



Altus Expert Services, Altus Group

Wetland Risk Evaluation

2055 Brock Road, Pickering, Ontario

December 13, 2021

Terrapex Environmental Ltd.

90 Scarsdale Road

Toronto, Ontario, M3B 2R7

Telephone: (416) 245-0011

Website: www.terrapex.com

In association with Terrastory
Environmental Consulting Inc.

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1.0 INTRODUCTION

Terrapex Limited (Terrapex) has been retained by Altus Expert Services (Altus) to prepare a Wetland Water Balance Risk Evaluation for the property located at 2055 Brock Road, Pickering, Ontario (hereafter, also referred to as the “subject property”). Terrastory Environmental Consulting Inc. (Terrastory) was retained by Terrapex to prepare the natural heritage component. Collectively, these two components comprise a Wetland Risk Evaluation (WRE).

2.0 PURPOSE

A Wetland Risk Evaluation (WRE) may be requested by the Toronto Region Conservation Authority (TRCA) when a proposal has the potential to impact the water balance of a wetland as part of a planning or infrastructure review and approval process. Impact to the water balance of a wetland may occur in the following circumstances:

- When there is alteration to the surface water catchment of a wetland; and
- When water taking requiring Ministry of the Environment, Conservation and Parks (MECP) Environmental Activity and Sector Registry (EASR) registration (i.e. > 50,000 L/day) is anticipated within the surface water catchment of a wetland or on a property that contains a wetland determined to be protected (TRCA; Wetland Water Balance Risk Evaluation 2017).

A Wetland Water Balance Risk Evaluation (herein referred to as “Risk Evaluation”) on the wetland feature, partially located on the eastern portion of the subject property was requested by the TRCA to inform the magnitude of hydrological change, the sensitivity of the evaluated wetland, and the level of risk (CFN62543; TRCA, 11 September 2020).

3.0 METHODOLOGY

A Wetland Risk Evaluation (WRE) can be described as a comparison of two symbiotic principle environmental components; namely the *magnitude of the proposed hydrological change*, and the *sensitivity of the subject wetlands*. Combined, the highest of the individual component assessments is the overall Risk Assignment, as outlined in (TRCA, 2017). The following outlines the methodology used to carry out the component assessments.

3.1 Background Data Review

Background information was gathered and reviewed as part of the evaluations. This involved consideration of the following documents and information sources, as relevant to the subject property:

Environmental Impact Study (EIS): Dillon (March, 2020)

Breeding Bird Survey (BBS): Beacon (October, 2019)

Hydrogeological Report: Soil Engineers Ltd. (March, 2020)

3.2 Study Area

The site is roughly rectangular, located east and adjacent to Brock Road, north of Finch Avenue, and south of Usman Road. The site is currently occupied by vacant land, and is approximately It is understood that the site is located within the jurisdiction of the TRCA, and the Toronto Source Protection Area (SPA).

An unevaluated wetland was identified on the eastern portion of the subject property through the work carried out as part of the Environmental Impact Study (EIS; Dillon, 2020). Two of these wetland vegetation communities were confirmed as part of the EIS:

- The wetland defined by Beacon (2019) and the TRCA is classified in the EIS as Bulrush Mineral Shallow Marsh Type (MASM1-2), and Green Ash Mineral Deciduous Swamp Forest (SWMD2-2). These classifications were estimated to have an area of 0.07 ha and 0.67 ha, respectively.

A review of available Ministry of the Environment, Conservation and Parks (MECP) mapping indicates that a watercourse (West Duffins Creek) with an associated flood area ('event based area') crosses through the south part of the property. The creek runs southwest to northeast in this location. The EIS defines the area of West Duffins Creek within the subject property as having

an area of 0.51 ha. The extents of the studied areas are indicated in **Figure 1**.

Available MECP mapping indicates that groundwater aquifers beneath the subject property are identified as Highly Vulnerable. The hydrogeological report (Soil Engineers Ltd., 2020) reports that groundwater levels measured in November and December of 2019 were observed to range from 2.93 metres below ground level (mbgl) through 6.61 mbgl, equivalent to approximately 82.6 metres above sea level (masl) through 85.72 masl.

A clean water outlet associated with the residential development north of the subject property was observed in the northernmost portion of the wetland (for location see **Appendix A, Figure 2**).

3.3 Field Investigations

Field investigations on the subject property and adjacent publicly accessible lands were undertaken by qualified Terrapex and Terrastory staff on September 14, 2021. The primary purpose of the field investigation was to confirm conditions described by Dillon and supplement existing information, as applicable.

3.3.1 Ecological Component

Assessment of the ecological component of the WRE completed by Terrastory primarily relied upon background information in the EIS completed by Dillon (2020) and Breeding Bird Survey completed by Beacon (2019) in support of the EIS, which was supplemented by observations made during a reconnaissance site visit completed by Terrastory in September 2021.

Ecological surveys completed in support of the EIS included a vegetation community assessment, summer vascular plant inventory, amphibian calling surveys, breeding bird surveys, and incidental wildlife observations. The results of these surveys were supplemented with data provided by the TRCA. Where applicable, Terrastory added to the existing dataset and modified wetland vegetation community boundaries and classifications. Biophysical conditions relevant to the WRE are detailed in the *Wetland Risk Evaluation: Wetland Sensitivity* report completed by Terrastory (2021), provided in **Appendix A**.

The following risk evaluation focuses on the results of the aggregate field investigations in the context of the wetland feature located on the eastern portion of the subject property and immediately adjacent lands which may be impacted by the proposed development.

3.3.2 Hydrological Component

A reconnaissance of the subject property was carried out on October 4, 2021 by a professional hydrogeologist as part of the scope for a feature-based water balance (FBWB). During the reconnaissance of the subject property, the condition of existing monitoring wells, drainage features, areas of potential groundwater recharge/discharge were visually assessed.

4.0 STEP 1 - POTENTIALLY AFFECTED WETLANDS

One wetland, consisting of three contiguous wetland vegetation communities, is present on the eastern portion of the subject property and immediately adjacent lands (**Figure 1** and **Figure 2**). Hydrologic inputs include overland sheet flow and storm water. The outlet of the wetland is not apparent/well-defined; it is likely that there is some groundwater infiltration and diffuse overland flow towards the forested floodplain associated with West Duffins Creek.

The vertical gradient of the wetland surface and soils is interpreted to be downward, based on paired measurements by mini-piezometer and staff gauge instrumentation, which demonstrates that the wetland function was not influenced by groundwater during the periods of measurement. Further wetland functional information will be provided quantitatively in the forthcoming Feature-Based Water Balance report.

No vegetation associated with the wetland is proposed to be removed as part of the development, and it is understood that appropriate buffers from the wetland limit (as staked by TRCA) are being implemented.

4.1 Wetland Feature Limits

The wetland limits shown in the Dillon EIS were confirmed with the TRCA and as such for the purpose of the planning application, no change to the wetland boundary is proposed despite of the refinement shown for the purpose of the WRE (see comparison between **Figure 2** and **Figure 3** of the Terrastory Report in **Appendix A**) and subsequent monitoring plan.

