherum elatius	I									
Arrhenatherum elatius ssp. elatius	I									
Artemisia abrotanum	I									
Artemisia absinthium	I									
Artemisia annua	I									
Artemisia biennis	I									
Artemisia pontica	I									
Artemisia stelleriana	I									
Artemisia vulgaris	I									
Aruncus dioicus	I									
Aruncus dioicus var. vulgaris	I									
Askellia elegans	I									
Asparagus officinalis	I									
Asperugo procumbens	I									
Asperula arvensis	I									
Asplenium scolopendrium var. scolopendrium	I									
Astragalus cicer	I									
Astragalus glycyphyllos	I									
Astragalus laxmannii	I									
Astragalus laxmannii var. robustior	I									
Atocion armeria	I									
Atriplex heterosperma	I									
Atriplex hortensis	I									
Atriplex oblongifolia	I									
Atriplex patula	I									
Atriplex prostrata	I									
Atriplex rosea	I									
Aurinia saxatilis	I									
Avena fatua	I									
Avena sativa	I									
Avena sterilis	I									
Avenula pubescens	I									
Axyris amaranthoides	I									
Ballota nigra	I									
Ballota nigra ssp. nigra	I									
Baptisia australis	I									
Baptisia australis var. minor	I									
Barbarea stricta	I									
Barbarea vulgaris	I									
Bassia scoparia	I									
Bellis perennis	I									
Berberis thunbergii	I									
Berberis vulgaris	I									
Berteroa incana	I									
Betula pendula	I	S								
Betula pubescens	I									
Betula pubescens ssp. pubescens	I									
Bidens aristosa	I									
Bidens bipinnata	I									
Bidens pilosa	I									
Bidens polylepis	I									
Blitum bonus-henricus	I									
Blitum nuttallianum	I									
Bolboschoenus maritimus ssp. maritimus	I	I								
Borago officinalis	I									
Bouteloua gracilis	I									
Brachypodium sylvaticum	I									

Brachypodium sylvaticum ssp. sylvaticum	I									
Brassica juncea	I									
Brassica napus	I									
Brassica nigra	I									
Brassica oleracea	I									
Brassica rapa	I									
Briza maxima	I									
Briza media	I									
Bromus arvensis	I									
Bromus briziformis	I									
Bromus commutatus	I									
Bromus danthoniae	I									
Bromus erectus	I									
Bromus hordeaceus	I									
Bromus hordeaceus ssp. hordeaceus	I									
Bromus japonicus	I									
Bromus racemosus	I									
Bromus secalinus	I									
Bromus sitchensis	I									
Bromus sitchensis var. aleutensis	I									
Bromus sitchensis var. carinatus	I									
Bromus squarrosus	I									
Bromus squarrosus var. squarrosus	I									
Bromus sterilis	I									
Bromus tectorum	I									
Buddleja davidii	I									
Buglossoides arvensis	I									
Bupleurum rotundifolium	I									
Butomus umbellatus	I	I								
Cabomba caroliniana	I	I								
Calamagrostis epigeios	I									
Calendula officinalis	I									
Calystegia pubescens	I									
Camelina microcarpa	I									
Camelina sativa	I									
Campanula cochlearifolia	I									
Campanula glomerata	I									
Campanula glomerata ssp. glomerata	I									
Campanula medium	I									
Campanula persicifolia	I									
Campanula persicifolia ssp. persicifolia	I									
Campanula rapunculoides	I									
Campanula trachelium	I									
Campanula trachelium ssp. trachelium	I									
Cannabis sativa	I									
Capsella bursa-pastoris	I									
Caragana arborescens	I									
Caragana frutex	I									
Cardamine flexuosa	I									
Cardamine hirsuta	I									
Cardamine impatiens	I									
Cardamine occulta	I									
Cardamine pratensis	I	I								
Carduus acanthoides	I									
Carduus acanthoides ssp. acanthoides	I									
Carduus crispus	I									
Carduus nutans	I									
Carduus nutans ssp. leiophyllus	I									
Carduus nutans ssp. nutans	I									
Carex acutiformis	I	I								
Carex disticha	I									
Carex divulsa	I									
Carex flacca	I									
Carex hirta	I									
Carex hookeriana	I									
Carex leersii	I									
Carex muricata	I									
Carex muricata ssp. lamprocarpa	I									
Carex nigra	I									
Carex parryana	I									
Carex praegracilis	I									
Carex spicata	I									
Carex sylvatica	I									
Carum carvi	I									
Carum carvi	I									

Castilleja miniata	I									
Castilleja miniata var. miniata	I									
Catalpa bignonioides	I									
Catalpa ovata	I									
Catalpa speciosa	I									
Celastrus orbiculatus	I									
Centaurea benedicta	I									
Centaurea calcitrapa	I									
Centaurea cyanus	I									
Centaurea diffusa	I									
Centaurea jacea	I									
Centaurea macrocephala	I									
Centaurea montana	I									
Centaurea nigra	I									
Centaurea nigrescens	I									
Centaurea scabiosa	I									
Centaurea solstitialis	I									
Centaurea stoebe	I									
Centaurea stoebe ssp. micranthos	I									
Centaurium erythraea	I									
Centaurium pulchellum	I									
Cephalaria gigantea	I									
Cerastium arvense ssp. arvense	I									
Cerastium fontanum	I									
Cerastium fontanum ssp. vulgare	I									
Cerastium glomeratum	I									
Cerastium pumilum	I									
Cerastium semidecandrum	I									
Cerastium tomentosum	I									
Ceratocephala testiculata	I									
Cercidiphyllum japonicum	I									
Chaenorhinum minus	I									
Chaenorhinum minus ssp. minus	I									
Chamaecrista fasciculata	I									
Chamaerhodos erecta	I									
Chelidonium majus	I									
Chenopodiastrum murale	I									
Chenopodium album	I									
Chenopodium ficifolium	I									
Chenopodium ficifolium ssp. ficifolium	I									
Chenopodium opulifolium	I									
Chenopodium strictum	I									
Chenopodium vulvaria	I									
Chondrilla juncea	I									
Chrysanthemum coccineum	I									
Cicer arietinum	I									
Cichorium intybus	I									
Cirsium arvense	I									
Cirsium palustre	I	S								
Cirsium vulgare	I									
Citrullus lanatus	I									
Citrullus lanatus ssp. lanatus	I									
Cladrastis kentukea	I									
Clematis campaniflora	I									
Clematis integrifolia	I									
Clematis orientalis	I									
Clematis recta	I									
Clematis tangutica	I									
Clematis tangutica var. tangutica	I									
Clematis terniflora	I									
Clematis viorna	I									
Clematis vitalba	I									
Clematis viticella	I									
Cleome ornithopodioides	I									
Clinopodium acinos	I									
Clinopodium glabellum	I									
Colutea arborescens	I									
Commelina communis	I									
Conium maculatum	I									
Conoclinium coelestinum	I									
Conringia orientalis	I									
Convallaria majalis	I									
Convallaria majalis var. majalis	I									
Convolvulus arvensis	I									
Coreopsis grandiflora	I									

Coreopsis tinctoria	I									
Coreopsis verticillata	I									
Coriandrum sativum	I									
Corydalis nobilis	I									
Corydalis solida	I									
Corylus avellana	I									
Cosmos bipinnatus	I									
Cota tinctoria	I									
Cotinus coggygria	I									
Cotoneaster divaricatus	I									
Cotoneaster lucidus	I									
Crataegus monogyna	I									
Crataegus monogyna var. monogyna	I									
Crataegus phaenopyrum	I									
Crepis capillaris	I									
Crepis pulchra	I									
Crepis setosa	I									
Crepis tectorum	I									
Crocus vernus	I									
Croton capitatus	I									
Cucumis melo	I									
Cucumis melo ssp. agrestis	I									
Cucumis melo ssp. melo	I									
Cucumis sativus	I									
Cucumis sativus var. sativus	I									
Cucurbita pepo	I									
Cucurbita pepo ssp. pepo	I									
Cuphea viscosissima	I									
Cuscuta epilinum	I									
Cuscuta epithymum	I									
Cuscuta epithymum var. epithymum	I									
Cyclachaena xanthiifolia	I									
Cydonia oblonga	I									
Cymbalaria muralis	I									
Cymbalaria muralis ssp. muralis	I									
Cynanchum laeve	I									
Cynodon dactylon	I									
Cynodon dactylon var. dactylon	I									
Cynoglossum officinale	I									
Cynosurus cristatus	I									
Cyperus fuscus	I	I								
Dactylorhiza praetermissa	I									
Dactylorhiza praetermissa ssp. praetermissa	I									
Dactylorhiza praetermissa ssp. praetermissa v	I									
Daphne mezereum	I									
Datura innoxia	I									
Datura stramonium	I									
Delphinium ajacis	I									
Delphinium consolida	I									
Descurainia sophia	I									
Deutzia scabra	I									
Dianthus arenarius	I									
Dianthus armeria	I									
Dianthus armeria ssp. armeria	I									
Dianthus barbatus	I									
Dianthus barbatus ssp. barbatus	I									
Dianthus chinensis	I									
Dianthus deltoides	I									
Dianthus deltoides ssp. deltoides	I									
Dianthus gratianopolitanus	I									
Dianthus plumarius	I									
Dianthus plumarius ssp. plumarius	I									
Digitalis grandiflora	I									
Digitalis lanata	I									
Digitalis lutea	I									
Digitalis purpurea	I									
Digitalis purpurea ssp. purpurea	I									
Digitaria ischaemum	I									
Digitaria sanguinalis	I									
Diplachne fusca	I	S								
Diplachne fusca ssp. fascicularis	I	S								
Diplotaxis muralis	I									
Diplotaxis tenuifolia	I									
Dipsacus fullonum	I									
Dipsacus laciniatus	I									

Distichlis spicata	I									
Draba verna	I									
Dracocephalum thymiflorum	I									
Dysphania ambrosioides	I									
Dysphania botrys	I									
Dysphania pumilio	I									
Dyssodia papposa	I									
Echinacea purpurea	I									
Echinochloa crus-galli	I	S								
Echinochloa frumentacea	I									
Echinops exaltatus	I									
Echinops sphaerocephalus	I									
Echium plantagineum	I									
Echium vulgare	I									
Egeria densa	I									
Eichhornia crassipes	I									
Elaeagnus angustifolia	I									
Elaeagnus umbellata	I									
Elatine triandra	I	I								
Eleusine indica	I									
Eleutherococcus sieboldianus	I									
Ellisia nyctelea	I									
Elsholtzia ciliata	I		P, b, **G**							
Elymus lanceolatus ssp. lanceolatus	I		**P, B**							
Elymus repens	I									
Epilobium hirsutum	I	I								
Epilobium parviflorum	I	S								
Epipactis helleborine	I		p,b,g							
Eragrostis cilianensis	I									
Eragrostis minor	I									
Eragrostis pectinacea var. miserrima	I									
Eragrostis pilosa	I									
Eragrostis pilosa var. pilosa	I									
Eranthis hyemalis	I									
Erigeron divaricatus	I									
Eriochloa contracta	I									
Erodium cicutarium	I									
Erodium cicutarium ssp. cicutarium	I									
Erodium moschatum	I									
Eruca vesicaria	I									
Eruca vesicaria ssp. sativa	I									
Erucastrum gallicum	I									
Eryngium aquaticum	I									
Eryngium aquaticum var. aquaticum	I									
Eryngium maritimum	I									
Eryngium planum	I									
Erysimum asperum	I									
Erysimum hieraciifolium	I									
Erysimum repandum	I									
Eschscholzia californica	I									
Euonymus alatus	I									
Euonymus europaeus	I									
Euonymus fortunei	I									
Eupatorium serotinum	I									
Euphorbia cyparissias	I									
Euphorbia davidii	I									
Euphorbia davidii	I									
Euphorbia dentata	I									
Euphorbia epithymoides	I									
Euphorbia esula	I									
Euphorbia exigua	I									
Euphorbia glyptosperma	I									
Euphorbia helioscopia	I									
Euphorbia heterophylla	I									
Euphorbia humistrata	I									
Euphorbia lathyris	I									
Euphorbia maculata	I									
Euphorbia marginata	I									
Euphorbia myrsinites	I									
Euphorbia peplus	I									
Euphorbia platyphyllos	I									
Euphorbia serpens	I									
Euphorbia virgata	I									
Euphrasia micrantha	I									
Euphrasia stricta	I									

Euphrasia stricta var. brevipila	I									
Euphrasia stricta var. stricta	I									
Euphrasia tetraquetra	I									
Exochorda racemosa	I									
Fagopyrum esculentum	I									
Fagopyrum tataricum	I									
Fallopia convolvulus	I									
Fallopia dumetorum	I									
Festuca filiformis	I									
Festuca rubra ssp. commutata	I									
Festuca rubra ssp. fallax	I									
Festuca rubra ssp. rubra	I									
Festuca trachyphylla	I									
Ficaria verna	I	S								
Ficus carica	I									
Filipendula rubra	I									
Filipendula ulmaria	I									
Filipendula vulgaris	I									
Foeniculum vulgare	I									
Forsythia suspensa	I									
Forsythia viridissima	I									
Fragaria vesca ssp. vesca	I									
Frangula alnus	I	S								
Fraxinus excelsior	I		p, b, g							
Froelichia gracilis	I									
Fumaria officinalis	I									
Gaillardia aristata	I									
Gaillardia pulchella	I									
Galanthus elwesii	I									
Galanthus nivalis	I									
Galega officinalis	I									
Galeopsis bifida	I									
Galeopsis speciosa	I									
Galeopsis tetrahit	I									
Galinsoga parviflora	I									
Galinsoga parviflora var. parviflora	I									
Galinsoga quadriradiata	I									
Galium glaucum	I									
Galium mollugo	I									
Galium odoratum	I									
Galium spurium	I									
Galium sylvaticum	I									
Galium tricornutum	I									
Galium verum	I									
Genista tinctoria	I									
Gentiana affinis	I									
Gentiana affinis var. affinis	I									
Geranium columbinum	I									
Geranium dissectum	I									
Geranium molle	I									
Geranium pratense	I									
Geranium pusillum	I									
Geranium pyrenaicum	I									
Geranium pyrenaicum ssp. pyrenaicum	I									
Geranium sanguineum	I									
Geum urbanum	I									
Glaucium flavum	I									
Glebionis coronaria	I									
Glebionis segetum	I									
Glechoma hederacea	I									
Glyceria maxima	I	I								
Glyceria notata	I									
Glycine max	I									
Gnaphalium uliginosum	I	S								
Grindelia squarrosa	I									
Guizotia abyssinica	I									
Gypsophila elegans	I									
Gypsophila paniculata	I									
Gypsophila scorzonerifolia	I									
Gypsophila vaccaria	I									
Hedera helix	I									
Helenium flexuosum	I									
Helianthus annuus	I									
Helianthus grosseserratus	I	S								
Helianthus hirsutus	I									

Helianthus maximiliani	I									
Helianthus mollis	I									
Helianthus nuttallii	I									
Helianthus nuttallii ssp. nuttallii	I									
Helianthus nuttallii ssp. rydbergii	I									
Helianthus pauciflorus ssp. pauciflorus	I									
Helianthus petiolaris	I									
Helianthus petiolaris ssp. petiolaris	I									
Helleborus niger	I									
Helminthotheca echioides	I									
Hemerocallis fulva	I									
Hemerocallis lilioasphodelus	I									
Heracleum mantegazzianum	I									
Heracleum sphondylium	I									
Herniaria glabra	I									
Heterotheca villosa var. ballardii	I									
Heterotheca villosa var. villosa	I									
Hibiscus trionum	I									
Hieracium lachenalii	I									
Hieracium laevigatum	I									
Hieracium laevigatum ssp. tridentatum	I									
Hieracium murorum	I									
Hippophae rhamnoides	I									
Holcus lanatus	I									
Holosteum umbellatum	I		**P,B,** g							
Holosteum umbellatum ssp. umbellatum	I									
Hordeum marinum	I									
Hordeum marinum ssp. gussoneanum	I									
Hordeum pusillum	I									
Hordeum vulgare	I									
Hordeum vulgare ssp. vulgare	I									
Humulus japonicus	I									
Humulus lupulus var. lupulus	I									
Hyacinthoides hispanica	I									
Hydrangea paniculata	I									
Hydrilla verticillata	I									
Hydrocharis morsus-ranae	I	I								
Hylotelephium telephioides	I									
Hylotelephium telephium	I									
Hyoscyamus albus	I									
Hyoscyamus niger	I									
Hypericum hirsutum	I									
Hypericum perforatum	I									
Hypericum perforatum ssp. perforatum	I									
Hypericum tetrapterum	I									
Hypochaeris glabra	I									
Hypochaeris radicata	I									
Hyssopus officinalis	I									
Iberis amara	I									
Iberis umbellata	I									
Impatiens balfourii	I									
Impatiens glandulifera	I									
Impatiens parviflora	I									
Imperatoria ostruthium	I									
Inula britannica	I									
Inula helenium	I	S								
Inula racemosa	I									
Ipomoea hederacea	I									
Ipomoea hederacea	I									
Ipomoea lacunosa	I									
Ipomoea purpurea	I									
Ipomoea quamoclit	I									
Ipomopsis rubra	I									
Iris ensata	I									
Iris pallida	I									
Iris prismatica	I									
Iris pseudacorus	I	I								
Iris pumila	I									
Iris sibirica	I									
Isatis tinctoria	I									
Isotrema macrophyllum	I									
Jacobaea vulgaris	I									
Juglans regia	I									
Juncus compressus	I	S								
Juncus conglomeratus	I									
Juncus effusus ssp. effusus	I	I								

Juncus gerardi	I	I								
Juncus gerardi ssp. gerardi	I	I								
Juncus inflexus	I	S								
Juncus inflexus ssp. inflexus	I									
Juniperus communis var. communis	I									
Kali collinum	I									
Kali tragus	I									
Kali turgidum	I									
Kali turgidum	I									
Kalopanax septemlobus	I									
Kerria japonica	I									
Kickxia elatine	I									
Kickxia spuria	I									
Knautia arvensis	I									
Kolkwitzia amabilis	I									
Lablab purpureus	I									
Lactuca ludoviciana	I									
Lactuca saligna	I									
Lactuca sativa	I									
Lactuca serriola	I									
Lagurus ovatus	I									
Lamium album	I									
Lamium amplexicaule	I									
Lamium galeobdolon	I									
Lamium hybridum	I									
Lamium maculatum	I									
Lamium purpureum	I									
Lappula squarrosa	I									
Lapsana communis	I									
Larix decidua	I									
Lathyrus latifolius	I									
Lathyrus niger	I									
Lathyrus niger ssp. niger	I									
Lathyrus odoratus	I									
Lathyrus pratensis	I									
Lathyrus sativus	I									
Lathyrus sylvestris	I									
Lathyrus tuberosus	I									
Lavatera thuringiaca	I									
Lens culinaris	I									
Leontodon hispidus	I									
Leontodon saxatilis	I									
Leontodon saxatilis ssp. saxatilis	I									
Leonurus cardiaca	I									
Leonurus cardiaca ssp. cardiaca	I									
Lepidium aucheri	I									
Lepidium campestre	I									
Lepidium chalepense	I									
Lepidium coronopus	I									
Lepidium densiflorum	I									
Lepidium didymum	I									
Lepidium draba	I									
Lepidium latifolium	I									
Lepidium perfoliatum	I									
Lepidium ramosissimum	I									
Lepidium ruderale	I									
Lepidium sativum	I									
Lespedeza bicolor	I									
Lespedeza cuneata	I									
Lespedeza thunbergii	I									
Leucanthemella serotina	I									
Leucojum aestivum	I									
Levisticum officinale	I									
Leymus arenarius	I									
Ligustrum obtusifolium	I									
Ligustrum ovalifolium	I									
Ligustrum vulgare	I									
Lilium bulbiferum	I									
Lilium lancifolium	I									
Lilium martagon	I									
Limonium platyphyllum	I									
Limonium vulgare	I									
Linaria dalmatica	I									
Linaria dalmatica ssp. dalmatica	I									
Linaria dalmatica ssp. macedonica	I									
Linaria vulgaris	I									

Linum austriacum	I									
Linum catharticum	I									
Linum lewisii var. lewisii	I									
Linum perenne	I									
Linum usitatissimum	I									
Lipandra polysperma	I									
Lipandra polysperma var. acutifolia	I									
Lipandra polysperma var. polysperma	I									
Liquidambar styraciflua	I									
Lithospermum officinale	I									
Lobularia maritima	I									
Logfia arvensis	I									
Lolium arundinaceum	I									
Lolium giganteum	I									
Lolium multiflorum	I									
Lolium perenne	I									
Lolium persicum	I									
Lolium remotum	I									
Lolium temulentum	I									
Lonicera caprifolium	I									
Lonicera chrysantha	I		p,b,g							
Lonicera etrusca	I		p,b,g							
Lonicera japonica	I									
Lonicera maackii	I									
Lonicera morrowii	I		p,b,g							
Lonicera periclymenum	I									
Lonicera ruprechtiana	I									
Lonicera sempervirens	I									
Lonicera sempervirens var. sempervirens	I									
Lonicera tatarica	I		**P,** b, g							
Lonicera xylosteum	I									
Lotus corniculatus	I									
Lotus tenuis	I									
Ludwigia peploides	I									
Ludwigia peploides ssp. glabrescens	I									
Lunaria annua	I									
Lupinus polyphyllus	I									
Lupinus polyphyllus var. polyphyllus	I									
Luzula campestris	I									
Luzula campestris ssp. campestris	I									
Luzula luzuloides	I									
Luzula luzuloides ssp. luzuloides	I									
Luzula pallescens	I									
Lycium barbarum	I									
Lycium chinense	I		**B,G**							
Lycopsis arvensis	I									
Lycopus europaeus	I	I								
Lysimachia arvensis	I									
Lysimachia nummularia	I									
Lysimachia punctata	I									
Lysimachia vulgaris	I	S								
Lythrum hyssopifolia	I	S								
Lythrum salicaria	I	I								
Macleaya cordata	I									
Maclura pomifera	I									
Madia glomerata	I									
Madia sativa	I									
Magnolia kobus	I									
Mahonia aquifolium	I									
Mahonia repens	I									
Malcolmia maritima	I									
Malus baccata	I									
Malus prunifolia	I									
Malus toringo	I									
Malva alcea	I									
Malva moschata	I									
Malva neglecta	I									
Malva parviflora	I									
Malva pusilla	I									
Malva sylvestris	I									
Malva verticillata	I									
Marrubium vulgare	I									
Marsilea quadrifolia	I									
Matricaria chamomilla	I									
Matricaria discoidea	I		p,b,g							
Matthiola incana	I									

Matthiola longipetala	I									
Medicago laciniata	I									
Medicago lupulina	I									
Medicago polymorpha	I									
Medicago sativa	I									
Medicago sativa ssp. falcata	I									
Medicago sativa ssp. sativa	I									
Medicago sativa ssp. x varia	I									
Melica altissima	I									
Melilotus albus	I									
Melilotus altissimus	I									
Melilotus officinalis	I									
Melissa officinalis	I									
Melissa officinalis ssp. officinalis	I									
Mentha aquatica	I									
Mentha spicata	I	S								
Mentha suaveolens	I	S								
Mentha x villosa var. alopecuroides	I									
Mercurialis annua	I									
Microstegium vimineum	I									
Mirabilis albida	I									
Miscanthus sacchariflorus	I									
Miscanthus sinensis	I									
Misopates orontium	I									
Misopates orontium ssp. orontium	I									
Molinia caerulea	I									
Mollugo verticillata	I									
Moluccella laevis	I									
Morus alba	I									
Muhlenbergia asperifolia	I									
Muscari armeniacum	I									
Muscari botryoides	I									
Muscari neglectum	I									
Mycelis muralis	I									
Myosotis arvensis	I									
Myosotis scorpioides	I	I								
Myosotis stricta	I									
Myosotis sylvatica	I									
Myosoton aquaticum	I	S								
Myriophyllum aquaticum	I									
Myriophyllum spicatum	I	I								
Myrrhis odorata	I									
Najas minor	I	I								
Narcissus poeticus	I									
Narcissus pseudonarcissus	I									
Nardus stricta	I									
Nasturtium microphyllum	I	I								
Nasturtium officinale	I									
Nelumbo nucifera	I									
Neottia ovata	I									
Nepeta cataria	I									
Neslia paniculata	I									
Nicandra physalodes	I									
Nicotiana alata	I									
Nicotiana longiflora	I									
Nicotiana rustica	I									
Nicotiana tabacum	I									
Nigella damascena	I									
Noccaea perfoliata	I									
Nymphoides peltata	I									
Odontarrhena muralis	I									
Odontites vulgaris	I		(p, b, g)							
Oenanthe javanica	I		p, b							
Oenothera filiformis	I									
Oenothera glazioviana	I									
Oenothera laciniata	I									
Oenothera nuttallii	I		(p, b)							
Oenothera serrulata	I									
Oenothera suffrutescens	I									
Omphalodes linifolia	I									
Omphalodes linifolia	I									
Onobrychis viciifolia	I		p,b,g							
Onopordum acanthium	I		**P,B,G**							
Onopordum acanthium ssp. acanthium	I									
Origanum vulgare	I									
Origanum vulgare ssp. vulgare	I									

Ornithogalum nutans	I									
Ornithogalum umbellatum	I									
Orthocarpus luteus	I									
Oxalis corniculata	I									
Oxalis dillenii	I									
Oxalis stricta	I									
Oxybasis glauca	I									
Oxybasis urbica	I									
Pachysandra terminalis	I									
Packera glabella	I									
Paeonia lactiflora	I									
Paeonia officinalis	I									
Panicum dichotomiflorum	I									
Panicum dichotomiflorum ssp. dichotomifloru	I									
Panicum miliaceum	I									
Panicum miliaceum ssp. miliaceum	I									
Papaver dubium	I									
Papaver orientale	I									
Papaver rhoeas	I									
Papaver somniferum	I									
Parthenocissus tricuspidata	I									
Paspalum racemosum	I									
Paspalum racemosum	I									
Pastinaca sativa	I									
Penstemon albidus	I									
Penstemon calycosus	I									
Penstemon pallidus	I									
Penstemon tubaeflorus	I									
Perilla frutescens	I									
Peritoma serrulata	I									
Persicaria hydropiper	I	I								
Persicaria longiseta	I									
Persicaria maculosa	I	S								
Persicaria minor	I									
Persicaria orientalis	I									
Petasites hybridus	I									
Petasites japonicus	I	S								
Petrorhagia saxifraga	I									
Petrorhagia saxifraga var. saxifraga	I									
Petroselinum crispum	I									
Petunia integrifolia	I									
Phacelia tanacetifolia	I									
Phalaris arundinacea var. picta	I									
Phalaris canariensis	I									
Phaseolus coccineus	I									
Phedimus aizoon	I									
Phedimus hybridus	I									
Phedimus spurius	I		**P,B,G**							
Phelipanche purpurea	I									
Phellodendron amurense	I									
Philadelphus coronarius	I									
Philadelphus inodorus	I									
Philadelphus pubescens	I									
Phleum pratense	I									
Phlox drummondii	I									
Phlox maculata	I	S								
Phlox paniculata	I									
Phlox subulata ssp. brittonii	I									
Phragmites australis ssp. australis	I	S								
Physalis grisea	I									
Physalis ixocarpa	I									
Physalis peruviana	I									
Picea abies	I									
Picea pungens	I									
Picris hieracioides	I									
Pilosella aurantiaca	I									
Pilosella flagellaris	I									
Pilosella officinarum	I									
Pilosella piloselloides	I									
Pilosella piloselloides ssp. piloselloides	I									
Pilosella piloselloides ssp. praealta	I									
Pimpinella saxifraga	I									
Pimpinella saxifraga ssp. saxifraga	I									
Pinellia ternata	I									
Pinus mugo	I									
Pinus nigra	I									

Pinus sylvestris var. sylvestris	I									
Pinus virginiana	I									
Pistia stratiotes	I									
Pisum sativum	I									
Pisum sativum var. sativum	I									
Pityopsis falcata	I									
Plagiobothrys scouleri	I									
Plagiobothrys scouleri var. hispidulus	I									
Plantago arenaria	I									
Plantago aristata	I									
Plantago major	I									
Plantago media	I									
Plantago virginica	I									
Pluchea odorata	I		**P**							
Pluchea odorata var. succulenta	I									
Poa annua	I									
Poa arida	I									
Poa bulbosa	I									
Poa bulbosa ssp. bulbosa	I									
Poa bulbosa ssp. vivipara	I		(p, b, g)							
Poa compressa	I									
Poa iconia	I									
Poa iconia var. iconia	I									
Poa nemoralis	I									
Poa pratensis ssp. angustifolia	I									
Poa pratensis ssp. pratensis	I									
Poa trivialis	I									
Polanisia dodecandra ssp. trachysperma	I									
Polemonium reptans	I									
Polemonium reptans var. reptans	I									
Polycnemum majus	I									
Polygonatum multiflorum	I									
Polygonum aviculare ssp. aviculare	I									
Polygonum aviculare ssp. depressum	I									
Polygonum aviculare ssp. neglectum	I									
Polypogon monspeliensis	I		p,b,g							
Populus alba	I		p,b,g							
Populus nigra	I		p,b,g							
Populus nigra var. italica	I									
Portulaca grandiflora	I									
Portulaca oleracea	I									
Potamogeton crispus	I	I								
Potentilla argentea	I									
Potentilla inclinata	I									
Potentilla indica var. indica	I									
Potentilla intermedia	I									
Potentilla recta	I									
Potentilla reptans	I	S								
Potentilla verna	I									
Poteridium annuum	I									
Poterium sanguisorba	I									
Poterium sanguisorba var. polygamum	I									
Primula incana	I									
Primula veris	I									
Proboscidea louisiana	I									
Prunella vulgaris ssp. vulgaris	I									
Prunus armeniaca	I									
Prunus avium	I									
Prunus cerasifera	I									
Prunus cerasus	I									
Prunus domestica	I									
Prunus glandulosa	I									
Prunus mahaleb	I									
Prunus padus	I									
Prunus persica	I									
Prunus spinosa	I									
Prunus tomentosa	I		p,b,g							
Psammophiliella muralis	I									
Puccinellia distans	I	S								
Puccinellia fasciculata	I									
Pueraria montana	I									
Pueraria montana var. lobata	I									
Pulmonaria officinalis	I									
Puschkinia scilloides	I									
Pyracantha coccinea	I									
Pyrus communis	I									

Quercus robur	I									
Ranunculus bulbosus	I									
Ranunculus repens	I									
Ranunculus sardous	I									
Ranunculus sceleratus var. sceleratus	I									
Raphanus raphanistrum	I									
Raphanus raphanistrum ssp. raphanistrum	I									
Raphanus sativus	I									
Rapistrum rugosum	I									
Ratibida columnifera	I									
Reseda alba	I									
Reseda lutea	I									
Reynoutria japonica	I									
Reynoutria japonica var. japonica	I									
Reynoutria sachalinensis	I									
Rhaponticum repens	I									
Rheum rhabarbarum	I									
Rhinanthus minor ssp. minor	I									
Rhodotypos scandens	I									
Ribes alpinum	I									
Ribes aureum	I									
Ribes aureum var. aureum	I									
Ribes aureum var. villosum	I									
Ribes missouriense	I									
Ribes nigrum	I									
Ribes rubrum	I	S								
Ribes uva-crispa	I									
Ricinus communis	I									
Robinia hispida	I									
Robinia pseudoacacia	I									
Robinia viscosa	I									
Rorippa curvipes	I									
Rorippa sinuata	I									
Rorippa sylvestris	I	S								
Rosa canina	I									
Rosa cinnamomea	I									
Rosa gallica	I									
Rosa hugonis	I									
Rosa multiflora	I									
Rosa rubiginosa	I									
Rosa rubiginosa var. nemoralis	I									
Rosa rubiginosa var. rubiginosa	I									
Rosa rugosa	I									
Rosa spinosissima	I									
Rubus bifrons	I									
Rubus caesius	I									
Rubus idaeus ssp. idaeus	I									
Rubus illecebrosus	I									
Rubus laciniatus	I									
Rubus ulmifolius	I									
Rubus ulmifolius var. anoplothyrsus	I									
Rudbeckia grandiflora	I		(p, b, g)							
Rudbeckia grandiflora var. grandiflora	I									
Rudbeckia triloba	I									
Rudbeckia triloba var. triloba	I									
Rumex acetosa	I									
Rumex acetosella	I									
Rumex acetosella ssp. acetosella	I									
Rumex acetosella ssp. pyrenaicus	I									
Rumex conglomeratus	I									
Rumex crispus	I	S								
Rumex cristatus	I									
Rumex dentatus	I									
Rumex longifolius	I									
Rumex obtusifolius	I	S								
Rumex patientia	I									
Rumex pseudonatronatus	I									
Rumex sanguineus	I	S								
Rumex stenophyllus	I									
Rumex thyrsiflorus	I									
Ruta graveolens	I									
Sagina japonica	I									
Sagina procumbens	I									
Salix alba	I	S								
Salix atrocinerea	I									
Salix caprea	I									

Salix cinerea	I									
Salix daphnoides	I									
Salix elaeagnos	I									
Salix euxina	I									
Salix matsudana	I									
Salix myrsinifolia	I									
Salix pentandra	I	S								
Salix purpurea	I	S								
Salix triandra	I									
Salix viminalis	I									
Salvia nemorosa	I									
Salvia officinalis	I									
Salvia pratensis	I									
Salvia reflexa	I									
Salvia sclarea	I									
Salvia verticillata	I									
Sambucus nigra	I									
Saponaria ocymoides	I									
Saponaria officinalis	I									
Satureja hortensis	I									
Scabiosa ochroleuca	I									
Scandix pecten-veneris	I		**P**,b,g							
Scandosorbus intermedia	I									
Schoenoplectiella mucronata	I									
Scilla forbesii	I									
Scilla luciliae	I									
Scilla siberica	I									
Scleranthus annuus	I									
Scleranthus annuus ssp. annuus	I									
Sclerochloa dura	I									
Scorzoneroides autumnalis	I									
Scrophularia nodosa	I									
Secale cereale	I									
Securigera varia	I									
Sedum acre	I									
Sedum album	I									
Sedum hispanicum	I									
Sedum sarmentosum	I									
Sedum sexangulare	I									
Sedum ternatum	I									
Sedum thartii	I									
Sempervivum tectorum	I									
Senecio sylvaticus	I									
Senecio viscosus	I									
Senecio vulgaris	I									
Sesbania herbacea	I									
Setaria faberi	I									
Setaria italica	I									
Setaria pumila	I									
Setaria verticillata	I									
Setaria verticilliformis	I									
Setaria viridis	I									
Setaria viridis var. viridis	I									
Shepherdia argentea	I									
Sherardia arvensis	I									
Sida spinosa	I									
Silene chalcedonica	I									
Silene coronaria	I									
Silene csereii	I									
Silene dichotoma	I									
Silene dichotoma ssp. dichotoma	I									
Silene dioica	I									
Silene flos-cuculi	I									
Silene flos-cuculi	I									
Silene flos-cuculi ssp. flos-cuculi	I									
Silene gallica	I									
Silene latifolia	I									
Silene noctiflora	I									
Silene stellata	I									
Silene vulgaris	I									
Silphium integrifolium	I									
Silphium integrifolium var. laeve	I									
Silybum marianum	I									
Sinapis alba	I									
Sinapis alba ssp. alba	I									
Sinapis arvensis	I									

Sisymbrium altissimum	I									
Sisymbrium loeselii	I									
Sisymbrium officinale	I									
Solanum carolinense	I									
Solanum carolinense var. carolinense	I									
Solanum dulcamara	I	S								
Solanum lycopersicum	I									
Solanum nigrum	I									
Solanum nitidibaccatum	I									
Solanum rostratum	I									
Solanum sisymbriifolium	I									
Solanum triflorum	I									
Solanum tuberosum	I									
Solidago lepida var. salebrosa	I									
Solidago rigida ssp. humilis	I									
Solidago sempervirens	I									
Sonchus arvensis	I									
Sonchus arvensis ssp. arvensis	I									
Sonchus arvensis ssp. uliginosus	I									
Sonchus asper	I									
Sonchus oleraceus	I									
Sonchus palustris	I	I								
Sonchus palustris ssp. palustris	I									
Sorbaria sorbifolia	I									
Sorghum bicolor	I									
Sorghum bicolor ssp. bicolor	I									
Sorghum halepense	I									
Spergula arvensis	I									
Spergularia media	I									
Spergularia media var. media	I									
Spergularia rubra	I									
Spiraea chamaedryfolia	I									
Spiraea corymbosa	I									
Spiraea japonica	I									
Spiraea prunifolia	I									
Spiraea salicifolia	I									
Spiraea thunbergii	I									
Sporobolus pumilus	I									
Sporobolus schoenoides	I									
Stachys byzantina	I									
Stachys germanica	I									
Stachys palustris	I	I								
Stachys sylvatica	I									
Stellaria graminea	I	S								
Stellaria media	I									
Stellaria pallida	I									
Stratiotes aloides	I									
Succisa pratensis	I									
Succisella inflexa	I									
Symphoricarpos albus var. laevigatus	I									
Symphoricarpos occidentalis	I									
Symphoricarpos orbiculatus	I									
Symphyotrichum falcatum	I									
Symphyotrichum falcatum var. commutatum	I									
Symphyotrichum novi-belgii	I									
Symphyotrichum racemosum	I									
Symphyotrichum subulatum	I	I								
Symphyotrichum subulatum	I	I								
Symphyotrichum subulatum var. subulatum	I									
Symphytum asperum	I									
Symphytum officinale	I									
Syringa josikaea	I									
Syringa reticulata	I									
Syringa reticulata ssp. pekinensis	I									
Syringa reticulata ssp. reticulata	I									
Syringa villosa	I									
Syringa vulgaris	I									
Tamarix parviflora	I									
Tanacetum balsamita	I									
Tanacetum parthenium	I									
Tanacetum vulgare	I									
Taraxacum erythrospermum	I									
Taraxacum palustre	I									
Tarenaya hassleriana	I									
Teucrium botrys	I									

Teucrium scorodonia	I									
Thalictrum aquilegiifolium	I									
Thermopsis rhombifolia	I									
Thinopyrum intermedium	I									
Thinopyrum intermedium ssp. intermedium	I									
Thinopyrum obtusiflorum	I									
Thladiantha dubia	I									
Thlaspi arvense	I									
Thymelaea passerina	I									
Thymus praecox	I									
Thymus praecox ssp. britannicus	I									
Thymus pulegioides	I									
Tilia cordata	I									
Tilia heterophylla	I									
Torilis japonica	I									
Tradescantia virginiana	I									
Tragopogon dubius	I									
Tragopogon porrifolius	I									
Tragopogon pratensis	I									
Trapa natans	I									
Tribulus terrestris	I									
Tridens flavus	I									
Tridens flavus var. flavus	I									
Trifolium arvense	I									
Trifolium aureum	I									
Trifolium campestre	I									
Trifolium dubium	I									
Trifolium fragiferum	I									
Trifolium fragiferum ssp. bonannii	I									
Trifolium hybridum	I									
Trifolium incarnatum	I									
Trifolium medium	I									
Trifolium resupinatum	I									
Trillium luteum	I									
Tripleurospermum inodorum	I									
Tripleurospermum maritimum ssp. maritimum	I									
Trisetum flavescens	I									
Trisetum flavescens ssp. flavescens	I									
Triticum aestivum	I									
Triticum turgidum	I									
Tulipa gesneriana	I									
Tulipa sylvestris	I									
Typha angustifolia	I	I								
Ulmus glabra	I									
Ulmus minor	I									
Ulmus parvifolia	I									
Ulmus procera	I									
Ulmus pumila	I									
Urtica dioica	I									
Urtica dioica ssp. dioica	I									
Urtica urens	I									
Valerianella locusta	I									
Ventenata dubia	I									
Verbascum blattaria	I									
Verbascum lychnitis	I									
Verbascum lychnitis ssp. lychnitis	I									
Verbascum nigrum	I									
Verbascum phlomoides	I									
Verbascum thapsus	I									
Verbascum thapsus ssp. thapsus	I									
Verbascum virgatum	I									
Verbena bonariensis	I									
Verbena bracteata	I									
Verbena incompta	I									
Veronica agrestis	I									
Veronica anagallis-aquatica	I	I								
Veronica arvensis	I									
Veronica austriaca	I									
Veronica austriaca ssp. vahlii	I									
Veronica austriaca ssp. vahlii	I									
Veronica beccabunga	I	I								
Veronica beccabunga ssp. beccabunga	I									
Veronica chamaedrys	I									
Veronica dillenii	I									
Veronica filiformis	I									
Veronica hederifolia	I									

Veronica incana	I									
Veronica incana	I									
Veronica longifolia	I									
Veronica officinalis	I									
Veronica persica	I									
Veronica polita	I									
Veronica serpyllifolia ssp. serpyllifolia	I									
Veronica spicata	I									
Veronica teucrium	I									
Veronica verna	I									
Viburnum lantana	I									
Viburnum opulus var. opulus	I									
Vicia hirsuta	I									
Vicia sativa	I									
Vicia sativa var. angustifolia	I									
Vicia sativa var. sativa	I									
Vicia sepium	I									
Vicia tenuifolia	I									
Vicia tetrasperma	I									
Vicia villosa	I									
Vicia villosa var. villosa	I									
Vinca minor	I									
Vincetoxicum hirundinaria	I									
Vincetoxicum nigrum	I									
Vincetoxicum rossicum	I									
Viola arvensis	I									
Viola odorata	I									
Viola tricolor	I									
Viola tricolor var. tricolor	I									
Vulpia myuros	I									
Xanthisma texanum	I									
Xanthium spinosum	I									
Yucca flaccida	I									
Zea mays	I									
Zea mays ssp. mays	I									
Zoysia japonica	I									
Abies balsamea	N	S								
Acalypha rhomboidea	N									
Acer negundo	N	S								
Acer negundo var. negundo	N									
Acer negundo var. texanum	N									
Acer nigrum	N									
Acer pensylvanicum	N									
Acer rubrum	N	S								
Acer rubrum var. rubrum	N									
Acer rubrum var. trilobum	N									
Acer saccharum	N									
Acer spicatum	N	S								
Acer x freemanii	N	I								
Achillea alpina	N									
Achillea alpina ssp. multiflora	N									
Achillea borealis	N									
Achillea borealis var. borealis	N									
Aconitum x bicolor	N									
Acorus americanus	N	I								
Actaea pachypoda	N									
Actaea racemosa	N									
Actaea rubra	N									
Actaea rubra ssp. rubra	N									
Actaea x ludovici	N									
Adenocaulon bicolor	N									
Adiantum pedatum	N		p,b,g							
Adlumia fungosa	N									
Adoxa moschatellina	N									
Aesculus glabra	N									
Aesculus glabra var. glabra	N									
Agalinis gattingeri	N									
Agalinis purpurea	N	S								
Agalinis purpurea var. parviflora	N	I								
Agalinis purpurea var. purpurea	N									
Agalinis skinneriana	N									
Agalinis tenuifolia	N	S								
Agastache foeniculum	N									
Agastache nepetoides	N									
Agastache scrophulariifolia	N									
Ageratina altissima	N	S								

Ageratina altissima var. altissima	N									
Agoseris glauca	N									
Agoseris glauca var. glauca	N									
Agrimonia gryposepala	N									
Agrimonia parviflora	N									
Agrimonia pubescens	N									
Agrimonia striata	N									
Agrostis hyemalis	N									
Agrostis mertensii	N									
Agrostis perennans	N									
Agrostis scabra	N	S								
Aletris farinosa	N									
Alisma gramineum	N	I								
Alisma subcordatum	N	I								
Alisma triviale	N	I								
Allium canadense	N									
Allium canadense var. canadense	N									
Allium cernuum	N									
Allium schoenoprasum	N									
Allium schoenoprasum var. sibiricum	N									
Allium stellatum	N									
Allium tricoccum	N									
Allium tricoccum var. burdickii	N									
Allium tricoccum var. tricoccum	N									
Alnus alnobetula	N									
Alnus alnobetula ssp. crispa	N									
Alnus incana	N	I								
Alnus incana ssp. rugosa	N									
Alopecurus aequalis	N	I								
Alopecurus aequalis var. aequalis	N									
Alopecurus magellanicus	N									
Amaranthus tuberculatus	N	I								
Amaranthus tuberculatus var. tuberculatus	N									
Amaranthus x ozanonii	N									
Amaranthus x soproniensis	N									
Ambrosia artemisiifolia	N									
Ambrosia psilostachya	N									
Ambrosia trifida	N									
Ambrosia x helenae	N									
Amelanchier alnifolia	N									
Amelanchier alnifolia var. alnifolia	N									
Amelanchier amabilis	N									
Amelanchier arborea	N									
Amelanchier bartramiana	N									
Amelanchier gaspensis	N									
Amelanchier humilis	N									
Amelanchier interior	N									
Amelanchier intermedia	N									
Amelanchier laevis	N									
Amelanchier sanguinea	N									
Amelanchier spicata	N									
Amelanchier x neglecta	N									
Amelanchier x quinti-martii	N									
Ammannia robusta	N	I								
Amorpha canescens	N									
Amphicarpaea bracteata	N	S								
Anaphalis margaritacea	N									
Anchistea virginica	N									
Andersonglossum boreale	N									
Andromeda polifolia	N									
Andromeda polifolia var. latifolia	N	I								
Andromeda polifolia var. polifolia	N	I								
Andromeda polifolia var. x jamesiana	N									
Andropogon gerardi	N									
Andropogon virginicus	N									
Andropogon virginicus var. virginicus	N									
Androsace occidentalis	N									
Androsace septentrionalis	N									
Anemonastrum canadense	N	S								
Anemonastrum richardsonii	N									
Anemone cylindrica	N									
Anemone multifida	N									
Anemone multifida var. multifida	N									
Anemone parviflora	N									
Anemone quinquefolia	N									

Anemone quinquefolia var. quinquefolia	N									
Anemone virginiana	N									
Anemone virginiana var. alba	N									
Anemone virginiana var. cylindroidea	N									
Anemone virginiana var. virginiana	N									
Angelica atropurpurea	N	I								
Angelica lucida	N									
Angelica venenosa	N									
Antennaria alpina	N									
Antennaria howellii	N									
Antennaria howellii ssp. canadensis	N									
Antennaria howellii ssp. howellii	N									
Antennaria howellii ssp. neodioica	N									
Antennaria howellii ssp. petaloidea	N									
Antennaria microphylla	N									
Antennaria neglecta	N									
Antennaria parlinii	N									
Antennaria parlinii ssp. fallax	N									
Antennaria parlinii ssp. parlinii	N									
Antennaria parvifolia	N									
Antennaria pulcherrima	N									
Antennaria pulcherrima ssp. pulcherrima	N									
Antennaria rosea	N									
Antennaria rosea ssp. confinis	N									
Antennaria rosea ssp. pulvinata	N									
Antennaria rosea ssp. rosea	N									
Anthoxanthum arcticum	N									
Anthoxanthum hirtum	N									
Anthoxanthum monticola	N									
Anthoxanthum monticola ssp. monticola	N									
Anthoxanthum nitens	N	S								
Anthoxanthum nitens	N	S								
Anthoxanthum nitens ssp. nitens	N	S								
Anticlea elegans	N	S								
Aphyllon fasciculatum	N									
Aphyllon uniflorum	N									
Apios americana	N	S								
Aplectrum hyemale	N									
Apocynum androsaemifolium	N									
Apocynum cannabinum	N									
Apocynum cannabinum var. cannabinum	N									
Apocynum cannabinum var. hypericifolium	N									
Apocynum x floribundum	N									
Aquilegia brevistyla	N									
Aquilegia canadensis	N									
Arabidopsis arenicola	N									
Arabidopsis lyrata	N									
Arabidopsis lyrata ssp. kamchatica	N									
Arabidopsis lyrata ssp. lyrata	N									
Arabis adpressipilis	N									
Arabis alpina	N									
Arabis pycnocarpa	N									
Aralia hispida	N		**P,G**							
Aralia nudicaulis	N		p,b,g							
Aralia racemosa	N		p,b,g							
Arceuthobium americanum	N									
Arceuthobium pusillum	N	S								
Arctagrostis latifolia	N									
Arctagrostis latifolia ssp. latifolia	N									
Arctanthemum arcticum	N									
Arctanthemum arcticum ssp. polare	N									
Arctium x nothum	N									
Arctophila fulva	N									
Arctostaphylos uva-ursi	N									
Arctous alpina	N									
Arctous rubra	N									
Arenaria humifusa	N									
Arethusa bulbosa	N	I								
Arisaema dracontium	N	I								
Arisaema triphyllum	N	S								
Arisaema triphyllum ssp. triphyllum	N									
Aristida basiramea	N									
Aristida dichotoma	N									
Aristida dichotoma var. dichotoma	N									
Aristida longespica	N									

Aristida longespica var. geniculata	N									
Aristida longespica var. longespica	N									
Aristida purpurascens	N									
Aristida purpurascens var. purpurascens	N									
Armeria maritima	N									
Armeria maritima ssp. sibirica	N									
Arnica angustifolia	N									
Arnica angustifolia ssp. angustifolia	N									
Arnica chamissonis	N									
Arnica cordifolia	N									
Arnica lonchophylla	N									
Arnoglossum plantagineum	N	I								
Aronia arbutifolia	N									
Aronia melanocarpa	N	I								
Aronia x prunifolia	N									
Artemisia borealis	N									
Artemisia borealis ssp. borealis	N									
Artemisia campestris	N									
Artemisia campestris ssp. canadensis	N									
Artemisia campestris ssp. caudata	N									
Artemisia dracunculus	N									
Artemisia frigida	N									
Artemisia ludoviciana	N									
Artemisia ludoviciana ssp. ludoviciana	N									
Artemisia tilesii	N									
Asarum canadense	N									
Asclepias exaltata	N									
Asclepias hirtella	N									
Asclepias incarnata	N	I								
Asclepias incarnata ssp. incarnata	N									
Asclepias ovalifolia	N									
Asclepias purpurascens	N									
Asclepias quadrifolia	N									
Asclepias sullivantii	N									
Asclepias tuberosa	N									
Asclepias tuberosa ssp. interior	N									
Asclepias tuberosa ssp. tuberosa	N									
Asclepias variegata	N									
Asclepias verticillata	N									
Asclepias viridiflora	N									
Asimina triloba	N									
Asplenium platyneuron	N		**P,G**							
Asplenium rhizophyllum	N		p,**B,**g							
Asplenium ruta-muraria	N		**P**							
Asplenium ruta-muraria var. cryptolepis	N									
Asplenium scolopendrium	N		p,**B**,g							
Asplenium scolopendrium var. americanum	N									
Asplenium trichomanes	N		p,**B**,g							
Asplenium trichomanes ssp. quadrivalens	N									
Asplenium trichomanes ssp. trichomanes	N									
Asplenium viride	N		p,g							
Aster alpinus	N									
Aster alpinus ssp. vierhapperi	N									
Astragalus agrestis	N									
Astragalus alpinus	N									
Astragalus alpinus var. alpinus	N									
Astragalus americanus	N									
Astragalus australis	N									
Astragalus australis var. glabriusculus	N									
Astragalus canadensis	N									
Astragalus canadensis var. canadensis	N									
Astragalus eucosmus	N									
Astragalus neglectus	N									
Astragalus tenellus	N		p,b,g							
Athyrium filix-femina	N	S								
Athyrium filix-femina var. angustum	N									
Athyrium filix-femina var. cyclosorum	N									
Atriplex dioica	N									
Atriplex glabriuscula	N									
Atriplex glabriuscula var. glabriuscula	N									
Aureolaria flava	N									
Aureolaria pedicularia	N									
Aureolaria virginica	N									
Avenella flexuosa	N									
Azolla cristata	N	I								
Baptisia tinctoria	N									

Barbarea orthoceras	N	I								
Bartonia paniculata	N	I								
Bartonia paniculata ssp. paniculata	N									
Bartonia virginica	N	I								
Bartsia alpina	N									
Beckmannia syzigachne	N	I								
Berberis x ottawensis	N									
Berula incisa	N									
Betula alleghaniensis	N	S								
Betula cordifolia	N									
Betula glandulosa	N									
Betula lenta	N									
Betula minor	N									
Betula murrayana	N									
Betula neoalaskana	N									
Betula occidentalis	N	S	p, b, g							
Betula papyrifera	N	S								
Betula populifolia	N	S								
Betula pumila	N	I								
Betula pumila var. glandulifera	N									
Betula pumila var. pumila	N									
Betula x purpusii	N									
Betula x sandbergii	N									
Betula x sargentii	N									
Bidens beckii	N	I								
Bidens cernua	N	I								
Bidens connata	N									
Bidens discoidea	N	I								
Bidens frondosa	N	I								
Bidens hyperborea	N	I								
Bidens trichosperma	N	I								
Bidens tripartita	N	I								
Bidens vulgata	N	S								
Bistorta vivipara	N	S								
Blephilia ciliata	N									
Blephilia hirsuta	N									
Blitum capitatum	N									
Blitum capitatum ssp. capitatum	N									
Blysmopsis rufa	N									
Boechera collinsii	N									
Boechera grahamii	N									
Boechera retrofracta	N									
Boechera stricta	N									
Boehmeria cylindrica	N	I								
Bolboschoenus fluviatilis	N	I								
Bolboschoenus maritimus	N									
Bolboschoenus maritimus ssp. paludosus	N									
Borodinia canadensis	N									
Borodinia dentata	N									
Borodinia laevigata	N									
Botrychium angustisegmentum	N									
Botrychium ascendens	N									
Botrychium campestre	N									
Botrychium campestre var. campestre	N									
Botrychium crenulatum	N		**P**							
Botrychium lunaria	N		**P,B,G**							
Botrychium lunaria var. lunaria	N									
Botrychium matricariifolium	N									
Botrychium michiganense	N		**P**							
Botrychium minganense	N									
Botrychium mormo	N									
Botrychium neolunaria	N									
Botrychium pallidum	N									
Botrychium pseudopinnatum	N		**P,G**							
Botrychium simplex	N									
Botrychium simplex var. simplex	N									
Botrychium spathulatum	N									
Botrychium tenebrosum	N		p,b,g							
Botrychium tunux	N									
Botrychium yaaxudakeit	N									
Botrypus virginianus	N									
Bouteloua curtipendula	N									
Bouteloua curtipendula var. curtipendula	N									
Brachyelytrum aristosum	N									

Brachyelytrum erectum	N	S								
Brasenia schreberi	N	I								
Braya humilis	N									
Braya humilis ssp. humilis	N									
Bromus ciliatus	N	S								
Bromus kalmii	N									
Bromus latiglumis	N	S								
Bromus nottowayanus	N									
Bromus pubescens	N									
Bromus pumpellianus	N									
Bromus x pseudothominii	N									
Buchnera americana	N	I								
Bulbostylis capillaris	N									
Cakile edentula	N									
Cakile edentula ssp. edentula	N									
Cakile edentula ssp. edentula var. lacustris	N									
Calamagrostis breviligulata	N		**P, B**							
Calamagrostis breviligulata ssp. breviligulata	N									
Calamagrostis canadensis	N	I								
Calamagrostis canadensis var. canadensis	N									
Calamagrostis canadensis var. langsdorffii	N									
Calamagrostis canadensis var. macouniana	N									
Calamagrostis deschampsioides	N									
Calamagrostis lapponica	N									
Calamagrostis purpurascens	N									
Calamagrostis stricta	N									
Calamagrostis stricta ssp. inexpansa	N									
Calamagrostis stricta ssp. stricta	N									
Calla palustris	N	I								
Callitriche hermaphroditica	N	I								
Callitriche heterophylla	N	I								
Callitriche heterophylla	N	I								
Callitriche palustris	N	I								
Callitriche stenoptera	N									
Calopogon tuberosus	N	I								
Calopogon tuberosus var. tuberosus	N									
Caltha natans	N	I								
Caltha palustris	N	I								
Calypso bulbosa	N									
Calypso bulbosa var. americana	N									
Calystegia sepium	N									
Calystegia sepium ssp. americana	N									
Calystegia sepium ssp. angulata	N									
Calystegia sepium ssp. erratica	N									
Calystegia spithamaea	N									
Calystegia spithamaea ssp. stans	N									
Camassia scilloides	N									
Campanula gieseckeana	N									
Campanula intercedens	N									
Campanula rotundifolia	N									
Campanulastrum americanum	N									
Campsis radicans	N									
Canadanthus modestus	N	I								
Capnoides sempervirens	N									
Cardamine bulbosa	N	I								
Cardamine concatenata	N									
Cardamine dentata	N									
Cardamine diphylla	N									
Cardamine douglassii	N	S								
Cardamine maxima	N									
Cardamine parviflora	N									
Cardamine pensylvanica	N	I								
Cardamine polemonioides	N									
Carduus x orthocephalus	N									
Carex adusta	N									
Carex aggregata	N									
Carex alata	N	I								
Carex albicans	N									
Carex albicans var. albicans	N									
Carex albicans var. emmonsii	N	S								
Carex albursina	N									
Carex alopecoidea	N	S								
Carex amphibola	N									
Carex annectens	N									
Carex annectens var. annectens	N									

Carex annectens var. xanthocarpa	N									
Carex appalachica	N									
Carex aquatilis	N	I								
Carex aquatilis var. aquatilis	N									
Carex aquatilis var. substricta	N									
Carex arcta	N	I								
Carex arctata	N									
Carex arctogena	N									
Carex argyrantha	N									
Carex assiniboinensis	N									
Carex atherodes	N	I								
Carex atlantica	N	I								
Carex atlantica ssp. capillacea	N									
Carex atlantica ssp. capillacea	N									
Carex atratiformis	N									
Carex atrofusca	N									
Carex aurea	N	S								
Carex backii	N									
Carex bebbii	N	I								
Carex bicknellii	N									
Carex bicolor	N									
Carex bigelowii	N									
Carex bigelowii ssp. bigelowii	N									
Carex billingsii	N	I								
Carex blanda	N									
Carex brevior	N									
Carex bromoides	N	I								
Carex bromoides ssp. bromoides	N									
Carex brunnescens	N	I								
Carex brunnescens ssp. brunnescens	N									
Carex brunnescens ssp. sphaerostachya	N									
Carex buxbaumii	N	S								
Carex canescens	N	I								
Carex canescens ssp. canescens	N									
Carex canescens ssp. disjuncta	N									
Carex capillaris	N									
Carex capillaris ssp. capillaris	N	S								
Carex capillaris ssp. fuscidula	N									
Carex capitata	N									
Carex careyana	N									
Carex careyana	N									
Carex castanea	N	S								
Carex castanea	N	S								
Carex cephaloidea	N									
Carex cephalophora	N									
Carex chordorrhiza	N	I								
Carex communis	N									
Carex communis var. communis	N									
Carex comosa	N	I								
Carex concinna	N									
Carex conoidea	N									
Carex crawei	N	S								
Carex crawfordii	N	S								
Carex crinita	N	I								
Carex crinita var. crinita	N									
Carex cristatella	N	I								
Carex crus-corvi	N	I								
Carex cryptolepis	N	I								
Carex cumulata	N									
Carex davisii	N									
Carex debilis	N									
Carex debilis var. rudgei	N									
Carex deflexa	N									
Carex deflexa var. deflexa	N									
Carex deweyana	N									
Carex deweyana var. deweyana	N									
Carex deweyana var. deweyana	N									
Carex diandra	N	I								
Carex digitalis	N									
Carex digitalis var. digitalis	N									
Carex disperma	N	I								
Carex duriuscula	N		p,b,g							
Carex eburnea	N									
Carex echinata	N	I								
Carex echinata ssp. echinata	N									

Carex echinodes	N									
Carex emoryi	N	I								
Carex exilis	N	I								
Carex festucacea	N									
Carex flava	N	I								
Carex foenea	N									
Carex folliculata	N	I								
Carex formosa	N									
Carex frankii	N	I								
Carex fuliginosa	N									
Carex garberi	N	I								
Carex glacialis	N									
Carex glareosa	N									
Carex glareosa ssp. glareosa	N									
Carex glaucodea	N									
Carex gracilescens	N									
Carex granularis	N	S								
Carex gravida	N									
Carex grayi	N	I								
Carex grisea	N									
Carex gynandra	N	I								
Carex gynocrates	N	I								
Carex haydenii	N	I								
Carex heleonastes	N									
Carex hirsutella	N									
Carex hirtifolia	N									
Carex hitchcockiana	N									
Carex houghtoniana	N									
Carex hyalinolepis	N	I								
Carex hystericina	N	I								
Carex inops	N									
Carex inops ssp. heliophila	N									
Carex interior	N	I								
Carex intumescens	N	I								
Carex jamesii	N									
Carex juniperorum	N									
Carex krausei	N									
Carex lachenalii	N									
Carex lacustris	N	I								
Carex laeviconica	N	I								
Carex laevivaginata	N	I								
Carex lapponica	N									
Carex lasiocarpa	N	I								
Carex lasiocarpa ssp. americana	N									
Carex laxiculmis	N									
Carex laxiculmis var. copulata	N									
Carex laxiculmis var. laxiculmis	N									
Carex laxiflora	N									
Carex leavenworthii	N									
Carex lenticularis	N	I								
Carex leptalea	N	I								
Carex leptonervia	N									
Carex limosa	N	I								
Carex livida	N	I								
Carex loliacea	N	I								
Carex longii	N									
Carex lucorum	N									
Carex lupuliformis	N	I								
Carex lupulina	N	I								
Carex lurida	N	S								
Carex mackenziei	N									
Carex magellanica	N	I								
Carex magellanica ssp. irrigua	N									
Carex marina	N									
Carex maritima	N									
Carex meadii	N									
Carex media	N									
Carex membranacea	N									
Carex merritt-fernaldii	N									
Carex mesochorea	N									
Carex michauxiana	N	I								
Carex microglochin	N									
Carex molesta	N	S								
Carex muehlenbergii	N									
Carex muehlenbergii var. enervis	N									
Carex muehlenbergii var. muehlenbergii	N									

Carex muskingumensis	N	I								
Carex myosuroides	N									
Carex nardina	N									
Carex nigromarginata	N									
Carex normalis	N	S								
Carex norvegica	N									
Carex novae-angliae	N									
Carex obtusata	N									
Carex oligocarpa	N									
Carex oligosperma	N	I								
Carex ormostachya	N									
Carex paleacea	N									
Carex pallescens	N	S								
Carex pauciflora	N	I								
Carex peckii	N									
Carex pedunculata	N									
Carex pellita	N	I								
Carex pensylvanica	N									
Carex plantaginea	N									
Carex platyphylla	N									
Carex prairea	N	I								
Carex prasina	N	I								
Carex praticola	N									
Carex projecta	N	I								
Carex pseudocyperus	N	I								
Carex radiata	N	S								
Carex rariflora	N									
Carex recta	N									
Carex retroflexa	N									
Carex retrorsa	N	I								
Carex richardsonii	N									
Carex rosea	N									
Carex rossii	N									
Carex rostrata	N	I								
Carex rupestris	N									
Carex salina	N									
Carex sartwellii	N	I								
Carex saxatilis	N									
Carex saximontana	N									
Carex scabrata	N	I								
Carex schweinitzii	N	I								
Carex scirpoidea	N	S								
Carex scirpoidea ssp. convoluta	N									
Carex scirpoidea ssp. scirpoidea	N									
Carex scoparia	N	S								
Carex seorsa	N	I								
Carex shortiana	N									
Carex siccata	N									
Carex simpliciuscula	N									
Carex simpliciuscula ssp. subholarctica	N									
Carex sparganioides	N									
Carex sprengelii	N									
Carex squarrosa	N	I								
Carex sterilis	N	I								
Carex stipata	N	I								
Carex stipata var. stipata	N									
Carex stricta	N	I								
Carex suberecta	N	I								
Carex subspathacea	N									
Carex supina	N									
Carex supina ssp. spaniocarpa	N									
Carex swanii	N									
Carex sychnocephala	N	I								
Carex tenera	N	S								
Carex tenuiflora	N	I								
Carex tetanica	N	I								
Carex tincta	N									
Carex tonsa	N									
Carex tonsa	N									
Carex tonsa var. rugosperma	N									
Carex tonsa var. tonsa	N									
Carex torreyi	N									
Carex torta	N									
Carex tribuloides	N	I								
Carex tribuloides var. tribuloides	N									

Carex trichocarpa	N	I								
Carex trisperma	N	I								
Carex tuckermanii	N	I								
Carex typhina	N	I								
Carex umbellata	N									
Carex ursina	N									
Carex utriculata	N	I								
Carex vaginata	N	I								
Carex vesicaria	N	I								
Carex virescens	N									
Carex viridula	N	I								
Carex viridula ssp. viridula	N									
Carex viridula ssp. viridula var. viridula	N									
Carex vulpinoidea	N	I								
Carex wiegandii	N	I								
Carex willdenowii	N									
Carex williamsii	N									
Carex woodii	N									
Carex x arctophila	N									
Carex x crinitoides	N									
Carex x dumanii	N									
Carex x dumanii	N									
Carex x flavicans	N									
Carex x grantii	N									
Carex x hartii	N									
Carex x knieskernii	N									
Carex x langeana	N									
Carex x limosoides	N									
Carex x mendica	N									
Carex x mirata	N									
Carex x neofilipendula	N									
Carex x neomiliaris	N									
Carex x neorigida	N									
Carex x persalina	N									
Carex x saxenii	N									
Carex x stenolepis	N									
Carex x subimpressa	N									
Carex x subpaleacea	N									
Carex x subviridula	N									
Carex x sullivantii	N									
Carex x ungavensis	N									
Carex xerantica	N									
Carpinus caroliniana	N	S								
Carpinus caroliniana ssp. virginiana	N									
Carya cordiformis	N									
Carya glabra	N									
Carya laciniosa	N	I								
Carya ovata	N	S								
Carya ovata var. ovata	N									
Carya x laneyi	N									
Castanea dentata	N									
Castilleja coccinea	N									
Castilleja raupii	N									
Castilleja septentrionalis	N									
Catabrosa aquatica	N									
Caulophyllum giganteum	N									
Caulophyllum thalictroides	N									
Ceanothus americanus	N									
Ceanothus herbaceus	N									
Celtis occidentalis	N									
Celtis tenuifolia	N									
Cenchrus longispinus	N									
Centaurea x moncktonii	N									
Centaurea x psammogena	N									
Cephalanthus occidentalis	N	I								
Cephalanthus occidentalis var. occidentalis	N									
Cerastium alpinum	N									
Cerastium alpinum ssp. alpinum	N									
Cerastium alpinum ssp. lanatum	N									
Cerastium arcticum	N									
Cerastium arvense	N									
Cerastium arvense ssp. strictum	N									
Cerastium beeringianum	N									
Cerastium brachypodum	N									
Cerastium nutans	N									

Cerastium nutans var. nutans	N									
Cerastium velutinum	N									
Cerastium velutinum var. velutinum	N									
Ceratophyllum demersum	N	I								
Ceratophyllum echinatum	N	I								
Cercis canadensis	N									
Cercis canadensis var. canadensis	N									
Chaerophyllum procumbens	N									
Chaerophyllum shortii	N									
Chamaedaphne calyculata	N	I								
Chamaelirium luteum	N									
Chamaenerion angustifolium	N									
Chamaenerion angustifolium ssp. angustifoliu	N									
Chamaenerion angustifolium ssp. circumvagu	N									
Chamaenerion latifolium	N									
Chelone glabra	N	I								
Chenopodiastrum simplex	N									
Chenopodium berlandieri	N									
Chenopodium berlandieri var. bushianum	N									
Chenopodium berlandieri var. zschackei	N									
Chenopodium foggii	N									
Chenopodium leptophyllum	N									
Chenopodium pratericola	N									
Chenopodium standleyanum	N									
Chimaphila maculata	N									
Chimaphila umbellata	N									
Chimaphila umbellata ssp. umbellata	N									
Chrysosplenium americanum	N	I								
Chrysosplenium tetrandrum	N									
Cicuta bulbifera	N	I								
Cicuta maculata	N	I								
Cicuta maculata var. angustifolia	N									
Cicuta maculata var. maculata	N									
Cicuta virosa	N	I								
Cinna arundinacea	N	S								
Cinna latifolia	N	S								
Circaea alpina	N									
Circaea alpina ssp. alpina	N									
Circaea canadensis	N									
Circaea canadensis ssp. canadensis	N									
Circaea x sterilis	N									
Cirsium discolor	N									
Cirsium drummondii	N									
Cirsium flodmanii	N									
Cirsium muticum	N	I								
Cirsium pitcheri	N									
Cirsium pumilum	N									
Cirsium pumilum var. hillii	N									
Cladium mariscoides	N	I								
Claytonia caroliniana	N									
Claytonia virginica	N	S								
Claytosmunda claytoniana	N	S	P,b,g							
Clematis occidentalis	N									
Clematis occidentalis var. occidentalis	N									
Clematis virginiana	N	S								
Clinopodium arkansanum	N	S								
Clinopodium vulgare	N									
Clinopodium vulgare ssp. vulgare	N									
Clintonia borealis	N	S								
Cochlearia groenlandica	N									
Coeloglossum viride	N									
Coleataenia rigidula	N	S								
Coleataenia rigidula ssp. rigidula	N									
Coleataenia rigidula ssp. rigidula	N									
Collinsia parviflora	N									
Collinsia verna	N									
Collinsonia canadensis	N	S								
Collomia linearis	N									
Comandra umbellata	N									
Comandra umbellata ssp. umbellata	N									
Comarum palustre	N	I								
Comastoma tenellum	N									
Comastoma tenellum	N									
Comptonia peregrina	N									
Conioselinum chinense	N	I								
Conopholis americana	N									

Coptidium lapponicum	N	I								
Coptidium pallasii	N									
Coptis trifolia	N									
Corallorhiza maculata	N									
Corallorhiza maculata var. maculata	N									
Corallorhiza maculata var. occidentalis	N									
Corallorhiza odontorhiza	N									
Corallorhiza odontorhiza var. odontorhiza	N									
Corallorhiza odontorhiza var. pringlei	N									
Corallorhiza striata	N									
Corallorhiza striata var. striata	N									
Corallorhiza trifida	N	S								
Coreopsis lanceolata	N									
Coreopsis tripteris	N									
Corispermum americanum	N									
Corispermum americanum var. americanum	N									
Corispermum hookeri	N									
Corispermum hookeri var. hookeri	N									
Corispermum pallasii	N									
Corispermum villosum	N									
Cornus alternifolia	N									
Cornus canadensis	N									
Cornus drummondii	N									
Cornus florida	N									
Cornus obliqua	N	I	**P,** b, **G**							
Cornus racemosa	N	S								
Cornus rugosa	N									
Cornus x arnoldiana	N									
Cornus x slavinii	N									
Corydalis aurea	N									
Corydalis aurea ssp. aurea	N									
Corydalis flavula	N									
Corylus americana	N									
Corylus cornuta	N									
Corylus cornuta ssp. cornuta	N									
Coryphopteris simulata	N	I								
Crassula aquatica	N	I								
Crataegus beata	N									
Crataegus brainerdii	N									
Crataegus calpodendron	N									
Crataegus chrysocarpa	N									
Crataegus chrysocarpa var. chrysocarpa	N									
Crataegus chrysocarpa var. phoeniceoides	N									
Crataegus chrysocarpa var. subrotundifolia	N									
Crataegus chrysocarpa var. vigintistamina	N									
Crataegus coccinea	N									
Crataegus coccinea var. coccinea	N									
Crataegus coccinea var. fulleriana	N									
Crataegus coccinea var. pringlei	N									
Crataegus coccinioides	N									
Crataegus cognata	N									
Crataegus compacta	N									
Crataegus crus-galli	N									
Crataegus crus-galli var. crus-galli	N									
Crataegus dodgei	N									
Crataegus douglasii	N									
Crataegus flabellata	N									
Crataegus florifera	N									
Crataegus fluviatilis	N									
Crataegus formosa	N									
Crataegus holmesiana	N									
Crataegus intricata	N									
Crataegus irrasa	N									
Crataegus jesupii	N									
Crataegus lumaria	N									
Crataegus macracantha	N									
Crataegus macrosperma	N									
Crataegus magniflora	N									
Crataegus margarettae	N									
Crataegus margarettae var. angustifolia	N									
Crataegus margarettae var. margarettae	N									
Crataegus mollis	N	S								
Crataegus mollis var. incisifolia	N									
Crataegus mollis var. mollis	N									
Crataegus nitidula	N									

Crataegus pennsylvanica	N									
Crataegus perjucunda	N									
Crataegus persimilis	N									
Crataegus populnea	N									
Crataegus prona	N									
Crataegus pruinosa	N									
Crataegus pruinosa var. dissona	N									
Crataegus pruinosa var. parvula	N									
Crataegus pruinosa var. pruinosa	N									
Crataegus pruinosa var. rugosa	N									
Crataegus pruinosa var. virella	N									
Crataegus punctata	N									
Crataegus scabrida	N									
Crataegus scabrida var. asperifolia	N									
Crataegus scabrida var. cyclophylla	N									
Crataegus scabrida var. scabrida	N									
Crataegus schuettei	N									
Crataegus schuettei var. schuettei	N									
Crataegus stolonifera	N									
Crataegus submollis	N									
Crataegus suborbiculata	N									
Crataegus succulenta	N									
Crataegus succulenta var. michiganensis	N									
Crataegus succulenta var. succulenta	N									
Crataegus x disperma	N									
Crataegus x kingstonensis	N									
Crataegus x lucorum	N									
Crataegus x ninae-celottiae	N									
Crocanthemum bicknellii	N									
Crocanthemum canadense	N									
Crocanthemum canadense	N									
Cryptogramma acrostichoides	N		p,g							
Cryptogramma stelleri	N									
Cryptotaenia canadensis	N									
Cuscuta campestris	N									
Cuscuta cephalanthi	N	I								
Cuscuta compacta	N									
Cuscuta coryli	N									
Cuscuta gronovii	N	S								
Cuscuta gronovii var. gronovii	N									
Cuscuta gronovii var. latiflora	N									
Cuscuta polygonorum	N									
Cuscuta umbrosa	N									
Cycloloma atriplicifolium	N									
Cyperus bipartitus	N	I								
Cyperus dentatus	N	I								
Cyperus diandrus	N	I								
Cyperus engelmannii	N									
Cyperus erythrorhizos	N	I								
Cyperus esculentus	N	S								
Cyperus esculentus var. leptostachyus	N									
Cyperus flavescens	N	I								
Cyperus houghtonii	N									
Cyperus lupulinus	N									
Cyperus lupulinus ssp. lupulinus	N									
Cyperus lupulinus ssp. macilentus	N									
Cyperus odoratus	N	I								
Cyperus odoratus var. squarrosus	N									
Cyperus schweinitzii	N									
Cyperus squarrosus	N	S								
Cyperus strigosus	N	S								
Cyperus subsquarrosus	N	I								
Cyperus x mesochorus	N									
Cypripedium acaule	N	S								
Cypripedium arietinum	N									
Cypripedium candidum	N	I								
Cypripedium parviflorum	N									
Cypripedium parviflorum var. makasin	N	S								
Cypripedium parviflorum var. pubescens	N									
Cypripedium passerinum	N									
Cypripedium reginae	N	I								
Cypripedium x andrewsii	N		p,b,g							
Cystopteris bulbifera	N	S	p,**B,**g							
Cystopteris fragilis	N		(p), **G**							
Cystopteris laurentiana	N									

Cystopteris montana	N									
Cystopteris protrusa	N		(p), g							
Cystopteris tenuis	N									
Dalea candida	N									
Dalea candida var. candida	N									
Dalea purpurea	N									
Dalea purpurea var. purpurea	N									
Danthonia compressa	N									
Danthonia intermedia	N									
Danthonia intermedia ssp. intermedia	N									
Danthonia spicata	N									
Dasiphora fruticosa	N	S								
Decodon verticillatus	N	I	(p,g)							
Dendrolycopodium dendroideum	N									
Dendrolycopodium hickeyi	N		(p,b,g)							
Dendrolycopodium obscurum	N		**P,B,G**							
Dendrolycopodium obscurum	N									
Dennstaedtia punctilobula	N		**P,**b,g							
Deparia acrostichoides	N	S								
Deschampsia cespitosa	N	S								
Deschampsia cespitosa ssp. cespitosa	N	S								
Deschampsia sukatschewii	N									
Descurainia incana	N									
Descurainia pinnata	N									
Descurainia pinnata ssp. brachycarpa	N									
Desmodium canadense	N									
Desmodium canescens	N									
Desmodium canescens	N									
Desmodium cuspidatum	N									
Desmodium illinoense	N									
Desmodium marilandicum	N									
Desmodium marilandicum var. ciliare	N									
Desmodium marilandicum var. marilandicum	N									
Desmodium paniculatum	N									
Desmodium perplexum	N									
Desmodium rotundifolium	N									
Desmodium sessilifolium	N									
Diapensia lapponica	N									
Diarrhena obovata	N	S								
Dicentra canadensis	N									
Dicentra cucullaria	N									
Dichanthelium boreale	N									
Dichanthelium clandestinum	N									
Dichanthelium columbianum	N									
Dichanthelium commonsianum	N									
Dichanthelium depauperatum	N									
Dichanthelium dichotomum	N									
Dichanthelium dichotomum ssp. dichotomum	N									
Dichanthelium implicatum	N	S								
Dichanthelium lanuginosum	N									
Dichanthelium latifolium	N									
Dichanthelium leibergii	N									
Dichanthelium lindheimeri	N	I								
Dichanthelium linearifolium	N									
Dichanthelium linearifolium var. linearifolium	N									
Dichanthelium linearifolium var. werneri	N									
Dichanthelium meridionale	N									
Dichanthelium oligosanthes	N									
Dichanthelium oligosanthes ssp. oligosanthes	N									
Dichanthelium oligosanthes ssp. scribnerianur	N									
Dichanthelium perlongum	N									
Dichanthelium polyanthes	N									
Dichanthelium praecocius	N									
Dichanthelium sphaerocarpon	N									
Dichanthelium spretum	N	I								
Dichanthelium xanthophysum	N									
Diervilla lonicera	N									
Digitaria cognata	N									
Dioscorea villosa	N									
Diphasiastrum complanatum	N		p,b,g							
Diphasiastrum digitatum	N									
Diphasiastrum sitchense	N		**P**							
Diphasiastrum tristachyum	N									
Diphasiastrum x habereri	N									
Diphasiastrum x sabinifolium	N									
Diphasiastrum x verecundum	N									

Diphasiastrum x zeilleri	N									
Dirca palustris	N									
Doellingeria umbellata	N	S								
Doellingeria umbellata var. pubens	N									
Doellingeria umbellata var. umbellata	N									
Draba alpina	N									
Draba arabisans	N									
Draba aurea	N									
Draba cana	N									
Draba cinerea	N									
Draba glabella	N									
Draba incana	N									
Draba lactea	N									
Draba nemorosa	N									
Draba nemorosa	N									
Draba nivalis	N									
Draba norvegica	N									
Dracocephalum parviflorum	N									
Drosera anglica	N	I								
Drosera intermedia	N	I								
Drosera linearis	N	I								
Drosera rotundifolia	N	I								
Drosera x eloisiana	N									
Drosera x woodii	N									
Dryas drummondii	N									
Dryas integrifolia	N									
Dryas integrifolia ssp. integrifolia	N									
Drymocallis arguta	N		p,b,g							
Dryopteris carthusiana	N	S	p,b,g							
Dryopteris clintoniana	N	I	p,b,g							
Dryopteris cristata	N	I								
Dryopteris expansa	N		p,g							
Dryopteris filix-mas	N									
Dryopteris filix-mas ssp. brittonii	N									
Dryopteris fragrans	N		p, **B,** g							
Dryopteris goldieana	N		p, b, g							
Dryopteris intermedia	N		p, b, g							
Dryopteris marginalis	N									
Dryopteris x algonquinensis	N									
Dryopteris x benedictii	N									
Dryopteris x boottii	N									
Dryopteris x burgessii	N									
Dryopteris x dowellii	N									
Dryopteris x mickelii	N									
Dryopteris x montgomeryi	N									
Dryopteris x neowherryi	N									
Dryopteris x pittsfordensis	N									
Dryopteris x slossoniae	N									
Dryopteris x triploidea	N									
Dryopteris x uliginosa	N									
Dulichium arundinaceum	N	I								
Dulichium arundinaceum var. arundinaceum	N									
Dupontia fisheri	N									
Echinacea pallida	N									
Echinochloa muricata	N									
Echinochloa muricata var. microstachya	N	S								
Echinochloa muricata var. muricata	N	I								
Echinochloa walteri	N	I								
Echinocystis lobata	N	S								
Eclipta prostrata	N	I								
Elaeagnus commutata	N									
Elatine americana	N									
Elatine minima	N	I								
Eleocharis acicularis	N	I								
Eleocharis compressa	N	S								
Eleocharis compressa var. compressa	N									
Eleocharis diandra	N									
Eleocharis elliptica	N	I								
Eleocharis engelmannii	N									
Eleocharis equisetoides	N	I								
Eleocharis erythropoda	N	I								
Eleocharis flavescens	N	I								
Eleocharis flavescens var. olivacea	N	I								
Eleocharis geniculata	N	I								
Eleocharis intermedia	N	I								
Eleocharis kamtschatica	N									