4.2 Wetland Community Characterization

According to Terrastory, wetland vegetation communities within and adjacent to the subject property consist of Cattail Mineral Shallow Marsh (MAS2-1) dominated by Cattail (*Typha angustifolia*); Forb Mineral Meadow Marsh (MAM2-10) dominated by Lance-leaved Aster (*Symphotrichum lanceolatum*), with Reed Canary Grass (*Phalaris arundinaceae*), and Joe Pye Weed (*Eutrochium maculatum*) as associates; and Green Ash Mineral Deciduous Swamp (SWDM2-2) dominated by Green Ash (*Fraxinus pennsylvancia*). The wetlands presented in **Figure 2** of the Terrastory Report, **Appendix A**) represent those observed by Terrastory and are intended to support the evaluation contained herein.

5.0 STEP 2 - HYDROLOGICAL ANALYSIS

5.1 Criteria

Several hydrological criteria were used to determine the magnitude of potential hydrological change on the wetland as part of the proposed development, based on the guidelines outlined in Wetland Water Balance Risk Evaluation (TRCA 2017). The following sections summarize the findings of each criteria.

5.1.1 Wetland Feature Limits (C)

As summarized in Section 4.1, above, the wetland comprised of the MASM1-2 and SWDM2-2 areas covers a total area of approximately 3,530 m². The wetland is irregular in shape and generally 'dog-head' in description, as shown in **Figure 1**.

5.1.2 Extent and Area of Pre-development Catchment

As shown in **Figure 3**, the existing pre-development catchment, which does not include the developed homes to the north of the subject property or the storm water input to the wetland, is presumed to be confined by the road storm sewer systems and topographic controls. Based on this, the topographic pre-development catchment of the feature of interest is estimated to be **62,916 m²** in area.

The storm water input to the north of the wetland is presumed to service the developed homes to the north of the subject property. The extents of this service area is delineated by Usman Road to the north and south, Saffron Drive to the east, and Brock Road to the west. As indicated in the Functional Service Report (Sabourin Kimble & Associates Ltd; March 2020, revised October 2021), most water is directed to a storm water management pond located to the northeast of Saffron Drive. From storm water management pond, water is directed to a wetland and Duffins Creek to the East of Saffron Drive. Specific to the catchment for the feature of interest within the existing residential area, the catchment is limited to approximately 9,100m² of the single unit and townhouse roof areas as well as 2,260 m² of rear yard area to rear yard catch basins for a total area of 1.14 ha (GHD; Kindwin Lands, City of Pickering Stormwater Management Report 2820027 [02112], 2015). The captured volume is understood to discharge from a Clean Water Pipe (CWP) located at the north of the wetland.

Based on these estimates, the full catchment area of the wetland is estimated to be a sum of the topographical catchment, minus the volume discharged to the storm water management pond located to the northeast of the existing residential area, and the CWP service area. For the purposes of this risk assessment, the existing full catchment area to the wetland feature is estimated to be:

$$\begin{aligned} &= (\text{topographic area surrounding existing residential}) + (\text{directed to CWP within residential}) \\ &= \mathbf{(62,916 \text{ m}^2) + (11,360 \text{ m}^2)} \end{aligned}$$

= 74,276 m² (7.4 ha)

5.1.3 Total Development Area of Catchment (C_{dev})

The proposed developed area for the subject property is approximately 13,115.2 m² (lot area). Because the topographic catchment crosses through the property and development, the area of the wetland catchment within the development area is 9,545 m².

5.1.4 Area of the Wetland Catchment Owned by the Proponent

The full property lot area is 52,076 m², and 13,115.2 m² (lot area) of that area is available for development.

Because the topographic catchment crosses through the property and the development, the area of the wetland catchment owned by the proponent is 23,597 m², of which 3,511 m² is part of the defined wetland. Of the total property, approximately 9,545 m² of the catchment is within the proposed development area.

5.1.5 Percent of Impervious Cover Planned Within the Proponent's Holdings

Based on plans provided to Beacon (Kohn Partnership Architects Inc.; *Site Plan/ Enlarged Site Plan & Statistics*, 2021-09-08), approximately 8,111 m² of the proposed impervious cover is within the area of the wetland catchment; equivalent to approximately 40.1% of the area of the wetland catchment owned by the proponent (Figure 3).

5.1.6 Proposed Extent and Area of Post-development Catchment

Based on the Functional Service Report (Sabourin Kimble & Associates Ltd; March 2020, revised October 2021), the proposed catchment for the feature of interest will be smaller than the existing catchment. Major system flows will be directed south of the property to Duffins Creek, and minor systems will be conveyed to the existing storm water management pond located to the northeast of Saffron Road.

As indicated above, the development area within the catchment is 9,545 m². The remaining catchment in the development area will be comprised of supplemental roof drainage, for a total of 4,200 m² (0.42 ha). As such, **the post-development plan proposed catchment area is reduced by approximately 5,345 m².**

5.1.7 Anticipated Magnitude and Duration of Water Taking

The information released as part of the hydrogeological report (Soil Engineers Ltd., 2020), estimates temporary (construction) dewatering rates to range from 95,592.8 L/day to 104,592.1 L/day (including a 3x factor of safety). The anticipated duration of dewatering operations is presumed to be no greater than six months. As such, approval for any construction related

groundwater taking would be through an Environmental Activity and Sector Registry (EASR).

5.1.8 Location and Extent of any Locally Significant Recharge Areas

A review of available MECP mapping indicates that no Intake Protection Zones or Wellhead Protection Areas (WHPA) for quality or quantity are within 500 metres of the subject property. As well, MECP mapping indicates that there are no Significant Recharge Areas within the subject property boundaries.

As indicated in the Wetland Water Balance Risk Evaluation (TRCA, 2017), locally significant recharge areas are defined as: “areas within the wetland’s catchment covered by highly porous sedimentary deposits, or otherwise having high hydraulic conductivity”.

Borehole log reports provided in the Hydrogeological Report (Soil Engineers Ltd. (March, 2020) indicate that subsurface conditions can be generally summarized as layers of silty clay overlying highly compact glacial till materials. A layer of fill materials is noted to exist to a maximum depth of 2.4 metres. The subsurface soil descriptions describe an area of relatively semi-permeable to impermeable conditions (Bear, 1972), and do not fall under the TRCA definition of significant recharge conditions.

5.2 Magnitude of Hydrological Change

The following criteria were evaluated according to the *Wetland Water Balance Risk Evaluation – Table 2* (TRCA, 2017), based on Terrapex’s understanding of the proposed conditions, and information provided.

Any comment based on work carried out by others is subject to the accuracy of the information supplied to Terrapex. Any use of the proposed comments by parties, or any reliance on or decisions to be made based on work not carried out by Beacon is the responsibility of those parties.