Eleocharis macrostachya	N									
Eleocharis mamillata	N									
Eleocharis mamillata ssp. mamillata	N									
Eleocharis nitida	N	I								
Eleocharis obtusa	N	I								
Eleocharis ovata	N	I								
Eleocharis palustris	N	I								
Eleocharis palustris	N	I								
Eleocharis parvula	N									
Eleocharis quadrangulata	N	I								
Eleocharis quinqueflora	N	I								
Eleocharis robbinsii	N	I								
Eleocharis rostellata	N	I								
Eleocharis uniglumis	N									
Elodea canadensis	N	I								
Elodea nuttallii	N	I								
Elymus canadensis	N									
Elymus canadensis var. brachystachys	N									
Elymus canadensis var. canadensis	N									
Elymus canadensis var. robustus	N									
Elymus curvatus	N									
Elymus diversiglumis	N									
Elymus glaucus	N									
Elymus glaucus ssp. glaucus	N									
Elymus hystrix	N									
Elymus lanceolatus	N									
Elymus lanceolatus	N									
Elymus lanceolatus ssp. psammophilus	N									
Elymus macgregorii	N									
Elymus riparius	N									
Elymus trachycaulus	N									
Elymus trachycaulus ssp. subsecundus	N									
Elymus trachycaulus ssp. trachycaulus	N									
Elymus trachycaulus ssp. trachycaulus	N									
Elymus villosus	N									
Elymus violaceus	N									
Elymus virginicus	N									
Elymus virginicus var. intermedius	N									
Elymus virginicus var. virginicus	N	S								
Elymus wiegandii	N									
Elymus x ebingeri	N									
Elymus x maltei	N									
Elymus x pseudorepens	N									
Empetrum nigrum	N									
Empetrum nigrum ssp. hermaphroditum	N									
Endotropis alnifolia	N	I								
Enemion biternatum	N									
Epifagus virginiana	N									
Epigaea repens	N									
Epilobium arcticum	N									
Epilobium brachycarpum	N									
Epilobium ciliatum	N									
Epilobium ciliatum ssp. ciliatum	N	I								
Epilobium ciliatum ssp. ciliatum var. ciliatum	N									
Epilobium ciliatum ssp. glandulosum	N									
Epilobium ciliatum ssp. glandulosum	N									
Epilobium coloratum	N	I								
Epilobium davuricum	N	I								
Epilobium hornemannii	N									
Epilobium hornemannii ssp. hornemannii	N									
Epilobium lactiflorum	N									
Epilobium leptophyllum	N	I								
Epilobium palustre	N	I								
Epilobium saximontanum	N									
Epilobium strictum	N	I								
Epilobium x wisconsinense	N									
Equisetum fluviatile	N	I	p,b,g							
Equisetum hyemale	N	S	**P**							
Equisetum hyemale ssp. affine	N									
Equisetum laevigatum	N		**P,B,G**							
Equisetum palustre	N	I	**P,G**							
Equisetum pratense	N		p,b,g							
Equisetum scirpoides	N	S	P,b,g							
Equisetum sylvaticum	N	S	p,b,g							
Equisetum variegatum	N	I								
Equisetum variegatum ssp. variegatum	N									

Equisetum x ferrissii	N									
Equisetum x litorale	N									
Equisetum x mackayi	N									
Equisetum x nelsonii	N	S								
Eragrostis capillaris	N									
Eragrostis frankii	N	S								
Eragrostis hypnoides	N	I								
Eragrostis pectinacea	N									
Eragrostis pectinacea var. pectinacea	N									
Eragrostis spectabilis	N									
Erechtites hieraciifolius	N	S								
Erechtites hieraciifolius var. hieraciifolius	N									
Erigenia bulbosa	N									
Erigeron acris	N									
Erigeron acris var. kamtschaticus	N									
Erigeron canadensis	N									
Erigeron elatus	N									
Erigeron glabellus	N									
Erigeron glabellus var. pubescens	N									
Erigeron humilis	N									
Erigeron hyssopifolius	N									
Erigeron lonchophyllus	N									
Erigeron philadelphicus	N	S								
Erigeron philadelphicus var. philadelphicus	N									
Erigeron philadelphicus var. provancheri	N									
Erigeron pulchellus	N									
Erigeron pulchellus var. pulchellus	N									
Erigeron strigosus	N									
Erigeron strigosus var. septentrionalis	N									
Erigeron strigosus var. strigosus	N									
Eriocaulon aquaticum	N	I								
Eriophorum angustifolium	N	I								
Eriophorum angustifolium ssp. angustifolium	N									
Eriophorum brachyantherum	N									
Eriophorum callitrix	N									
Eriophorum gracile	N	I								
Eriophorum gracile ssp. gracile	N									
Eriophorum russeolum	N	I								
Eriophorum russeolum ssp. albidum	N									
Eriophorum russeolum ssp. russeolum	N									
Eriophorum scheuchzeri	N									
Eriophorum scheuchzeri ssp. scheuchzeri	N									
Eriophorum tenellum	N	I								
Eriophorum triste	N									
Eriophorum vaginatum	N	I								
Eriophorum vaginatum ssp. spissum	N									
Eriophorum virginicum	N	I								
Eriophorum viridicarinatum	N									
Eriophorum x pylaieanum	N									
Erysimum cheiranthoides	N									
Erysimum inconspicuum	N									
Erythranthe geyeri	N									
Erythranthe moschata	N	S								
Erythronium albidum	N									
Erythronium americanum	N									
Erythronium americanum ssp. americanum	N									
Euonymus atropurpureus	N									
Euonymus obovatus	N									
Eupatorium altissimum	N									
Eupatorium perfoliatum	N	I								
Euphorbia commutata	N									
Euphorbia corollata	N									
Euphorbia nutans	N									
Euphorbia polygonifolia	N									
Euphorbia serpillifolia	N									
Euphorbia serpillifolia ssp. serpillifolia	N									
Euphorbia spathulata	N									
Euphorbia vermiculata	N									
Euphorbia x gayeri	N									
Euphorbia x pseudoesula	N									
Euphorbia x pseudolucida	N									
Euphorbia x pseudovirgata	N									
Euphrasia arctica	N									
Euphrasia arctica ssp. arctica	N									
Euphrasia arctica ssp. borealis	N									
Euphrasia farlowii	N									

Euphrasia hudsoniana	N									
Euphrasia nemorosa	N									
Euphrasia ostenfeldii	N									
Euphrasia suborbicularis	N									
Euphrasia vinacea	N									
Euphrasia wettsteinii	N									
Eurybia divaricata	N									
Eurybia macrophylla	N									
Eurybia radula	N									
Eurybia schreberi	N									
Euthamia caroliniana	N									
Euthamia graminifolia	N									
Eutrochium maculatum	N									
Eutrochium maculatum var. bruneri	N									
Eutrochium maculatum var. foliosum	N									
Eutrochium maculatum var. maculatum	N	I								
Eutrochium purpureum	N									
Eutrochium purpureum var. purpureum	N									
Fagus grandifolia	N									
Fallopia cilinodis	N									
Fallopia scandens	N									
Festuca baffinensis	N									
Festuca brachyphylla	N									
Festuca brachyphylla ssp. brachyphylla	N									
Festuca hallii	N									
Festuca occidentalis	N									
Festuca prolifera	N									
Festuca prolifera var. lasiolepis	N									
Festuca prolifera var. prolifera	N									
Festuca rubra	N									
Festuca rubra ssp. arctica	N									
Festuca rubra ssp. pruinosa	N									
Festuca saximontana	N									
Festuca saximontana var. saximontana	N									
Festuca subverticillata	N									
Fimbristylis autumnalis	N	I								
Fimbristylis puberula	N	I								
Fimbristylis puberula var. puberula	N									
Floerkea proserpinacoides	N	S								
Fragaria vesca	N									
Fragaria vesca ssp. americana	N									
Fragaria virginiana ssp. glauca	N									
Fragaria virginiana ssp. virginiana	N									
Fragaria x ananassa	N									
Frasera caroliniensis	N		p, b, g							
Fraxinus americana	N									
Fraxinus nigra	N	I	p, b, g							
Fraxinus pennsylvanica	N	S								
Fraxinus profunda	N	I								
Fraxinus quadrangulata	N									
Fuirena pumila	N									
Gaillardia x grandiflora	N									
Galearis rotundifolia	N	I								
Galearis spectabilis	N									
Galium aparine	N									
Galium asprellum	N	I								
Galium boreale	N									
Galium brandegei	N									
Galium brevipes	N	I								
Galium circaezans	N									
Galium concinnum	N									
Galium kamtschaticum	N									
Galium labradoricum	N	I								
Galium lanceolatum	N									
Galium obtusum	N	S								
Galium palustre	N	I								
Galium pilosum	N									
Galium pilosum var. pilosum	N									
Galium tinctorium	N	I								
Galium trifidum	N	I								
Galium trifidum ssp. subbiflorum	N									
Galium trifidum ssp. trifidum	N									
Galium triflorum	N									
Gamochaeta purpurea	N									
Gaultheria hispidula	N									
Gaultheria procumbens	N									

Gaylussacia baccata	N									
Gentiana alba	N									
Gentiana andrewsii	N	S								
Gentiana andrewsii var. andrewsii	N									
Gentiana linearis	N	I								
Gentiana puberulenta	N									
Gentiana rubricaulis	N	I								
Gentiana x billingtonii	N									
Gentiana x pallidocyanea	N									
Gentianella amarella	N									
Gentianella amarella ssp. acuta	N									
Gentianella propinqua	N									
Gentianella propinqua ssp. propinqua	N									
Gentianella quinquefolia	N									
Gentianella quinquefolia ssp. occidentalis	N									
Gentianella quinquefolia ssp. quinquefolia	N									
Gentianopsis crinita	N	I								
Gentianopsis detonsa	N									
Gentianopsis detonsa ssp. nesophila	N									
Gentianopsis virgata	N	I								
Gentianopsis virgata ssp. macounii	N									
Gentianopsis virgata ssp. virgata	N	I								
Geocaulon lividum	N	S								
Geranium bicknellii	N									
Geranium carolinianum	N									
Geranium maculatum	N									
Geranium robertianum	N									
Geum aleppicum	N	S								
Geum canadense	N	S								
Geum fragarioides	N									
Geum laciniatum	N	S								
Geum macrophyllum	N	S								
Geum macrophyllum var. macrophyllum	N	S								
Geum macrophyllum var. perincisum	N									
Geum rivale	N	I								
Geum triflorum	N									
Geum triflorum var. triflorum	N									
Geum vernum	N	S								
Geum virginianum	N									
Geum x aurantiacum	N									
Geum x catlingii	N									
Geum x hainesianum	N									
Geum x pulchrum	N									
Geum x spurium	N									
Gillenia trifoliata	N									
Gleditsia triacanthos	N									
Glyceria borealis	N	I								
Glyceria canadensis	N	I								
Glyceria canadensis var. canadensis	N									
Glyceria canadensis var. laxa	N									
Glyceria grandis	N	I								
Glyceria grandis var. grandis	N									
Glyceria melicaria	N	I								
Glyceria septentrionalis	N	I								
Glyceria septentrionalis var. septentrionalis	N									
Glyceria striata	N	I								
Glyceria striata var. striata	N									
Glyceria x ottawensis	N									
Glycyrrhiza lepidota	N									
Goodyera oblongifolia	N									
Goodyera pubescens	N									
Goodyera repens	N									
Goodyera tesselata	N									
Graphephorum melicoides	N									
Gratiola lutea	N	I								
Gratiola neglecta	N	S								
Gratiola quartermaniae	N	S								
Grindelia hirsutula	N									
Gymnocarpium continentale	N		p,b,g							
Gymnocarpium dryopteris	N	S	**P**							
Gymnocarpium robertianum	N									
Gymnocarpium x brittonianum	N									
Gymnocarpium x intermedium	N									
Gymnocladus dioicus	N									
Hackelia deflexa	N									
Hackelia deflexa ssp. americana	N									

Hackelia floribunda	N									
Hackelia virginiana	N									
Halenia deflexa	N									
Halerpestes cymbalaria	N	I								
Hamamelis virginiana	N									
Hammarbya paludosa	N									
Hedeoma hispida	N									
Hedeoma pulegioides	N									
Hedysarum americanum	N									
Hedysarum boreale	N									
Hedysarum boreale ssp. mackenziei	N									
Helenium autumnale	N	S								
Helianthus decapetalus	N									
Helianthus divaricatus	N									
Helianthus giganteus	N	S								
Helianthus occidentalis	N									
Helianthus pauciflorus	N									
Helianthus pauciflorus ssp. subrhomboideus	N									
Helianthus strumosus	N									
Helianthus tuberosus	N									
Helianthus x laetiflorus	N									
Helianthus x luxurians	N									
Heliopsis helianthoides	N									
Heliopsis helianthoides var. helianthoides	N									
Heliopsis helianthoides var. scabra	N									
Hepatica acutiloba	N									
Hepatica americana	N									
Heracleum maximum	N	S								
Hesperostipa comata	N									
Hesperostipa comata ssp. comata	N									
Hesperostipa curtiseta	N									
Hesperostipa spartea	N									
Heteranthera dubia	N	I								
Heterotheca villosa	N									
Heterotheca villosa var. minor	N									
Heuchera americana	N									
Heuchera americana var. americana	N									
Heuchera richardsonii	N									
Hibiscus laevis	N									
Hibiscus moscheutos	N	I								
Hibiscus moscheutos ssp. moscheutos	N									
Hieracium gronovii	N									
Hieracium gronovii	N									
Hieracium longipilum	N									
Hieracium paniculatum	N									
Hieracium scabrum	N									
Hieracium umbellatum	N									
Hieracium venosum	N									
Hieracium x marianum	N									
Hippuris lanceolata	N									
Hippuris tetraphylla	N									
Hippuris vulgaris	N	I								
Homalosorus pycnocarpos	N	S								
Honckenya peploides	N									
Honckenya peploides ssp. diffusa	N									
Hordeum jubatum	N	S								
Hordeum jubatum ssp. jubatum	N									
Hordeum jubatum ssp. x intermedium	N									
Houstonia caerulea	N									
Houstonia canadensis	N									
Houstonia longifolia	N									
Hudsonia tomentosa	N									
Humulus lupulus	N									
Humulus lupulus var. lupuloides	N									
Huperzia appressa	N									
Huperzia arctica	N									
Huperzia continentalis	N		p,b,g							
Huperzia lucidula	N									
Huperzia porophila	N									
Huperzia selago	N									
Huperzia x buttersii	N									
Huperzia x josephbeitelii	N									
Huperzia x protoporophila	N									
Hybanthus concolor	N									
Hydrastis canadensis	N									
Hydrocotyle americana	N	I								

Hydrocotyle ranunculoides	N									
Hydrophyllum appendiculatum	N									
Hydrophyllum canadense	N									
Hydrophyllum virginianum	N									
Hydrophyllum virginianum var. virginianum	N									
Hydrophyllum virginianum var. virginianum	N									
Hylodesmum glutinosum	N									
Hylodesmum nudiflorum	N									
Hypericum ascyron	N									
Hypericum ascyron ssp. pyramidatum	N									
Hypericum boreale	N	I								
Hypericum canadense	N	I								
Hypericum ellipticum	N	I								
Hypericum gentianoides	N									
Hypericum kalmianum	N	S								
Hypericum majus	N	I								
Hypericum mutilum	N	I								
Hypericum mutilum ssp. mutilum	N									
Hypericum prolificum	N									
Hypericum punctatum	N	S								
Hypericum sphaerocarpum	N									
Hypericum x dissimulatum	N									
Hypopitys monotropa	N									
Hypoxis hirsuta	N									
Ilex mucronata	N	I								
Ilex verticillata	N	I								
Impatiens capensis	N	I								
Impatiens pallida	N	S								
Ipomoea pandurata	N									
Iris brevicaulis	N	I								
Iris lacustris	N									
Iris versicolor	N	I								
Iris virginica	N	I								
Iris virginica var. shrevei	N									
Iris x germanica	N									
Iris x robusta	N									
Isoetes echinospora	N	I								
Isoetes engelmannii	N	I								
Isoetes lacustris	N	I								
Isoetes septentrionalis	N									
Isoetes tuckermanii	N	S								
Isoetes tuckermanii ssp. tuckermanii	N									
Isoetes x eatonii	N									
Isoetes x echtuckerii	N									
Isoetes x harveyi	N									
Isoetes x hickeyi	N									
Isoetes x robusta	N									
Isotria medeoloides	N									
Isotria verticillata	N									
Jeffersonia diphylla	N									
Juglans cinerea	N									
Juglans nigra	N									
Juglans x bixbyi	N									
Juncus acuminatus	N	S								
Juncus alpinoarticulatus	N	I								
Juncus alpinoarticulatus ssp. americanus	N									
Juncus anthelatus	N									
Juncus arcticus	N									
Juncus arcticus ssp. arcticus	N									
Juncus articulatus	N	I								
Juncus articulatus ssp. articulatus	N									
Juncus balticus	N	I								
Juncus balticus ssp. littoralis	N									
Juncus biflorus	N									
Juncus biglumis	N									
Juncus brachycarpus	N									
Juncus brachycephalus	N	I								
Juncus brevicaudatus	N	I								
Juncus bufonius	N	S								
Juncus canadensis	N	I								
Juncus castaneus	N									
Juncus castaneus ssp. castaneus	N									
Juncus dudleyi	N	S								
Juncus effusus	N									
Juncus effusus ssp. solutus	N									
Juncus ensifolius	N									

Juncus filiformis	N	I								
Juncus greenei	N									
Juncus interior	N	S								
Juncus longistylis	N									
Juncus marginatus	N	I								
Juncus militaris	N	I								
Juncus nodosus	N	I								
Juncus pelocarpus	N	I								
Juncus pylaei	N	I								
Juncus ranarius	N									
Juncus secundus	N									
Juncus stygius	N	I								
Juncus stygius ssp. americanus	N									
Juncus subtilis	N	I								
Juncus tenuis	N									
Juncus torreyi	N	S								
Juncus triglumis	N	I								
Juncus triglumis ssp. albescens	N									
Juncus vaseyi	N	S								
Juncus x gracilescens	N									
Juncus x lemieuxii	N									
Juncus x nodosiformis	N		p,b,**G**							
Juniperus communis	N		p,b, **G**							
Juniperus communis var. depressa	N									
Juniperus horizontalis	N									
Juniperus virginiana	N									
Juniperus virginiana var. virginiana	N									
Justicia americana	N	I								
Kalmia angustifolia	N									
Kalmia angustifolia var. angustifolia	N									
Kalmia microphylla	N									
Kalmia microphylla var. microphylla	N									
Kalmia polifolia	N	I								
Kalmia procumbens	N									
Koeleria macrantha	N									
Koeleria spicata	N									
Koenigia islandica	N									
Koenigia x fennica	N									
Krigia biflora	N									
Krigia virginica	N									
Lactuca biennis	N									
Lactuca canadensis	N									
Lactuca floridana	N									
Lactuca hirsuta	N									
Laportea canadensis	N	S								
Larix laricina	N	I								
Lathyrus japonicus	N									
Lathyrus japonicus var. glaber	N									
Lathyrus japonicus var. japonicus	N									
Lathyrus japonicus var. pellitus	N									
Lathyrus ochroleucus	N									
Lathyrus palustris	N	I								
Lathyrus venosus	N									
Lathyrus venosus var. intonsus	N									
Lechea intermedia	N									
Lechea intermedia var. intermedia	N									
Lechea intermedia var. laurentiana	N									
Lechea minor	N									
Lechea mucronata	N									
Lechea pulchella	N									
Lechea pulchella var. moniliformis	N									
Lechea stricta	N									
Leersia oryzoides	N	I								
Leersia virginica	N	S								
Lemna minor	N	I								
Lemna trisulca	N	I								
Lemna turionifera	N									
Lepidium virginicum	N									
Lepidium virginicum ssp. virginicum	N									
Lespedeza capitata	N									
Lespedeza frutescens	N									
Lespedeza hirta	N									
Lespedeza hirta ssp. hirta	N									
Lespedeza procumbens	N									
Lespedeza violacea	N									
Lespedeza virginica	N									

Lespedeza x longifolia	N									
Lespedeza x nuttallii	N									
Leucophysalis grandiflora	N									
Leucospora multifida	N									
Leymus innovatus	N									
Leymus innovatus ssp. innovatus	N									
Leymus mollis	N									
Leymus mollis ssp. mollis	N									
Liatris aspera	N									
Liatris cylindracea	N									
Liatris spicata	N	S								
Liatris spicata var. spicata	N									
Liatris x gladewitzii	N									
Liatris x spheroidea	N									
Ligusticum scoticum	N									
Ligusticum scoticum ssp. scoticum	N									
Lilium canadense	N	S								
Lilium michiganense	N	S								
Lilium philadelphicum	N									
Limosella aquatica	N	I								
Lindera benzoin	N	S								
Lindernia dubia	N									
Lindernia dubia var. anagallidea	N	I								
Lindernia dubia var. dubia	N	I								
Linnaea borealis	N	S								
Linnaea borealis ssp. longiflora	N									
Linum lewisii	N									
Linum lewisii var. lepagei	N									
Linum medium	N									
Linum medium var. medium	N	S								
Linum medium var. texanum	N	S								
Linum striatum	N	S								
Linum sulcatum	N									
Linum virginianum	N									
Liparis liliifolia	N									
Liparis loeselii	N	I								
Liriodendron tulipifera	N									
Lithospermum canescens	N									
Lithospermum caroliniense	N									
Lithospermum incisum	N									
Lithospermum latifolium	N									
Lithospermum occidentale	N									
Lithospermum parviflorum	N									
Littorella americana	N	I								
Lobelia cardinalis	N	I								
Lobelia dortmanna	N	I								
Lobelia inflata	N									
Lobelia kalmii	N	I								
Lobelia siphilitica	N	I								
Lobelia spicata	N									
Lobelia x speciosa	N									
Lomatogonium rotatum	N	I	p,b,g							
Lomatogonium rotatum var. rotatum	N									
Lonicera canadensis	N									
Lonicera dioica	N									
Lonicera dioica var. dioica	N									
Lonicera dioica var. glaucescens	N									
Lonicera hirsuta	N									
Lonicera involucrata	N									
Lonicera involucrata var. involucrata	N									
Lonicera oblongifolia	N	I								
Lonicera villosa	N	I								
Lonicera x bella	N									
Ludwigia alternifolia	N	I								
Ludwigia palustris	N	I								
Ludwigia polycarpa	N	I								
Lupinus perennis	N									
Luzula acuminata	N									
Luzula acuminata ssp. acuminata	N									
Luzula confusa	N									
Luzula echinata	N									
Luzula groenlandica	N									
Luzula multiflora	N									
Luzula multiflora ssp. frigida	N									
Luzula multiflora ssp. multiflora	N									
Luzula parviflora	N									

Luzula parviflora ssp. melanocarpa	N									
Lycopodiella inundata	N	S	p,b,g							
Lycopodium clavatum	N									
Lycopodium lagopus	N									
Lycopus americanus	N	I								
Lycopus asper	N	I								
Lycopus laurentianus	N									
Lycopus rubellus	N	I								
Lycopus uniflorus	N	I								
Lycopus virginicus	N	I								
Lycopus x sherardii	N									
Lysimachia borealis	N									
Lysimachia ciliata	N	S								
Lysimachia hybrida	N									
Lysimachia lanceolata	N									
Lysimachia maritima	N									
Lysimachia quadriflora	N	I								
Lysimachia quadrifolia	N									
Lysimachia terrestris	N	I								
Lysimachia thyrsiflora	N	I								
Lysimachia x commixta	N									
Lysimachia x producta	N									
Lythrum alatum	N	S								
Lythrum alatum var. alatum	N									
Magnolia acuminata	N		p, b, g							
Maianthemum canadense	N									
Maianthemum canadense ssp. canadense	N									
Maianthemum canadense ssp. interius	N		p,b,g							
Maianthemum racemosum	N									
Maianthemum stellatum	N		p,b,g							
Maianthemum trifolium	N	I								
Malaxis monophyllos	N	I								
Malaxis monophyllos var. brachypoda	N									
Malaxis unifolia	N									
Malus coronaria	N									
Matteuccia struthiopteris	N	S								
Medeola virginiana	N									
Melampyrum lineare	N									
Melanocalyx uniflora	N									
Melica smithii	N									
Menispermum canadense	N	S								
Mentha x dumetorum	N									
Mentha x gracilis	N									
Mentha x muelleriana	N									
Mentha x piperita	N	I								
Mentha x villosa	N	S								
Menyanthes trifoliata	N	I								
Mertensia maritima	N									
Mertensia maritima ssp. maritima	N									
Mertensia paniculata	N	S								
Mertensia paniculata var. paniculata	N									
Mertensia virginica	N									
Micranthes pensylvanica	N	I								
Micranthes virginiensis	N									
Micranthes virginiensis	N	S								
Milium effusum	N									
Milium effusum var. cisatlanticum	N									
Mimulus alatus	N	I								
Mimulus ringens	N	I								
Mimulus ringens var. ringens	N									
Mirabilis nyctaginea	N									
Mitchella repens	N									
Mitella diphylla	N	S								
Mitella nuda	N									
Moehringia lateriflora	N									
Moehringia macrophylla	N									
Monarda didyma	N	S								
Monarda fistulosa	N									
Monarda fistulosa var. fistulosa	N									
Monarda fistulosa var. menthifolia	N									
Monarda fistulosa var. mollis	N									
Monarda punctata	N									
Monarda punctata var. villicaulis	N									
Monarda x media	N									
Moneses uniflora	N	S								
Mononeuria groenlandica	N									

Monotropa uniflora	N									
Montia fontana	N									
Morella pensylvanica	N									
Morus rubra	N									
Muhlenbergia cuspidata	N									
Muhlenbergia frondosa	N	S								
Muhlenbergia glomerata	N	I								
Muhlenbergia mexicana	N	S								
Muhlenbergia mexicana var. filiformis	N									
Muhlenbergia mexicana var. mexicana	N									
Muhlenbergia racemosa	N									
Muhlenbergia richardsonis	N									
Muhlenbergia schreberi	N									
Muhlenbergia sobolifera	N									
Muhlenbergia sylvatica	N									
Muhlenbergia tenuiflora	N									
Muhlenbergia uniflora	N									
Muhlenbergia x curtisetosa	N									
Mulgedium pulchellum	N									
Myosotis laxa	N	I								
Myosotis macrosperma	N									
Myosotis verna	N									
Myosurus minimus	N									
Myrica gale	N	I								
Myriophyllum alterniflorum	N	I								
Myriophyllum farwellii	N	I								
Myriophyllum heterophyllum	N	I								
Myriophyllum sibiricum	N	I								
Myriophyllum tenellum	N	I								
Myriophyllum verticillatum	N	I								
Nabalus albus	N	S								
Nabalus altissimus	N									
Nabalus racemosus	N									
Najas canadensis	N									
Najas flexilis	N	I								
Najas gracillima	N	I								
Najas guadalupensis	N	I								
Najas guadalupensis ssp. guadalupensis	N									
Najas guadalupensis ssp. olivacea	N									
Najas marina	N	I								
Nasturtium x sterilis	N									
Nelumbo lutea	N	I								
Neottia auriculata	N	I								
Neottia bifolia	N	I								
Neottia borealis	N	I								
Neottia convallarioides	N	I								
Neottia cordata	N	I								
Neottia x veltmanii	N									
Nuphar advena	N	I								
Nuphar advena ssp. advena	N									
Nuphar microphylla	N	I								
Nuphar variegata	N	I								
Nuphar x rubrodisca	N	I								
Nuttallanthus canadensis	N									
Nymphaea leibergii	N	I								
Nymphaea odorata	N	I								
Nymphaea odorata ssp. odorata	N									
Nymphaea odorata ssp. tuberosa	N									
Nymphoides cordata	N	I								
Nyssa sylvatica	N	I								
Oclemena acuminata	N									
Oclemena nemoralis	N	I								
Oclemena x blakei	N									
Oenothera clelandii	N									
Oenothera fruticosa	N									
Oenothera fruticosa ssp. tetragona	N									
Oenothera gaura	N									
Oenothera nutans	N									
Oenothera oakesiana	N									
Oenothera parviflora	N									
Oenothera perennis	N									
Oenothera pilosella	N									
Oenothera villosa	N									
Oenothera villosa ssp. strigosa	N									
Oenothera villosa ssp. villosa	N									
Omalotheca sylvatica	N									

Onoclea sensibilis	N	I								
Ophioglossum pusillum	N	S								
Oplopanax horridus	N									
Opuntia cespitosa	N									
Opuntia fragilis	N									
Orthilia secunda	N	S								
Oryzopsis asperifolia	N									
Osmorhiza berteroi	N									
Osmorhiza claytonii	N									
Osmorhiza depauperata	N									
Osmorhiza longistylis	N		P,b,g							
Osmunda regalis	N	I	p,b,g							
Osmunda regalis var. spectabilis	N									
Osmundastrum cinnamomeum	N	I								
Ostrya virginiana	N									
Oxalis montana	N	S								
Oxybasis rubra	N									
Oxybasis rubra var. humilis	N									
Oxybasis rubra var. rubra	N	S								
Oxybasis salina	N	S								
Oxybasis salina	N	S								
Oxypolis rigidior	N	S								
Oxytropis borealis	N									
Oxytropis borealis var. hudsonica	N									
Oxytropis borealis var. viscida	N									
Oxytropis campestris	N									
Oxytropis campestris var. johannensis	N									
Oxytropis campestris var. minor	N									
Oxytropis deflexa	N									
Oxytropis deflexa var. foliolosa	N									
Oxytropis deflexa var. sericea	N									
Oxytropis splendens	N									
Packera aurea	N	I								
Packera indecora	N	S								
Packera obovata	N									
Packera pauciflora	N									
Packera paupercula	N	S								
Packera paupercula var. paupercula	N									
Packera paupercula var. pseudotomentosa	N									
Packera paupercula var. savannarum	N									
Packera plattensis	N									
Packera pseudaurea	N									
Packera pseudaurea var. semicordata	N									
Palustricodon aparinoides	N	I								
Palustricodon aparinoides var. aparinoides	N	I								
Palustricodon aparinoides var. grandiflorus	N									
Panax quinquefolius	N									
Panax trifolius	N	S								
Panicum capillare	N									
Panicum flexile	N	I								
Panicum gattingeri	N									
Panicum philadelphicum	N									
Panicum tuckermanii	N	I								
Panicum virgatum	N									
Parathelypteris noveboracensis	N		p,b,g							
Parietaria pensylvanica	N									
Parnassia glauca	N	I								
Parnassia kotzebuei	N									
Parnassia palustris	N	I								
Parnassia parviflora	N	I								
Paronychia canadensis	N									
Paronychia fastigiata	N									
Paronychia fastigiata var. fastigiata	N									
Parthenocissus vitacea	N									
Pascopyrum smithii	N									
Paspalum setaceum	N									
Paspalum setaceum var. muhlenbergii	N									
Paspalum setaceum var. stramineum	N									
Patis racemosa	N									
Pedicularis canadensis	N									
Pedicularis flammea	N									
Pedicularis groenlandica	N	I								
Pedicularis labradorica	N									
Pedicularis lanceolata	N	I								
Pedicularis lapponica	N									
Pedicularis parviflora	N	S								

Pedicularis sudetica	N		**P**							
Pedicularis sudetica ssp. interior	N									
Pellaea atropurpurea	N		p,g							
Pellaea glabella	N									
Pellaea glabella ssp. glabella	N									
Peltandra virginica	N	I								
Penstemon digitalis	N									
Penstemon gracilis	N									
Penstemon hirsutus	N									
Penthorum sedoides	N	I								
Persicaria amphibia	N	I								
Persicaria amphibia var. emersa	N									
Persicaria amphibia var. stipulacea	N									
Persicaria arifolia	N	I								
Persicaria careyi	N	I								
Persicaria hydropiperoides	N	I								
Persicaria lapathifolia	N	S								
Persicaria pensylvanica	N	I								
Persicaria punctata	N	I								
Persicaria robustior	N									
Persicaria sagittata	N	I								
Persicaria virginiana	N									
Petasites frigidus	N									
Petasites frigidus var. palmatus	N									
Petasites frigidus var. sagittatus	N	I								
Petasites frigidus var. x vitifolius	N	S								
Petunia x atkinsiana	N									
Phacelia franklinii	N									
Phacelia purshii	N									
Phalaris arundinacea	N	S								
Phegopteris connectilis	N	S								
Phegopteris hexagonoptera	N									
Phleum alpinum	N									
Phlox divaricata	N									
Phlox pilosa	N									
Phlox pilosa ssp. pilosa	N									
Phlox subulata	N									
Phlox subulata ssp. subulata	N									
Phragmites australis	N									
Phragmites australis ssp. americanus	N	I								
Phryma leptostachya	N									
Phryma leptostachya var. leptostachya	N									
Phyla lanceolata	N	I								
Phyllodoce caerulea	N									
Physalis heterophylla	N									
Physalis longifolia	N									
Physalis longifolia var. subglabrata	N									
Physalis virginiana	N									
Physocarpus intermedius	N									
Physocarpus opulifolius	N	S								
Physostegia virginiana	N	I								
Physostegia virginiana ssp. virginiana	N									
Phytolacca americana	N									
Phytolacca americana var. americana	N									
Picea glauca	N	S								
Picea mariana	N									
Picea rubens	N									
Pilea fontana	N	I								
Pilea pumila	N	I								
Pilosella x atramentaria	N									
Pilosella x floribunda	N									
Pinguicula villosa	N									
Pinguicula vulgaris	N	I								
Pinguicula vulgaris ssp. vulgaris	N									
Pinus banksiana	N									
Pinus resinosa	N									
Pinus rigida	N									
Pinus strobus	N	S								
Piptatheropsis canadensis	N									
Piptatheropsis pungens	N									
Piptochaetium avenaceum	N									
Plantago cordata	N	I								
Plantago maritima	N									
Plantago rugelii	N									
Platanthera aquilonis	N	I								
Platanthera blephariglottis	N	I								

Platanthera blephariglottis var. blephariglottis	N									
Platanthera ciliaris	N									
Platanthera clavellata	N	I								
Platanthera dilatata	N	I								
Platanthera dilatata var. dilatata	N									
Platanthera flava	N									
Platanthera flava var. herbiola	N	I								
Platanthera grandiflora	N	S								
Platanthera hookeri	N									
Platanthera huronensis	N									
Platanthera hyperborea	N									
Platanthera lacera	N	I								
Platanthera leucophaea	N	S								
Platanthera macrophylla	N									
Platanthera obtusata	N	I								
Platanthera obtusata ssp. obtusata	N									
Platanthera orbiculata	N									
Platanthera psycodes	N	I								
Platanthera unalascensis	N									
Platanthera x andrewsii	N									
Platanthera x hollandiae	N									
Platanthera x reznicekii	N									
Platanus occidentalis	N	S								
Poa alpina	N		**P**, b, g							
Poa alpina ssp. alpina	N									
Poa alsodes	N									
Poa arctica	N									
Poa arctica ssp. arctica	N									
Poa arctica ssp. caespitans	N									
Poa glauca	N									
Poa glauca ssp. glauca	N									
Poa interior	N									
Poa palustris	N	I								
Poa pratensis ssp. agassizensis	N									
Poa pratensis ssp. alpigena	N									
Poa pratensis ssp. irrigata	N									
Poa saltuensis	N									
Poa saltuensis ssp. languida	N									
Poa saltuensis ssp. saltuensis	N									
Poa secunda	N									
Poa secunda ssp. secunda	N									
Poa sylvestris	N									
Podophyllum peltatum	N									
Podostemum ceratophyllum	N	I								
Pogonia ophioglossoides	N	I								
Polanisia dodecandra	N									
Polanisia dodecandra ssp. dodecandra	N									
Polygala aquilonia	N									
Polygala incarnata	N									
Polygala polygama	N									
Polygala sanguinea	N									
Polygala senega	N									
Polygala verticillata	N									
Polygaloides paucifolia	N									
Polygonatum biflorum	N									
Polygonatum biflorum var. commutatum	N									
Polygonatum biflorum var. melleum	N									
Polygonatum pubescens	N									
Polygonum achoreum	N									
Polygonum articulatum	N									
Polygonum aviculare	N									
Polygonum aviculare ssp. buxiforme	N									
Polygonum douglasii	N									
Polygonum erectum	N									
Polygonum erectum ssp. erectum	N									
Polygonum fowleri	N									
Polygonum fowleri ssp. fowleri	N									
Polygonum fowleri ssp. hudsonianum	N									
Polygonum ramosissimum	N									
Polygonum ramosissimum ssp. prolificum	N									
Polygonum ramosissimum ssp. ramosissimum	N									
Polygonum tenue	N									
Polymnia canadensis	N									
Polypodium appalachianum	N									
Polypodium sibiricum	N		p, **B,** g							
Polypodium virginianum	N									

Polypodium x incognitum	N									
Polystichum acrostichoides	N									
Polystichum braunii	N		p,g							
Polystichum lonchitis	N									
Polystichum x hagenahii	N									
Pontederia cordata	N	I								
Populus deltoides	N	S								
Populus deltoides ssp. deltoides	N									
Populus deltoides ssp. monilifera	N									
Populus grandidentata	N									
Populus heterophylla	N	I								
Populus x berolinensis	N									
Populus x canadensis	N									
Populus x canescens	N									
Populus x heimburgeri	N									
Populus x jackii	N									
Populus x rouleauiana	N									
Populus x smithii	N									
Potamogeton alpinus	N	I								
Potamogeton amplifolius	N	I								
Potamogeton berchtoldii	N	I								
Potamogeton bicupulatus	N	I								
Potamogeton confervoides	N	I								
Potamogeton epihydrus	N	I								
Potamogeton foliosus	N	I								
Potamogeton foliosus ssp. foliosus	N									
Potamogeton friesii	N	I								
Potamogeton gramineus	N	I								
Potamogeton hillii	N	I								
Potamogeton illinoensis	N	I								
Potamogeton natans	N	I								
Potamogeton nodosus	N	I								
Potamogeton oakesianus	N	I								
Potamogeton obtusifolius	N	I								
Potamogeton perfoliatus	N	I								
Potamogeton praelongus	N	I								
Potamogeton pulcher	N	I								
Potamogeton pusillus	N	I								
Potamogeton richardsonii	N	I								
Potamogeton robbinsii	N	I								
Potamogeton spirillus	N	I								
Potamogeton strictifolius	N	I								
Potamogeton subsibiricus	N									
Potamogeton vaseyi	N	I								
Potamogeton x absconditus	N									
Potamogeton x faxonii	N									
Potamogeton x hagstroemii	N									
Potamogeton x haynesii	N									
Potamogeton x nitens	N									
Potamogeton x ogdenii	N	I								
Potamogeton x spathuliformis	N									
Potamogeton zosteriformis	N	I								
Potentilla anserina	N									
Potentilla anserina ssp. anserina	N	S								
Potentilla anserina ssp. groenlandica	N									
Potentilla arenosa	N									
Potentilla arenosa ssp. chamissonis	N									
Potentilla arenosa ssp. chamissonis	N									
Potentilla bimundorum	N									
Potentilla bipinnatifida	N									
Potentilla canadensis	N									
Potentilla crantzii	N									
Potentilla gracilis	N									
Potentilla gracilis var. fastigiata	N									
Potentilla gracilis var. flabelliformis	N									
Potentilla hippiana	N									
Potentilla litoralis	N									
Potentilla nivea	N									
Potentilla norvegica	N	S								
Potentilla pensylvanica	N									
Potentilla pulchella	N									
Potentilla pulcherrima	N									
Potentilla rivalis	N									
Potentilla rivalis	N									
Potentilla simplex	N									
Potentilla supina	N	S								

Potentilla supina ssp. paradoxa	N									
Primula egaliksensis	N									
Primula laurentiana	N									
Primula mistassinica	N	S								
Primula stricta	N									
Prosartes lanuginosa	N									
Prosartes trachycarpa	N									
Proserpinaca palustris	N	I								
Prunella vulgaris	N									
Prunella vulgaris ssp. lanceolata	N	S								
Prunus americana	N									
Prunus nigra	N									
Prunus pensylvanica	N									
Prunus pumila	N									
Prunus pumila var. besseyi	N									
Prunus pumila var. depressa	N									
Prunus pumila var. pumila	N									
Prunus pumila var. susquehanae	N									
Prunus serotina var. serotina	N									
Prunus virginiana	N									
Prunus virginiana var. virginiana	N									
Prunus x cistena	N									
Pseudognaphalium macounii	N									
Pseudognaphalium obtusifolium	N									
Ptelea trifoliata	N		p,b,g							
Ptelea trifoliata ssp. trifoliata	N									
Pteridium aquilinum	N									
Pteridium aquilinum ssp. latiusculum	N									
Pterospora andromedea	N									
Puccinellia nutkaensis	N									
Puccinellia nutkaensis	N									
Puccinellia nuttalliana	N									
Puccinellia phryganodes	N									
Puccinellia phryganodes ssp. neoarctica	N									
Puccinellia pumila	N									
Puccinellia tenella	N									
Puccinellia tenella ssp. langeana	N									
Puccinellia vaginata	N									
Pulsatilla nuttalliana	N									
Pycnanthemum incanum	N									
Pycnanthemum incanum var. incanum	N									
Pycnanthemum tenuifolium	N									
Pycnanthemum verticillatum	N									
Pycnanthemum verticillatum var. pilosum	N									
Pycnanthemum verticillatum var. verticillatum	N									
Pycnanthemum virginianum	N	S								
Pyrola americana	N									
Pyrola asarifolia	N	S								
Pyrola asarifolia ssp. asarifolia	N									
Pyrola chlorantha	N									
Pyrola elliptica	N									
Pyrola grandiflora	N									
Pyrola minor	N	S								
Quercus alba	N									
Quercus bicolor	N	I								
Quercus ellipsoidalis	N									
Quercus ilicifolia	N									
Quercus macrocarpa	N	S								
Quercus muehlenbergii	N									
Quercus palustris	N	S								
Quercus prinoides	N									
Quercus rubra	N									
Quercus shumardii	N	I								
Quercus velutina	N									
Quercus x bebbiana	N									
Quercus x deamii	N									
Quercus x fernaldii	N									
Quercus x hawkinsii	N									
Quercus x jackiana	N									
Quercus x mutabilis	N									
Quercus x palaeolithicola	N									
Quercus x riparia	N									
Quercus x schuettei	N									
Ranunculus abortivus	N									
Ranunculus arcticus	N									
Ranunculus caricetorum	N									

Ranunculus fascicularis	N									
Ranunculus flabellaris	N	I								
Ranunculus flammula	N									
Ranunculus flammula var. ovalis	N									
Ranunculus flammula var. reptans	N	I								
Ranunculus gmelinii	N	I								
Ranunculus hispidus	N									
Ranunculus hyperboreus	N									
Ranunculus longirostris	N									
Ranunculus macounii	N									
Ranunculus pensylvanicus	N	I								
Ranunculus recurvatus	N									
Ranunculus recurvatus var. recurvatus	N									
Ranunculus rhomboideus	N									
Ranunculus sceleratus	N	I								
Ranunculus sceleratus var. multifidus	N									
Ranunculus septentrionalis	N									
Ranunculus subrigidus	N									
Ranunculus trichophyllus	N									
Ratibida pinnata	N									
Ratibida pinnata	N									
Reynoutria x bohemica	N									
Rhexia virginica	N	I								
Rhinanthus minor	N									
Rhinanthus minor ssp. groenlandicus	N									
Rhododendron canadense	N	I								
Rhododendron groenlandicum	N	I								
Rhododendron lapponicum	N									
Rhododendron tomentosum	N									
Rhus aromatica	N									
Rhus aromatica var. aromatica	N									
Rhus copallinum	N									
Rhus copallinum var. copallinum	N									
Rhus glabra	N									
Rhus typhina	N									
Rhus x borealis	N									
Rhynchospora alba	N	I								
Rhynchospora capillacea	N	I								
Rhynchospora capitellata	N	I								
Rhynchospora fusca	N	I								
Ribes americanum	N	S								
Ribes cynosbati	N									
Ribes glandulosum	N	I								
Ribes hirtellum	N	I								
Ribes hudsonianum	N	I								
Ribes hudsonianum var. hudsonianum	N									
Ribes lacustre	N	I								
Ribes oxyacanthoides	N									
Ribes oxyacanthoides var. oxyacanthoides	N									
Ribes oxyacanthoides var. setosum	N									
Ribes triste	N	I								
Ripariosida hermaphrodita	N									
Rorippa aquatica	N	I								
Rorippa palustris	N	I								
Rorippa palustris ssp. hispida	N									
Rorippa palustris ssp. palustris	N									
Rosa acicularis	N									
Rosa acicularis ssp. sayi	N									
Rosa arkansana	N		p, b, **G**							
Rosa blanda	N									
Rosa carolina	N									
Rosa carolina ssp. carolina	N									
Rosa carolina ssp. subserrulata	N									
Rosa nitida	N									
Rosa palustris	N	I								
Rosa setigera	N									
Rosa virginiana	N									
Rosa virginiana ssp. virginiana	N									
Rosa woodsii	N									
Rosa woodsii ssp. woodsii	N									
Rosa x gilmaniana	N									
Rosa x hainesii	N									
Rosa x harmsiana	N									
Rosa x hodgdonii	N									
Rosa x oldhamii	N									
Rosa x palustriformis	N									

Rosa x per-axeliana	N									
Rotala ramosior	N	I								
Rubus ablatus	N									
Rubus acridens	N									
Rubus allegheniensis	N									
Rubus allegheniensis var. allegheniensis	N									
Rubus allegheniensis var. gravesii	N									
Rubus alumnus	N									
Rubus arcticus	N									
Rubus arcticus ssp. acaulis	N	I								
Rubus arundelanus	N									
Rubus baileyanus	N									
Rubus canadensis	N									
Rubus cauliflorus	N									
Rubus chamaemorus	N	I								
Rubus curtipes	N									
Rubus deamii	N									
Rubus dissensus	N									
Rubus enslenii	N									
Rubus flagellaris	N									
Rubus frondosus	N									
Rubus fulleri	N									
Rubus groutianus	N									
Rubus hispidus	N	S								
Rubus idaeus ssp. strigosus	N									
Rubus ithacanus	N									
Rubus michiganensis	N									
Rubus multifer	N									
Rubus nutkanus	N									
Rubus occidentalis	N									
Rubus odoratus	N									
Rubus pensilvanicus	N									
Rubus plicatifolius	N									
Rubus pubescens	N									
Rubus recurvans	N									
Rubus regionalis	N									
Rubus repens	N	S								
Rubus rosa	N									
Rubus satis	N									
Rubus setosus	N	S								
Rubus signatus	N									
Rubus steelei	N									
Rubus superioris	N									
Rubus tardatus	N									
Rubus trifrons	N									
Rubus uniformis	N									
Rubus vermontanus	N									
Rubus wheeleri	N									
Rubus x jacens	N									
Rubus x neglectus	N									
Rubus x paracaulis	N									
Rubus x recurvicaulis	N									
Rubus x wisconsinensis	N									
Rudbeckia hirta	N									
Rudbeckia hirta var. hirta	N									
Rudbeckia hirta var. pulcherrima	N									
Rudbeckia laciniata	N	S								
Rudbeckia laciniata var. laciniata	N									
Rudbeckia speciosa	N	S								
Rumex altissimus	N	S								
Rumex britannica	N	I								
Rumex fueginus	N	I								
Rumex occidentalis	N	I								
Rumex pallidus	N									
Rumex subarcticus	N									
Rumex triangulivalvis	N									
Rumex verticillatus	N	I								
Rumex x pratensis	N									
Ruppia maritima	N									
Sabatia angularis	N									
Sabulina dawsonensis	N									
Sabulina litorea	N									
Sabulina michauxii	N									
Sabulina rubella	N									
Sabulina stricta	N									
Sagina nodosa	N									

Sagina nodosa ssp. borealis	N									
Sagittaria cristata	N	I								
Sagittaria cuneata	N	I								
Sagittaria engelmanniana	N									
Sagittaria graminea	N	I								
Sagittaria graminea ssp. graminea	N									
Sagittaria latifolia	N	I								
Sagittaria rigida	N	I								
Salicornia maritima	N									
Salix amygdaloides	N	S								
Salix arbusculoides	N									
Salix arctica	N									
Salix arctophila	N									
Salix ballii	N									
Salix brachycarpa	N									
Salix brachycarpa var. brachycarpa	N									
Salix calcicola	N									
Salix calcicola var. calcicola	N									
Salix candida	N	I								
Salix cordata	N									
Salix eriocephala	N	S								
Salix famelica	N									
Salix glauca	N	S								
Salix glauca var. cordifolia	N									
Salix humilis	N									
Salix humilis var. humilis	N									
Salix interior	N	S								
Salix lucida	N	I								
Salix maccalliana	N	I								
Salix myricoides	N	S								
Salix myrtillifolia	N	S								
Salix nigra	N	S								
Salix pedicellaris	N	I								
Salix pellita	N	S								
Salix planifolia	N	I								
Salix pseudomonticola	N	S								
Salix pseudomyrsinites	N									
Salix pyrifolia	N	I								
Salix reticulata	N									
Salix serissima	N	I								
Salix vestita	N									
Salix x beschelii	N									
Salix x fragilis	N	S								
Salix x glatfelteri	N									
Salix x hudsonensis	N									
Salix x jamesensis	N									
Salix x jesupii	N									
Salix x laurentiana	N									
Salix x meyeriana	N									
Salix x pendulina	N									
Salix x sepulcralis	N									
Salix x waghornei	N									
Sambucus canadensis	N	S								
Sambucus racemosa	N									
Sambucus racemosa	N									
Samolus parviflorus	N	I								
Sanguinaria canadensis	N									
Sanguisorba canadensis	N									
Sanicula canadensis	N									
Sanicula canadensis var. canadensis	N									
Sanicula canadensis var. grandis	N									
Sanicula marilandica	N									
Sanicula odorata	N									
Sanicula trifoliata	N									
Sarracenia purpurea	N	I								
Sarracenia purpurea ssp. purpurea	N									
Sassafras albidum	N									
Saururus cernuus	N	I								
Saxifraga aizoides	N									
Saxifraga cernua	N									
Saxifraga cespitosa	N									
Saxifraga hirculus	N									
Saxifraga oppositifolia	N									
Saxifraga oppositifolia ssp. oppositifolia	N									
Saxifraga paniculata	N									
Saxifraga paniculata ssp. laestadii	N									

Saxifraga rivularis	N									
Saxifraga rivularis ssp. rivularis	N									
Saxifraga tricuspidata	N									
Sceptridium dissectum	N		**P**,b,**G**							
Sceptridium multifidum	N		**P,G**							
Sceptridium oneidense	N									
Sceptridium rugulosum	N									
Scheuchzeria palustris	N	I								
Schizachne purpurascens	N									
Schizachne purpurascens ssp. purpurascens	N									
Schizachyrium scoparium	N									
Schizachyrium scoparium var. littorale	N									
Schizachyrium scoparium var. scoparium	N									
Schizaea pusilla	N									
Schoenoplectiella purshiana	N	I								
Schoenoplectiella purshiana var. purshiana	N	I								
Schoenoplectiella purshiana var. williamsii	N									
Schoenoplectiella smithii	N	I								
Schoenoplectiella smithii var. setosa	N									
Schoenoplectiella smithii var. smithii	N									
Schoenoplectus acutus	N									
Schoenoplectus acutus var. acutus	N	I								
Schoenoplectus heterochaetus	N	I								
Schoenoplectus pungens	N	I								
Schoenoplectus pungens var. longispicatus	N									
Schoenoplectus pungens var. pungens	N									
Schoenoplectus subterminalis	N	I								
Schoenoplectus tabernaemontani	N	I								
Schoenoplectus torreyi	N	I								
Schoenoplectus x oblongus	N									
Scirpus atrocinctus	N	I								
Scirpus cyperinus	N	I								
Scirpus expansus	N	I								
Scirpus georgianus	N	I								
Scirpus hattorianus	N	S								
Scirpus microcarpus	N	I								
Scirpus pallidus	N									
Scirpus pallidus	N									
Scirpus pedicellatus	N	I								
Scirpus pendulus	N	I								
Scleria pauciflora	N									
Scleria pauciflora var. pauciflora	N									
Scleria triglomerata	N									
Scleria verticillata	N	I								
Scrophularia lanceolata	N									
Scrophularia marilandica	N									
Scutellaria galericulata	N	I								
Scutellaria galericulata var. pubescens	N									
Scutellaria lateriflora	N	I								
Scutellaria nervosa	N									
Scutellaria parvula	N									
Scutellaria parvula var. missouriensis	N									
Scutellaria parvula var. parvula	N									
Scutellaria x churchilliana	N									
Selaginella densa	N		p,b,g							
Selaginella eclipes	N	I								
Selaginella rupestris	N		p,**B,G**							
Selaginella selaginoides	N	I								
Senecio eremophilus	N									
Senecio eremophilus var. eremophilus	N									
Senna hebecarpa	N									
Shepherdia canadensis	N									
Sibbaldia tridentata	N									
Sicyos angulatus	N									
Silene acaulis	N									
Silene antirrhina	N									
Silene drummondii	N									
Silene drummondii ssp. drummondii	N									
Silene involucrata	N									
Silene involucrata ssp. involucrata	N									
Silene involucrata ssp. tenella	N									
Silene uralensis	N									
Silene uralensis ssp. ogilviensis	N									
Silene uralensis ssp. uralensis	N									
Silene virginica	N									
Silene x hampeana	N									

Silphium laciniatum	N									
Silphium perfoliatum	N									
Silphium perfoliatum var. perfoliatum	N									
Silphium terebinthinaceum	N									
Silphium terebinthinaceum var. terebinthinace	N									
Sisyrinchium albidum	N									
Sisyrinchium angustifolium	N	S								
Sisyrinchium montanum	N	S								
Sisyrinchium montanum var. crebrum	N									
Sisyrinchium montanum var. montanum	N									
Sisyrinchium mucronatum	N	S								
Sium suave	N	I								
Smilax ecirrata	N									
Smilax herbacea	N									
Smilax illinoensis	N									
Smilax lasioneura	N									
Smilax rotundifolia	N									
Smilax tamnoides	N									
Solanum emulans	N									
Solidago altissima	N									
Solidago altissima var. altissima	N									
Solidago altissima var. gilvocanescens	N									
Solidago arguta	N									
Solidago arguta	N									
Solidago bicolor	N									
Solidago brendae	N									
Solidago caesia	N									
Solidago caesia var. caesia	N									
Solidago canadensis	N									
Solidago canadensis var. canadensis	N									
Solidago canadensis var. hargeri	N									
Solidago fallax	N									
Solidago fallax var. molina	N									
Solidago flexicaulis	N									
Solidago gigantea	N	S								
Solidago gigantea var. gigantea	N									
Solidago gigantea var. shinnersii	N									
Solidago gillmanii	N									
Solidago glutinosa	N									
Solidago hispida	N									
Solidago hispida var. hispida	N									
Solidago hispida var. huronensis	N									
Solidago houghtonii	N	S								
Solidago juncea	N									
Solidago lepida	N									
Solidago lepida var. lepida	N									
Solidago macrophylla	N									
Solidago missouriensis	N									
Solidago multiradiata	N									
Solidago nemoralis	N									
Solidago nemoralis ssp. decemflora	N									
Solidago nemoralis ssp. nemoralis	N									
Solidago ohioensis	N	I								
Solidago ontarioensis	N									
Solidago pallida	N									
Solidago patula	N	I								
Solidago ptarmicoides	N									
Solidago puberula	N									
Solidago riddellii	N	I								
Solidago rigida	N									
Solidago rigida ssp. rigida	N									
Solidago rigidiuscula	N									
Solidago rugosa	N	S								
Solidago rugosa ssp. aspera	N									
Solidago rugosa ssp. aspera var. aspera	N									
Solidago rugosa ssp. rugosa	N									
Solidago rugosa ssp. rugosa var. rugosa	N									
Solidago squarrosa	N									
Solidago uliginosa	N	I								
Solidago uliginosa var. peracuta	N									
Solidago uliginosa var. uliginosa	N									
Solidago ulmifolia	N									
Solidago ulmifolia var. ulmifolia	N									
Solidago x beaudryi	N									
Solidago x krotkovii	N									
Solidago x lutescens	N									

Sorbus americana	N									
Sorbus decora	N									
Sorghastrum nutans	N									
Sorghum bicolor ssp. x drummondii	N									
Sparganium acaule	N									
Sparganium americanum	N	I								
Sparganium androcladum	N	I								
Sparganium angustifolium	N	I								
Sparganium emersum	N	I								
Sparganium eurycarpum	N	I								
Sparganium fluctuans	N	I								
Sparganium glomeratum	N	I								
Sparganium glomeratum	N	I								
Sparganium hyperboreum	N									
Sparganium natans	N	I								
Spergularia canadensis	N									
Spergularia canadensis var. canadensis	N									
Spergularia marina	N									
Sphenopholis intermedia	N	S								
Sphenopholis nitida	N									
Sphenopholis obtusata	N		p,b,g							
Spinulum annotinum	N									
Spinulum canadense	N									
Spiraea alba	N	I								
Spiraea alba var. alba	N									
Spiraea alba var. latifolia	N									
Spiraea tomentosa	N	S								
Spiraea tomentosa var. rosea	N									
Spiraea tomentosa var. tomentosa	N									
Spiraea x vanhouttei	N									
Spiranthes arcisepala	N									
Spiranthes casei	N									
Spiranthes casei	N									
Spiranthes casei var. casei	N									
Spiranthes incurva	N									
Spiranthes lacera	N									
Spiranthes lacera var. gracilis	N									
Spiranthes lacera var. lacera	N									
Spiranthes lucida	N	I								
Spiranthes magnicamporum	N									
Spiranthes ochroleuca	N									
Spiranthes ovalis	N									
Spiranthes ovalis var. erostellata	N									
Spiranthes romanzoffiana	N	I								
Spiranthes x simpsonii	N									
Spirodela polyrhiza	N	I								
Sporobolus compositus	N									
Sporobolus compositus var. compositus	N									
Sporobolus cryptandrus	N									
Sporobolus heterolepis	N									
Sporobolus michauxianus	N	S								
Sporobolus neglectus	N									
Sporobolus rigidus	N									
Sporobolus rigidus var. magnus	N									
Sporobolus rigidus var. rigidus	N									
Sporobolus vaginiflorus	N									
Sporobolus vaginiflorus var. inaequalis	N									
Sporobolus vaginiflorus var. ozarkanus	N									
Sporobolus vaginiflorus var. vaginiflorus	N									
Stachys hispida	N	I								
Stachys pilosa	N	I								
Stachys pilosa var. arenicola	N									
Stachys pilosa var. pilosa	N									
Stachys tenuifolia	N									
Staphylea trifolia	N									
Stellaria borealis	N	S								
Stellaria borealis ssp. borealis	N									
Stellaria crassifolia	N	S								
Stellaria humifusa	N									
Stellaria longifolia	N	I								
Stellaria longipes	N	S								
Stellaria longipes ssp. longipes	N									
Streptopus amplexifolius	N									
Streptopus lanceolatus	N									
Streptopus lanceolatus var. lanceolatus	N									
Streptopus lanceolatus var. longipes	N									

Streptopus x oreopolus	N									
Strophostyles helvola	N									
Strophostyles leiosperma	N									
Stuckenia filiformis	N	I								
Stuckenia pectinata	N	I								
Stuckenia vaginata	N	S								
Stylophorum diphyllum	N									
Suaeda calceoliformis	N									
Subularia aquatica	N	I								
Subularia aquatica ssp. americana	N									
Symphoricarpos albus	N									
Symphoricarpos albus var. albus	N									
Symphyotrichum boreale	N	I								
Symphyotrichum ciliatum	N	I								
Symphyotrichum ciliolatum	N									
Symphyotrichum cordifolium	N									
Symphyotrichum dumosum	N	I								
Symphyotrichum ericoides	N									
Symphyotrichum ericoides var. ericoides	N									
Symphyotrichum ericoides var. pansum	N									
Symphyotrichum firmum	N									
Symphyotrichum laeve	N									
Symphyotrichum laeve ssp. laeve	N									
Symphyotrichum laeve var. geyeri	N									
Symphyotrichum laeve var. laeve	N									
Symphyotrichum lanceolatum	N									
Symphyotrichum lanceolatum ssp. hesperium	N									
Symphyotrichum lanceolatum ssp. lanceolatur	N	I								
Symphyotrichum lanceolatum ssp. lanceolatur	N									
Symphyotrichum lanceolatum ssp. lanceolatur	N									
Symphyotrichum lanceolatum ssp. lanceolatur	N									
Symphyotrichum lanceolatum ssp. lanceolatur	N									
Symphyotrichum lateriflorum	N	S								
Symphyotrichum lateriflorum var. angustifoliu	N									
Symphyotrichum lateriflorum var. hirsuticaule	N									
Symphyotrichum lateriflorum var. lateriflorum	N									
Symphyotrichum novae-angliae	N									
Symphyotrichum ontarionis	N	I								
Symphyotrichum ontarionis var. glabratum	N									
Symphyotrichum ontarionis var. ontarionis	N									
Symphyotrichum oolentangiense	N									
Symphyotrichum pilosum	N									
Symphyotrichum pilosum var. pilosum	N									
Symphyotrichum pilosum var. pringlei	N	S								
Symphyotrichum praealtum	N									
Symphyotrichum praealtum var. praealtum	N									
Symphyotrichum prenanthoides	N	I								
Symphyotrichum puniceum	N	I								
Symphyotrichum puniceum var. puniceum	N									
Symphyotrichum robynsianum	N	I								
Symphyotrichum sericeum	N									
Symphyotrichum shortii	N									
Symphyotrichum undulatum	N									
Symphyotrichum urophyllum	N									
Symphyotrichum x amethystinum	N									
Symphytum x uplandicum	N									
Symplocarpus foetidus	N	I								
Taenidia integerrima	N									
Tanacetum bipinnatum	N									
Tanacetum bipinnatum ssp. huronense	N									
Taraxacum ceratophorum	N	S								
Taxus canadensis	N									
Tephroseris palustris	N	S								
Tephrosia virginiana	N									
Tetraneuris herbacea	N									
Teucrium canadense	N	S								
Teucrium canadense var. canadense	N									
Teucrium canadense var. occidentale	N									
Thalictrum amphibolum	N									
Thalictrum confine	N									
Thalictrum dasycarpum	N	S								
Thalictrum dioicum	N									
Thalictrum pubescens	N	S								
Thalictrum sparsiflorum	N									
Thalictrum thalictroides	N									
Thalictrum venulosum	N	S								

Thaspium barbinode	N									
Thaspium chapmanii	N									
Thaspium trifoliatum	N		**P**,b,**G**							
Thaspium trifoliatum var. aureum	N									
Thelypteris palustris	N	I								
Thelypteris palustris var. pubescens	N									
Thuja occidentalis	N	S								
Tiarella stolonifera	N									
Tilia americana	N									
Tilia x europaea	N									
Tipularia discolor	N									
Tofieldia pusilla	N	S								
Tomostima reptans	N									
Torreyochloa pallida	N									
Torreyochloa pallida var. fernaldii	N	I								
Torreyochloa pallida var. pallida	N	I								
Toxicodendron radicans	N									
Toxicodendron radicans var. radicans	N	S								
Toxicodendron vernix	N	I								
Tradescantia ohiensis	N									
Tragopogon x crantzii	N									
Tragopogon x mirabilis	N									
Tragopogon x neohybridus	N									
Triadenum fraseri	N	I								
Triadenum virginicum	N	I								
Triantha glutinosa	N	I								
Trichophorum alpinum	N	I								
Trichophorum cespitosum	N	I								
Trichophorum clintonii	N									
Trichophorum planifolium	N									
Trichostema brachiatum	N									
Trichostema dichotomum	N									
Trifolium reflexum	N									
Triglochin maritima	N	I								
Triglochin palustris	N	I								
Trillidium undulatum	N									
Trillium cernuum	N	S								
Trillium erectum	N									
Trillium flexipes	N									
Trillium grandiflorum	N									
Trillium recurvatum	N									
Triodanis perfoliata	N									
Triosteum angustifolium	N									
Triosteum aurantiacum	N									
Triosteum aurantiacum var. aurantiacum	N									
Triosteum perfoliatum	N									
Triphora trianthophoros	N									
Triphora trianthophoros ssp. trianthophoros	N									
Triplasis purpurea	N									
Triplasis purpurea var. purpurea	N									
Tripleurospermum maritimum	N									
Tripleurospermum maritimum ssp. phaeocepl	N									
Tsuga canadensis	N	S								
Turritis glabra	N									
Typha latifolia	N	I								
Typha x glauca	N	I								
Ulmus americana	N	S								
Ulmus rubra	N									
Ulmus thomasii	N									
Urtica gracilis	N	S								
Urtica gracilis ssp. gracilis	N	S								
Utricularia cornuta	N	I								
Utricularia geminiscapa	N	I								
Utricularia gibba	N	I								
Utricularia intermedia	N	I								
Utricularia minor	N	I								
Utricularia ochroleuca	N									
Utricularia purpurea	N	I								
Utricularia resupinata	N	I								
Utricularia vulgaris	N	I								
Utricularia vulgaris ssp. macrorhiza	N									
Uvularia grandiflora	N									
Uvularia perfoliata	N									
Uvularia sessilifolia	N									
Vaccinium angustifolium	N									
Vaccinium cespitosum	N									

Vaccinium corymbosum	N	I								
Vaccinium macrocarpon	N	I								
Vaccinium membranaceum	N									
Vaccinium microcarpum	N									
Vaccinium myrtilloides	N	S								
Vaccinium ovalifolium	N									
Vaccinium oxycoccos	N	I								
Vaccinium pallidum	N									
Vaccinium stamineum	N									
Vaccinium uliginosum	N									
Vaccinium uliginosum ssp. gaultherioides	N									
Vaccinium uliginosum ssp. pubescens	N									
Vaccinium vitis-idaea	N									
Vahlodea atropurpurea	N									
Valeriana dioica	N	I								
Valeriana dioica ssp. sylvatica	N									
Valeriana edulis	N	I								
Valeriana edulis ssp. ciliata	N									
Valeriana uliginosa	N	I								
Valerianella chenopodiifolia	N									
Valerianella umbilicata	N	S								
Vallisneria americana	N	I								
Verbena hastata	N	I								
Verbena simplex	N									
Verbena stricta	N									
Verbena urticifolia	N	S								
Verbena x deamii	N									
Verbena x engelmannii	N									
Verbena x perriana	N									
Verbena x rydbergii	N									
Verbesina alternifolia	N	S								
Vernonia gigantea	N									
Vernonia missurica	N									
Veronica americana	N	I								
Veronica catenata	N	I								
Veronica peregrina	N									
Veronica peregrina ssp. peregrina	N	S								
Veronica peregrina ssp. xalapensis	N									
Veronica scutellata	N	I								
Veronica serpyllifolia	N									
Veronica serpyllifolia ssp. humifusa	N									
Veronica wormskjoldii	N									
Veronica wormskjoldii ssp. wormskjoldii	N									
Veronicastrum virginicum	N									
Viburnum acerifolium	N									
Viburnum cassinoides	N	S								
Viburnum dentatum var. lucidum	N									
Viburnum edule	N	S								
Viburnum lantanoides	N									
Viburnum opulus	N									
Viburnum opulus var. americanum	N	S								
Viburnum rafinesqueanum	N									
Viburnum rafinesqueanum var. affine	N									
Viburnum rafinesqueanum var. rafinesqueanu	N									
Vicia americana	N									
Vicia americana var. americana	N									
Vicia caroliniana	N									
Viola adunca	N									
Viola adunca var. adunca	N									
Viola affinis	N	S								
Viola baxteri	N									
Viola bicolor	N									
Viola blanda	N	S								
Viola canadensis	N									
Viola canadensis var. canadensis	N									
Viola canadensis var. rugulosa	N									
Viola cucullata	N	I								
Viola epipsila	N	I								
Viola epipsila var. repens	N									
Viola labradorica	N									
Viola lanceolata	N	I								
Viola latiuscula	N									
Viola macloskeyi	N	I								
Viola nephrophylla	N	I								
Viola novae-angliae	N									
Viola palmata	N									

Viola palmata var. palmata	N									
Viola palustris	N									
Viola pedata	N									
Viola pedata var. pedata	N									
Viola pedatifida	N									
Viola pubescens	N									
Viola pubescens var. pubescens	N									
Viola pubescens var. scabriuscula	N									
Viola renifolia	N									
Viola rostrata	N									
Viola rotundifolia	N									
Viola sagittata	N									
Viola sagittata var. ovata	N									
Viola sagittata var. sagittata	N									
Viola selkirkii	N									
Viola sororia	N	S								
Viola striata	N	S								
Viola subsinuata	N									
Viola x brauniae	N									
Viola x eclipes	N									
Viola x malteana	N									
Viola x melissifolia	N									
Viola x populifolia	N									
Viola x porteriana	N									
Viola x sublanceolata	N									
Vitis aestivalis	N									
Vitis labrusca	N									
Vitis vulpina	N									
Vitis x novae-angliae	N									
Vulpia octoflora	N									
Vulpia octoflora var. glauca	N									
Vulpia octoflora var. octoflora	N									
Wolffia borealis	N	I								
Wolffia brasiliensis	N	I								
Wolffia columbiana	N	I								
Woodsia alpina	N									
Woodsia glabella	N									
Woodsia ilvensis	N									
Woodsia obtusa	N		**P**							
Woodsia obtusa ssp. obtusa	N									
Woodsia oregana	N									
Woodsia oregana ssp. cathcartiana	N									
Woodsia scopulina	N									
Woodsia scopulina ssp. laurentiana	N									
Woodsia x abbeae	N									
Woodsia x gracilis	N									
Woodsia x maxonii	N									
Woodsia x tryonis	N		**P,G**							
x Dryostichum singulare	N									
x Elyhordeum macounii	N									
x Elyleymus ontariensis	N									
Xanthium strumarium	N	S								
Xyris difformis	N	I								
Xyris difformis var. difformis	N									
Xyris montana	N	I								
Zannichellia palustris	N	I								
Zanthoxylum americanum	N									
Zizania aquatica	N	I								
Zizania aquatica var. aquatica	N									
Zizania palustris	N	I								
Zizania palustris var. interior	N									
Zizania palustris var. palustris	N									
Zizia aptera	N									
Zizia aurea	N	S								
Zostera marina	N									

Scientific Name	Common Name	Native?	S Rank		
Parthenocissus quinquefolia	Virginia Creeper	N	S4?	SP	
Equisetum arvense	Field Horsetail	N	S5	CENT_SP	Knapweed Species
Matteuccia struthiopteris var. pensylvar	Ostrich Fern	N	S5	CRAT_SP	Hawthorn Species
Rubus idaeus	Red Raspberry	N	S5	GALI_SP	Bedstraw Species
Poa pratensis	Kentucky Bluegrass	N	S5	LARI_SP	Larch Species
Carex gracillima	Graceful Sedge	N	S5	LONI_SP	Honeysuckle Species
Scirpus atrovirens	Dark-green Bulrush	N	S5	SOLI_SP	Goldenrod Species
Populus balsamifera	Balsam Poplar	N	S5	ASTE_SP	Aster Species
Populus tremuloides	Trembling Aspen	N	S5	VIOL_SP	Violet Species
Salix bebbiana	Bebb's Willow	N	S5		
Salix discolor	Pussy Willow	N	S5		
Salix petiolaris	Meadow Willow	N	S5		
Fragaria virginiana	Wild Strawberry	N	S5		
Prunus serotina	Black Cherry	N	S5		
Sorbus americana	American Mountain-ash	N	S5		
Toxicodendron radicans var. rydbergii	Western Poison Ivy	N	S5		
Celastrus scandens	Climbing Bittersweet	N	S5		
Acer saccharinum	Silver Maple	N	S5		
Endotropis alnifolia	Alder-leaved Buckthorn	N	S5		
Vitis riparia	Riverbank Grape	N	S5		
Oenothera biennis	Common Evening-primrose	N	S5		
Cornus sericea	Red-osier Dogwood	N	S5		
Asclepias syriaca	Common Milkweed	N	S5		
Viburnum lentago	Nannyberry	N	S5		
Erigeron annuus	Annual Fleabane	N	S5		
Vicia americana var. americana	American Vetch	N	S5		
Phalaris arundinacea var. arundinacea	Reed Canarygrass	N	S5		
Mentha x gracilis	(Mentha arvensis ssp. arvensis X Mentha	N	SNA		
Pinus sylvestris	Scots Pine	I	SNA		
Bromus hordeaceus	Soft Brome	I	SNA		
Bromus inermis	Smooth Brome	I	SNA		
Dactylis glomerata	Orchard Grass	I	SNA		
Lolium pratense	Meadow Ryegrass	I	SNA		
Ranunculus acris	Common Buttercup	I	SNA		
Hesperis matronalis	Dame's Rocket	I	SNA		
Potentilla indica	Mock Strawberry	I	SNA		
Malus pumila	Common Apple	I	SNA		
Trifolium pratense	Red Clover	I	SNA		
Trifolium repens	White Clover	I	SNA		
Vicia cracca	Tufted Vetch	I	SNA		
Acer ginnala	Amur Maple	I	SNA		
Daucus carota	Wild Carrot	I	SNA		
Myosotis discolor	Yellow-and-blue Forget-me-not	I	SNA		
Plantago lanceolata	English Plantain	I	SNA		
Valeriana officinalis	Common Valerian	I	SNA		
Pilosella caespitosa	Meadow Hawkweed	I	SNA		
Arctium lappa	Great Burdock	I	SNA		
Leucanthemum vulgare	Oxeye Daisy	I	SNA		
Taraxacum officinale	Common Dandelion	I	SNA		
Tussilago farfara	Coltsfoot	I	SNA		
Phleum pratense ssp. pratense	Common Timothy	I	SNA		
Lotus uliginosus	Large Bird's-foot Trefoil	I	SNA		

Botanical Inventory Plant List

Scientific Name	Common Name	S RANK	ESA (2007)	COSEWIC	SARA (2002)	cc	cw	Native/Introduced	OWES Wetland Plant List	Bruce-Grey (OSFN 2010)	P1 (SWDM4-5)	P2 (MEFM1-1)	P3 (TAGM5)	P4 (MEFM1-1)	P5 (TAGM5)	P6 (MEGM3-5)
Acer ginnala	Amur Maple	SNA				0	5	I					X			
Acer saccharinum	Silver Maple	S5				5	-3	N	I	p,b,g					X	
Arctium minus	Common Burdock	SNA				0	3	I						X		
Asclepias syriaca	Common Milkweed	S5				0	5	N		p,b,g	X	X		X		X
Bromus inermis	Smooth Brome	SNA				0	5	I		*	X		X	X		
Carex gracillima	Graceful Sedge	S5				4	3	N	S	p,b,g	X	X				
Celastrus scandens	Climbing Bittersweet	S5				3	3	N		p,b,g			X			X
Cornus sericea	Red-osier Dogwood	S5				2	-3	N		p,b,g	X	X	X	X	X	X
Dactylis glomerata	Orchard Grass	SNA				0	3	I		*		X		X		X
Daucus carota	Wild Carrot	SNA				0	5	I		*		X		X		X
Equisetum arvense	Field Horsetail	S5				0	0	N	S	p,b,g	X			X		
Erigeron annuus	Annual Fleabane	S5				0	3	N		p,b,g	X					
Fragaria virginiana	Wild Strawberry	S5				2	3	N		p,b,g	X	X				X
Hesperis matronalis	Dame's Rocket	SNA				0	3	I		*			X	X		
Leucanthemum vulgare	Oxeye Daisy	SNA				0	5	I		*	X	X				
Lolium pratense	Meadow Ryegrass	SNA				0	3	I		*	X					
Lotus uliginosus	Large Bird's-foot Trefoil	SNA				0	0	I			X	X	X			
Malus pumila	Common Apple	SNA				0	5	I		*			X			
Matteuccia struthiopteris var. pensylvanica	Ostrich Fern	S5				5	0	N		p,b,g				X		
Mentha canadensis	Canada Mint	S5				3	-3	N					X	X		X
Myosotis discolor	Yellow-and-blue Forget-me-not	SNA				0	5	I		*	X					
Oenothera biennis	Common Evening-primrose	S5				0	3	N		(p,b,g)		X		X		X
Parthenocissus quinquefolia	Virginia Creeper	S4?				6	3	N		p,b,g	X	X	X			
Phalaris arundinacea var. arundinacea	Reed Canarygrass	S5				0	-3	N		p,b,g	X	X				
Phleum pratense ssp. pratense	Common Timothy	SNA				0	3	I		*						X
Pilosella caespitosa	Meadow Hawkweed	SNA				0	5	I		*		X				
Pinus sylvestris	Scots Pine	SNA				0	3	I		p,b,g		X		X		
Plantago lanceolata	English Plantain	SNA				0	3	I		*		X				
Poa pratensis	Kentucky Bluegrass	S5				0	3	N		*	X					X
Populus balsamifera	Balsam Poplar	S5				4	-3	N	S	p,b,g	X					
Populus tremuloides	Trembling Aspen	S5				2	0	N	S	p,b,g	X					
Potentilla indica	Mock Strawberry	SNA				0	3	I			X					
Prunus serotina	Black Cherry	S5				3	3	N		p,b,g			X			

Scientific Name	Common Name	S RANK	ESA (2007)	COSEWIC	SARA (2002)	cc	cw	Native/Introduced	OWES Wetland Plant List	Bruce-Grey (OSFN 2010)	P1 (SWDM4-5)	P2 (MEFM1-1)	P3 (TAGM5)	P4 (MEFM1-1)	P5 (TAGM5)	P6 (MEGM3-5)
Ranunculus acris	Common Buttercup	SNA				0	0	I	S	*	X	X	X			X
Rhamnus cathartica	European Buckthorn	SNA				0	0	I	S				X		X	
Rubus idaeus	Red Raspberry	S5				2	3	N		p,b,g			X	X		
Salix bebbiana	Bebb's Willow	S5				4	-3	N	I	p,b,g		X				
Salix discolor	Pussy Willow	S5				3	-3	N	I	p,b,g	X	X		X		
Salix petiolaris	Meadow Willow	S5				3	-3	N	I	p,b,g	X	X				
Scirpus atrovirens	Dark-green Bulrush	S5				3	-5	N	S	p,b,g	X					
Sorbus aucuparia	European Mountain-ash	SNA				0	5	I		E			X			
Taraxacum officinale	Common Dandelion	SNA				0	3	I		*	X	X		X		X
Toxicodendron radicans var. rydbergii	Western Poison Ivy	S5				2	0	N		p,b,g						X
Trifolium pratense	Red Clover	SNA				0	3	I		*	X		X			
Trifolium repens	White Clover	SNA				0	3	I		*			X			
Tussilago farfara	Coltsfoot	SNA				0	3	I	S	*				X		
Valeriana officinalis	Common Valerian	SNA				0	3	I		E				X		X
Viburnum lentago	Nannyberry	S5				4	0	N	S	p,b,g	X					
Vicia cracca	Tufted Vetch	SNA				0	5	I		*	X	X	X	X		X
Vitis riparia	Riverbank Grape	S5				0	0	N		p,b,g					X	

Natural Heritage Information Centre. 2023. Vascular Plant Species List (20 September 2023).

ESA Status

Species at Risk in Ontario list: The list of species that are classified as species at risk under the Endangered Species Act (2007).

EXT: Extinct – A species that no longer exists anywhere.

EXP: Extirpated – A species that no longer exists in the wild in Ontario but still occurs elsewhere.

END: Endangered – A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's Endangered Species Act (ESA).

THR: Threatened – A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.

SC: Special Concern (formerly Vulnerable) – A species with characteristics that make it sensitive to human activities or natural events.

NAR: Not at Risk – A species that has been evaluated and found to be not at risk.

DD: Data Deficient (formerly Indeterminate) – A species for which there is insufficient information for a provincial status recommendation.

COSEWIC Status

Committee on the Status of Endangered Wildlife in Canada status: Species has been assessed by COSEWIC as having status, but status is not necessarily adopted on the official Schedule 1 to SARA.

EXT: Extinct – A species that no longer exists.

EXP: Extirpated – A species no longer existing in the wild in Canada, but occurring elsewhere.

END: Endangered – A species facing imminent extirpation or extinction.

THR:	Threatened – A species likely to become endangered if limiting factors are not reversed.
SC:	Special Concern (formerly vulnerable) – A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
NAR:	Not At Risk – A species that has been evaluated and found to be not at risk of extinction given the current circumstances.
DD:	Data Deficient (formerly Indeterminate) – Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

SARA Schedule 1 Status

Species at Risk Act Schedule 1 Status: Schedule 1 is the official list of species that are classified as extirpated, endangered, threatened, and of special concern. The Act establishes Schedule 1, as the official list of species at risk. It classifies those species as being either Extirpated, Endangered, Threatened, or a Special Concern. Once listed, the measures to protect and recover a listed species are implemented.