5.2.1 Impervious Cover

The following equation is provided in the Wetland Water Balance Risk Evaluation (TRCA 2017):

Equation 1: Where:

$$S = \frac{(IC \times C_{dev})}{C}$$

S = the impervious cover score
IC = proportion of impervious cover in the proponent’s holdings
(Section 5.1.5)
C_{dev} = the size of the wetland’s development catchment in hectares
(Section 5.1.3)
C = the size of the wetland’s catchment in hectares
(Section 5.1.2)

Using this equation, the following variables result in:

$$S = (40.1 * 0.95) / 12.4$$

$$S = 3.07$$

In accordance with the TRCA (2107), the Impervious Cover Score is delineated as low-, medium-, or high- magnitude, where:

Magnitude Evaluation	Impervious Cover Score
High Magnitude	> 25%
Medium Magnitude	10-25%
Low Magnitude	<10%

The result of the provided Equation 1, reflects a low magnitude of hydrological change.

5.2.2 Increase or Decrease in Catchment Size

The original catchment size is **7.4 ha** in size (74,276 m²; Section 5.1.2). As indicated in Section 5.1.6, the proposed catchment size is **reduced by 0.53 ha** (5,345 m²). Subsequently, the proposed catchment will be:

$$\begin{aligned} \text{Proposed Catchment Size} &= 7.4 - 0.53 \\ &= 6.87 \text{ ha} \end{aligned}$$

As such, the proposed catchment will be 92 % the size of the existing catchment, equivalent to an **8 % change in size**. Based on the criteria thresholds provided in *Wetland Water Balance Risk Evaluation – Table 2* (TRCA, 2017), the Increase or Decrease in Catchment Size criteria is delineated as low-, medium-, or high- magnitude, where:

Magnitude Evaluation	Change in Catchment Size
High Magnitude	> 25%
Medium Magnitude	10-25%
Low Magnitude	<10%

The result of the provided Change in Catchment Size criteria reflects a low magnitude of hydrological change.

5.2.3 Water Taking or Discharge

The information released as part of the hydrogeological report (Soil Engineers Ltd., 2020), estimates temporary (construction) dewatering rates to range from 95,592.8 L/day to 104,592.1 L/day (including a 3x factor of safety). As such, approval for any construction related groundwater taking would be through an Environmental Activity and Sector Registry (EASR).

Based on the Water Taking or Discharge criteria thresholds provided in Table 2 of the *Wetland Water Balance Risk Evaluation* (TRCA 2017), and assuming an anticipated water taking period of up to six months, **the provided temporary (construction) dewatering rates reflect a low magnitude of hydrological change.**

5.2.4 Impact to Recharge Areas

As summarized in Section 5.1.8, the subsurface soil descriptions describe an area of relatively semi-permeable to impermeable conditions (Bear, 1972), and do not fall under the TRCA definition of significant recharge conditions. As such, a negligible amount of locally significant recharge area has been replaced.

Based on the criteria thresholds provided in Table 2 of the *Wetland Water Balance Risk Evaluation* (TRCA 2017), the impact to the local recharge area is considered **low magnitude.**

5.2.5 Overall Assessment of Hydrological Change

Following the guidelines outlined in *Wetland Water Balance Risk Evaluation* (TRCA, 2017), the highest magnitude category with one or more criteria satisfied determines the potential magnitude of change. The categories and magnitude of change are summarized as follows:

- Impervious Cover Score criteria indicates **Low Magnitude.**
- Increase or decrease in catchment size criteria indicates **Low Magnitude.**
- Water Taking or Discharge criteria indicates **Low Magnitude.**
- Impact to Recharge Areas criteria indicates **Low magnitude.**

As summarized, all magnitudes criteria were considered Low Magnitude. As such, the resulting magnitude of hydrological change, which directs the Wetland Evaluation Decision Tree (**Figure 4**) is **Low.**

6.0 STEP 3 - WETLAND SENSITIVITY ANALYSIS

6.1 Individual Criteria Component Assessment

The material in this section and associated subsections represent abridged text from the *Wetland Risk Evaluation: Wetland Sensitivity* report completed by Terrastory (2021, **Appendix A**). For ease of reading, quotations and citations are excluded

The results of the background review and site assessment are intended to evaluate the sensitivity of wetlands on and adjacent to the Subject Property to hydrological change using the following five (5) criteria listed under Step 3 of the Wetland Water Balance Risk Evaluation guidelines (TRCA 2017):

- i. Vegetation community
- ii. Fauna species
- iii. Flora species
- iv. Significant Wildlife Habitat (SWH) for hydrologically sensitive species
- v. Hydrological classification

Upon review of the background biophysical information and completion of the site assessment, the data was interpreted per Wetland Water Balance Risk Evaluation guidelines (TRCA 2017) to determine the level of sensitivity, or risk, relevant components of each of the criteria listed above. The highest magnitude sensitivity category (i.e., high, medium, low) determines the overall sensitivity of the wetland to hydrological change.

6.1.1 Vegetation Community Sensitivity

The sensitivity of wetland vegetation communities on the Subject Property to hydrologic change is detailed in **Table 1**. The overall sensitivity of wetland vegetation communities within the subject property is medium, meaning a slight change in wetland hydrology is tolerated.

Table 3. Wetland Vegetation Community Sensitivity Ranking

Vegetation Community	ELC Code	Sensitivity	Assumption / Basis
Cattail Mineral Shallow Marsh	MAS2-1	Medium	Community tolerant of slight hydrological change.
Forb Mineral Meadow Marsh	MAM2-10	Low	Community moderately tolerant of hydrological change.
Green Ash Mineral Deciduous Swamp	SWD2-2 (SWDM2-2)	Medium	Community tolerant of slight hydrological change.
Overall Vegetation Community Sensitivity Rating:		Medium	Community tolerant of slight hydrological change.

6.1.2 Fauna

Of all wildlife recoded on site by Dillon, TRCA (per Dillon EIS), Beacon, and Terrastory; two are dependent on wetland habitats and thus included in the TRCA's sensitivity ranking (TRCA 2017).

Grey Treefrog (*Hyla versicolor*) and Northern Leopard Frog (*Lithobates pipiens*) were observed incidentally by Water Management Ecology (in Dillon 2020) and Terrastory, respectively. Both species are considered highly sensitivity to wetland hydrologic change. The sensitive period for Grey Treefrog spans late April to early October and for Northern Leopard Frog, late September to mid-August.

It is unclear in the TRCA guidelines if confirmation of amphibian breeding is required to warrant inclusion of a species' in the sensitivity analysis. The results of the anuran calling survey completed by Water Management Ecology in 2009 are negative. However, since 2009 adjacent lands have been developed and potentially suitable amphibian breeding habitat is present near the storm water outfall at the northern end of the wetland. It is likely that the presence of permanent standing water in this area is a result of storm water inputs and not overland flow from the Subject Property, as evidenced by observations made on site by Terrastory and comparison of historic air photos.

6.1.3 Flora

A total of 93 vascular plant species were recorded on and adjacent to the Subject Property, including 31 species recorded in wetlands by Terrastory that had not previously been recorded. Most species for which sensitivity rankings are applicable exhibit a medium sensitivity to hydrologic change (see **Appendix 1** of **Appendix A**). One species observed in the Green Ash Mineral Deciduous Swamp (SWD2-2), Hop Sedge (*Carex lupulina*), is ascribed a sensitivity rating of high.

However, the coefficient of conservatism, which determines the species sensitivity rating, is erroneously listed as 10 (highly conservative). The coefficient of conservatism ascribed to Hop Sedge by the Natural Heritage Information Centre is 6 (MNDMNRF 2021), which according to the TRCA's guidelines (2017) would warrant a sensitivity rating of medium. It is possible that the coefficient of conservatism of 10 which is correctly ascribed to False Hope Sedge (*C. lupuliformis*), an Endangered sedge not known to occur in the TRCA's watershed, was mistakenly ascribed by the TRCA to Hop Sedge (i.e., a transcription error). Accordingly, in the opinion of Terrastory and consistent with the rationale in the TRCA's guidelines, the overall sensitivity rating for flora is medium.

6.1.4 Significant Wildlife Habitat for Hydrologically Sensitive Species

According to Dillon (2020), Significant Wildlife Habitat (SWH) for hydrologically sensitive species is not present within wetlands. However, the presence of several Black Ash (*F. nigra*) (S3; medium hydrologic sensitivity) in the Green Ash Mineral Deciduous Swamp (SWD2-2), recorded by

Terrastory, satisfies the criteria for the “special concern and rare wildlife species” category per SWH Schedule 7E (MNR 2010).

Notably, Black Ash has recently been listed as Threatened federally and may be listed as Endangered provincially on 27 January 2022. The Ontario government is currently accepting comments on the potential for suspending the listing. Should Black Ash be listed as Endangered provincially, the aforementioned deciduous swamp would be ineligible for consideration as SWH. If the listing is suspended, the Green Ash Mineral Deciduous Swamp (SWD2-2) would qualify as confirmed SWH.

6.1.5 Hydrological Classification

Wetlands on the Subject Property represent a topographic depression. Hydrologic inputs consist of overland sheet flow and stormwater inputs from the adjacent residential development to the north. The outlet consists of diffuse overland flow into the floodplain at the southern end of the wetland. As wetland vegetation communities on the Subject property are contiguous, for the purposes of the hydrological classification they are treated as one wetland unit. In accordance with hydrological type classification per the Ontario Wetland Evaluation System, Southern Manual (OMNR 2014), wetlands on and adjacent to the Subject Property are palustrine.

Per Table 3 of the TRCA's guidelines (2017), the combination of palustrine wetland and the presence of medium sensitivity vegetation communities (e.g., MAS2-1 and SWD 2-2) or medium or high sensitivity flora or fauna species (e.g., Hope Sedge and amphibians, respectively) means the wetland is highly sensitive to hydrological change.

7.0 STEP 4 - RISK CHARACTERIZATION

7.1 Assessment of Wetland Sensitivity Analysis

The Wetland Water Balance Risk Evaluation guidelines (TRCA 2017) provides guidance for determining the sensitivity of the wetland to hydrologic change. Per the guidelines, the highest magnitude sensitivity category determines the overall sensitivity of the wetland. Per the Wetland Sensitivity Analysis provided in **Appendix A** and summarized herein, **the overall sensitivity of the wetland to hydrologic change is high**. A summary of the findings is presented below in **Table 4**.

Table 4. Summary of Wetland Sensitivity

Metric	Sensitivity	Assumption / Basis
Vegetation Community	Medium	Two of the three wetland communities are tolerant of slight hydrological change.
Fauna	High	Two highly sensitive species, Grey Treefrog and Northern Leopard Frog, are present in the wetland. Species' sensitivity periods are late April – early Oct. and late Sept. – mid August, respectively.
Flora	Medium	Species are moderately sensitive to hydrological change.
Significant Wildlife Habitat for Hydrologically Sensitive Species	Present*	Black Ash is present in the Green Ash Mineral Deciduous Swamp (SWD2-2). Both the species and the vegetation community in which it is located have a hydrologic sensitivity rating of medium.
Hydrological Classification	High	Palustrine wetland and presence of medium sensitivity vegetation communities / high sensitivity fauna / medium sensitivity flora.

Overall sensitivity rating: High

*Note that should Black Ash be listed as Endangered, the wetland would be ineligible for classification as SWH based on the presence of this species (see **Section 6.1.4** for explanation).

7.2 Assessment of Hydrological Change

As summarized, all magnitudes criteria were considered Low Magnitude. As such, the resulting magnitude of hydrological change, which directs the Wetland Evaluation Decision Tree (**Figure 4**, below) is **Low**.

7.3 Overall Combined Risk Assignment

The overall magnitude of hydrological change was estimated as Low, and the overall sensitivity of the wetland was estimated as High. Following the Wetland Risk Evaluation Decision Tree (**Figure 4**, TRCA, 2017), **the resulting overall risk assigned to the wetland water balance is low risk**.

8.0 SUMMARY

Based on the results of the assessment outlined herein, the requirements assigned as part of the Low Risk classification are considered appropriate. As summarized in Wetland Risk Evaluation Decision Tree, the requirements for Low Risk Classifications include:

- Non-Continuous hydrological model (Thornthwaite Mather methodology), with output at monthly or higher resolution;
- Design mitigation plan to maintain water balance to wetland as outlined in SWM Criteria Document (TRCA, 2012).

We trust that this Risk Evaluation meets project needs at this time. Should there be any questions or points of discussion regarding the contents of this report, please don't hesitate to contact us anytime.

Prepared by:
Terrapex Ltd.



Zen Keizars, P.Ge.
Senior Hydrogeologist

Prepared by:
Terrastory Environmental Consulting Inc.