EXT:	Extinct – A species that no longer exists.
EXP:	Extirpated – A species that no longer exists in the wild in Canada but exists elsewhere in the wild.
END:	Endangered – A species that is facing imminent extirpation or extinction.
THR:	Threatened – A species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
SC:	Special Concern – A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

Subnational Rank

S-Rank: Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks but consider only those factors within the political boundaries of Ontario.

S1:	Critically Imperiled – Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2:	Imperiled – Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3:	Vulnerable – Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4:	Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5:	Secure – Common, widespread, and abundant in the nation or state/province.
S#S#:	Range Rank – A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
SX:	Presumed Extirpated – Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
SH:	Possibly Extirpated (Historical) – Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.
SE:	Species is considered exotic in Ontario
SNR:	Unranked – Nation of state/province conservation status not yet assessed.
SU:	Unrankable – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA:	Not Applicable – A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

Native?:

N:	Native to Ontario. Species does not have exotic status under NHIC database.
I:	Introduced to Ontario. Species has exotic status rank under NHIC database.

Bruce
Grey

A Checklist of Vascular Plants for Bruce and Grey Counties Ontario (2010)

Owen Sound Field Naturalists

4th Edition April 2010

Bruce-Grey Plant Committee

p	Present on Bruce Peninsula north of Highway 21
b	Present in Bruce County south of Highway 21
g	Present in Grey County excluding Keppel, Sarawak and part of Derby Townships which are part of the Peninsula
P	Very uncommon on Bruce Peninsula north of Highway 21
P	Rare on Bruce Peninsula north of Highway 21

Appendix X - Botanical Inventory Plant List
Project Number, Project Name

B	Rare in Bruce County south of Highway 21
G	Rare in Grey County excluding Keppel, Sarawak and part of Derby Townships which are part of the Peninsula
()	degree of occurrence not determined
*	naturalized
E	Species escaped from horticultural or agricultural planting; not well established
R	Rare in Ontario - NHIC
C	Native species of Conservation Concern - Natural Heritage Information Centre
H	Historical Record - not recorded for 35 years or more, in some cases less if a single colony is known to be extirpated

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix E

Development Plan

CAUTION:
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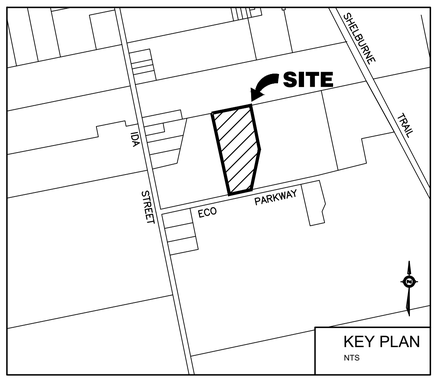
ECO PARKWAY INDUSTRIAL DEVELOPMENT
PHASE 1

TOWNSHIP OF SOUTHGATE
COUNTY OF GREY

CONTRACT NO. 23-03710-01

MAYOR : MR. BRIAN MILNE
CHIEF ADMINISTRATIVE OFFICER : MS. DINA LUNDY
CHIEF BUILDING OFFICIAL : MR. BEV FISHER

OWNER :
WILSON DEVELOPMENTS



Index

No.	DATE	DESCRIPTION	BY	APPD
3	NOV 24/23	THIRD SUBMISSION	JHL	TLB
2	AUG 14/23	SECOND SUBMISSION	JHL	TLB
1	JUNE 24/22	FIRST SUBMISSION	EV	TLB

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www.cobideeng.com

Title:
PROPOSED INDUSTRIAL SITE
PART OF LOT 235 AND 236
FORMER TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
TITLE SHEET

Client: WILSON DEVELOPMENTS

Design:	TLB	Scale:	N/A
Drawn:	JHL	Approved:	
Checked:	TLB		
Date:	JAN 2022		Design Engineer

DRAWING No. 03710-TS

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2. TOPOGRAPHICAL INFORMATION DERIVED FROM FIELD SURVEY BY WILSON-FORD AS SUPPLIED BY THE TOWNSHIP OF SOUTHGATE.
3. SEE SHEET 03710-DET1 FOR TYPICAL CROSS-SECTION AND PAVEMENT DESIGN.
4. ALL ORGANIC MATERIAL WITHIN 1.2m OF FINISHED PROFILE GRADE TO BE REMOVED FROM ALL AREAS UNDER THE TRAVELLED PORTION OF THE ROAD.
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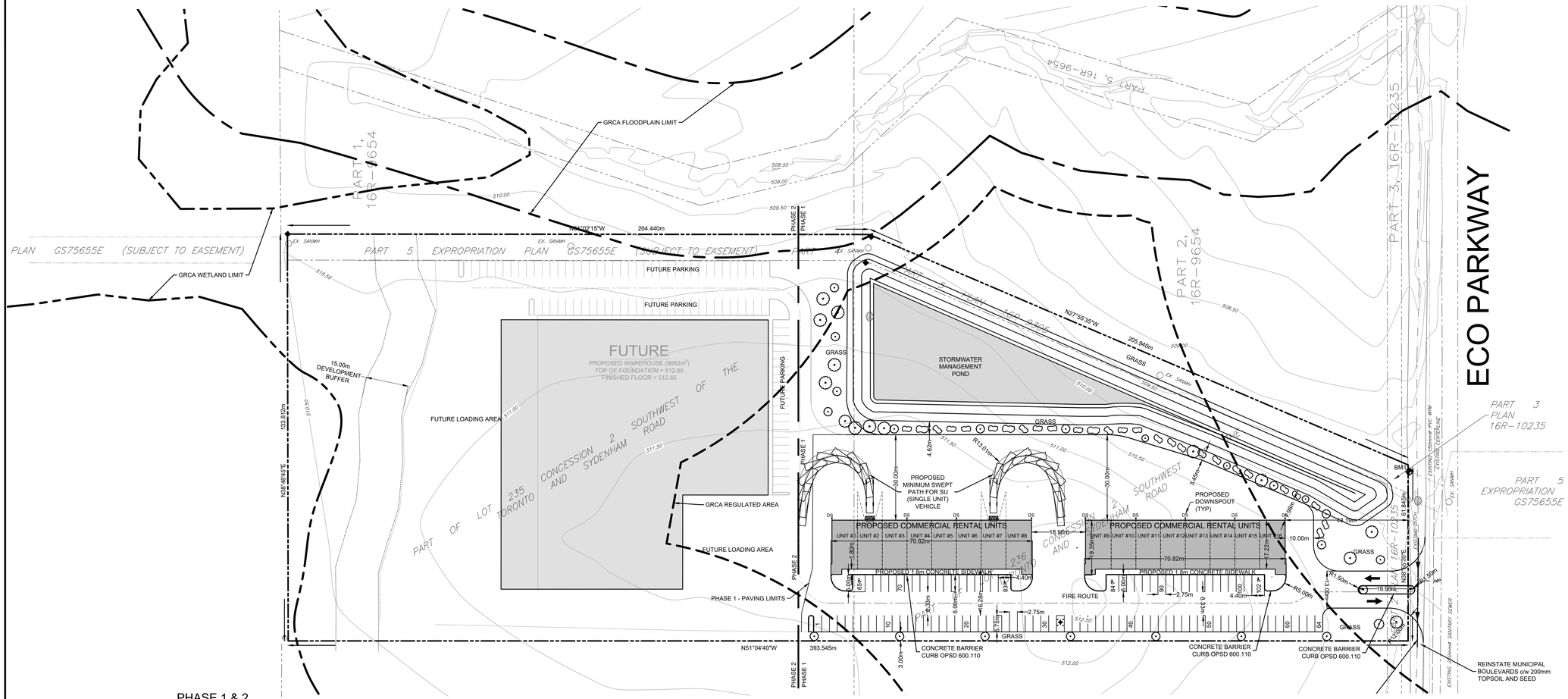

SCALE 1:750

10 0 10 20 50 METRES
50 0 25 50 100 FEET

Benchmark Information

BM1
TOP OF STANDARD IRON BAR LOCATED AT NORTHEAST CORNER OF SUBJECT PROPERTY.

ELEVATION 509.20m

PHASE 1 & 2

PROPOSED INDUSTRIAL DEVELOPMENT STATISTICS			
PROPOSED USE: GENERAL INDUSTRIAL (ZONE: M1)			
REGULATION	REQUIRED	PROVIDED	RELIEF REQUIRED
MIN. LOT AREA	0.186ha	4.85ha	NO
MIN. LOT FRONTAGE	30.0m	61.85m	NO
MIN. FRONT YARD	15.0m	43.19m	NO
MIN. INTERIOR SIDE YARD	7.5m	18.17m	NO
MIN. REAR YARD	7.5m	60.03m	NO
MAX. LOT COVERAGE	50%	23.8%	NO
PARKING SPACES REQUIRED	83 SPACES	202 SPACES	NO

LEGEND

- SUBDIVISION BOUNDARY
- PROPOSED RIGHT OF WAY
- PROPOSED PROPERTY LINES
- EDGE OF EXISTING PAVEMENT
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- PROPOSED STORM SEWER
- EXISTING STORM SEWER
- PROPOSED SUBDRAIN
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- PROPOSED SANITARY SERVICE
- EXISTING SANITARY SERVICE
- PROPOSED WATER SERVICE
- PROPOSED STORM SERVICE
- SANMH PROPOSED SANITARY MANHOLE
- SANMH EXISTING SANITARY MANHOLE
- STMMH PROPOSED STORM MANHOLE
- STMMH EXISTING STORM MANHOLE
- CBMH PROPOSED CATCHBASIN MANHOLE
- TICBMH PROPOSED TWIN INLET CATCHBASIN MANHOLE
- TICB PROPOSED TWIN INLET CATCHBASIN
- CB PROPOSED CATCH BASIN
- CB EXISTING CATCH BASIN
- DICB PROPOSED DITCH INLET CATCHBASIN
- CO PROPOSED SANITARY SERVICE CLEANOUT
- CO EXISTING SANITARY SERVICE CLEANOUT
- CSV PROPOSED CURB STOP VALVE
- CSV EXISTING CURB STOP VALVE
- PROPOSED HYDRANT SET
- HYD EXISTING FIRE HYDRANT
- PROPOSED GATE VALVE
- WV EXISTING GATE VALVE
- PROPOSED CAP C/W THRUST BLOCK
- PROPOSED BLOWOFF
- HP EXISTING HYDRO GUY WIRE
- HP EXISTING HYDRO POLE
- CATV EXISTING CABLE TV PEDESTAL
- BPED EXISTING TELEPHONE PEDESTAL
- SIB STANDARD IRON BAR
- IB IRON BAR
- BM BENCHMARK
- DROP CURB

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www.cobideeng.com

Title:
PROPOSED INDUSTRIAL SITE
PART OF LOT 235 AND 236
FORMER TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
DEVELOPMENT SITE PLAN

Client: WILSON DEVELOPMENTS

Design:	TLB	Scale:	1:750
Drawn:	JHL	Approved:	
Checked:	TLB		
Date:	JAN 2022		Design Engineer

DRAWING No. 03710-SP1

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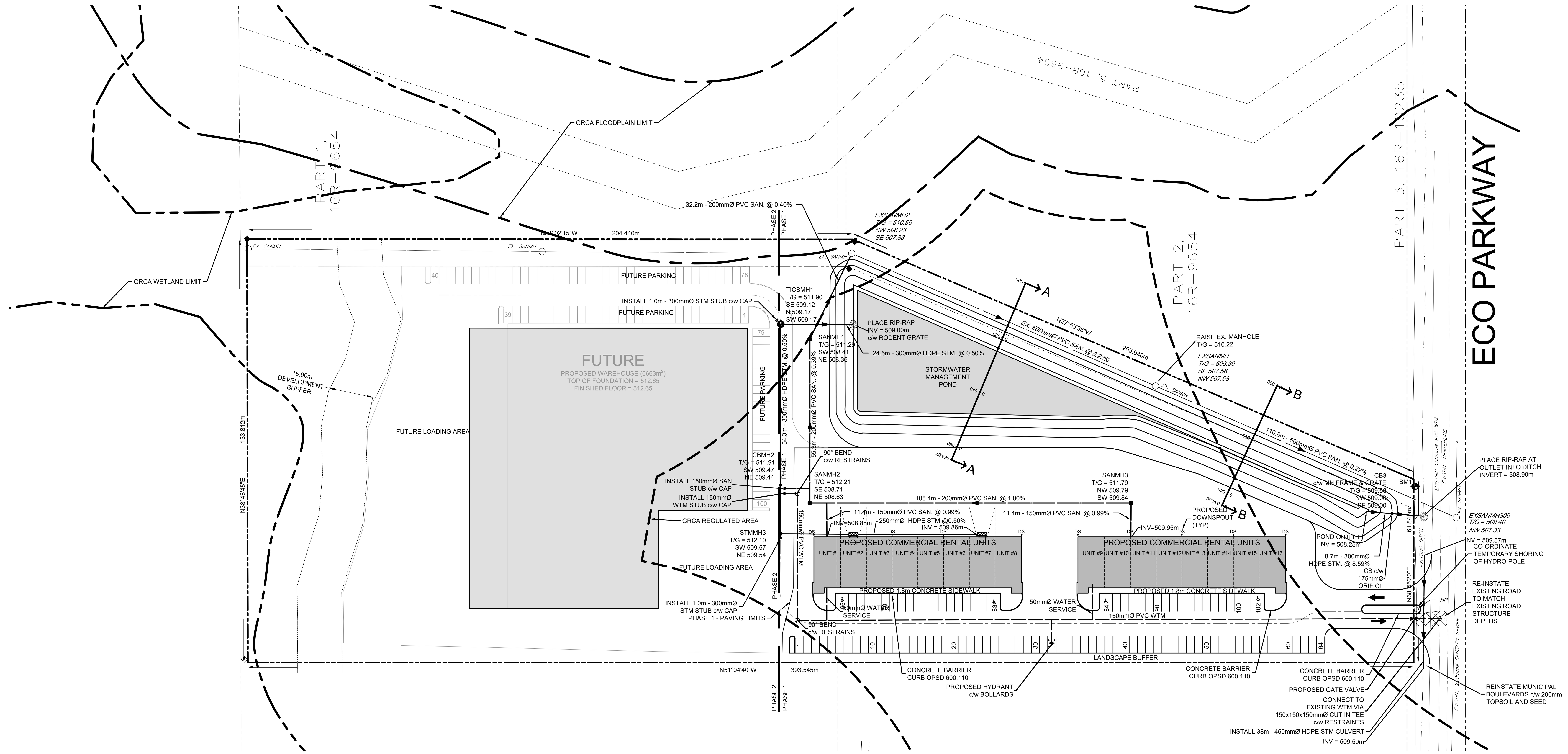

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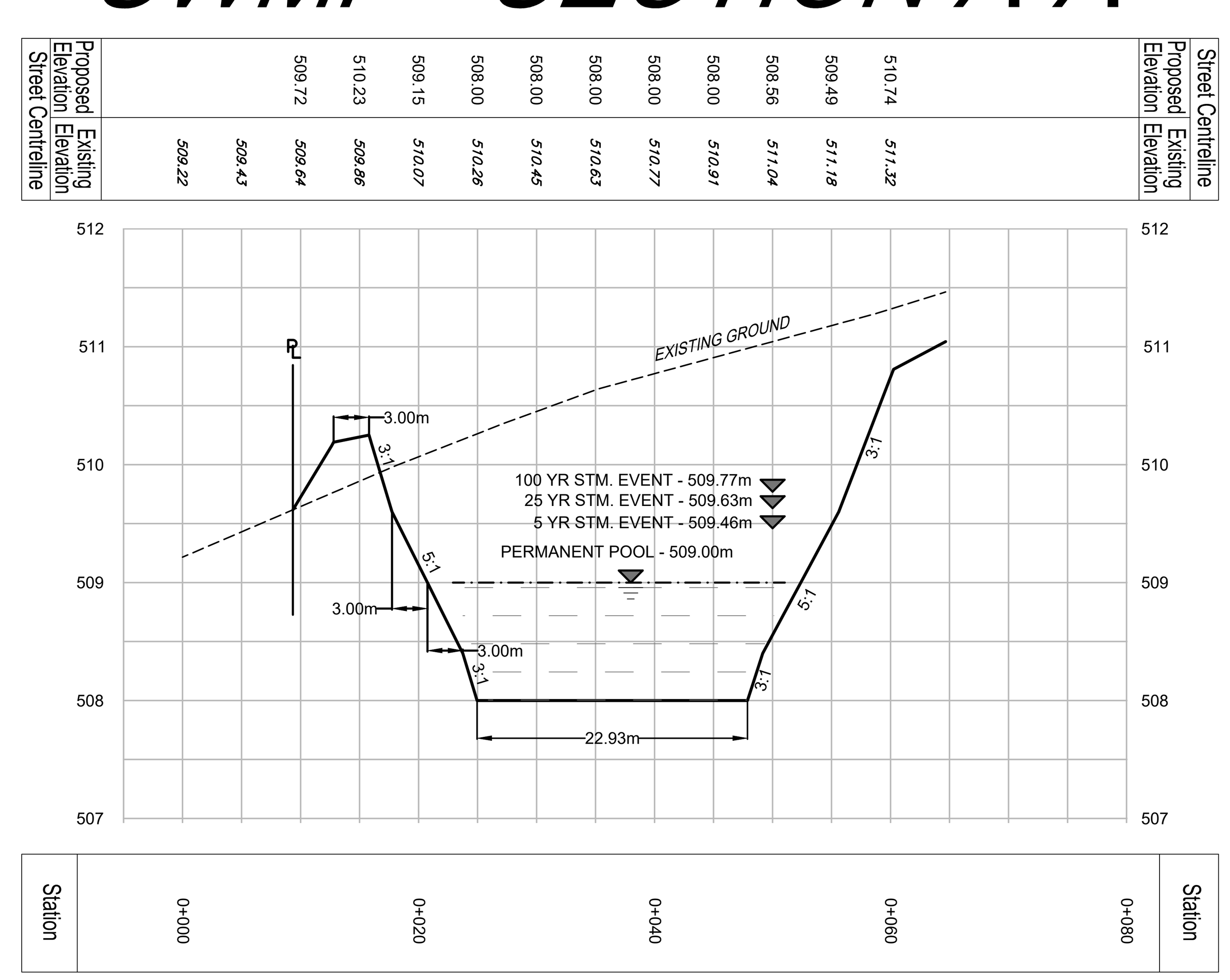
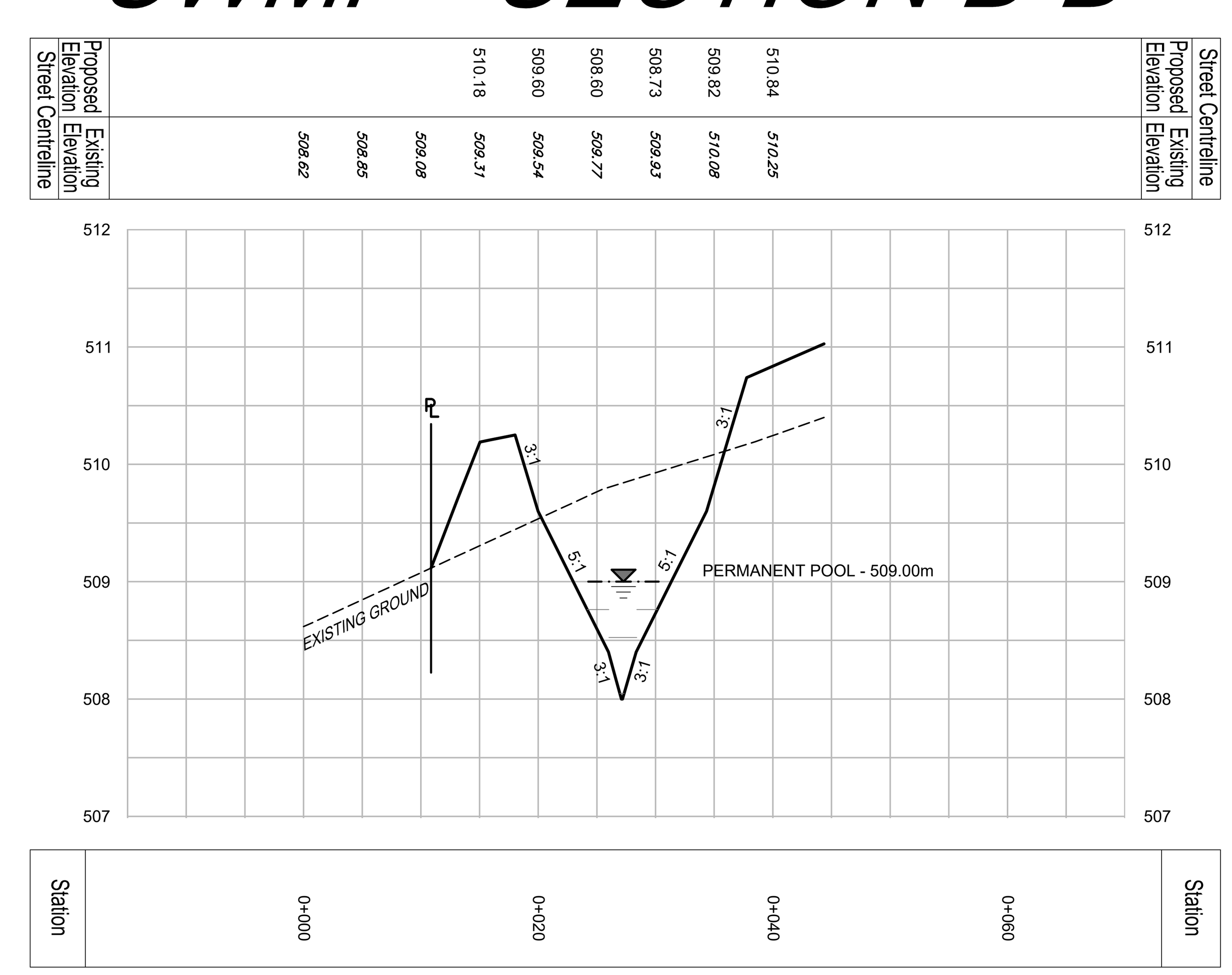
ELEVATION 509.20m

SWMP - SECTION A-A



SWMP - SECTION B-B



LEGEND

SUBDIVISION BOUNDARY	SANMH — EXISTING SANITARY MANHOLE	WV — EXISTING GATE VALVE
PROPOSED RIGHT OF WAY	STMMH — PROPOSED STORM MANHOLE	PROPOSED CAP C/W THRUST BLOCK
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PROPOSED WATERMAIN	CO — PROPOSED SANITARY SERVICE CLEANOUT	BM — BENCHMARK
EXISTING WATERMAIN	CO — EXISTING SANITARY SERVICE CLEANOUT	DROP CURB
PROPOSED SANITARY SERVICE	CSV — PROPOSED CURB STOP VALVE	
EXISTING SANITARY SERVICE	CSV — EXISTING CURB STOP VALVE	
PROPOSED WATER SERVICE	PROPOSED HYDRANT SET	
PROPOSED STORM SERVICE	HYD — EXISTING FIRE HYDRANT	
SANMH — PROPOSED SANITARY MANHOLE	PROPOSED GATE VALVE	

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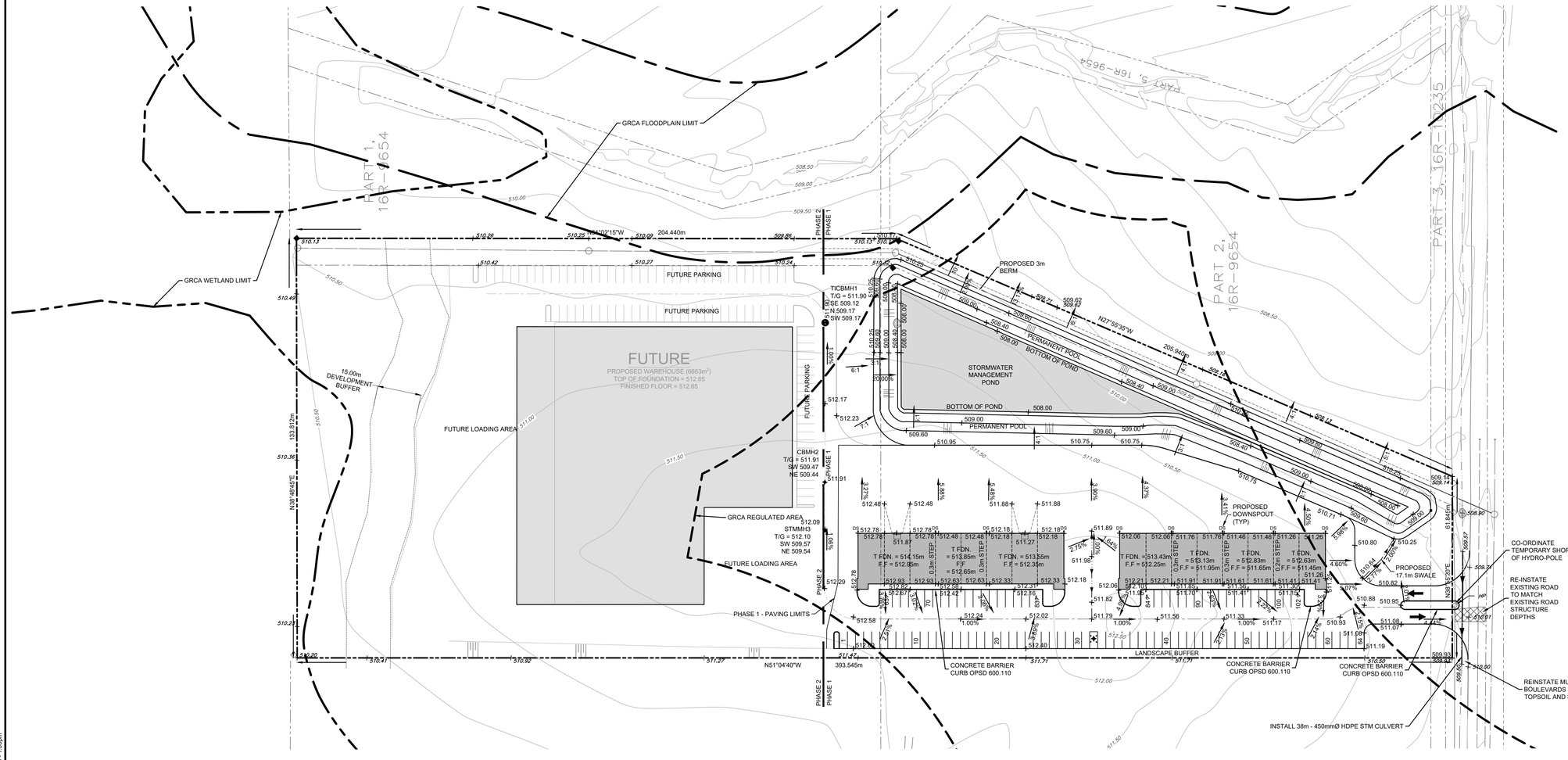
8. ALL JOINTS OF SANITARY MAINTENANCE HOLES TO BE CAULKED WITH MIN. 15mm BEAD, INSTALLED ON THE TOP OF JOINT OF EACH SECTION PRIOR TO SECTION ABOVE BEING INSTALLED. CAULKING TO BE SIKAFLEX 1A OR APPROVED EQUIVALENT.
9. MAINTAIN 2.50m HORIZONTAL AND 0.50m VERTICAL SEPERATION BETWEEN STORM/SANITARY SEWERS AND WATERMAIN.
10. ALL STORM CATCHBASINS TO HAVE A MINIMUM SUMP OF 600mm AND ALL STORM MAINTENANCE HOLES TO HAVE A MINIMUM SUMP OF 300mm.
11. FIELD LOCATES OF ALL UNDERGROUND UTILITIES INCLUDING BUT NOT LIMITED TO; UNDERGROUND GAS, HYDRO, TELEPHONE, AND CABLE TELEVISION SHALL BE ARRANGED PRIOR TO CONSTRUCTION AND IS THEREFORE RESPONSIBILITY OF THE CONTRACTOR.
12. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNTIL STAMPED 'ISSUED FOR CONSTRUCTION'.
13. ALL CONSTRUCTION SHALL BE COMPLETED IN ACCORDANCE WITH THE TOWNSHIP OF SOUTHGATE'S MUNICIPAL SERVICING STANDARDS.



SCALE 1:750

10 0 10 20 50 METRES
50 0 25 50 100 FEET

Benchmark Information

BM1
TOP OF STANDARD IRON BAR LOCATED AT NORTHEAST CORNER OF SUBJECT PROPERTY.

ELEVATION 509.20m

No.	DATE	DESCRIPTION	BY	APPD
3	NOV 24/23	THIRD SUBMISSION	JHL	TLB
2	AUG 14/23	SECOND SUBMISSION	JHL	TLB
1	JUNE 24/22	FIRST SUBMISSION	EV	TLB

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COBIDE ENGINEERING INC
517 - 10th STREET, Hanover, Ontario N4N 1R4
Telephone: (519) 506-5959
www.cobideeng.com

Title:
PROPOSED INDUSTRIAL SITE
PART OF LOT 235 AND 236
FORMER TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
SITE GRADING PLAN

Client:	WILSON DEVELOPMENTS
Design: TLB	Scale: 1:750
Drawn: JHL	Approved:
Checked: TLB	
Date: JAN 2022	Design Engineer

DRAWING No. 03710-SG1

LEGEND

SUBDIVISION BOUNDARY	SANMH STMMH	EXISTING SANITARY MANHOLE	EXISTING GATE VALVE
PROPOSED RIGHT OF WAY	STMMH CBMH	PROPOSED STORM MANHOLE	PROPOSED CAP C/W THRUST BLOCK
PROPOSED PROPERTY LINES	TICBMH	EXISTING STORM MANHOLE	PROPOSED BLOWOFF
EDGE OF EXISTING PAVEMENT	TICB	PROPOSED CATCHBASIN MANHOLE	EXISTING HYDRO GUY WIRE
PROPOSED SANITARY SEWER	CB	PROPOSED TWIN INLET CATCHBASIN MANHOLE	EXISTING HYDRO POLE
EXISTING SANITARY SEWER	DICB	PROPOSED TWIN INLET CATCHBASIN	EXISTING CABLE TV PEDESTAL
PROPOSED STORM SEWER	CO	PROPOSED CATCH BASIN	EXISTING TELEPHONE PEDESTAL
EXISTING STORM SEWER	CSV	EXISTING CATCH BASIN	STANDARD IRON BAR
PROPOSED SUBDRAIN	HYD	PROPOSED DITCH INLET CATCHBASIN	IRON BAR
PROPOSED WATERMAIN	BM	PROPOSED SANITARY SERVICE CLEANOUT	BENCHMARK
EXISTING WATERMAIN		EXISTING SANITARY SERVICE CLEANOUT	DROP CURB
PROPOSED SANITARY SERVICE		PROPOSED CURB STOP VALVE	
EXISTING SANITARY SERVICE		EXISTING CURB STOP VALVE	
PROPOSED WATER SERVICE		PROPOSED HYDRANT SET	
PROPOSED STORM SERVICE		EXISTING FIRE HYDRANT	
PROPOSED SANITARY MANHOLE		PROPOSED GATE VALVE	

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Notes

1. PROPERTY BOUNDARY DERIVED FROM INFORMATION SHOWN ON PLAN 16R-11609 BY VAN HARTEN SURVEYING INC.
2. TOPOGRAPHICAL INFORMATION DERIVED FROM FIELD SURVEY BY WILSON-FORD AS SUPPLIED BY THE TOWNSHIP OF SOUTHGATE.
3. SEE SHEET 03710-DET1 FOR TYPICAL CROSS-SECTION AND PAVEMENT DESIGN.
4. ALL ORGANIC MATERIAL WITHIN 1.2m OF FINISHED PROFILE GRADE TO BE REMOVED FROM ALL AREAS UNDER THE TRAVELLED PORTION OF THE ROAD.
5. COVER OVER WATERMAIN TO BE MINIMUM 2.0m AT ALL POINTS.
6. ALL WATERMAINS SHALL BE CONSTRUCTED OF PVC DR18.
7. SANITARY SEWER SHALL BE CONSTRUCTED OF PVC SDR35.
8. ALL JOINTS OF SANITARY MAINTENANCE HOLES TO BE CAULKED WITH MIN. 15mm BEAD, INSTALLED ON THE TOP OF JOINT OF EACH SECTION PRIOR TO SECTION ABOVE BEING INSTALLED. CAULKING TO BE SIKAFLEX 1A OR APPROVED EQUIVALENT.
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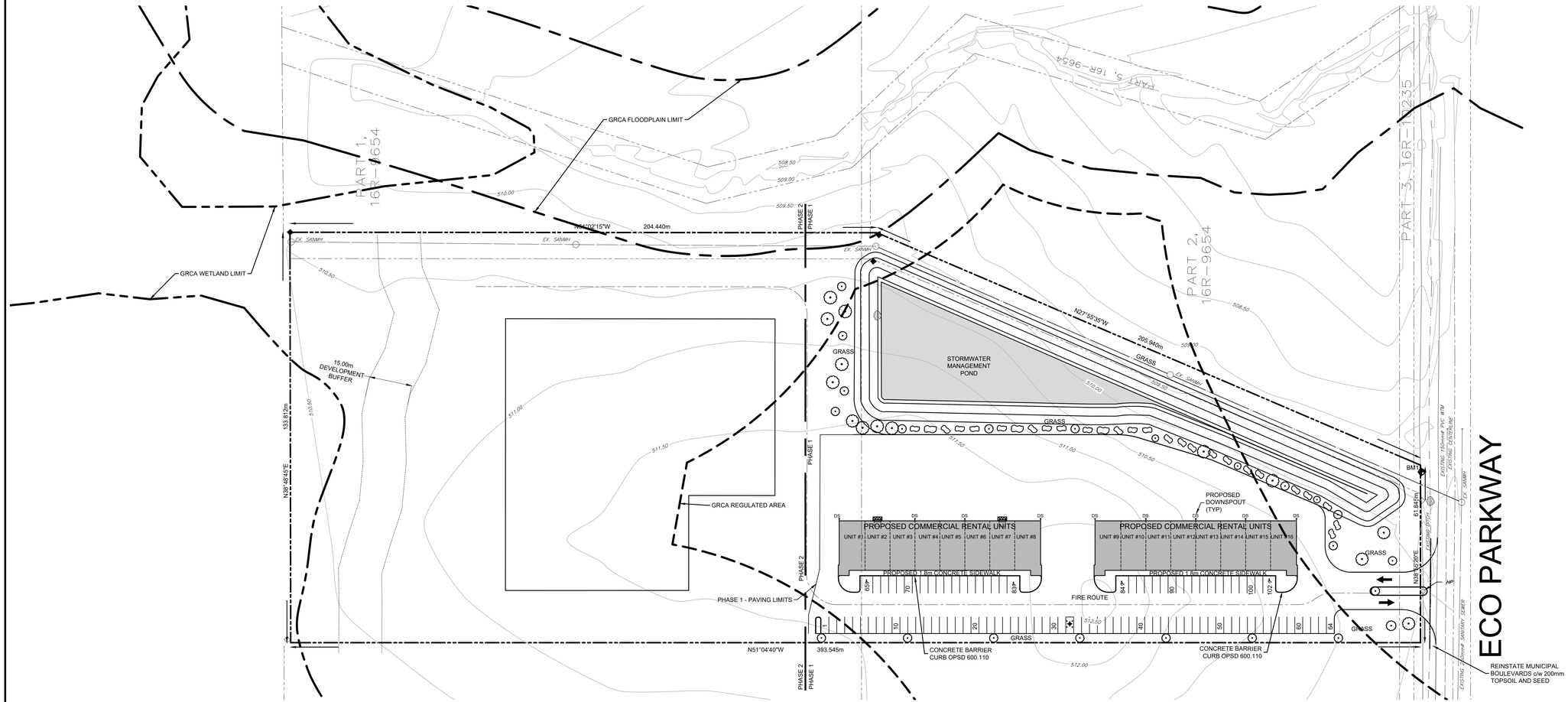

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Telephone: (519) 506-5959
www.cobideeng.com

Title:
PROPOSED INDUSTRIAL SITE PART OF LOT 235 AND 236 FORMER TOWNSHIP OF PROTON TOWNSHIP OF SOUTHGATE LANDSCAPE PLAN

Client: WILSON DEVELOPMENTS

Design:	TLB	Scale:	1:750
Drawn:	JHL	Approved:	
Checked:	TLB		
Date:	JAN 2022		Design Engineer

DRAWING No. 03710-LP1

LEGEND

SUBDIVISION BOUNDARY	EXISTING SANITARY MANHOLE
PROPOSED RIGHT OF WAY	PROPOSED STORM MANHOLE
PROPOSED PROPERTY LINES	EXISTING STORM MANHOLE
EDGE OF EXISTING PAVEMENT	PROPOSED CATCHBASIN MANHOLE
PROPOSED SANITARY SEWER	PROPOSED TWIN INLET CATCHBASIN MANHOLE
EXISTING SANITARY SEWER	PROPOSED TWIN INLET CATCHBASIN
PROPOSED STORM SEWER	PROPOSED CATCH BASIN
EXISTING STORM SEWER	EXISTING CATCH BASIN
PROPOSED SUBDRAIN	PROPOSED DITCH INLET CATCHBASIN
PROPOSED WATERMAIN	PROPOSED SANITARY SERVICE CLEANOUT
EXISTING WATERMAIN	EXISTING SANITARY SERVICE CLEANOUT
PROPOSED SANITARY SERVICE	PROPOSED CURB STOP VALVE
EXISTING SANITARY SERVICE	EXISTING CURB STOP VALVE
PROPOSED WATER SERVICE	PROPOSED HYDRANT SET
PROPOSED STORM SERVICE	EXISTING FIRE HYDRANT
SANMH PROPOSED SANITARY MANHOLE	PROPOSED GATE VALVE
EXISTING GATE VALVE	
PROPOSED CAP C/W THRUST BLOCK	
PROPOSED BLOWOFF	
EXISTING HYDRO GUY WIRE	
EXISTING HYDRO POLE	
EXISTING CABLE TV PEDESTAL	
EXISTING TELEPHONE PEDESTAL	
STANDARD IRON BAR	
IRON BAR	
BENCHMARK	
DROP CURB	

SEED MIX REQUIREMENTS

Type	Amount
Nu Blue Kentucky Bluegrass	25%
Baren Kentucky Bluegrass	25%
Herald Creeping Red Fescue	15%
Wilma Chewing Fescue	10%
Pinnacle Turf Type Per Rye	25%

SEED SHALL BE APPLIED AT A RATE OF 1.5 - 1.7 kg/100m².
ALL TOPSOIL SHALL BE IN CONFORMANCE WITH OPSS 570.

CONTRACTOR TO SELECT PLANTING SPECIES BASED ON AVAILABILITY AND APPROVED LIST BELOW.

Scientific Name	Common Name
Acer Nigrum	Black Maple
Acer rubrum	Red Maple
Acer Saccharum	Sugar Maple
Aesculus Hippocastanum	Common Horse Chestnut
Gleditsia Triacanthos Var. Inermis "Halica" Honeylocust	Honey Locust
Gleditsia Triacanthos Var. Inermis Sunburst Locust	Sunburst Locust
Pyrus Calleryana	Redspire Pear
Tilia Cordata	Glenleven Linden
Acer x freemanii 'Jeffersred'	Autumn Blaze Maple
Celtis occidentalis	Common Hackberry
Quercus macrocarpa	Bur Oak
Quercus rubra	Red Oak
Tilia americana 'Redmond'	Redmond Basswood
Ulmus americana 'Princeton'	Princeton Elm

TREE PLANTING & CARE PROCEDURE

1. DIG HOLES WITH APPROPRIATE EQUIPMENT. HOLES SHALL BE 250mm WIDER IN CIRCUMFERENCE AND THE SAME DEPTH AS THE ROOT BALL.
2. LOOSEN, UNTIE AND FOLD DOWN BURLAP AND ROPE FROM TREE TRUNK AND PLACE IN HOLE. PLACE ROOT BALL IN THE CENTRE OF HOLE AND ENSURE THAT THE TOP OF THE ROOT BALL IS FLUSH WITH SURROUNDING TERRAIN.
3. BACKFILL WITH NATIVE SOIL. ADJUST IF NECESSART AND PACK THE ROOT BALL FIRMLY.
4. ADD A MULCH RING AT A DEPTH OF 10cm AT THE BASE OF THE TREE KEEPING THE MULCH FROM TOUCHNIG THE TRUNK DIRECTLY. TERMITE RESISTANT MULCH SHALL BE USED IN THE TERMITE ZONE.
5. STAKE TREE FOR TWO YEARS USING RUBBER GARDEN HOSE TO PROTECT TREE FROM BEING CUT BY SUPPORT WIRES.
6. TO PROTECT THE TRUNK FROM LINE TRIMMERS WHERE MULCH IS NOT USED - USE A 20cm SECTION OF SOLID DRAINAGE TILE.
7. WATER NEWLY-PLANTED TREES REGULARLY DURING THE FIRST YEAR.
8. REMOVE STAKED FROM TREE AFTER 2 YEARS OR IF TREE IS IN A WINDY LOCATION POSTPONE STAKE REMOVAL FOR 2 MORE YEARS ADJUSTING WIRE AND HOSE ACCORDINGLY.
9. TOP UP MULCH RING AS REQUIRED ON A YEARLY BASIS

Legend

- SUBDIVISION BOUNDARY
- EXISTING PROPERTY LINES
- PROPOSED RIP-RAP
- TEMPORARY CONSTRUCTION MUD MAT
- PROPOSED SILT FENCE

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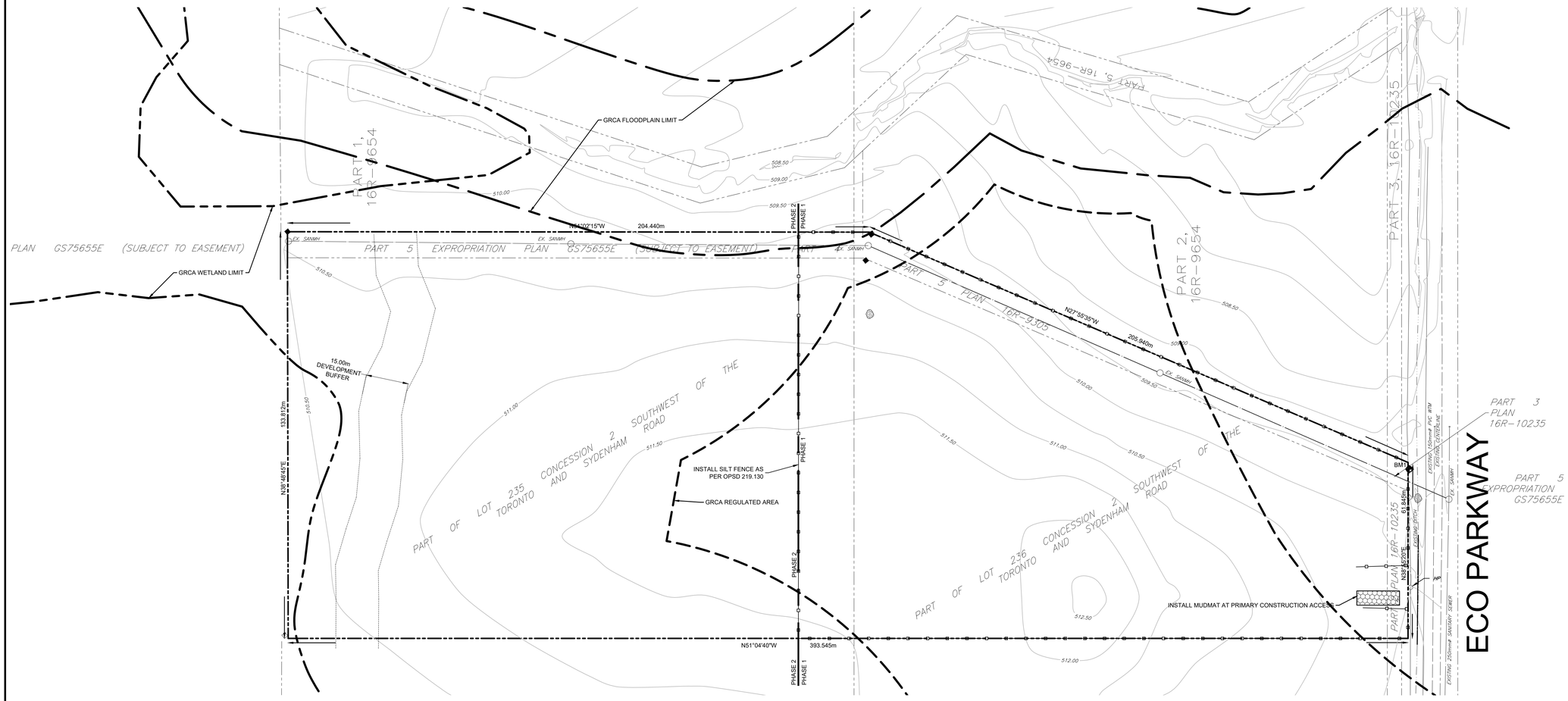

SCALE 1:750

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Benchmark Information

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Title:
PROPOSED INDUSTRIAL SITE PART OF LOT 235 AND 236 FORMER TOWNSHIP OF PROTON TOWNSHIP OF SOUTHGATE EROSION AND SEDIMENTATION PLAN

Client: WILSON DEVELOPMENTS

Design:	TLB	Scale:	1:750
Drawn:	JHL	Approved:	
Checked:	TLB		
Date:	JAN 2022		Design Engineer

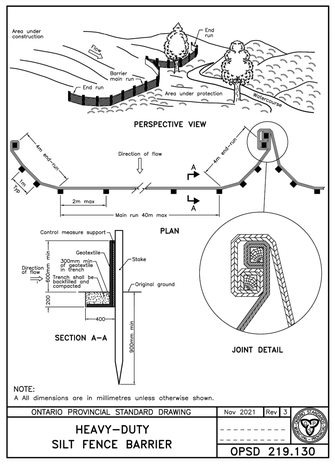
DRAWING No. 03710-LP1

EROSION AND SEDIMENTATION CONTROL NOTES

1. PLACEMENT OF SILTATION FENCES IN ALL AREAS WHERE SURFACE DRAINAGE FLOWS OVER DISTURBED AREAS. SILTATION FENCE SHALL REMAIN ERECT UNTIL CONSTRUCTION IS COMPLETED AND THE UPSTREAM AREA IS FULLY RE-VEGETATED.
2. THE STORMWATER MANAGEMENT POND SHOULD BE CONSTRUCTED FIRST TO ACT AS A SEDIMENTATION POND DURING CONSTRUCTION.
2. PLACEMENT OF TEMPORARY STRAW CHECK DAMS WITHIN SWALES AND ANY OTHER LOCATIONS WHERE A CONCENTRATED FLOW OF RUNOFF MAY OCCUR. ALL PROPOSED DRAINAGE SWALES ARE TO BE SEEDED DURING CONSTRUCTION;
3. INSTALLATION OF FILTER CLOTH UNDER ALL NEW AND EXISTING CATCHBASIN GRATES UNTIL PAVING OF THE SUBDIVISION STREETS IS COMPLETED;
4. MUD MATS WILL BE PLACED AT CONSTRUCTION ACCESSES TO KEEP PUBLIC ROADWAYS FREE FROM DEBRIS DURING THE CONSTRUCTION PERIOD.

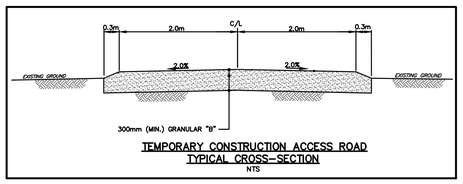
LEGEND

- SUBDIVISION BOUNDARY
- PROPOSED RIGHT OF WAY
- PROPOSED PROPERTY LINES
- EDGE OF EXISTING PAVEMENT
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- PROPOSED STORM SEWER
- EXISTING STORM SEWER
- PROPOSED SUBDRAIN
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- PROPOSED SANITARY SERVICE
- EXISTING SANITARY SERVICE
- PROPOSED WATER SERVICE
- PROPOSED STORM SERVICE
- SANMH PROPOSED SANITARY MANHOLE
- SANMH EXISTING SANITARY MANHOLE
- STMMH PROPOSED STORM MANHOLE
- STMMH EXISTING STORM MANHOLE
- CBMH PROPOSED CATCHBASIN MANHOLE
- TICBMH PROPOSED TWIN INLET CATCHBASIN MANHOLE
- TICB PROPOSED TWIN INLET CATCHBASIN
- CB PROPOSED CATCH BASIN
- CB EXISTING CATCH BASIN
- DICB PROPOSED DITCH INLET CATCHBASIN
- CO PROPOSED SANITARY SERVICE CLEANOUT
- CO EXISTING SANITARY SERVICE CLEANOUT
- CSV PROPOSED CURB STOP VALVE
- CSV EXISTING CURB STOP VALVE
- PROPOSED HYDRANT SET
- HYD EXISTING FIRE HYDRANT
- PROPOSED GATE VALVE
- MV EXISTING GATE VALVE
- PROPOSED BLOWOFF
- HP EXISTING HYDRO GUY WIRE
- EXISTING HYDRO POLE
- CATV EXISTING CABLE TV PEDESTAL
- BPED EXISTING TELEPHONE PEDESTAL
- SIB STANDARD IRON BAR
- IB IRON BAR
- BM BENCHMARK
- DROP CURB

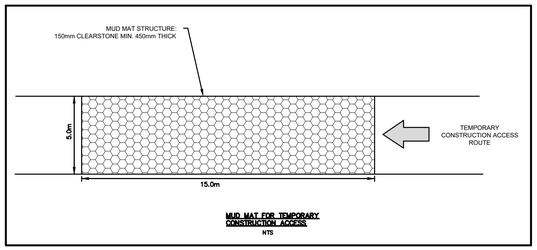


NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2021	Rev. 3
HEAVY–DUTY SILT FENCE BARRIER		
OPSD 219.130		



TEMPORARY CONSTRUCTION ACCESS ROAD
TYPICAL CROSS–SECTION
NTS



MUD MAT FOR TEMPORARY CONSTRUCTION ACCESS
NTS

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TOWNSHIP OF SOUTHGATE MUNICIPAL SERVICING STANDARDS

GENERAL - CONSTRUCTION

1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH TOWNSHIP OF SOUTHGATE STANDARDS AND OPSS. WHERE CONFLICT OCCURS, TOWN STANDARDS GOVERN.
2. DEWATERING TO BE CARRIED OUT IN ACCORDANCE WITH OPSS 517 AND 518 TO MAINTAIN ALL TRENCHES IN A DRY CONDITION.
3. ALL ENGINE DRIVEN PUMPS TO BE ADEQUATELY SILENCED, SUITABLE FOR OPERATION IN A RESIDENTIAL DISTRICT.
4. DISTURBED AREAS TO BE REINSTATED TO PREVIOUS CONDITION OR BETTER.
5. ALL MAINTENANCE HOLE FRAMES AND COVERS TO BE INITIALLY SET TO BASE COURSE HL4 ASPHALT ELEVATION AND ULTIMATELY RAISED BY ADDING SOLID ONE PIECE CAST IRON ADJUSTMENT RINGS PRIOR TO PLACING SURFACE COURSE HL3 ASPHALT.
6. ALL EXISTING MAINTENANCE HOLES TO BE RAISED OR LOWERED TO PROPOSED GRADE. MAXIMUM ALLOWABLE HEIGHT OF ADJUSTMENT TO BE 300mm.
7. ALL EXISTING HYDRANTS AND VALVES TO BE RAISED OR LOWERED TO PROPOSED GRADE.
8. TRENCHES FOR UTILITIES TO BE MINIMUM 600mm WIDE BACKFILLED WITH APPROVED NATIVE MATERIAL AND COMPACTED ALL TO THE SATISFACTION OF THE LOCAL UTILITY.
9. CONDUITS FOR ROAD CROSSINGS TO EXTEND 1.0m BEYOND CURB c/w PULL ROPES. INSTALL CONDUITS TO LOCAL STANDARDS.
10. MAINTAIN A 150mm VERTICAL SEPARATION (MINIMUM) BETWEEN SEWERS AT CROSSINGS.
11. CONTRACTOR IS RESPONSIBLE TO NOTIFY ALL UTILITY COMPANIES PRIOR TO COMMENCING WORK AND COORDINATE CONSTRUCTION ACCORDINGLY.
12. TOPSOIL TO BE STRIPPED FROM SITE SHALL BE STOCKPILED AS DIRECTED BY ENGINEER.
13. CONTRACTOR TO PROVIDE CCTV FOOTAGE
14. WATERMAIN TO BE TESTED AND MEET AWWA AND OCWA STANDARDS. MUNICIPAL REPRESENTATIVE TO BE PRESENT FOR ALL TESTING PROCEDURES.

ROADWAYS

1. MINIMUM GRADE: TO MAINTAIN 0.50% MINIMUM ON GUTTER GRADE. MAXIMUM GRADE: 8.0%
2. ASPHALT DEPTH:
   - 2.1. 90mm MIN (50mm HL4 & 40mm HL3 COMPACTED) ON LOCAL RESIDENTIAL. REFER TO STD R1.
   - 2.2. 110mm MIN (70mm HL4 & 40mm HL3 COMPACTED) ON COLLECTOR & ARTERIAL. REFER TO STD R2 AND R3.
   - 2.3. 75mm MIN (TWO LIFTS OF HL4) ON RURAL LOCAL STREET
   - 2.4. 50mm HL4 ON TEMPORARY CUL-DE-SAC OR TEMPORARY ACCESS ROADS
3. GRANULAR DEPTH: DEPENDING ON SOIL CONDITIONS AND A GEOTECHNICAL REPORT, BUT NO LESS THAN 150mm GRANULAR 'A' AND 450mm GRANULAR 'B'
4. CONCRETE CURB AND GUTTER SHALL BE CONSTRUCTED ON BOTH SIDES OF ALL STREETS IN ACCORDANCE WITH TABLE 1 AND STD DWG R1, R2 & R3. DRIVEWAY CUTS SHALL NOT BE MADE UNTIL AFTER BUILDING FOUNDATION IS CONSTRUCTED. ALL CUTS SHALL BE MECHANICALLY CUT IN ACCORDANCE WITH SPECIFICATIONS APPROVED BY THE TOWNSHIP OF SOUTHGATE. THE USE OF TEMPORARY (THROW-AWAY) CURB, CONSTRUCTED OF LOW MPA CONCRETE, IS PERMISSIBLE AND IS TO BE REPLACED PRIOR TO PLACEMENT OF SURFACE ASPHALT.
5. CONCRETE SIDEWALKS THAT ARE 1.5 M WIDE SHALL BE PROVIDED ON BOTH SIDES OF RESIDENTIAL COLLECTOR AND ARTERIAL STREETS AND ONE SIDE ON RESIDENTIAL LOCAL STREETS. RAMPS SHALL BE PROVIDED AT ALL INTERSECTIONS WITH CURB. MINIMUM 100 MM GRANULAR "A" BASE AND 125MM CONCRETE THICKNESS AND 200MM THICKNESS AT ALL DRIVEWAYS. TACTILE WARNING PLATES SHALL BE PROVIDED WHERE EVER SIDEWALK RAMPS ARE PROVIDED AT ROADWAY AND IN ACCORDANCE WITH THE LATEST VERSION OF THE ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES ACT. EXPANSION JOINT MATERIAL IS TO BE BITUMINOUS IMPREGNATED FIBREBOARD.
6. PEDESTRIAN WALKWAYS SHALL BE CONCRETE, 1.8 M WIDE WITH 1.5 M MINIMUM HEIGHT BLACK VINYL COATED GALVANIZED CHAIN LINK FENCE ON EACH SIDE WITHIN PROPERTY LIMITS. MINIMUM R.O.W WIDTH IS TO BE 6.0 M. IF THE WALKWAY IS ALSO TO BE USED FOR MAINTENANCE VEHICLE ACCESS, TOWNSHIP STD L3 AND L4 IS TO BE USED. IF WALKWAY IS ONLY FOR PEDESTRIAN USE, BOLLARDS ARE TO BE INSTALLED 1.1 M EITHER SIDE OF CENTRE OF SIDEWALK, AT BOTH ENDS OF THE WALKWAY AS PER TOWNSHIP STD L6. MINIMUM R.O.W. TO BE INCREASED TO A MINIMUM OF 9.0 M WHERE UNDERGROUND MUNICIPAL SERVICING EXCEEDS ONE SERVICE TYPE AND A WALKWAY EXIST THROUGH A CORRIDOR.
7. ALL BOULEVARDS SHALL BE GRADED, TOPSOILED WITH A MINIMUM DEPTH OF 200 MM, AND SODDED FROM THE PROPERTY LINE TO THE BACK OF CURB.
8. TRAFFIC CONTROL SIGNS WILL BE PROVIDED AT LOCATIONS DESIGNATED BY THE TOWNSHIP AND SHALL BE IN ACCORDANCE WITH THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES" PUBLISHED BY THE MTO. STREET NAME SIGNS SHOULD BE 16 CM HIGH WITH A GREEN BACKGROUND AND WHITE LETTERING (BOTH SIDES), REFLECTORIZED AND MOUNTED ON GALVANIZED STEEL 60 MM DIA. X 3.2 M POSTS IN ACCORDANCE WITH THE TOWNSHIP OF SOUTHGATE SPECIFICATIONS.
9. MINIMUM 6.0 M EASEMENTS REQUIRED FOR SINGLE MUNICIPAL SERVICES; MINIMUM 9.0 M EASEMENTS REQUIRED FOR TWO MUNICIPAL SERVICES. WHERE MORE THAN TWO SERVICES ARE TO BE ACCOMMODATED BY AN EASEMENT CONSULT WITH THE TOWNSHIP FOR SPECIFIC EASEMENT REQUIREMENTS. FOR REAR YARD STORM SEWERS 300 MM DIAMETER OR LESS, AND CATCHBASINS, MINIMUM EASEMENT WIDTH TO BE 3.0 M. ALONG REAR YARDS EASEMENT TO BE ENTIRELY ON ONE PROPERTY WITH PIPE 1 M OFF PROPERTY LINE. ALONG SIDEYARDS EASEMENT TO BE EVENLY SPLIT ON BOTH PROPERTIES WITH PIPE OFFSET 0.5 M FROM PROPERTY LINE. FOR STORM SEWERS LARGER THAN 300 MM DIAMETER CONSULT WITH TOWNSHIP FOR SPECIFIC EASEMENT REQUIREMENTS

SANITARY SEWERS AND SERVICES

1. MAINTENANCE HOLE DIAMETER: MIN 1200mmØ OR AS PER MANUFACTURER'S SPECIFICATIONS/RECOMMENDATIONS. PRE-BENCHED STRUCTURES TO BE USED WHERE POSSIBLE.
2. MAINTENANCE HOLE PIPE CONNECTIONS: APPROVED KOR-N-SEAL PIPE ADAPTORS SHALL BE USED FOR THE CONNECTION OF ALL PIPES AT MAINTENANCE HOLES.
3. MAINTENANCE HOLE DROP STRUCTURE: REQUIRED WHERE THE INLET AND OUTLET INVERTS DIFFER BY MORE THAN 0.6m.
4. INVERT DROPS ACROSS DETERMINED BY HYDRAULIC CALCULATIONS FOR ALL JUNCTION AND MAINTENANCE HOLES: TRANSITION MAINTENANCE HOLES. FOR ALL OTHERS:
   - 4.1. 0° Turn = 20 mm
   - 4.2. 10° - 45° Turn = 50 mm
   - 4.3. 46° - 90° Turn = 80 mm
5. MAINTENANCE HOLE ADJUSTMENT: PRECAST CONCRETE ADJUSTMENT UNITS TO BE USED. MIN 150mm ADJUSTMENT ALLOWANCE. MAX 300mm ADJUSTMENT ALLOWANCE. NO BRICK, BLOCK OR STEEL LIFT RINGS PERMITTED.
6. MAINTENANCE HOLE WATER TIGHT FRAMES AND COVERS: WHERE THERE IS A POSSIBILITY OF FLOODING, WATER TIGHT LIDS AND MAINTENANCE HOLE INSERT (AS MANUFACTURED BY MANPAN®) SHALL BE INSTALLED.
7. FOR MAINTENANCE HOLE DEPTHS BETWEEN 5.0m AND 10.0m, A SAFETY GRATE MUST BE INSTALLED AT THE MID-POINT. FOR MAINTENANCE HOLE DEPTHS BETWEEN 10.0m AND 15.0m, A SAFETY GRATE MUST BE INSTALLED AT THE THIRD POINTS. REFER TO OPSD 404.020 (LATEST REVISION).
8. ALL MAINTENANCE HOLE JOINTS, ADJUSTMENT RING ASSEMBLIES SHALL BE SEALED WATER TIGHT WITH THE RISER-WRAP® WATER INFILTRATION SYSTEM AS MANUFACTURED BY PIPELINE SEAL AND INSULATOR INC. OR MEL-ROL WATERPROOFING MEMBRANE INSTALLED WITH ALL NECESSARY ACCESSORY PRODUCTS ALL IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
9. SERVICE CONNECTIONS: MINIMUM DIAMETER - 100 mm FOR RESIDENTIAL SERVICES AND 150mm FOR COMMERCIAL AND INDUSTRIAL OR MATCH EXISTING. MINIMUM GRADE - 2%. MAXIMUM GRADE - 8%. ALL CONNECTIONS TO BE MADE WITH A FACTORY-MADE TEE OR WYE OR APPROVED EQUIVALENT UNLESS CONNECTING TO AN EXISTING MAIN, WHERE A STAINLESS-STEEL STRAP AND SADDLE MAY BE PERMITTED. ONE SERVICE/RESIDENTIAL UNIT FOR SINGLES, SEMIS, ROW OR BLOCK TOWNHOUSES. SERVICES ARE NOT TO BE PLACED IN THE DRIVEWAY WHERE POSSIBLE. SEE STANDARD DRAWING S1 FOR SERVICE LAYOUT. FOR INDUSTRIAL SERVICES A MAINTENANCE HOLE SHALL BE INSTALLED ADJACENT TO LIMIT OF THE ROAD RIGHT-OF-WAY (ROW) BUT ENTIRELY WITHIN THE ROW. TYPICALLY, SERVICE CONNECTIONS ARE NOT TO HAVE CLEAN-OUTS. HOWEVER, IN CERTAIN CIRCUMSTANCES (I.E., LONG SERVICES, CONSTRAINED) SERVICES MAY NEED TO BE OUTFITTED WITH CLEAN-OUTS AT PROPERTY LINE, THIS WILL BE AT THE DISCRETION OF THE TOWNSHIP.
10. CLOSED CIRCUIT T.V. (CCTV) INSPECTIONS OF THE MAIN SEWER AND SERVICES CONNECTIONS UP TO THE PROPERTY LINE WILL BE REQUIRED AT THE FOLLOWING 3 MILESTONES.
    - 10.1. PRIOR TO PRELIMINARY ACCEPTANCE (AFTER BASE ASPHALT AND CURB IS PLACED)
    - 10.2. PRIOR TO SURFACE ASPHALT
    - 10.3. PRIOR TO FINAL ACCEPTANCE OF DEVELOPMENT
11. MAINTENANCE HOLES SHALL BE TESTED IN ACCORDANCE WITH O.P.S.S. 407 (LATEST REVISION) FIELD TESTING OF SANITARY SEWERS SHALL BE TESTED IN ACCORDANCE WITH O.P.S.S. 410 (LATEST REVISION)

WATERMAIN AND WATER SERVICES

1. MIN SIZE = 150mmØ MAINS
2. MIN DEPTH OF COVER = 2.0 METRES FOR MAINS AND SERVICES.
3. TRACER WIRE: ALL WATERMAIN AND SERVICES SHALL BE INSTALLED WITH TRACER WIRE. #12 AWG COPPER CLAD STEEL, HIGH STRENGTH WITH MINIMUM 450 LB. BREAK LOAD AND MINIMUM 30 MIL HDPE INSULATION THICKNESS SUITABLE FOR DIRECT BURIAL AND COLOUR CODED BLUE. DIRECT BURY WIRE CONNECTORS SHALL INCLUDE 3-WAY LOCKABLE CONNECTORS AND MAINLINE TO LATERAL LUG CONNECTORS SPECIFICALLY MANUFACTURED FOR USE IN UNDERGROUND TRACE WIRE INSTALLATIONS. CONNECTORS SHALL BE DIELECTRIC SILICON FILLED TO SEAL OUT MOISTURE AND CORROSION. NON-LOCKING FRICTION FIT, TWIST OR TAPED CONNECTORS ARE PROHIBITED. ABOVE GROUND TRACER WIRE ACCESS BOXES SHALL BE ATTACHED TO UNDERSIDE OF BOTTOM FLANGE OF FIRE HYDRANTS. (STD. DWG. NO. W3)
4. FITTINGS: DUCTILE IRON, MECHANICAL JOINT, AWWA C110 APPROVED, PRESSURE RATING 1035 KPA. PVC BENDS AND TEES, TO BE USED WITH MECHANICAL JOINT RESTRAINTS.
5. VALVES: ONE LESS VALVE THAN NUMBER OF STREETS AT AN INTERSECTION WITH VALVE LOCATED AT EXTENSION OF THE PROPERTY LINE OF THE INTERSECTING STREET. MAXIMUM 200 m SPACING ON STRAIGHT RUNS. MAXIMUM 250 m SPACING ON TRUNK LINES. CHAMBERS WILL BE REQUIRED FOR ALL VALVES OVER 300 mmØ (OPSD 1101.01)
6. HYDRANTS: ALL HYDRANTS TO BE PAINTED RED WITH RED STORZ CAP. ANCHOR TEES TO BE USED WITH HYDRANT INSTALLATION. HYDRANT SPACING 150m MAX.
7. SERVICES: 25 mm DIAMETER SERVICES. ALL SERVICES TO BE TYPE "K" COPPER PIPE UNLESS OTHERWISE APPROVED BY THE TOWNSHIP OF SOUTHGATE PUBLIC WORKS DEPARTMENT. CROSS-LINKED POLYETHYLENE (MUNICIPEX® BY REHAU AND "BLUE904" BY IPEX) MAY BE CONSIDERED FOR SERVICES OVER 20 m IN LENGTH. 75 mm PVC SLEEVES ARE REQUIRED WHERE CURB STOPS ARE LOCATED IN DRIVEWAYS. NOTE: CURB STOPS ARE NOT TO BE PLACED IN DRIVEWAYS WHERE POSSIBLE. TEMPORARY PLASTIC BLOW-OFF PIPES ARE REQUIRED FOR ALL UNCONNECTED SERVICES.
8. ANODES: DZP-24, 10.9 KG SHALL BE INSTALLED ON ALL CONNECTIONS TO EXISTING IRON WATERMAIN. DZP-12, 5.4 KG SHALL BE INSTALLED ON ALL IRON FITTINGS, VALVES ETC.
9. MECHANICAL JOINT RESTRAINTS:
   - 9.1. UNI-FLANGE SERIES 1300 MANUFACTURED BY FORD METER BOX COMPANY, INC.
   - 9.2. MEGALUG SERIES 1100 FOR DUCTILE IRON PIPE
   - 9.3. MEGALUG SERIES 2000 PV FOR PVC C900 PIPE
   - 9.4. STARGRIP SERIES 3000 FOR DUCTILE IRON PIPE
   - 9.5. PVC STARGRIP SERIES 4000 FOR PVC C900 PIPE
10. WATER SAMPLING STATIONS: SAMPLING STATIONS SHALL BE ECLIPSE #88 ON A PEDESTAL AS MANUFACTURED BY THE KUPFERLE FOUNDRY COMPANY ON THE SAME SIDE OF THE ROW AS THE WATERMAIN. THE NUMBER AND LOCATION OF WATER SAMPLING LOCATIONS SHALL BE REVIEWED AND APPROVED BY THE TOWNSHIP.
11. ADDITIONAL DETAILS ARE SHOWN ON THE TOWNSHIP OF SOUTHGATE STANDARD DRAWINGS.
12. THE DEVELOPER'S CONTRACTOR SHALL NOT OPERATE ANY VALVE OR HYDRANT OF THE EXISTING WATER DISTRIBUTION SYSTEM. OPERATION OF VALVES AND HYDRANTS ON THE MUNICIPAL SYSTEM SHALL ONLY BE UNDERTAKEN BY CERTIFIED MUNICIPAL STAFF.
13. GROUNDING OF HYDRO SERVICES TO THE MUNICIPAL WATER SYSTEM IS PROHIBITED.
14. WATERMAIN TESTING PROCEDURES TO BE IN ACCORDANCE WITH TOWNSHIP REQUIREMENTS.

STORM SEWERS AND SERVICES

1. MAINTENANCE HOLE DIAMETER: MINIMUM OF 1200mmØ OR AS PER MANUFACTURER'S SPECIFICATIONS/RECOMMENDATIONS.
2. STRUCTURE PIPE CONNECTIONS: BRICK, BLOCK AND NON-SHRINK GROUT TO BE USED FOR THE CONNECITON OF CONCRETE AT STRUCTURE. APPROVED 'KOR-N-SEAL' PIPE ADAPTORS SHALL BE USED FOR THE CONNECTION OF PVC PIPES AT STRUCTURES.
3. STRUCTURE ADJUSTMENT: PRECAST CONCRETE ADJUSTMENT UNITS SHALL BE USED. MIN 150mm ADJUSTMENT ALLOWANCE. MAX 300mm ADJUSTMENT ALLOWANCE. NO BRICK, BLOCK OR STEEL LIFT RINGS PERMITTED.
4. CATCHBASIN SPACING OF 75m MAX. CATCHBASIN LEADS AT 1.0% MIN SLOPE.
5. REAR YARD DRAINAGE: SURFACE INLETS (CATCHBASIN OR INLET BASIN) ARE REQUIRED EVERY 2 UNITS TOWNHOUSE OR SINGLES) ALONG REAR LOT LINE SWALES. SINGLES WILL REQUIRE FULL CATCHBASINS FOR ALL STRUCTURES. TOWNHOUSES REQUIRE A CATCHBASIN AT THE LEAD FROM THE ROAD BUT INLET BASINS CAN BE USED THEREAFTER. SEWER FROM THE ROAD THE REAR YARD (I.E. ON SIDEYARD) IS TO BE A MINIMUM OF 300 MM DIAMETER CONCRETE PIPE OFFSET 0.5 M FROM THE LOT LINE SITUATED ON A 3 M EASEMENT DIVIDED EQUALLY ON THE SIDE LOT LINE. SEWERS ACROSS THE REAR LOT LINE TO BE OFFSET 1 M FROM THE LOT LINE ON A 3 M EASEMENT ENTIRELY ON ONE LOT. SEWERS ALONG THE REAR LOT LINES OF TOWNHOUSES ARE TO BE A MINIMUM OF 200 MM IN DIAMETER. WHERE THE NUMBER OF UPSTREAM INLETS BASINS EXCEEDS 2, THE PIPE SIZE IS TO BE INCREASED TO A MINIMUM OF 250 MM IN DIAMETER. THESE SEWERS ALONG THE REAR CAN BE PVC OR HDPE. SEWERS ALONG THE REAR LOT LINES OF SINGLES ARE TO BE A MINIMUM OF 250 MM IN DIAMETER. WHERE THE NUMBER OF UPSTREAM CATCHBASINS EXCEEDS 1, THE PIPE SIZE IS TO BE INCREASED TO A MINIMUM OF 300 MM IN DIAMETER. THESE SEWERS ALONG THE REAR CAN BE PVC OR HDPE.
6. IN-LINE DRAINS: WHERE STORM SEWERS ARE EXTENDED ALONG REAR YARD SWALES BEHIND MULTIPLE UNIT BLOCKS, IN-LINE DRAINS ARE TO BE INSTALLED FOR EVERY TWO UNITS.
7. TWIN INLET CATCHBASINS: REQUIRED AT ALL SAG POINTS.
8. BLIND CONNECTIONS NOT PERMITTED TO STORM SEWERS UNDER 900 mm DIAMETER.
9. SUMPS: 450 mm DIAMETER PIPES AND UNDER REQUIRE 600 mm SUMP IN CATCHBASINS AND MAINTENANCE HOLES.
10. BENCHING REQUIRED FOR PIPES OVER 450mmØ.
11. MINIMUM COVER = 1.2m.
12. MINIMUM SIZE:
    - 12.1. 200 mm WHERE ONLY SERVICES ARE CONNECTED
    - 12.2. 300 mm (TRUNK)
    - 12.3. SINGLE CB LEADS 250 mm
    - 12.4. TWIN INLET CB LEADS 300 mm
    - 12.5. 375 mm CULVERT
13. SERVICE CONNECTIONS:
    - 13.1. MINIMUM SIZE : 100 mm - 150 mm (2 SHARED TOWNHOUSE UNITS)
    - 13.2. MINIMUM GRADE: 1%.
    - 13.3. MINIMUM DEPTH @ PROPERTY LINE: 1.2 METRES
    - 13.4. SERVICES TO BE LOCATED 1.5 m MINIMUM FROM SIDE LOT LINE. FOR SINGLES LOCATE ON LOW SIDE OF LOT. ONE SERVICE/RESIDENTIAL UNIT FOR SINGLES, AND TWO UNITS PER SHARED SERVICE ON SEMIS, ROW OR BLOCK TOWNHOUSES. SEE STANDARD DRAWING S1 FOR SERVICE LAYOUT.
    - 13.5. ALL CONNECTIONS TO BE MADE WITH AN APPROVED PREFABRICATED TEE OR "KOR-N-TEE".
14. ROOF DRAINS: ALL ROOF DRAINS SHALL DISCHARGE TO SURFACE.
15. STORM SEWER OUTLETS: SUITABLE BANK AND STREAM BOTTOM EROSION PROTECTION MUST BE PROVIDED I.E., HEADWALLS, RIP RAP, CSP END SECTION, ETC.
16. SUBDRAIN: A MINIMUM OF 6 m OF 100 mm DIAMETER GEOTEXTILE WRAPPED SUBDRAIN IS REQUIRED UPSTREAM OF ALL STORM STRUCTURES AND IN BOTH DIRECTIONS AT SAGS IN THE ROAD PROFILE. ADDITIONAL SUBDRAIN AS RECOMMENDED BY GEOTECHNICAL CONSULTANT.
17. MAINTENANCE HOLES SHALL BE TESTED IN ACCORDANCE WITH O.P.S.S. 407 (LATEST REVISION)
18. FIELD TESTING OF STORM SEWERS SHALL BE TESTED IN ACCORDANCE WITH O.P.S.S.410 (LATEST REVISION)

Table 1: Standard Drawings

Title	Ontario Provincial Standard Drawing (Latest Revision)	Township of Southgate Standard
Pipe Bedding – Granular "A" Cover Material-Granular "A" or sand	802.010.802.013 802.030.803.033	-
M.H. Frame and Cover a) Standard – Sanitary b) Standard – Storm c) Watertight – Sanitary	401.010 (Type "A") 401.010 (Type "B") 401.030	-
Catchbasin Frame and Grate	400.110	-
Rear Yard Catchbasin Frame and Grate	400.120	-
Ditch Inlet Catchbasin Honeycomb Grate	403.010	Special where required
M.H.Steps	405.010 (Hollow Circular Aluminum)	-
Safety Platform Aluminum	404.020	-
Sewer Service Connections	1006.010	S4
M.H. (precast)	Section 700 & 1000	-
Catchbasins M.H. (precast)	Section 700	-
M.H. Benching	701.021	-
Water Service	1104.010, 1104.020	-
25mm Blow Off Installation	-	W1
Valve and Box	1101.020	W2
Hydrant Setting	1105.010	W3
Connection of New Watermain to existing Watermain		W4, W5
Spacer for Water Meter		W6
Thrust Blocks	1103.010, 1103.020	-
20m Right-of-Way	-	R1
22m Right-of-Way	-	R2
26m Right-of-Way	-	R3
Typical Rural Section (20m Right-Of-Way)	-	R4
Concrete Sidewalk (125mm Concrete) (100 mm Granular 'A' minimum)	310.010	-
Sidewalk Ramps	310.030, 310.033, 310.039	-
Barrier Curb and Gutter	600.040	-
Asphalt Gutter	601.010	-
Tree Protection Fencing	220.010	F1
Tree Protection Hoarding	220.010	F2
Wood Privacy Fencing	-	F3
Chain-Link Fencing	972.030	-
Lot Grading Detail	-	G1
Typical Servicing Layout Singles & Semi Detached	-	S1
Typical Servicing Layout Semi Detached & Multi Units	-	S2
Sump Pump / Storm Connection	-	S3
Sanitary Service Connection	-	S4
Typical Depth		S5
Sewer > 4m Deep		

Table 2: Approved Materials and Product List

Service	Item	Approved Products
		diameter shall be a minimum of 200mm Rods and pins shall be stainless steel.
	Mechanical Joint Restraints	- Uni-Flange Series 1300 manufactured by Ford Meter Box Company, Inc. - Megalug Series 1100 for ductile iron pipe - Megalug Series 2000 PV for PVC C900 pipe - Stargrip Series 3000 for ductile iron pipe - PVC Stargrip Series 4000 for PVC C900 pipe - Sigma ONE-LOK Series SLCE for PVC pipe
	Tracer Wire	Refer to Section E2. Attached to underside of bottom flange of fire hydrant (Std. Dwg. No. W3)
	Water Service Material	Copper Seamless Type "K" for services less than or equal to 20.0 m in length Cross-Linked Polyethylene ("Municipex" by Rehau and "Blue904" by Ipex) for services greater than 20m in length

Table 2: Approved Materials and Product List

Service	Item	Approved Products
	Valves	Mueller Resilient Wedge Gate Valve AWWA C509 (latest revision), mechanical joint with: - fusion-bonded epoxy coating, AWWA C550 (latest revision) - bronze stem - open counter clockwise Clow Resilient Wedge Valve AWWA C509 (latest revision), F-6100 mechanical joint with: - fusion-bonded epoxy coating, AWWA C550 (latest revision) - bronze stem - open counter clockwise American AVK Co., Series 25 Resilient Seated Gate Valve AWWA C509 (latest revision), mechanical joint with: - fusion-bonded epoxy resin coating, AWWA C550 (latest revision) - standard stainless steel stem - open counter clockwise
	Hydrants	Canada Valve Century Compression Type Valve Seats, or Clow Canada Brigadier Heritage Style Hydrant with McAvity M59M shape, both with "Storz" pumper connection.
	Corporation Main Stop	Cambridge Brass, Ball Style, Series 301NL (No Lead), AWWA X CB Compression Assembly, Mueller Canada, Mueller 300, Ball Type, No Lead, B-25008, AWWA x Mueller "CC" Compression assembly Ford Metter Box Company, Ball Style, FB-1000-NL, No Lead, AWWA x "CC" Compression assembly
	Curb Stop	Cambridge Brass, Ball Style, Series 202NL (No Lead), CB Compression x CB Compression assembly. Mueller Canada, Mueller 300, Ball Type, No Lead, Mueller "CC" x Mueller "CC" compression assembly Ford Metter Box Company, Ball Style, B44 Series, No Lead, "CC" compression assembly
	Saddle	Cambridge Brass, Series 8403, Type 304 Stainless Steel, Double Bolt, AWWA Thread Robar 2616DB, Type 304 Stainless Steel, Double Bolt, AWWA Thread, Ford Meter Box Company, FS323, Type 304 Stainless Steel, Double Bolt, AWWA Thread • Band width for services 25mm in diameter or less shall be a minimum of 150mm • Band width for services greater than 25mm in

Table 2: Approved Materials and Product List

Service	Item	Approved Products
SANITARY	Sewer Pipe	PVC DR 35 Concrete CSA#A257.1/A257.2 (latest revision)
	Service Pipe	PVC DR 28
	Connections	Kor-N-Seal for manholes, Prefab tees for PVC pipe or Kor-N-Tee for concrete pipe services
STORM	Sewer Pipe	375 mm diameter or less: PVC DR 35 - IPEX "Ultra Rib" - Loc Pipe "Loc PVC" Concrete CSA A257.1 (latest revision) (non-reinforced), and A257.2 (latest revision) (reinforced). HDPE Big 'O' Boss Polytite - Royal Rib "Korflo" 450 mm diameter or greater: Concrete CSA A257.1 (latest revision) (non-reinforced) and A257.2 (latest revision) (reinforced) Leads to rear yard catchbasins are to be concrete. All culverts shall be galvanized CSP, (minimum 1.6 mm thickness) or HDPE Boss 2000, 320 kPa stiffness c/w Ultra Stab 75 Joint
	Service Pipe	PVC DR 28
	Connections	Kor-N-Seal for manholes Prefab tee for HDPE and PVC pipe or Kor-N-Tee (services for Concrete pipe only)
WATER	Watermain	Ductile Iron ANSI A21.51 (latest revision) AWWA C151 (latest revision) with Tyton Joints Cement Lined with Copper Straps C900 PVC Class 235 (DR 18), B 137.3 (latest revision) and Tracer Wire Bionax PVCO C909 PVC (Associated fittings and restraints shall be approved by the (Township) and Tracer Wire

No.	DATE	DESCRIPTION	BY	APPD
3	NOV 24/23	THIRD SUBMISSION	JHL	TLB
2	AUG 14/23	SECOND SUBMISSION	JHL	TLB
1	JUNE 24/22	FIRST SUBMISSION	EV	TLB

REVISION / ISSUE

Seal not valid unless signed and dated

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COBIDE ENGINEERING INC
517 - 10th STREET, Hanover, Ontario N4N 1R4
Telephone: (519) 506-5959
www.cobideeng.com

Title:
PROPOSED INDUSTRIAL SITE
PART OF LOT 235 AND 236
FORMER TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
MISCELLANEOUS DETAILS I

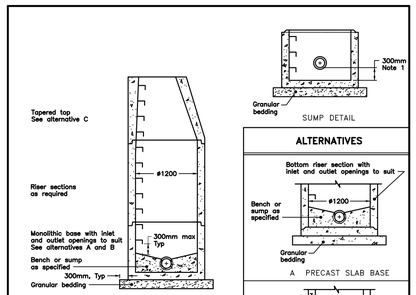
Client: WILSON DEVELOPMENTS

Design:	TLB	Scale:	N/A
Drawn:	JHL	Approved:	
Checked:	TLB		
Date:	JAN 2022		Design Engineer

DRAWING No. 03710-DET1

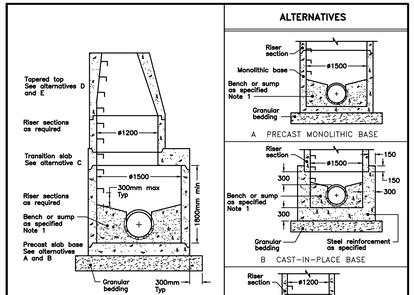
C:\Users\Jacoba\appdata\local\temp\AcPublish_12760\03710 Eco Park Drive Industrial Base 2023-11-24.dwg Nov 28, 2023 - 1:06pm

CAUTION:
THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



NOTES:
1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, or 701.032.
C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.
D Pipe support according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		OPSD 701.010

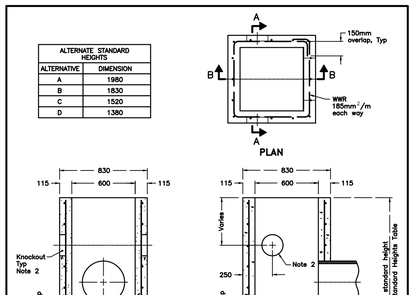


NOTES:
1 For sump detail, see OPSD 701.010.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, 701.040, 701.041, 703.011, 703.021, and 706.010.
C Structures exceeding 5.0m in depth shall include safety platform according to OPSD 404.020 or 404.021.
D Pipe support shall be according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

ALTERNATIVES

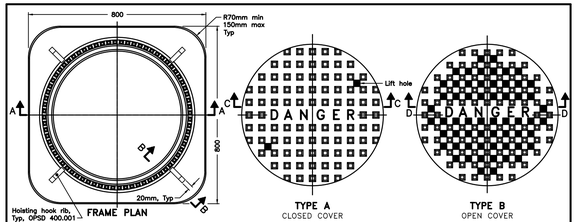
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1500mm DIAMETER		OPSD 701.011

ALTERNATE STANDARD HEIGHTS	
ALTERNATIVE	DIMENSION
A	1980
B	1830
C	1520
D	1380



NOTES:
1 Outlet hole size 525mm diameter maximum, location as required.
2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
A Centre reinforcing in base slab and walls ±20mm.
B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
D Pipe support shall be according to OPSD 708.020.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
PRECAST CONCRETE CATCH BASIN 600x600mm		OPSD 705.010



NOTES:
A Covers shall be Type A or Type B, as specified.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev 3
CAST IRON, SQUARE FRAME WITH CIRCULAR CLOSED OR OPEN COVER FOR MAINTENANCE HOLES		OPSD 401.010

NOTES:
A Couplings shall not be permitted unless the service length exceeds 20m between the main stop and curb stop.
B All water services shall be installed 90° to the longitudinal axis of the watermain.
C Backfill material within 500mm of service box shall be native or imported, as specified.
D All dimensions are in millimetres unless otherwise shown.