Ash Baron, B.E.S., CEERR
Senior Ecologist | Arborist

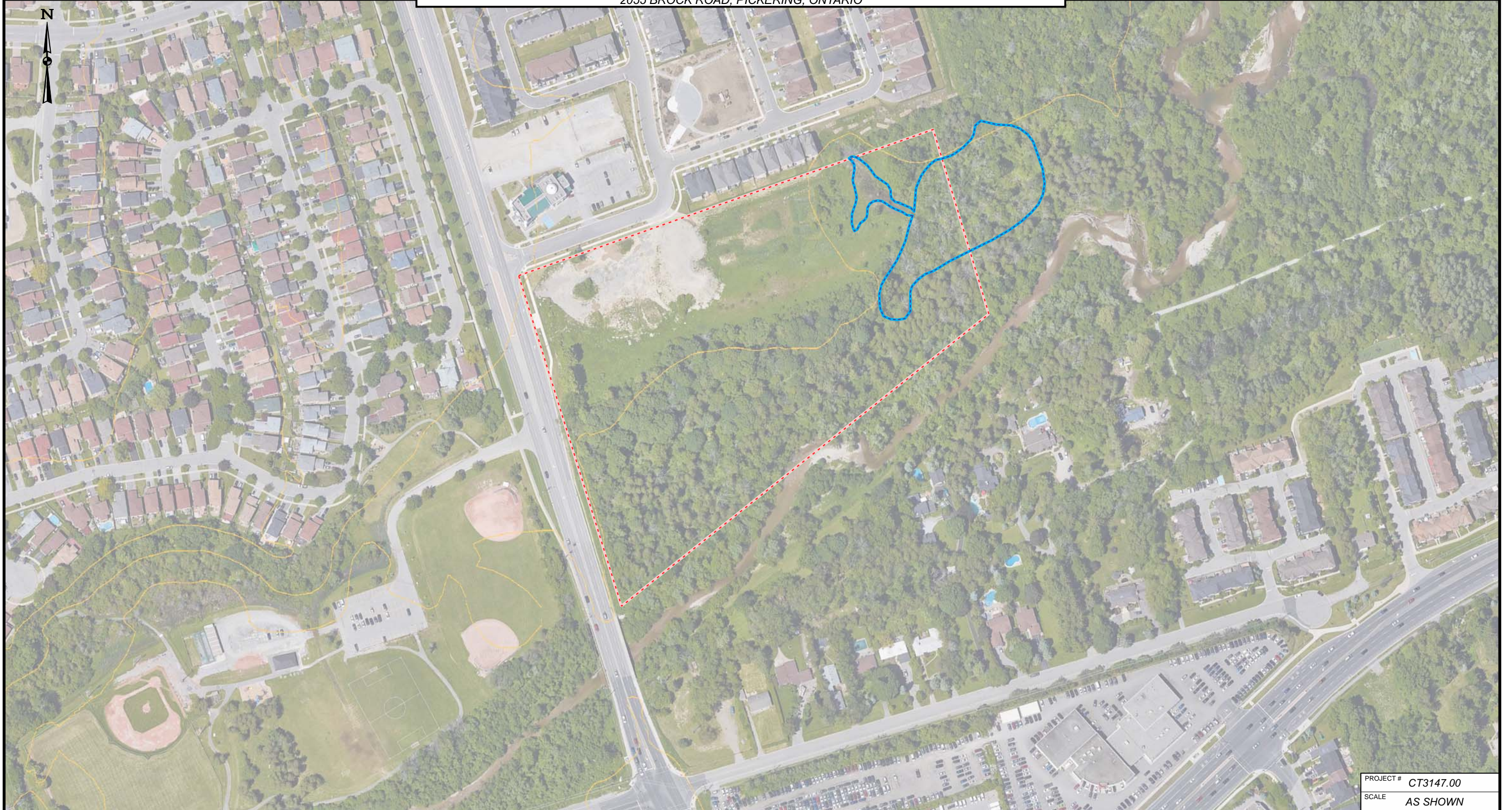
FIGURES



EXISTING CONDITIONS SITE LAYOUT

CLIENT

2055 BROCK ROAD, PICKERING, ONTARIO



SOURCE: Google Earth



PROJECT #	CT3147.00
SCALE	AS SHOWN
DATE	OCTOBER 2021
DRAWN	JOB
CHECKED	
DRAWING #	

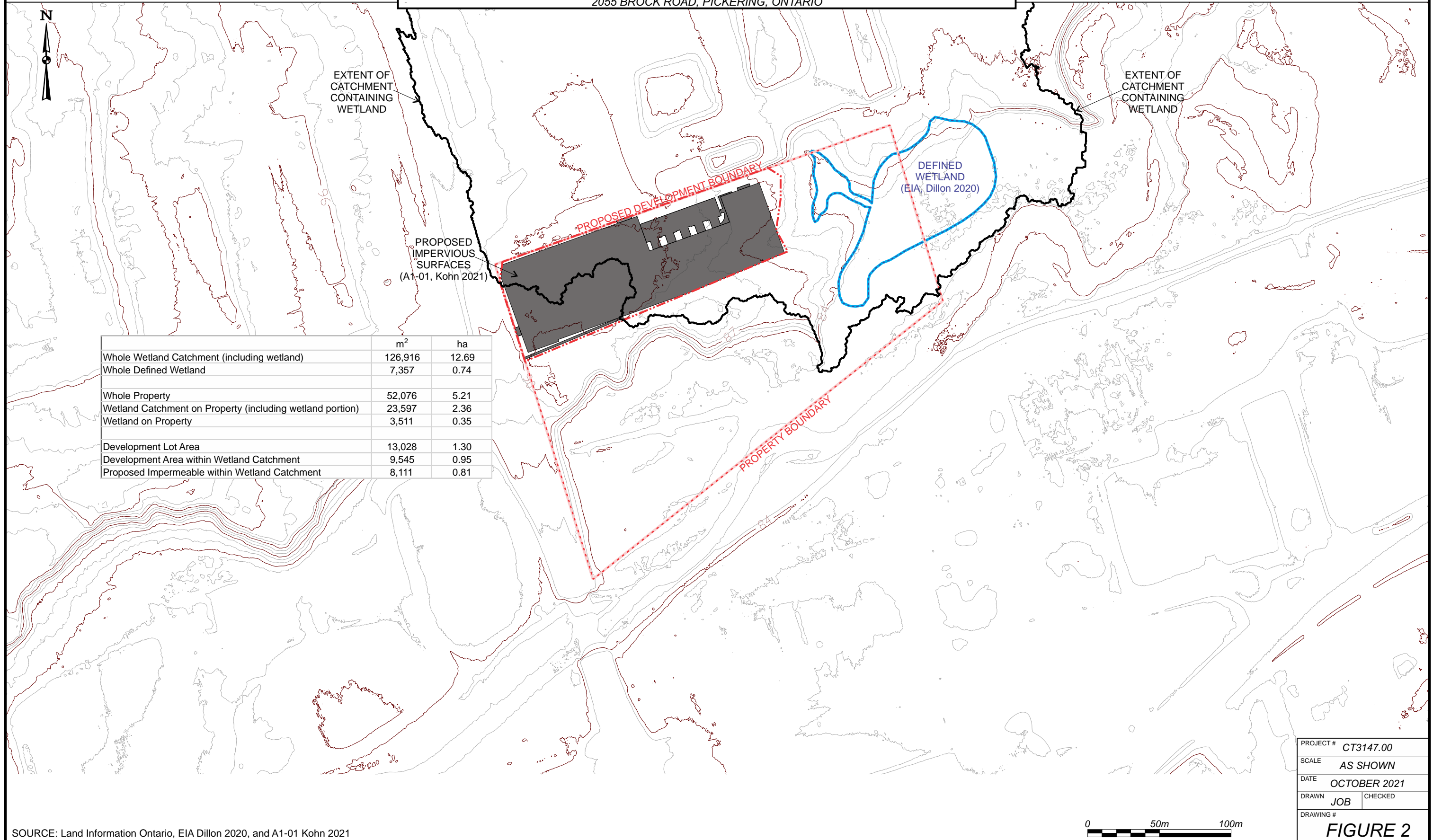
FIGURE 1



EXISTING CONDITIONS WITH CATCHMENT AND PROPOSED IMPERVIOUS SURFACES

CLIENT

2055 BROCK ROAD, PICKERING, ONTARIO

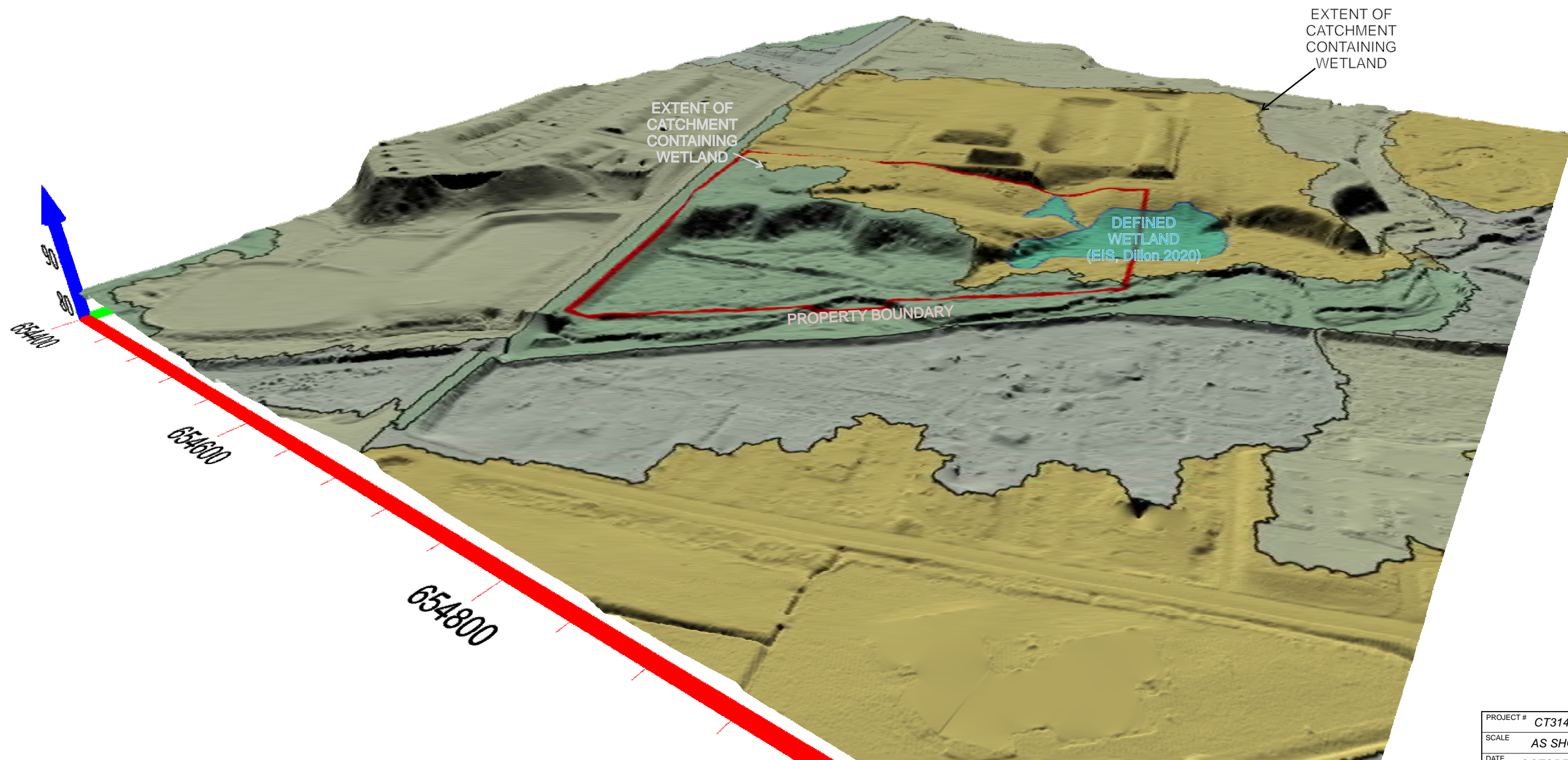


	m ²	ha