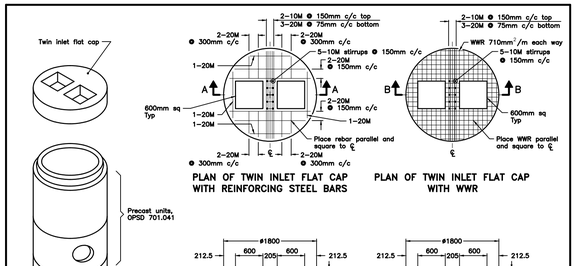
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev 2
WATER SERVICE CONNECTION 32, 38, and 50mm DIAMETER SIZES		OPSD 1104.020

NOTES:
1 Sewer service connections to the main pipe sewer shall be made using factory made tees, strap-on-saddles, or other approved saddles.
2 Vertical risers shall be as specified.
3 Cap or plug at property line shall be adequately braced.
A Maintenance holes shall be used at the main sewer to connect service connections greater than or equal to 200mm.
B For new construction, saddles shall be installed on the main pipe before that pipe is laid.
C Approved cut-in tool shall be used for field made connections.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev 3
SEWER SERVICE CONNECTIONS FOR MAIN PIPE SEWER		OPSD 1006.010

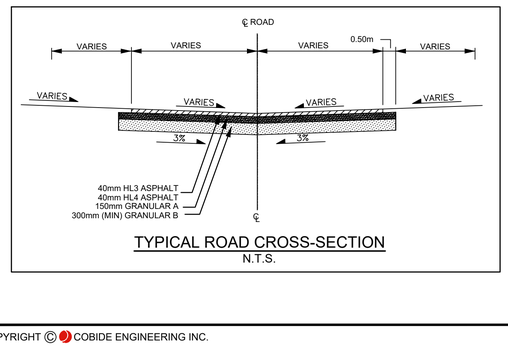
NOTES:
1 When sidewalk is continuously adjacent, the dropped curb at entrances shall be reduced to 75mm.
2 For slipforming procedure a 5% batter is acceptable.
A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with guide rail where it shall be according to the OPSD 900 Series.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev 2
CONCRETE BARRIER CURB		OPSD 600.110

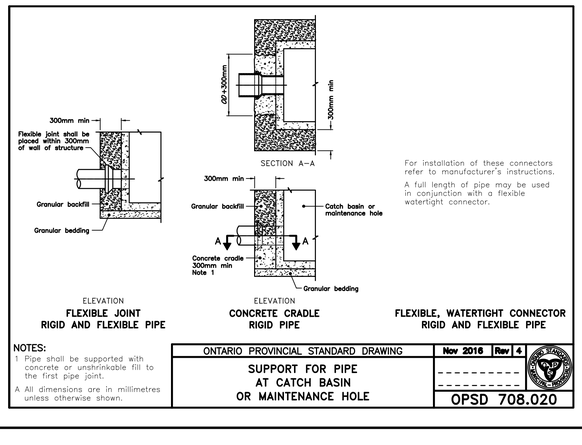


NOTES:
A All reinforcing steel shall have 25mm minimum cover.
B All dimensions are nominal.
C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 2
PRECAST CONCRETE TWIN INLET FLAT CAP 1500mm DIAMETER		OPSD 703.021

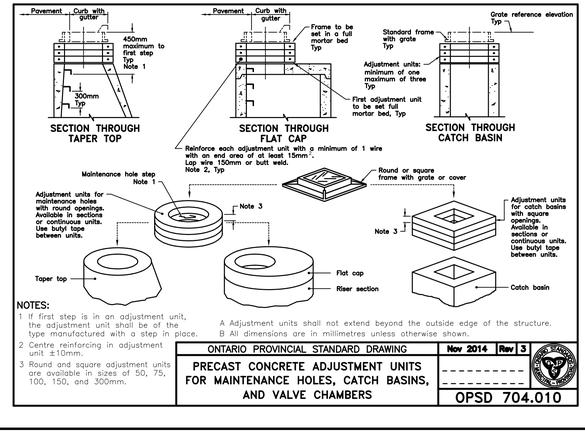


TYPICAL ROAD CROSS-SECTION
N.T.S.



NOTES:
1 Pipe shall be supported with concrete or unshrinkable fill to the first pipe joint.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev 4
SUPPORT FOR PIPE AT CATCH BASIN OR MAINTENANCE HOLE		OPSD 708.020



NOTES:
1 If first step is in an adjustment unit, the adjustment unit shall be of the type manufactured with a step in place.
2 Centre reinforcing in adjustment unit ±10mm.
3 Round and square adjustment units are available in sizes of 50, 75, 100, 150, and 300mm.
A Adjustment units shall not extend beyond the outside edge of the structure.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
PRECAST CONCRETE ADJUSTMENT UNITS FOR MAINTENANCE HOLES, CATCH BASINS, AND VALVE CHAMBERS		OPSD 704.010

No.	DATE	DESCRIPTION	BY	APPD
3	NOV 24/23	THIRD SUBMISSION	JHL	TLB
2	AUG 14/23	SECOND SUBMISSION	JHL	TLB
1	JUNE 24/22	FIRST SUBMISSION	EV	TLB

REVISION / ISSUE

Seal not valid unless signed and dated

.\TLB Stamp1 – page 1.png

COBIDE ENGINEERING INC
517 - 10th STREET, Hanover, Ontario N4N 1R4
Telephone: (519) 506-5959
www.cobideeng.com

Title:
PROPOSED INDUSTRIAL SITE
PART OF LOT 235 AND 236
FORMER TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
MISCELLANEOUS DETAILS II

Client: WILSON DEVELOPMENTS

Design:	TLB	Scale:	N/A
Drawn:	JHL	Approved:	
Checked:	TLB		
Date:	JAN 2022		Design Engineer

DRAWING No. 03710-DET1

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Appendix F

Water Balance Tables

WATER BALANCE CALCULATIONS
Wilson Developments LP
181 Eco Parkway
Dundalk, Ontario
PROJECT No.300056110

TABLE F-1

Monthly Water Balance Components

Based on Thornthwaite's Soil Moisture Balance Approach with a Soil Moisture Retention of 150 mm (moderate rooted crops in sandy loam soils)

Climate data from Egbert Climate Station (1991 - 2020)

Potential Evapotranspiration Calculation	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Average Temperature (Degree C)	-7.2	-6.4	-1.3	5.6	12.3	17.5	20.1	19.2	15.3	8.9	2.7	-3.2	**7.0**
Heat index: i = $(t/5)^{1.514}$	0.00	0.00	0.00	1.19	3.91	6.66	8.22	7.67	5.44	2.39	0.39	0.00	**35.9**
Unadjusted Daily Potential Evapotranspiration U (mm)	0.00	0.00	0.00	25.70	59.35	86.36	100.08	95.32	74.86	42.07	11.83	0.00	**496**
Adjusting Factor for U (Latitude 44° 14' N)	0.81	0.82	1.02	1.13	1.27	1.29	1.3	1.2	1.04	0.95	0.8	0.76	
Adjusted Potential Evapotranspiration PET (mm)	0	0	0	29	75	111	130	114	78	40	9	0	**588**
COMPONENTS	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Precipitation (P)	55	45	48	62	74	83	78	83	72	65	72	58	**793**
Potential Evapotranspiration (PET)	0	0	0	29	75	111	130	114	78	40	9	0	**588**
P - PET	55	45	48	33	-1	-28	-52	-32	-6	25	62	58	**206**
Change in Soil Moisture Storage	0	0	0	0	-1	-28	-52	-32	-6	25	62	32	**0**
Soil Moisture Storage max 150 mm	150	150	150	150	149	120	68	36	31	56	118	150	
Actual Evapotranspiration (AET)	0	0	0	29	75	111	130	114	78	40	9	0	**588**
Soil Moisture Deficit max 150 mm	0	0	0	0	1	30	82	114	119	94	32	0	
Water Surplus - available for infiltration or runoff	55	45	48	33	0	0	0	0	0	0	0	26	**206**
Potential Infiltration (based on MOE metholodogy*; independent of temperature)	38	31	34	23	0	0	0	0	0	0	0	18	**144**
Potential Direct Surface Water Runoff (independent of temperature)	16	13	14	10	0	0	0	0	0	0	0	8	**62**
IMPERVIOUS AREA WATER SURPLUS													
Precipitation (P)	793	mm/year											
Potential Evaporation (PE) from impervious areas (assume 15%)	119	mm/year											
P-PE (surplus available for runoff from impervious areas)	674	mm/year											

Assume January storage is 100% of Soil Moisture Storage
Soil Moisture Storage 150 mm <-- See "Water Holding Capacity" values in Table 3.1, MOE SWMPDM, 2003

*MOE SWM infiltration calculations

topography - rolling land (1% slope)	0.2	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
soils - sandy loam soils	0.4	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
cover - cultivated	0.1	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
Infiltration factor	**0.7**	

Latitude of site (or climate station) 44 ° N.

WATER BALANCE CALCULATIONS
Wilson Developments LP
181 Eco Parkway
Dundalk, Ontario
PROJECT No.300056110

TABLE F-2

Monthly Water Balance Components

Based on Thornthwaite's Soil Moisture Balance Approach with a Soil Moisture Retention of 75 mm (urban lawns in sandy loam soils)

Climate data from Egbert Climate Station (1991 - 2020)

Potential Evapotranspiration Calculation	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Average Temperature (Degree C)	-7.2	-6.4	-1.3	5.6	12.3	17.5	20.1	19.2	15.3	8.9	2.7	-3.2	**7.0**
Heat index: i = $(t/5)^{1.514}$	0.00	0.00	0.00	1.19	3.91	6.66	8.22	7.67	5.44	2.39	0.39	0.00	**35.9**
Unadjusted Daily Potential Evapotranspiration U (mm)	0.00	0.00	0.00	25.70	59.35	86.36	100.08	95.32	74.86	42.07	11.83	0.00	**496**
Adjusting Factor for U (Latitude 44° 14' N)	0.81	0.82	1.02	1.13	1.27	1.29	1.3	1.2	1.04	0.95	0.8	0.76	
Adjusted Potential Evapotranspiration PET (mm)	0	0	0	29	75	111	130	114	78	40	9	0	**588**
COMPONENTS	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Precipitation (P)	55	45	48	62	74	83	78	83	72	65	72	58	**793**
Potential Evapotranspiration (PET)	0	0	0	29	75	111	130	114	78	40	9	0	**588**
P - PET	55	45	48	33	-1	-28	-52	-32	-6	25	62	58	**206**
Change in Soil Moisture Storage	0	0	0	0	-1	-28	-45	0	0	25	50	0	**0**
Soil Moisture Storage max 75 mm	75	75	75	75	74	45	0	0	0	25	75	75	
Actual Evapotranspiration (AET)	0	0	0	29	75	111	123	83	72	40	9	0	**543**
Soil Moisture Deficit max 75 mm	0	0	0	0	1	30	75	75	75	50	0	0	
Water Surplus - available for infiltration or runoff	55	45	48	33	0	0	0	0	0	0	13	58	**250**
Potential Infiltration (based on MOE metholodogy*; independent of temperature)	38	31	34	23	0	0	0	0	0	0	9	40	**175**
Potential Direct Surface Water Runoff (independent of temperature)	16	13	14	10	0	0	0	0	0	0	4	17	**75**
IMPERVIOUS AREA WATER SURPLUS													
Precipitation (P)	793	mm/year											
Potential Evaporation (PE) from impervious areas (assume 15%)	119	mm/year											
P-PE (surplus available for runoff from impervious areas)	674	mm/year											

Assume January storage is 100% of Soil Moisture Storage
Soil Moisture Storage 75 mm <-- See "Water Holding Capacity" values in Table 3.1, MOE SWMPDM, 2003

*MOE SWM infiltration calculations

topography - rolling land (1% slope)	0.2	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
soils - sand loam soils	0.4	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
cover - urban lawns	0.1	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
Infiltration factor	**0.7**	

Latitude of site (or climate station) 44 ° N.

WATER BALANCE CALCULATIONS
Wilson Developments LP
181 Eco Parkway
Dundalk, Ontario
PROJECT No.300056110

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TABLE F-3

Water Balance - Existing Conditions and Post-Development

Land Use	Approx. Land Area* (m^2)	Estimated Impervious Fraction for Land Use	Estimated Impervious Area (m^2)	Runoff from Impervious Area** (m/a)	Runoff Volume from Impervious Area (m^3/a)	Estimated Pervious Area (m^2)	Runoff from Pervious Area** (m/a)	Runoff Volume from Pervious Area (m^3/a)	Infiltration from Pervious Area** (m/a)	Infiltration Volume from Pervious Area (m^3/a)	Total Runoff Volume (m^3/a)	Total Infiltration Volume (m^3/a)
Existing Land Cover												
Agricultural	28,667	0.00	0	0.674	0	28,667	0.062	1,770	0.144	4,130	1,770	4,130
Open Space / Brush	19,860	0.00	0	0.674	0	19,860	0.062	1,226	0.144	2,861	1,226	2,861
TOTAL PRE-DEVELOPMENT	**48,527**		**0**		**0**	**48,527**		**2,996**		**6,991**	**2,996**	**6,991**
Post-Development Land Cover												
Stormwater Management Pond	5,131	0.70	3592	0.674	2422	1539	0.075	116	0.175	270	2537	270
Commercial Rental Units	1,223	1.00	1223	0.674	824	0	0.075	0	0.175	0	824	0
Pavement (Asphalt, Concrete)	10,591	1.00	10591	0.674	7141	0	0.075	0	0.175	0	7141	0
Grass/Landscaped	8,449	0.00	0	0.674	0	8449	0.075	634	0.175	1480	634	1480
Future Warehouse	9,302	1.00	9302	0.674	6272	0	0.075	0	0.175	0	6272	0
Phase 2 Future Loading/Parking Area	11,250	1.00	11250	0.674	7585	0	0.075	0	0.175	0	7585	0
Phase 2 Future Gravel Area	2,581	0.85	2194	0.674	1479	387	0.075	29	0.175	68	1508	68
TOTAL POST-DEVELOPMENT	**48,527**		**38,151**		**25,722**	**10,375**		**779**		**1,817**	**26,501**	**1,817**
										% Change from Pre to Post	885	74
										Effect of development (with no mitigation)	8.8 increase in runoff	74% decrease in infiltration

* Based on Numbers provided by Site Plan

** figures from Table F-1 and Table F-2

Difference in recharge-, pre to post (m^3/a)= **-5,174**

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Appendix G

Functional Servicing Report

WILSON DEVELOPMENTS INC.

FUNCTIONAL SERVICING REPORT

ECO PARKWAY INDUSTRIAL SITE

TOWNSHIP OF SOUTHGATE

AUGUST 2023

COBIDE Engineering Inc
517 10th Street
Hanover, ON N4N 1R1
TEL: 519-506-5959
www.cobideeng.com

COBIDE ENGINEERING INC

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APPENDICES

1. INTRODUCTION

Cobide Engineering Inc. was retained by Wilson Developments to provide engineering services in support of a Site Plan Approval Application for Phase 1 of their proposed industrial development in the village of Dundalk.

A copy of the proposed Site Plan has been included in Appendix A as Drawing SP1.

1.1 LOCATION

The proposed development is located Part of Lots 235 and 236, Former Township of Proton, Township of Southgate, County of Grey (described herein as the “site”). A Site Location Map is included as Figure 1. The subject property is approximately 4.85 hectares in area.

1.2 DEVELOPMENT PROPOSAL

The proposed development be completed in phases with Phase 1 consisting two (2) 1,113.6 m^2 rental unit buildings, adjacent parking areas and an interior roadway. Phase 2 will consist of constructing a 9,300 m^2 industrial building. The total area to be developed is approximately 4.85 hectares.

There will be a private road throughout the site providing access around the buildings. One entrance will be provided in the southwest corner of the property off Eco Parkway.

The Site Plan showing the overall configuration of the development has been included in Appendix A and noted as SP1.

The subject property is currently designated Industrial in the Township of Southgate’s Official Plan and is zoned “M1 – General Industrial Zone” in the Township of Southgate’s Zoning By-law. The subject property is within the Dundalk Settlement Boundary of the current Official Plan of the Township of Southgate and thus is intended for servicing from municipal water and municipal sewage.

The servicing of Phase 2 will be dealt with under a separate apparoval.

MAP SOURCE - MTO ROAD MAP

COBIDE ENGINEERING INC
517 - 10th STREET, Hanover, Ontario N4N 1R4
Telephone: (519) 506-5959
www.cobideeng.com

Client/Project

ECO PARKWAY INDUSTRIAL DEVELOPMENT
WILSON DEVELOPMENTS
Township of Southgate, Ontario
FUNCTIONAL SERVICING REPORT

Figure No.

1

Title

REGIONAL LOCATION MAP

ORIGINAL SHEET – 8 x 11

H:\Wilson\03710 – Eco Park Drive Industrial Site\Drawings\Working Drawings\03710 Regional Location – FSR.dwg Jun 07, 2022 – 9:53am

2. WATER DISTRIBUTION SYSTEM

The water distribution system will be sized based on the existing conditions at the connection to the municipal system and the proposed development's estimated demands which are determined by the Ministry of the Environment, Conservation and Parks (MECP) Design Guidelines for Drinking-Water Systems (2008).

2.1 DESIGN CRITERIA

The water distribution system will be design in accordance MOE guidelines which state the system *"should be designed to satisfy the greater of the following demands:*

- *Maximum day demand plus fire flow; or,*
- *Peak hour demand*

The maximum day demand and peak hour demand are based on the projected water consumption from the development and the fire flow is based on the type of the development.

The system will require modelling during the detailed design stage to ensure the water pressure throughout the system is within the requirements of the MECP.

Based on MECP guidelines, the minimum pressure at ground level at all points in the distribution system under maximum day demand plus fire flow conditions are to be 140 kPa (20 psi). The normal operation pressure should be between 350 kPa (50 psi) to 480 kPa (70 psi). There shall be no point in the distribution system that has a normal operating pressure of less than 275 kPa (40 psi). The maximum pressure in the pipe cannot exceed 700 kPa (100 psi).

2.2 WATER CONSUMPTION

The system will be designed based on the average recommended commercial water demand of 5 L/m^2 of floor area/day per the MECP's Design Guidelines for Drinking-Water Systems (2008).

Table 1 below summarizes the projected water demands for the proposed development.

Table 1 - Proposed Water Demands

Demand	Area	Consumption	Peaking Factor	Peak Rate (L/day)	Peak Rate (L/s)
Rental	2,227 m^2	5 L/m^2/day	2.5	27,838	0.32

The system should be capable of supplying a minimum of 0.32 L/s of water to meet the peak hour demand of the proposed development.

2.3 WATERMAIN CONFIGURATION

A 150mm diameter watermain will be connected to the municipal system at the proposed entrance into the development. There is currently a 150mm diameter watermain on the east side of Eco Parkway.

A single 50mm diameter connection will be provided to each storage building.

A drawing showing the proposed watermain distribution network has been included in Appendix A.

3. SANITARY SEWER SYSTEM

The sanitary servicing of the proposed development will be sized based on the existing conditions at the connection to the municipal sanitary sewer and the proposed development's estimated site demands which are determined by the MECP *Design Guidelines for Sewage Works (2008).*

3.1 DESIGN CRITERIA

The sanitary sewer system will be designed in accordance MECP guidelines.

The sanitary sewer will be designed to convey the projected peak flow based on the site's occupancy load as well as extraneous flows.

3.2 DESIGN FLOW RATES

The sanitary sewer will be design flows are expected to be similar to the water usage. Therefore the peak flows are expected to be approximately 0.32 l/s.

3.3 SANITARY SEWER CONFIGURATION

There will be a sanitary sewer through the middle of the site with a single connection to the existing sanitary sewer. Based on the as built drawings received for the area, there are sanitary sewers north of the site which connect to the sanitary sewer system on Eco Parkway that will provide the outlet for the development.

All sanitary sewers are proposed to be 200mm diameter PVC pipe. The minimum slope considered will be 0.40% to maintain a minimum velocity at full flow to prevent sediment deposition and blockages.

A drawing showing the proposed sanitary collection network has been included in Appendix A as Drawing 03710-SS1.

4. STORM SEWER SYSTEM

The subject property is currently vacant. The site is generally sloping from south to north, and west to east. There are no existing storm sewers on the property. The site mainly discharges into an existing ditch on the west side of Eco Parkway. Eco Parkway will be considered Discharge Point #1 for the purposes of this report.

The proposed development will be graded such that runoff is conveyed via storm sewer system and sheet flow to a new wet stormwater management pond in the northeast corner of the property. The outlet for the stormwater management pond will consist of a headwall, and a 300mm dia. storm sewer c/w an orifice, that will then discharge into the existing ditch on the west side of Eco Parkway.

The storm sewer system will be designed in accordance with the municipal and conservation authority guidelines including the Ministry of the Environment, Conservation and Parks (MECP) Design Guidelines. The storm sewer system will use the rationale method to size the storm sewer to accommodate the 5 year peak flow from the development. The majority of the site will discharge to the proposed storm sewers.

The hydrologic modelling software PCSWMM Version 7.4.3240 Professional 2D was used to determine the pre and post-development peak flows of the 5 yr., 25 yr., and 100 yr. storm events (3 hour Chicago Storm Event, Dundalk IDF Parameters using MTO Curve Look-Up Tool).

The pre-development and post-development parameters and model outputs are contained in Appendix B.

For the purposes of this report, Discharge Point #1 will be the Eco-Park Way Ditch and Discharge Point #2 will be the lands to the north of the property.

4.1 DESIGN REQUIREMENTS

The intent of stormwater quantity control is to limit the flows under proposed conditions to existing levels or less to protect the downstream watercourses, infrastructure and properties.

Minor and Major flows from the majority of the development will be conveyed to the proposed stormwater management facility via a new storm sewer system throughout the site and overland flow routes.

Due to the increase in impervious area, stormwater quantity control will be required for the site. The design of the stormwater management facility has assumed a free outlet from the pond.

4.2 SWM FACILITY CHARACTERISTICS

The stormwater management facility and outlet structure have been designed to control peak runoff rates as well as conform to MECP best practices.

In order to provide the above required volumes and discharges, the following SWM Facility geometry is being proposed:

Table 4.1 – SWM Facility Geometry

SWM FACILITY	DETAILED DESIGN
Side Slope	3:1 - 5:1
SWM Facility Bottom	508.00 m
Permanent Pool Elevation	509.00 m
Top Elevation	510.25 m
High Water Elevation	509.57 m

The outlet configuration for the SWM Facility will be as follows:

- A 300mm diameter storm sewer with a 175mm orifice and an outlet elevation of 509.00 m;
- The outlet pipe will discharge into the roadside ditch on the west side of Eco Parkway

As seen by the proposed inverts, the proposed stormwater management facility will be constructed as a wet pond.

4.2.1 SWM FACILITY PERFORMANCE

Below is a summary of the hydraulic performance of the stormwater SWM Facility during the various storm events.

Table 4.2 – SWM Facility Performance

RETURN PERIOD	ELEVATION (m)	STORAGE (m^3)	DISCHARGE (l/s)
5 Year	509.35	1,448	35.3
25 Year	509.47	2,049	43.1
100 Year	509.57	2,542	48.3

4.3 MODELLING RESULTS

Based upon the above outlet structure, the following summarizes the pre-development and post development peak flows to the discharge point.

Table 4.3 - Peak Flow Summary

RETURN PERIOD	DISCHARGE POINT #1 (L/S)		DISCHARGE POINT #2 (L/S)	
	PRE	POST	PRE	POST
5 Year	43.3	35.3	15.3	0
25 Year	92.9	43.1	32.4	0
100 Year	147.8	48.3	51.2	0

As seen in the above table, the post development peak flows will be less than the pre development peak flows for all design storm events at Discharge Point #1. The peak flow is being conservatively controlled by the proposed stormwater management pond.

4.4 WATER QUAILITY

The MOE guidelines require that extended detention SWM facility's provide quality treatment of 40m^3/ha and discharge it over a minimum of 24 hours. Having an extended detention component in the quality ponds provides settlement of suspended solids.

The following table summarizes the volume requirements based the MOE Guidelines.

Table 4.4 - Water Quality Requirements

POST DEV DRAINAGE AREA (ha)	MOE VOLUME REQUIREMENT FOR NORMAL PROTECTION BASED ON 81.5% IMPERVIOUS (245 m^3/ha)	MOE EXTENDED DETENTION (40 m^3/ha)	PERMANENT POOL REQUIRED (m^3)
4.48 ha	1,120 m^3	180 m^3	940 m^3

The wetland facility will provide 6,250 m^3 of active storage volume. The pond will provide a permanent pool volume of 2,800 m^3. The pond has sufficient volume and size to meet water quality sizing requirements.

5. GRADING & EROSION AND SEDIMENT CONTROL

Erosion and sediment controls shall meet the requirements of the most recent version of the MECP *Stormwater Management Planning and Design Manual* at the time of construction.

5.1 CONSTRUCTION STAGE

Prior to the start of construction, appropriate sediment control facilities are to be in place. Following are details regarding erosion and sediment control that are to be implemented:

- Placement of heavy duty siltation fencing is required to be installed around the property boundary within the drainage corridor on the north and east side of the site to intercept sediment that could potentially be transported by sheet flow across the site. Light duty siltation fence will also be installed at any development grading limits where runoff may discharge from the site.
- It is proposed that the stormwater management pond be constructed first to act as a sedimentation basin.
- Placement of temporary straw check dams within the Eco Parkway drainage ditch downstream of the site;
- Installation of filter cloth under all new catchbasin grates until paving of the roadway is completed;
- Mud mats will be placed at construction access to keep public roadways free from debris during the construction period.
- Re-vegetate all disturbed areas after underground and surface works have been constructed.

Prior to removal of sediment control facilities, ensure that sediment that may have accumulated has been removed.

Once the area has been stabilized, the silt fencing can be removed.

Sincerely,

Cobide Engineering Inc.

Travis Burnside, P. Eng.

LICENSED PROFESSIONAL ENGINEER
8/14/2023
T. L. BURNSIDE
100199868
PROVINCE OF ONTARIO

H:\Wilson\03710 - Eco Park Drive Industrial Site\Reports\FSR\2022-06-03 Eco Parkway FSR 03710.docx

Appendix A

DRAWINGS

FUNCTIONAL SERVICING REPORT

ECO PARKWAY INDUSTRIAL SITE

TOWNSHIP OF SOUTHGATE

CAUTION:
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Notes

1. PROPERTY BOUNDARY DERIVED FROM INFORMATION SHOWN ON PLAN 16R-11609 BY VAN HARTEN SURVEYING INC.
2. TOPOGRAPHICAL INFORMATION DERIVED FROM FIELD SURVEY BY WILSON-FORD AS SUPPLIED BY THE TOWNSHIP OF SOUTHGATE.
3. SEE SHEET 03710-DET1 FOR TYPICAL CROSS-SECTION AND PAVEMENT DESIGN.
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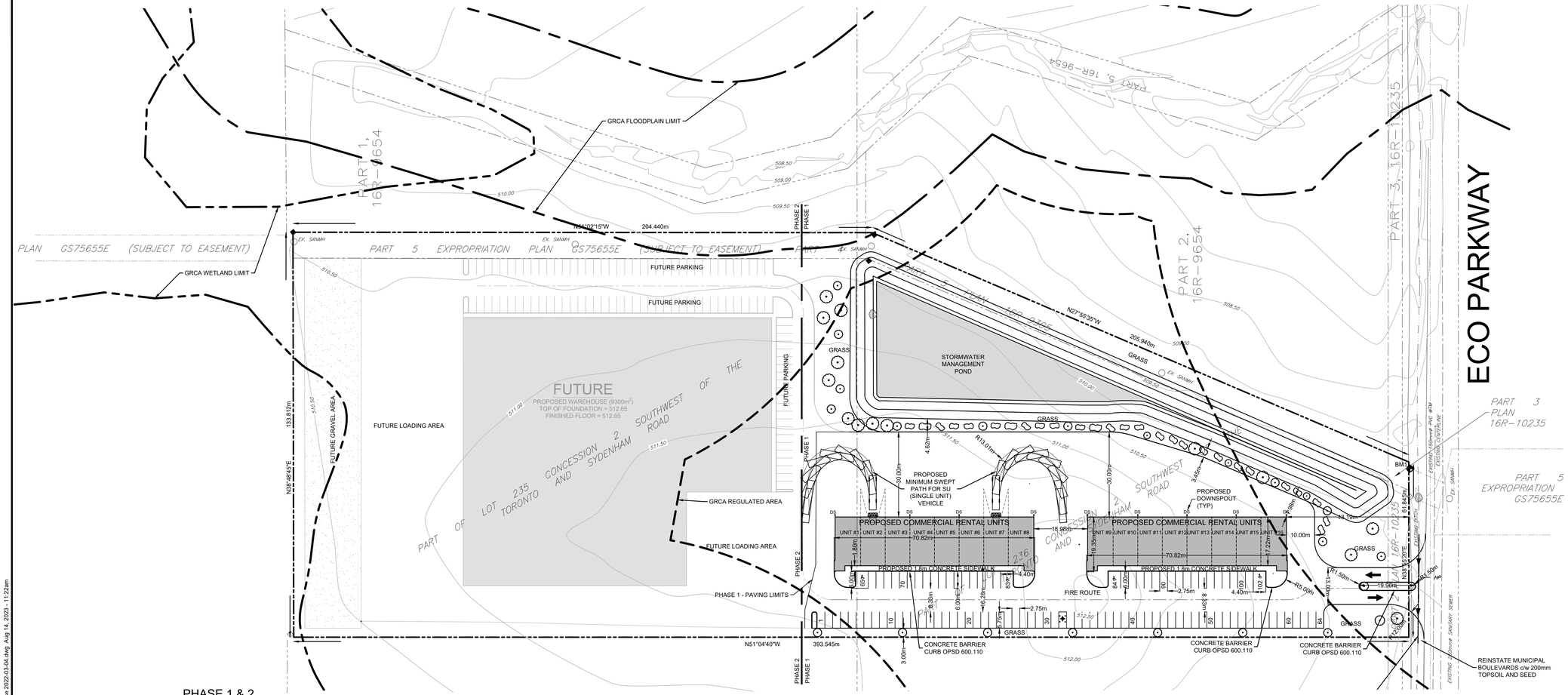

Benchmark Information

BM1
TOP OF STANDARD IRON BAR LOCATED AT NORTHEAST CORNER OF SUBJECT PROPERTY.

ELEVATION 509.20m

PHASE 1 & 2

PROPOSED INDUSTRIAL DEVELOPMENT STATISTICS

PROPOSED USE: GENERAL INDUSTRIAL (ZONE: M1)

REGULATION	REQUIRED	PROVIDED	RELIEF REQUIRED
MIN. LOT AREA	0.186ha	4.85ha	NO
MIN. LOT FRONTAGE	30.0m	61.85m	NO
MIN. FRONT YARD	15.0m	43.19m	NO
MIN. INTERIOR SIDE YARD	7.5m	18.17m	NO
MIN. REAR YARD	7.5m	60.03m	NO
MAX. LOT COVERAGE	50%	23.8%	NO
PARKING SPACES REQUIRED	83 SPACES	202 SPACES	NO

LEGEND

- SUBDIVISION BOUNDARY
- PROPOSED RIGHT OF WAY
- PROPOSED PROPERTY LINES
- EDGE OF EXISTING PAVEMENT
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- PROPOSED STORM SEWER
- EXISTING STORM SEWER
- PROPOSED SUBDRAIN
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- PROPOSED SANITARY SERVICE
- EXISTING SANITARY SERVICE
- PROPOSED WATER SERVICE
- PROPOSED STORM SERVICE
- SANMH PROPOSED SANITARY MANHOLE
- SANMH EXISTING SANITARY MANHOLE
- STMMH PROPOSED STORM MANHOLE
- STMMH EXISTING STORM MANHOLE
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- PROPOSED BLOWOFF
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- CATV EXISTING CABLE TV PEDESTAL
- BPED EXISTING TELEPHONE PEDESTAL
- SIB STANDARD IRON BAR
- IB IRON BAR
- BM BENCHMARK
- DROP CURB

No.	DATE	DESCRIPTION	BY	APPD
2	AUG 14/23	SECOND SUBMISSION	JHL	TLB
1	JUNE 24/22	FIRST SUBMISSION	EV	TLB

REVISION / ISSUE

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LICENSED PROFESSIONAL ENGINEER
8/14/2023
T. L. BURNSIDE
100199868
PROVINCE OF ONTARIO

COBIDE ENGINEERING INC
517 - 10th STREET, Hanover, Ontario N4N 1R4
Telephone: (519) 506-5959
www.cobideeng.com

Title:
PROPOSED INDUSTRIAL SITE
PART OF LOT 235 AND 236
FORMER TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
DEVELOPMENT SITE PLAN

Client: WILSON DEVELOPMENTS

Design:	TLB	Scale:	1:750
Drawn:	JHL	Approved:	
Checked:	TLB		
Date:	JAN 2022		Design Engineer

DRAWING No. 03710-SP1

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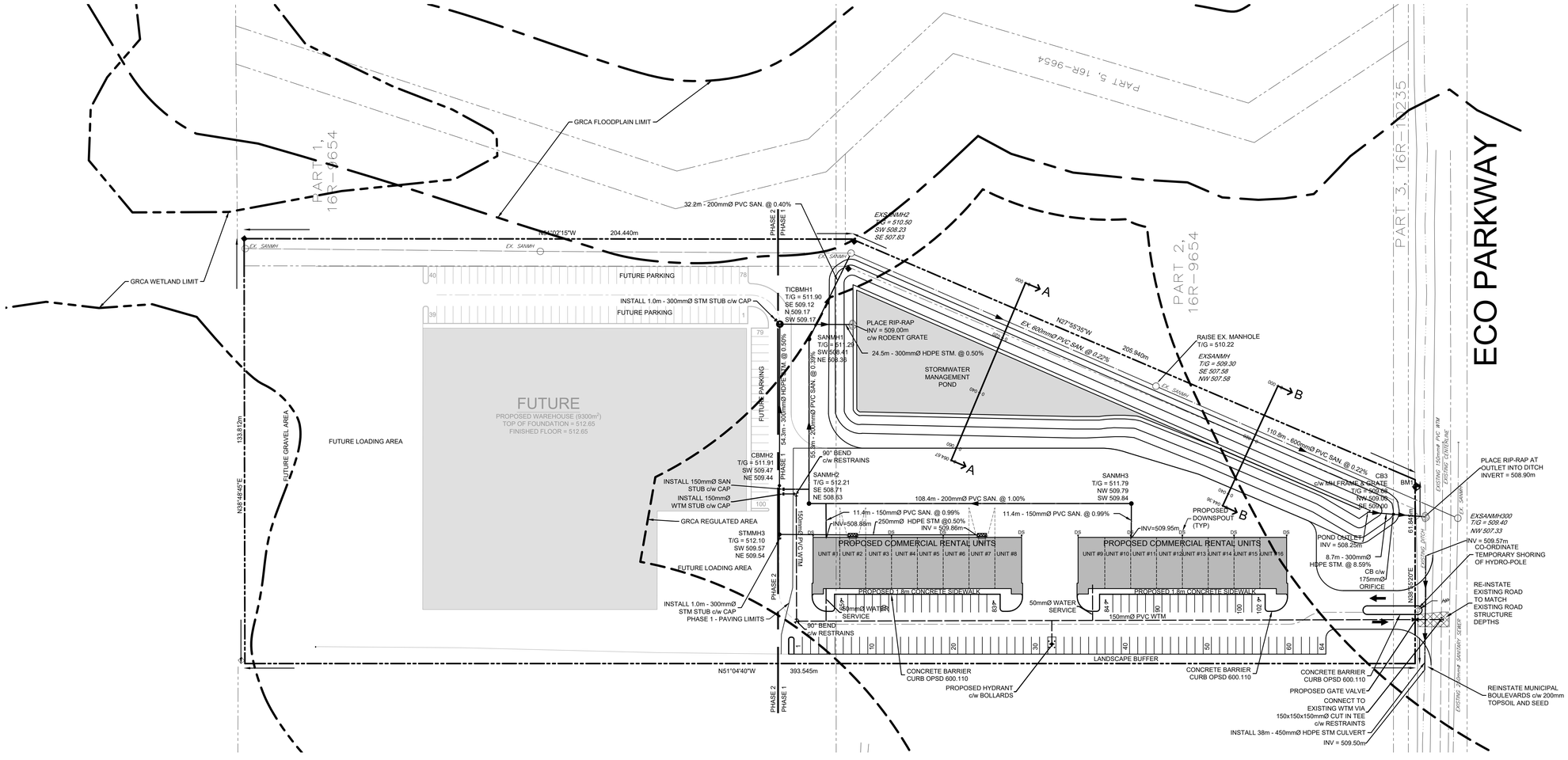


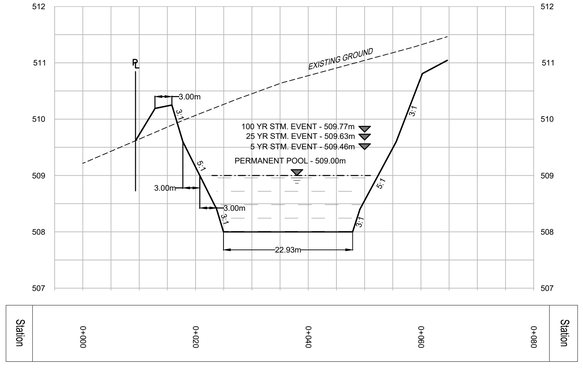
SCALE 1:750

10 0 10 20 50 METRES
50 0 25 50 100 FEET

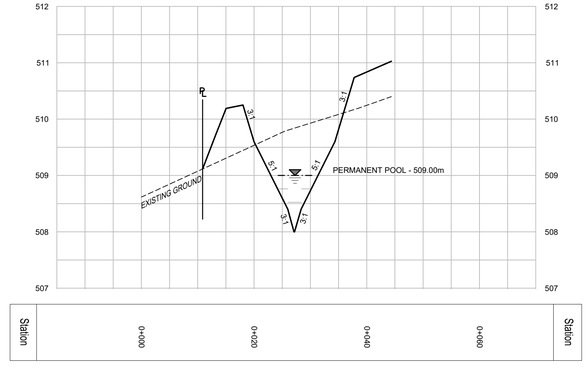
Benchmark Information

BM1
TOP OF STANDARD IRON BAR LOCATED AT NORTHEAST CORNER OF SUBJECT PROPERTY.
ELEVATION 509.20m

SWMP - SECTION A-A



SWMP - SECTION B-B



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1	JUNE 24/22	FIRST SUBMISSION	EV	TLB

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LICENSED PROFESSIONAL ENGINEER
8/14/2023
T. L. BURNSIDE
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COBIDE ENGINEERING INC
517 - 10th STREET, Hanover, Ontario N4N 1R4
Telephone: (519) 506-5959
www.cobideeng.com

Title:
PROPOSED INDUSTRIAL SITE PART OF LOT 235 AND 236 FORMER TOWNSHIP OF PROTON TOWNSHIP OF SOUTHGATE SITE SERVICING PLAN

Client:	WILSON DEVELOPMENTS
Design: TLB	Scale: 1:750
Drawn: JHL	Approved:
Checked: TLB	
Date: JAN 2022	Design Engineer
DRAWING No.	03710-SS1

H:\Wilson\03710 - Eco Park Drive Industrial Site\Drawings\Submissions\2023-08-23 Second Submission\03710 Eco Park Drive Industrial Base 2022-03-04.dwg Aug 14, 2023 - 11:22am

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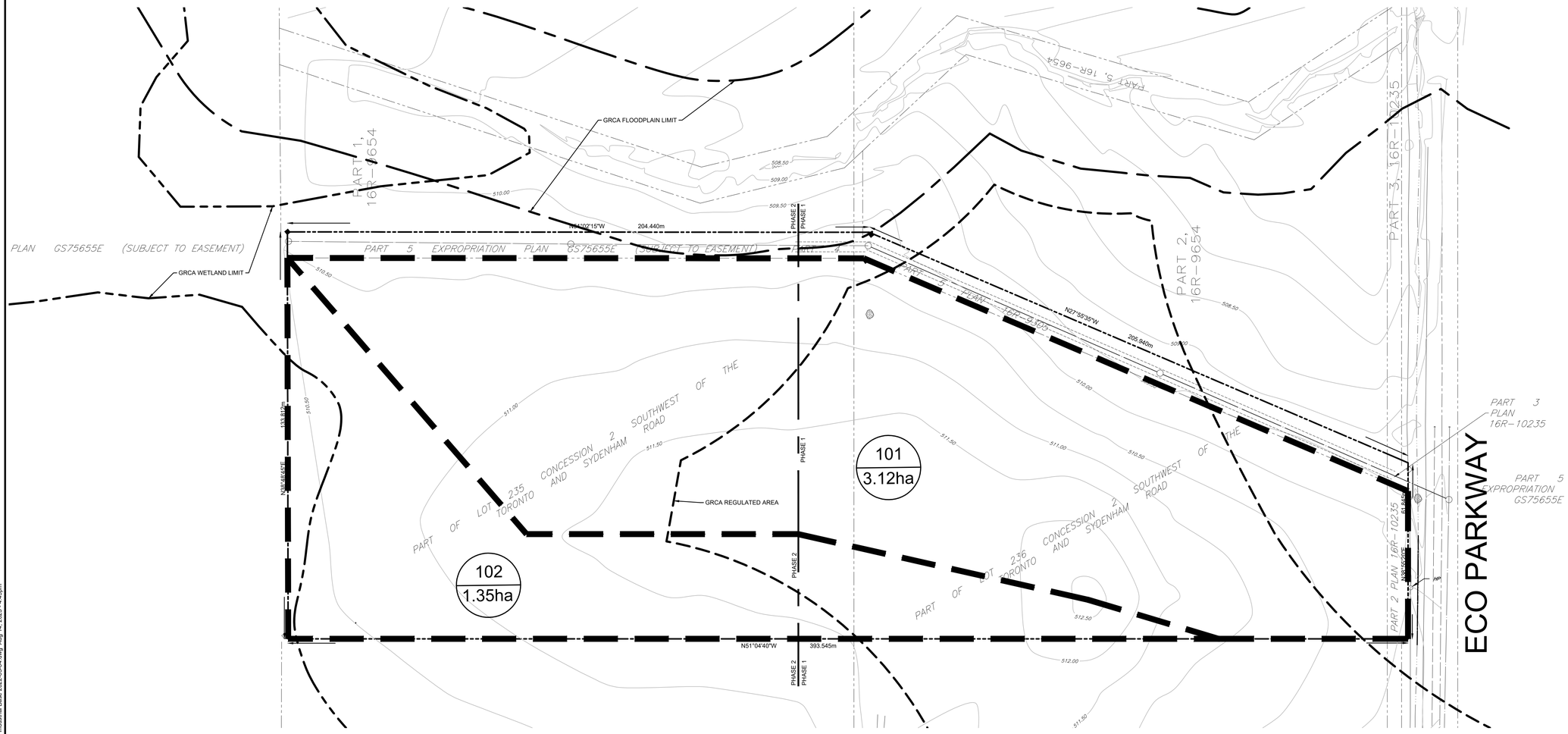

LEGEND

SUBDIVISION BOUNDARY	SANMH STMMH	EXISTING SANITARY MANHOLE	WV	EXISTING GATE VALVE
PROPOSED RIGHT OF WAY	STMMH	PROPOSED STORM MANHOLE		PROPOSED CAP C/W THRUST BLOCK
PROPOSED PROPERTY LINES	CBMH	EXISTING STORM MANHOLE		PROPOSED BLOWOFF
EDGE OF EXISTING PAVEMENT	TICBMH	PROPOSED CATCHBASIN MANHOLE	HP	EXISTING HYDRO GUY WIRE
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PROPOSED STORM SEWER	CB	PROPOSED CATCH BASIN	SIB	EXISTING TELEPHONE PEDESTAL
EXISTING STORM SEWER	DICB	EXISTING CATCH BASIN	IB	STANDARD IRON BAR
PROPOSED SUBDRAIN	CO	PROPOSED DITCH INLET CATCHBASIN	BM	IRON BAR
PROPOSED WATERMAIN	CO	PROPOSED SANITARY SERVICE CLEANOUT		BENCHMARK
EXISTING WATERMAIN	CSV	EXISTING SANITARY SERVICE CLEANOUT		DROP CURB
PROPOSED SANITARY SERVICE	CSV	PROPOSED CURB STOP VALVE		
EXISTING SANITARY SERVICE	HYD	EXISTING CURB STOP VALVE		
PROPOSED WATER SERVICE		PROPOSED HYDRANT SET		
PROPOSED STORM SERVICE		EXISTING FIRE HYDRANT		
SANMH PROPOSED SANITARY MANHOLE		PROPOSED GATE VALVE		

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ELEVATION 509.20m

No.	DATE	DESCRIPTION	BY	APPD
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1	JUNE 24/22	FIRST SUBMISSION	EV	TLB

REVISION / ISSUE

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Title:
PROPOSED INDUSTRIAL SITE
PART OF LOT 235 AND 236
FORMER TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
PRE-DEVELOPMENT CATCHMENT AREAS

Client: WILSON DEVELOPMENTS

Design:	TLB	Scale:	1:750
Drawn:	KW	Approved:	
Checked:	TLB		
Date:	JAN 2022		Design Engineer

DRAWING No. 03710-SWM1

H:\Wilson\03710 - Eco Park Drive Industrial Site\Drawings\Submissions\2023-06-23 Second Submission\03710 Eco Park Drive Industrial Base 2022-03-04.dwg Aug 14, 2023 - 4:45pm

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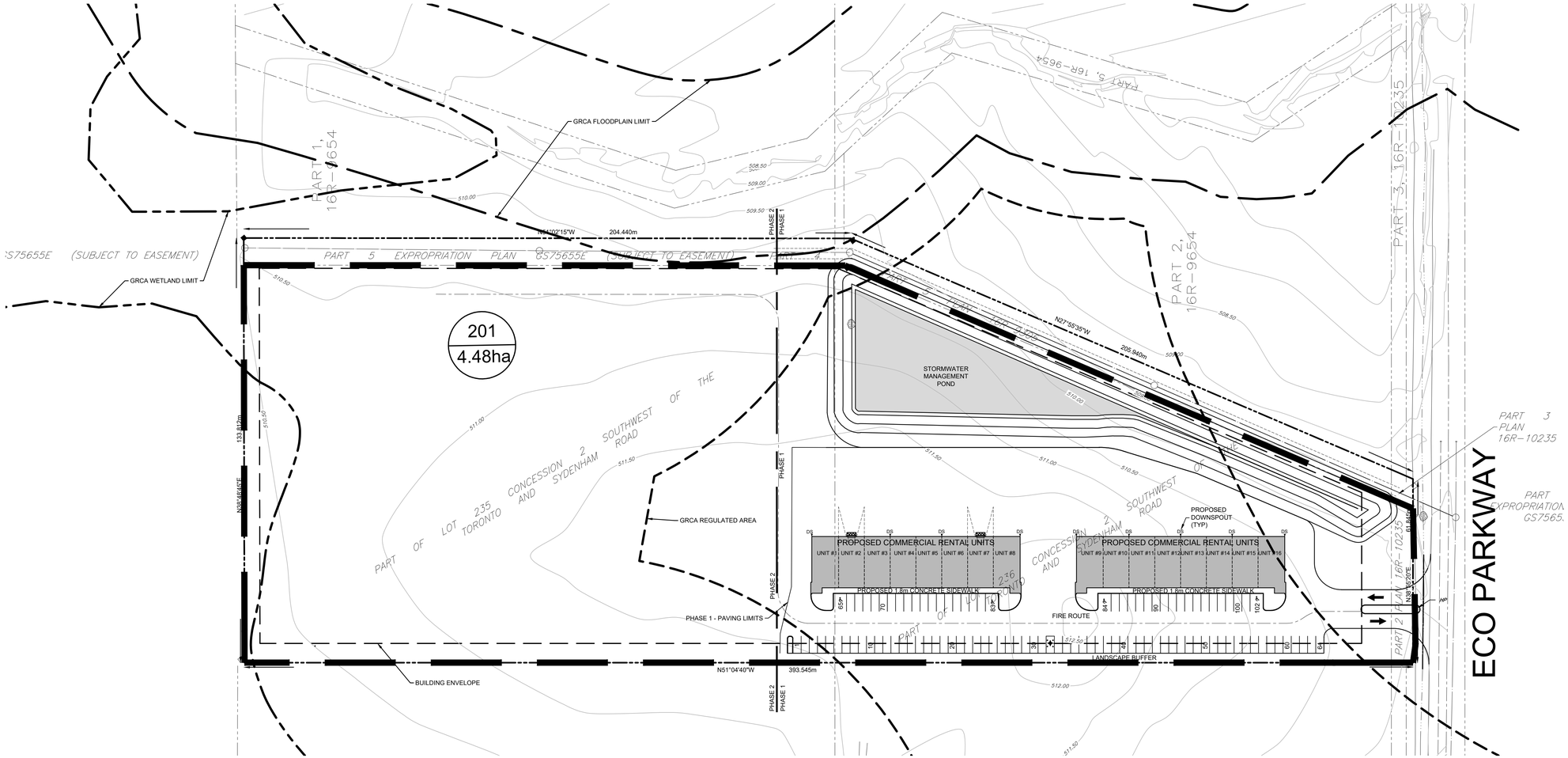

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Client: WILSON DEVELOPMENTS

Design:	TLB	Scale:	1:750
Drawn:	KW	Approved:	
Checked:	TLB		
Date:	JAN 2022		Design Engineer

DRAWING No. 03710-SWM2

LEGEND

- SUBDIVISION BOUNDARY
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- PROPOSED PROPERTY LINES
- EDGE OF EXISTING PAVEMENT
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Appendix B

MODEL PARAMETERS AND OUTPUT

STORMWATER MANAGEMENT REPORT

ECO PARKWAY INDUSTRIAL SITE

TOWNSHIP OF SOUTHGATE

Table A.1 Parameter Summary Table

Existing Conditions									
Outlet Location	**Model Catchment ID**	**Description**	**Area (ha)**	**Drainage Channel (m)**	**Flow Length (m)**	**Gradient (%)**	**Total Imperv. Connected (%)**	**Manning's 'n' (Perv.)**	**CN (Perv.)**
	101	Pre Development Site - Front Portion	3.12	120	260	2.0	0.0	0.30	72.0
	102	Pre Development Site - Back Portion	1.35	390	35	2.0	0.0	0.30	72.0
	201	Post Development Site	4.48	600	75	5.0	81.5	0.25	77.0

Table A.2 Site Soils: (as per Ontario Soil Survey Report for Grey County)

Soil Type
Listowel Silt Loam

Hydologic Soil Group
BC

TABLE OF CURVE NUMBERS (CN's)									
Land Use	Hydrologic Soil Type								
	A	AB	B	BC	C	CD	D	Manning's 'n'	
Meadow	50	54	58	64.5	71	74.5	78	0.4	continuous grass
Woodlot	50	55.3	60.5	67	73.5	76.8	80	0.4	forests
Long Grass	55	60	65	72	79	81.5	84	0.3	natural, not maintained
Lawns	60	65.5	71	77	83	86	89	0.25	maintained
Pasture/Range	58	61.5	65	70.5	76	78.5	81	0.17	farm pasture
Crop	66	70	74	78	82	84	86	0.13	farm land
Fallow (bare)	77	82	86	89	91	93	94	0.05	idle farm land (bare)
Built-up	60	65.5	71	77	83	89	89	0.25	Lawns Existing
Streets, paved	98	98	98	98	98	98	98	0.01	

HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
Catchment	Hydrologic Soil Type							
	A	AB	B	BC	C	CD	D	TOTAL
101	0	0	0	100	0	0	0	100
102	0	0	0	100	0	0	0	100
201	0	0	0	100	0	0	0	100

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Long Grass	Lawns	Pasture Range	Crop	Fallow (Bare)	Imperv. Not Connected (Rooftops)	Imperv. Connected	Total
101	0	0.0	100.0	0	0	0.0	0	0.0	0.0	100
102	0	0	100	0.0	0	0	0	0.0	0.0	100
201	0	0	0	19	0	0	0	25.8	55.7	100

CURVE NUMBER (CN) - Existing Conditions											
Catchment	Meadow	Woodlot	Long Grass	Lawns	Pasture Range	Crop	Fallow (Bare)	Built-up	Imperv. Not Connected (Rooftops)	Weighted CN - Pervious	Manning's 'n'
101	65	67	72	77	70.5	78	89	77	90	72.0	0.30
102	65	67	72	77	70.5	78	89	77	90	72.0	0.30
201	65	67	72	77	70.5	78	89	77	90	77.0	0.25

Table A.3: Impervious Area Determination for Subcatchment 101

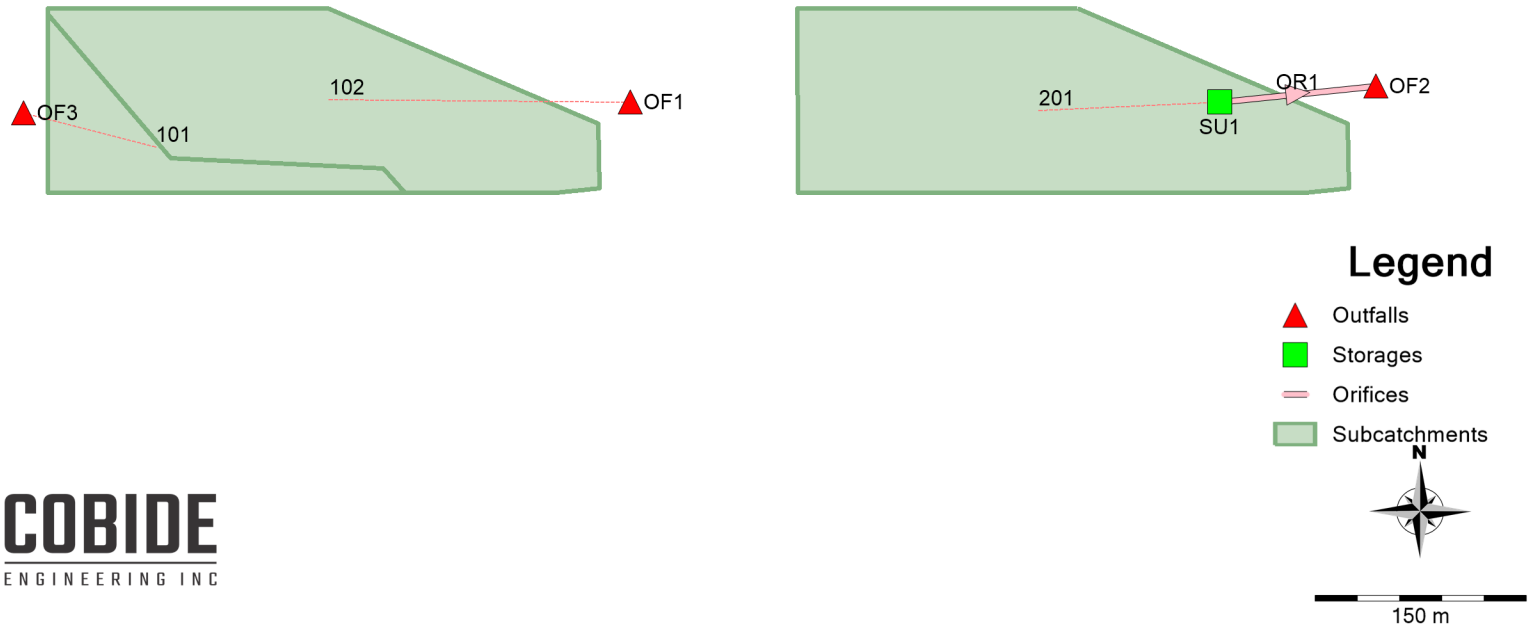
Existing Conditions

Area of Concern	Total Area (ha)	Impervious Area Connected		Impervious Area Not Connected (Rooftops)		Total (%)
		(ha)	(%)	(ha)	(%)	
101	3.12	0.00	0.0	0.00	0.0	0.0
102	1.35	0.00	0.0	0.00	0.0	0.0
201	4.48	2.50	55.7	1.15	25.8	81.5

Table A.3 - Impervious Area Determination for Existing Catchments 101

Catchment					Imperv. Area	Imperv %
101	0	m of	20	m wide ROW @ 45% imperv.	0.00 ha	0.0 %
	0	Impervious Area	720	m^2 @ 100% imperv.	0.00 ha	0.0 %
	0	Roof Area	100	m^2 @ 100% imperv.	0.00 ha	0.0 %
					0.00 ha	
102	0	m of	20	m wide ROW @ 45% imperv.	0.00 ha	0.0 %
	0	Impervious Area	24927	m^2 @ 100% imperv.	0.00 ha	0.0 %
	0	Permanent Pool	3060	m^2 @ 100% imperv.	0.00 ha	0.0 %
	0	Roof Area	11540	m^2 @ 100% imperv.	0.00 ha	0.0 %
					0.00 ha	
201	0	m of	20	m wide ROW @ 45% imperv.	0.00 ha	0.0 %
	1	Impervious Area	24950	m^2 @ 100% imperv.	2.50 ha	55.7 %
	1	Permanent Pool	3060	m^2 @ 100% imperv.	0.31 ha	6.8 %
	1	Roof Area	11540	m^2 @ 100% imperv.	1.15 ha	25.8 %
					3.96 ha	

ECO PARKWAY SWM MODEL SCHEMATIC



COBIDE
ENGINEERING INC

ECOPARK WAY SITE PLAN – MODEL DETAILS

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           LPS
INFILTRATION         HORTON
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         ELEVATION
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           5/25/2022
START_TIME           00:00:00
REPORT_START_DATE    5/25/2022
REPORT_START_TIME    00:00:00
END_DATE             5/26/2022
END_TIME             00:00:00
SWEEP_START          1/1
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:05:00
DRY_STEP             00:05:00
ROUTING_STEP         5
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           8
HEAD_TOLERANCE       0
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              8

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- -------- -------- ----------
Chicago_3h       INTENSITY 0:05     1.0      TIMESERIES Chicago_3h
Chicago_3h_100yr INTENSITY 0:05     1.0      TIMESERIES Chicago_3h_100yr
Chicago_3h_25yr  INTENSITY 0:05     1.0      TIMESERIES Chicago_3h_25yr

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------
-
101              Chicago_3h       OF3              1.35     0        120      2        0
102              Chicago_3h       OF1              3.12     0        390      2        0
201              Chicago_3h       SU1              4.48     81.5     600      2        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
101              0.01       0.3        0.05       0.05       25         OUTLET
102              0.01       0.3        0.05       0.05       25         OUTLET
201              0.01       0.25       0.05       0.05       25         OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
101              72         0.5        7          0          0          CURVE_NUMBER
102              72         0.5        7          0          0          CURVE_NUMBER
```

ECOPARK WAY SITE PLAN – MODEL DETAILS

```
201              77         0.5        7          0          0          CURVE_NUMBER

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
OF1              509.1      FREE                        NO
OF2              509        FREE                        NO
OF3              0          FREE                        NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi
Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- --------
-------- --------
SU1              508      2.25       1          TABULAR    Pond                         0        0

[ORIFICES]
;;Name           From Node        To Node          Type         Offset     Qcoeff     Gated    CloseTime
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- ----------
OR1              SU1              OF2              SIDE         509        0.65       NO       0

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
OR1              CIRCULAR     0.175            0          0          0

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
Pond             Storage    0          2020
Pond                        0.4        2515
Pond                        1          3790
Pond                        1.6        5130
Pond                        2          5675
Pond                        2.25       6024

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Chicago design storm, a = 541.32, b = 0.093, c = 0.701, Duration = 180 minutes, r = 0.4, rain units = mm/hr.
Chicago_3h


;Chicago design storm, a = 895.37, b = 0.029, c = 0.7, Duration = 180 minutes, r = 0.4, rain units = mm/hr.
Chicago_3h_100yr


;Chicago design storm, a = 737.24, b = 0.067, c = 0.7, Duration = 180 minutes, r = 0.4, rain units = mm/hr.
Chicago_3h_25yr


[REPORT]
;;Reporting Options
INPUT      YES
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS       548709.3262      4889582.2144     549762.9458      4889725.9536
UNITS            Meters
```

ECOPARK WAY SITE PLAN – 5 YEAR DESIGN STORM EVENT

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

****
Element Count
****
Number of rain gages 3
Number of subcatchments ... 3
Number of nodes 4
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_3h	Chicago_3h	INTENSITY	5 min.
Chicago_3h_100yr	Chicago_3h_100yr	INTENSITY	5 min.
Chicago_3h_25yr	Chicago_3h_25yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
101	1.35	120.00	0.00	2.0000	Chicago_3h	OF3
102	3.12	390.00	0.00	2.0000	Chicago_3h	OF1
201	4.48	600.00	81.50	2.0000	Chicago_3h	SU1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OF1	OUTFALL	509.10	0.00	0.0	
OF2	OUTFALL	509.00	0.00	0.0	
OF3	OUTFALL	0.00	0.00	0.0	
SU1	STORAGE	508.00	2.25	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
OR1	SU1	OF2	ORIFICE			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options

ECOPARK WAY SITE PLAN – 5 YEAR DESIGN STORM EVENT

```
***************
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ................ NO
  Snowmelt ............ NO
  Groundwater ......... NO
  Flow Routing ........ YES
  Ponding Allowed ..... NO
  Water Quality ....... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ........ EXTRAN
Starting Date ........... 05/25/2022 00:00:00
Ending Date ............. 05/26/2022 00:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ........ 00:01:00
Wet Time Step ........... 00:05:00
Dry Time Step ........... 00:05:00
Routing Time Step ....... 5.00 sec
Variable Time Step ...... YES
Maximum Trials .......... 8
Number of Threads ....... 1
Head Tolerance .......... 0.001524 m


*************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
*************************     ---------       -------
Total Precipitation ......         0.381        42.606
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.168        18.746
Surface Runoff ...........         0.215        23.978
Final Storage ............         0.001         0.126
Continuity Error (%) .....        -0.572


*************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.215         2.146
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.191         1.911
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.280         2.798
Final Stored Volume ......         0.303         3.033
Continuity Error (%) .....         0.000


***************************
Time-Step Critical Elements
***************************
None


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :     4.50 sec
Average Time Step           :     5.00 sec
Maximum Time Step           :     5.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     2.00
```

ECOPARK WAY SITE PLAN – 5 YEAR DESIGN STORM EVENT

```
  Percent Not Converging      :     0.00
  Time Step Frequencies       :
      5.000 -  3.155 sec      :   100.00 %
      3.155 -  1.991 sec      :     0.00 %
      1.991 -  1.256 sec      :     0.00 %
      1.256 -  0.792 sec      :     0.00 %
      0.792 -  0.500 sec      :     0.00 %


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ----------------------------------------------------------------------------------------------------------------
                            Total      Total      Total      Total     Imperv       Perv      Total       Total
Peak  Runoff
                           Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff      Runoff
Runoff   Coeff
  Subcatchment                mm         mm         mm         mm         mm         mm         mm    10^6 ltr
LPS
  ----------------------------------------------------------------------------------------------------------------
  101                       42.61       0.00       0.00      32.94       0.00       9.43       9.43        0.13
15.27   0.221
  102                       42.61       0.00       0.00      32.23       0.00      10.21      10.21        0.32
43.35   0.240
  201                       42.61       0.00       0.00       5.07      35.13       2.82      37.96        1.70
1758.46   0.891


  ******************
  Node Depth Summary
  ******************

  ---------------------------------------------------------------------------
                                Average  Maximum  Maximum  Time of Max    Reported
                                  Depth    Depth      HGL   Occurrence   Max Depth
  Node                 Type      Meters   Meters   Meters  days hr:min      Meters
  ---------------------------------------------------------------------------
  OF1                  OUTFALL     0.00     0.00   509.10     0  00:00        0.00
  OF2                  OUTFALL     0.00     0.00   509.00     0  00:00        0.00
  OF3                  OUTFALL     0.00     0.00     0.00     0  00:00        0.00
  SU1                  STORAGE     1.16     1.35   509.35     0  03:03        1.35


  *******************
  Node Inflow Summary
  *******************

  ---------------------------------------------------------------------------------------------------
                                Maximum  Maximum                  Lateral       Total        Flow
                                Lateral    Total  Time of Max      Inflow      Inflow     Balance
                                 Inflow   Inflow   Occurrence      Volume      Volume       Error
  Node                 Type        LPS      LPS  days hr:min    10^6 ltr    10^6 ltr     Percent
  ---------------------------------------------------------------------------------------------------
  OF1                  OUTFALL   43.35    43.35     0  01:40       0.318       0.318       0.000
  OF2                  OUTFALL    0.00    35.28     0  03:03           0        1.47       0.000
  OF3                  OUTFALL   15.27    15.27     0  01:50       0.127       0.127       0.000
  SU1                  STORAGE 1758.46  1758.46     0  01:15         1.7         4.5       0.001


  **********************
  Node Surcharge Summary
  **********************

  No nodes were surcharged.


  ********************
  Node Flooding Summary
  ********************

  No nodes were flooded.
```

ECOPARK WAY SITE PLAN – 5 YEAR DESIGN STORM EVENT

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
SU1	3.464	38	0	0	4.248	47	0 03:03	35.28

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	97.22	3.79	43.35	0.318
OF2	99.27	17.08	35.28	1.465
OF3	96.71	1.52	15.27	0.127
System	97.73	22.40	90.53	1.911

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
OR1	ORIFICE	35.28	0 03:03			1.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Mon Aug 14 16:28:54 2023
Analysis ended on: Mon Aug 14 16:28:54 2023
Total elapsed time: < 1 sec

ECOPARK WAY SITE PLAN – 25 YEAR DESIGN STORM EVENT

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
--------------------------------------------------------------


*************
Element Count
*************
Number of rain gages ...... 3
Number of subcatchments ... 3
Number of nodes ........... 4
Number of links ........... 1
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                  Data       Recording
Name                 Data Source                  Type       Interval
----------------------------------------------------------------------
Chicago_3h           Chicago_3h                   INTENSITY    5 min.
Chicago_3h_100yr     Chicago_3h_100yr             INTENSITY    5 min.
Chicago_3h_25yr      Chicago_3h_25yr              INTENSITY    5 min.


*******************
Subcatchment Summary
*******************
Name                        Area     Width   %Imperv    %Slope Rain Gage            Outlet
-----------------------------------------------------------------------------------------------
101                         1.35    120.00      0.00    2.0000 Chicago_3h_25yr      OF3
102                         3.12    390.00      0.00    2.0000 Chicago_3h_25yr      OF1
201                         4.48    600.00     81.50    2.0000 Chicago_3h_25yr      SU1


************
Node Summary
************
                                      Invert      Max.    Ponded    External
Name                 Type              Elev.     Depth      Area    Inflow
-----------------------------------------------------------------------------
OF1                  OUTFALL           509.10      0.00       0.0
OF2                  OUTFALL           509.00      0.00       0.0
OF3                  OUTFALL             0.00      0.00       0.0
SU1                  STORAGE           508.00      2.25       0.0


************
Link Summary
************
Name             From Node        To Node          Type            Length    %Slope Roughness
---------------------------------------------------------------------------------------------
OR1              SU1              OF2              ORIFICE


*******************
Cross Section Summary
*******************
                                    Full     Full     Hyd.     Max.   No. of     Full
Conduit          Shape             Depth     Area     Rad.    Width  Barrels     Flow
---------------------------------------------------------------------------------------


*****************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*****************************************************

***************
Analysis Options
```

ECOPARK WAY SITE PLAN – 25 YEAR DESIGN STORM EVENT

```
***************
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ................ NO
  Snowmelt ............ NO
  Groundwater ......... NO
  Flow Routing ........ YES
  Ponding Allowed ..... NO
  Water Quality ....... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ........ EXTRAN
Starting Date ........... 05/25/2022 00:00:00
Ending Date ............. 05/26/2022 00:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ........ 00:01:00
Wet Time Step ........... 00:05:00
Dry Time Step ........... 00:05:00
Routing Time Step ....... 5.00 sec
Variable Time Step ...... YES
Maximum Trials .......... 8
Number of Threads ....... 1
Head Tolerance .......... 0.001524 m


*************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
*************************     ---------       -------
Total Precipitation ......         0.522        58.334
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.207        23.116
Surface Runoff ...........         0.317        35.400
Final Storage ............         0.001         0.127
Continuity Error (%) .....        -0.529


*************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.317         3.168
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.285         2.853
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.280         2.798
Final Stored Volume ......         0.311         3.113
Continuity Error (%) .....         0.001


***************************
Time-Step Critical Elements
***************************
None


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :     4.50 sec
Average Time Step           :     5.00 sec
Maximum Time Step           :     5.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     2.00
```

ECOPARK WAY SITE PLAN – 25 YEAR DESIGN STORM EVENT

```
  Percent Not Converging      :     0.00
  Time Step Frequencies       :
      5.000 -  3.155 sec      :   100.00 %
      3.155 -  1.991 sec      :     0.00 %
      1.991 -  1.256 sec      :     0.00 %
      1.256 -  0.792 sec      :     0.00 %
      0.792 -  0.500 sec      :     0.00 %


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ---------------------------------------------------------------------------------------------------------------
                            Total      Total      Total      Total     Imperv       Perv      Total      Total
Peak  Runoff
                           Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff     Runoff
Runoff   Coeff
  Subcatchment                mm         mm         mm         mm         mm         mm         mm    10^6 ltr
LPS
  ---------------------------------------------------------------------------------------------------------------
  101                       58.33       0.00       0.00      40.79       0.00      17.32      17.32       0.23
32.36   0.297
  102                       58.33       0.00       0.00      39.81       0.00      18.38      18.38       0.57
92.87   0.315
  201                       58.33       0.00       0.00       6.16      48.02       4.68      52.70       2.36
2476.89   0.903


  ******************
  Node Depth Summary
  ******************

  ---------------------------------------------------------------------------
                                Average  Maximum  Maximum  Time of Max    Reported
                                  Depth    Depth      HGL   Occurrence   Max Depth
  Node                 Type      Meters   Meters   Meters  days hr:min      Meters
  ---------------------------------------------------------------------------
  OF1                  OUTFALL     0.00     0.00   509.10     0  00:00        0.00
  OF2                  OUTFALL     0.00     0.00   509.00     0  00:00        0.00
  OF3                  OUTFALL     0.00     0.00     0.00     0  00:00        0.00
  SU1                  STORAGE     1.24     1.47   509.47     0  03:03        1.47


  *******************
  Node Inflow Summary
  *******************

  ---------------------------------------------------------------------------------------------------
                                Maximum  Maximum                  Lateral       Total        Flow
                                Lateral    Total  Time of Max      Inflow      Inflow     Balance
                                 Inflow   Inflow   Occurrence      Volume      Volume       Error
  Node                 Type        LPS      LPS  days hr:min    10^6 ltr    10^6 ltr     Percent
  ---------------------------------------------------------------------------------------------------
  OF1                  OUTFALL   92.87    92.87     0  01:30       0.573       0.573       0.000
  OF2                  OUTFALL    0.00    43.10     0  03:03           0        2.05       0.000
  OF3                  OUTFALL   32.36    32.36     0  01:35       0.234       0.234       0.000
  SU1                  STORAGE 2476.89  2476.89     0  01:15        2.36        5.16       0.001


  **********************
  Node Surcharge Summary
  **********************

  No nodes were surcharged.


  ********************
  Node Flooding Summary
  ********************

  No nodes were flooded.
```

ECOPARK WAY SITE PLAN – 25 YEAR DESIGN STORM EVENT

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
SU1	3.771	41	0	0	4.849	53	0 03:03	43.10

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	97.84	6.78	92.87	0.573
OF2	99.41	23.82	43.10	2.046
OF3	97.37	2.78	32.36	0.234
System	98.21	33.38	162.48	2.853

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
OR1	ORIFICE	43.10	0 03:03			1.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Mon Aug 14 16:27:56 2023
Analysis ended on: Mon Aug 14 16:27:56 2023
Total elapsed time: < 1 sec

ECOPARK WAY SITE PLAN – 100 YEAR DESIGN STORM EVENT

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

****
Element Count
****
Number of rain gages 3
Number of subcatchments ... 3
Number of nodes 4
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_3h	Chicago_3h	INTENSITY	5 min.
Chicago_3h_100yr	Chicago_3h_100yr	INTENSITY	5 min.
Chicago_3h_25yr	Chicago_3h_25yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
101	1.35	120.00	0.00	2.0000	Chicago_3h_100yr	OF3
102	3.12	390.00	0.00	2.0000	Chicago_3h_100yr	OF1
201	4.48	600.00	81.50	2.0000	Chicago_3h_100yr	SU1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OF1	OUTFALL	509.10	0.00	0.0	
OF2	OUTFALL	509.00	0.00	0.0	
OF3	OUTFALL	0.00	0.00	0.0	
SU1	STORAGE	508.00	2.25	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
OR1	SU1	OF2	ORIFICE			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options

ECOPARK WAY SITE PLAN – 100 YEAR DESIGN STORM EVENT

```
***************
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ................ NO
  Snowmelt ............ NO
  Groundwater ......... NO
  Flow Routing ........ YES
  Ponding Allowed ..... NO
  Water Quality ....... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ........ EXTRAN
Starting Date ........... 05/25/2022 00:00:00
Ending Date ............. 05/26/2022 00:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ........ 00:01:00
Wet Time Step ........... 00:05:00
Dry Time Step ........... 00:05:00
Routing Time Step ....... 5.00 sec
Variable Time Step ...... YES
Maximum Trials .......... 8
Number of Threads ....... 1
Head Tolerance .......... 0.001524 m


*************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
*************************     ---------       -------
Total Precipitation ......         0.634        70.857
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.233        26.036
Surface Runoff ...........         0.403        45.058
Final Storage ............         0.001         0.126
Continuity Error (%) .....        -0.511


*************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.403         4.033
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.363         3.635
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.280         2.798
Final Stored Volume ......         0.320         3.196
Continuity Error (%) .....         0.001


***************************
Time-Step Critical Elements
***************************
None


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :     4.50 sec
Average Time Step           :     5.00 sec
Maximum Time Step           :     5.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     2.00
```

ECOPARK WAY SITE PLAN – 100 YEAR DESIGN STORM EVENT

```
  Percent Not Converging      :     0.00
  Time Step Frequencies       :
      5.000 -  3.155 sec      :   100.00 %
      3.155 -  1.991 sec      :     0.00 %
      1.991 -  1.256 sec      :     0.00 %
      1.256 -  0.792 sec      :     0.00 %
      0.792 -  0.500 sec      :     0.00 %


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ---------------------------------------------------------------------------------------------------------------
                            Total      Total      Total      Total     Imperv       Perv      Total       Total
Peak  Runoff
                           Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff      Runoff
Runoff   Coeff
  Subcatchment                mm         mm         mm         mm         mm         mm         mm    10^6 ltr
LPS
  ---------------------------------------------------------------------------------------------------------------
  101                       70.86       0.00       0.00      45.96       0.00      24.70      24.70        0.33
51.23   0.349
  102                       70.86       0.00       0.00      44.94       0.00      25.82      25.82        0.81
147.78   0.364
  201                       70.86       0.00       0.00       6.87      58.27       6.32      64.59        2.89
3078.31   0.912


  ******************
  Node Depth Summary
  ******************

  ---------------------------------------------------------------------------
                                Average  Maximum  Maximum  Time of Max    Reported
                                  Depth    Depth      HGL   Occurrence   Max Depth
  Node                 Type      Meters   Meters   Meters  days hr:min      Meters
  ---------------------------------------------------------------------------
  OF1                  OUTFALL     0.00     0.00   509.10     0  00:00        0.00
  OF2                  OUTFALL     0.00     0.00   509.00     0  00:00        0.00
  OF3                  OUTFALL     0.00     0.00     0.00     0  00:00        0.00
  SU1                  STORAGE     1.30     1.57   509.57     0  03:04        1.57


  *******************
  Node Inflow Summary
  *******************

  ---------------------------------------------------------------------------------------------------
                                Maximum  Maximum                  Lateral       Total        Flow
                                Lateral    Total  Time of Max      Inflow      Inflow     Balance
                                 Inflow   Inflow   Occurrence      Volume      Volume       Error
  Node                 Type        LPS      LPS  days hr:min    10^6 ltr    10^6 ltr     Percent
  ---------------------------------------------------------------------------------------------------
  OF1                  OUTFALL  147.78   147.78     0  01:25       0.805       0.805       0.000
  OF2                  OUTFALL    0.00    48.31     0  03:04           0         2.5       0.000
  OF3                  OUTFALL   51.23    51.23     0  01:30       0.333       0.333       0.000
  SU1                  STORAGE 3078.31  3078.31     0  01:15        2.89        5.69       0.001


  **********************
  Node Surcharge Summary
  **********************

  No nodes were surcharged.


  ********************
  Node Flooding Summary
  ********************

  No nodes were flooded.
```

ECOPARK WAY SITE PLAN – 100 YEAR DESIGN STORM EVENT

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
SU1	4.051	45	0	0	5.342	59	0 03:04	48.31

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	98.17	9.50	147.78	0.805
OF2	99.48	29.04	48.31	2.496
OF3	97.74	3.95	51.23	0.333
System	98.46	42.48	239.39	3.635

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
OR1	ORIFICE	48.31	0 03:04			1.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed Jul 19 10:15:00 2023
Analysis ended on: Wed Jul 19 10:15:00 2023
Total elapsed time: < 1 sec

R.J. Burnside & Associates Limited