Whole Wetland Catchment (including wetland)	126,916	12.69
Whole Defined Wetland	7,357	0.74
Whole Property	52,076	5.21
Wetland Catchment on Property (including wetland portion)	23,597	2.36
Wetland on Property	3,511	0.35
Development Lot Area	13,028	1.30
Development Area within Wetland Catchment	9,545	0.95
Proposed Impermeable within Wetland Catchment	8,111	0.81

SOURCE: Land Information Ontario, EIA Dillon 2020, and A1-01 Kohn 2021

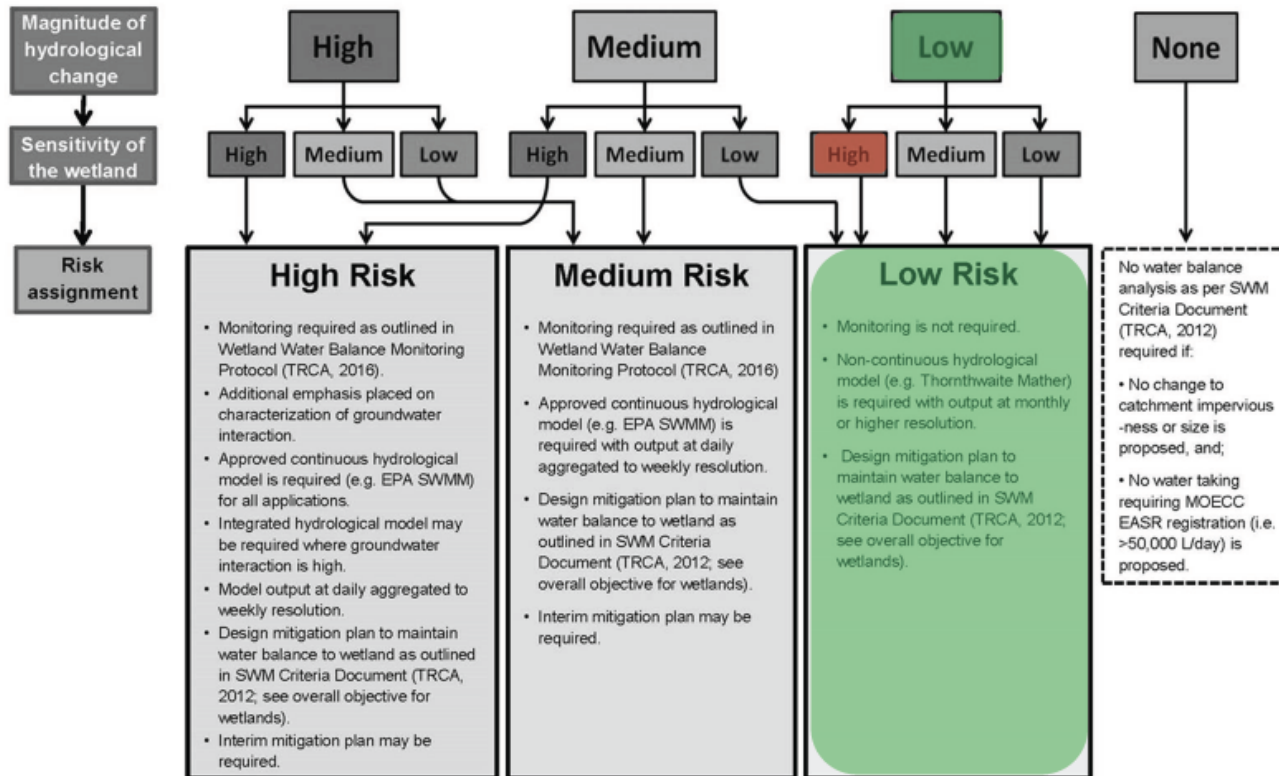
PROJECT #	CT3147.00
SCALE	AS SHOWN
DATE	OCTOBER 2021
DRAWN	JOB
CHECKED	
DRAWING #	

FIGURE 2



PROJECT #	CT3147.00	
SCALE	AS SHOWN	
DATE	OCTOBER 2021	
DRAWN	JOB	CHECKED
DRAWING #		

FIGURE 3



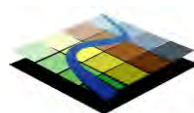
PROJECT #	CT3147
DATE	December 2021
DRAWN	CHECKED
KZK	KZK
DRAWING #	FIGURE 4

APPENDIX I
Terrastory Report - full



WETLAND RISK EVALUATION: WETLAND SENSITIVITY

OPA, ZBA, and Draft Plan of Subdivision Application
2055 Brock Road, Pickering
13 October 2021



TERRASTORY
environmental consulting inc.

WETLAND RISK EVALUATION: WETLAND SENSITIVITY

OPA, ZBA, and Draft Plan of Subdivision Application
2055 Brock Road, Pickering

Prepared for:

Zen Keizars
Sr. Hydrogeologist
Terrapex Environmental Ltd.
90 Scarsdale Road
Toronto, ON M3B 2R7

Prepared by:

Terrastory Environmental Consulting Inc.
171 Glen Road
Hamilton, ON L8S 3N2
905.745.5398

Report by:



Ash Baron, B.E.S., CEERR
Senior Ecologist | Arborist

Reviewed by:



Robert Aitken, B.Sc.
Senior Ecologist | GIS Specialist

Project No.: 21171
13 October 2021

This report has been prepared by Terrastory Environmental Consulting Inc. (hereinafter "Terrastory") for the client. All information, conclusions, and recommendations contained in this report are subject to the scope and limitations set out in the agreement between Terrastory and the client and qualifications contained in this report. This report shall not be relied upon by any third parties without the prior written consent of Terrastory. Terrastory is not responsible for any injury, loss, or damages arising from improper use of this report by third parties. Excerpts of this report or alterations to this report taken without the authorization of Terrastory invalidates the report and any conclusions therein.



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1 INTRODUCTION

1.1 Study Background

Terrastory Environmental Consulting Inc. (hereinafter “Terrastory”) was retained by Terrapex Environmental Ltd. (hereinafter “Terrapex”) on behalf of Altus Group (hereinafter “the Applicant”) to prepare the natural heritage component of a Wetland Risk Evaluation (WRE) in support of an Official Plan Amendment (OPA), Zoning By-law Amendment (ZBA) and draft plan of subdivision at 2055 Brock Road (hereinafter “Subject Property”) in the City of Pickering. The Subject Property is a 5.047 hectare parcel bounded by Brock Road (west), Usman Road (north), residential parcels (north and east), and wooded areas (east and south). Natural features on and adjacent to the Subject Property include valleylands, West Duffins Creek, meadow, thicket, woodlands, and wetlands. The location of the Subject Property within its broader landscape setting is shown in **Figure 1**.

The proposed development application is supported by several studies, including an Environmental Impact Assessment (EIS) completed by Dillon Consulting Ltd. (hereinafter “Dillon”, March 2020) and a breeding bird study completed by Beacon Environmental Ltd. (hereinafter “Beacon”, 2019). The EIS identified several natural heritage features afforded protection under provincial acts, municipal policies and policies of the Toronto and Region Conservation Authority (TRCA). To assess potential impacts to wetlands on and adjacent to the Subject Property, the TRCA requires completion of a WRE per the Wetland Water Balance Risk Evaluation guidelines (TRCA 2017). Terrastory has been retained to assess wetland sensitivity based on an evaluation of vegetation community type, flora, fauna, habitat features, and wetland hydrogeological type (e.g., palustrine, riverine, etc.). The information contained in this report is intended to inform the overall WRE completed by Terrapex in consultation with Terrastory.

1.2 Study Purpose

The purpose of a WRE is to determine the level of risk a development proposal has to the ecological integrity of a wetland through changes to hydrology. As wetland flora and fauna are linked to wetland hydrology, an assessment of vegetation community and individual species’ tolerance to hydrologic change is included in the WRE methodology. The results of the WRE determine the scope of hydrological monitoring and feature-based water balance required.

As mentioned above, the information contained in this report is intended to inform the overall WRE completed by Terrapex in consultation with Terrastory. Specifically, this study is intended to satisfy requirements under Step 3 of the Wetland Water Balance Risk Evaluation guidelines (TRCA 2017), which evaluates the sensitivity of a wetland to hydrologic change. It is understood that this report will form part of the OPA, ZBA, and draft plan of subdivision application package that is to be submitted for consideration by the City, Region, and TRCA.

2 APPROACH AND METHODS

This study is composed of three (3) discrete components which are bulleted below and further described in the following sections.

1. **Acquire background biophysical information and mapping** available for the local landscape surrounding the Subject Property (see **Section 2.1**).

2. **Conduct a site assessment** to field-verify the accuracy of the acquired background biophysical information and collect additional biophysical information as necessary (see **Section 2.1**).
3. **Assess the significance** of the biophysical information collected and natural features identified within the context of the Wetland Water Balance Risk Evaluation guidelines (TRCA 2017) (see **Section 2.2**).

2.1 Background Biophysical Information and Site Assessment

The background information in the EIS completed by Dillon (2020) and Breeding Bird Survey completed by Beacon (2019) helped direct a site assessment carried out by Terrastory staff (A. Baron) on 14 September 2021. Terrapex staff (Z. Keizars) accompanied Terrastory. The background resources listed above are the primary sources of information used in this WRE report.

The site assessment centred on confirming the biophysical conditions of the Subject Property and, where appropriate, adjacent lands (i.e., those within 120 m of the Subject Property) described in the Dillon EIS. When encountered, flora and fauna not included in the EIS were recorded. The locations and boundaries of wetlands and/or species at risk plants that differed from those in the Dillon EIS were recorded on-site with a high-accuracy GPS (Mesa II).

Vegetation communities on the Subject Property were characterized and mapped according to Ecological Land Classification (ELC) (Lee et al. 1998), as the TRCA's Wetland Water Balance Risk Evaluation guidelines does not recognise vegetation community names contained in the 2008 update (Lee 2008). Vegetation communities were initially identified based on current aerial photographs and then verified and refined (as necessary) on-site. ELC mapping was scaled to the finest level of resolution deemed appropriate (i.e., either Ecosite or Vegetation Type). Vegetation communities mapped on Adjacent Lands were delineated predominantly via aerial photograph interpretation unless lands were publicly accessible.

Where wetlands were identified via ELC, their boundaries were delineated consistent with the "50% wetland vegetation rule" and presence of hydric soils per the procedures of the Ontario Wetland Evaluation System (OWES) (OMNRF 2014). All wetlands mapped on Adjacent Lands were delineated via aerial photograph interpretation unless lands were publicly accessible.

2.2 Significance Evaluation

The results of the background review and site assessment are intended to evaluate the sensitivity of wetlands on and adjacent to the Subject Property to hydrological change using the following five (5) criteria listed under Step 3 of the Wetland Water Balance Risk Evaluation guidelines (TRCA 2017):

- i. Vegetation community
- ii. Fauna species
- iii. Flora species
- iv. Significant Wildlife Habitat (SWH) for hydrologically sensitive species
- v. Hydrological classification

Upon review of the background biophysical information and completion of the site assessment, the data was interpreted per Wetland Water Balance Risk Evaluation guidelines (TRCA 2017) to determine the level of sensitivity, or risk, relevant components of each of the criteria listed above. The highest magnitude sensitivity category (i.e., high, medium, low) determines the overall sensitivity of the wetland to hydrological change.

3 EXISTING BIOPHYSICAL CONDITIONS AND SIGNIFICANCE EVALUATION

The following is a description of the biophysical features and conditions of the Subject Property, which are shown spatially on **Figure 2** and **Figure 3**.

3.1 Wetland Vegetation Communities

According to Dillon (2020), two wetland communities, one of which extends outside of the eastern boundary of the Subject Property, are present:

- Bulrush Mineral Shallow Marsh (MASM1-2); and
- Green Ash Mineral Deciduous Swamp (SWDM2-2).

It is the opinion of Terrastory that the Bulrush Mineral Shallow Marsh (MASM1-2) was erroneously classified and, per the community assemblage described by Dillon (i.e., dominated by Narrow-leaved Cattail (*Typha angustifolia*), which is sometimes colloquially referred to as Bulrush) and observations made by Terrastory, is more accurately described as Cattail Mineral Shallow Marsh (MAS2-1). At the time of the site visit completed by Terrastory, the boundaries of the wetland varied from what was reported by Dillon. However, as wetland boundaries have already been staked with the TRCA, no changes are proposed to support the development application. Furthermore, the Bulrush Mineral Shallow Marsh described by Dillon was refined by Terrastory to include a Forb Mineral Meadow Marsh (MAM2-10) on the western side of the aforementioned wetland unit. This meadow marsh is dominated by Lance-leaved Aster (*Symphotrichum lanceolatum*), with Reed Canary Grass (*Phalaris arundinaceae*), and Joe Pye Weed (*Eutrochium maculatum*) as associates. The wetlands presented in **Figure 2** represent those observed by Terrastory and are intended to support the evaluation contained herein¹. Wetlands described by Dillon and confirmed by TRCA are presented in **Figure 3**.

As the TRCA guidelines refer to vegetation communities named in accordance with the 1998 Ecological Land Classification Manual (Lee et al.) and not the 2008 update, as was used by Dillon, to apply the TRCA's guidelines equivalent vegetation community names per the 1998 manual have been provided in **Appendix 1**, with 2008 names used by Dillon presented in bracketed italics where applicable.

The sensitivity of wetland vegetation communities on the Subject Property to hydrologic change is detailed in **Table 1**. The overall sensitivity of wetland vegetation communities within the Subject Property is medium, meaning a slight change in wetland hydrology is tolerated.

¹ Note that wetlands are dynamic systems and boundaries can vary seasonally and from year to year. It is possible in this case that wetland boundary changes could have resulted, in part, from an increase in stormwater inputs from the adjacent development to the north.

Table 1. Wetland Vegetation Community Sensitivity Ranking

Vegetation Community	ELC Code	Sensitivity	Assumption / Basis
Cattail Mineral Shallow Marsh	MAS2-1	Medium	Community tolerant of slight hydrological change.
Forb Mineral Meadow Marsh	MAM2-10	Low	Community moderately tolerant of hydrological change.
Green Ash Mineral Deciduous Swamp	SWD2-2 (SWDM2-2)	Medium	Community tolerant of slight hydrological change.
Overall Vegetation Community Sensitivity Rating:		Medium	Community tolerant of slight hydrological change.

3.2 Fauna

Of all wildlife recoded on site by Dillon, TRCA (per Dillon EIS), Beacon, and Terrastory; two are dependent on wetland habitats and thus included in the TRCA’s sensitivity ranking (TRCA 2017).

Grey Treefrog (*Hyla versicolor*) and Northern Leopard Frog (*Lithobates pipiens*) were observed incidentally by Dillon and Terrastory, respectively. Both species are considered highly sensitive to wetland hydrologic change. The sensitive period for Grey Treefrog spans late April to early October and for Northern Leopard Frog, late September to mid-August.

It is unclear in the TRCA guidelines if confirmation of amphibian breeding is required to warrant inclusion of a species’ in the sensitivity analysis. The results of the anuran calling survey completed by Dillon in 2009 are negative. However, since 2009 adjacent lands have been developed and potentially suitable amphibian breeding habitat is present near the storm water outfall at the northern end of the wetland. It is likely that the presence of permanent standing water in this area is a result of storm water inputs and not overland flow from the Subject Property, as evidenced by observations made on site by Terrastory and comparison of historic air photos.

3.3 Flora

A total of 93 vascular plant species were recorded on and adjacent to the Subject Property, including 31 species recorded in wetlands by Terrastory that had not previously been recorded. Most species for which sensitivity rankings are applicable exhibit a medium sensitivity to hydrologic change (see **Appendix 1**). One species observed in the Green Ash Mineral Deciduous Swamp (SWD2-2), Hop Sedge (*Carex lupulina*), is ascribed a sensitivity rating of high.

However, the coefficient of conservatism, which determines the species sensitivity rating, is erroneously listed as 10 (highly conservative). The coefficient of conservatism ascribed to Hop Sedge by the Natural Heritage Information Centre is 6 (MNDMNRF 2021), which according to the TRCA’s guidelines (2017) would warrant a sensitivity rating of medium. It is possible that the coefficient of conservatism of 10 which is correctly ascribed to False Hope Sedge (*C. lupuliformis*), an Endangered sedge not known to occur in the TRCA’s watershed, was mistakenly ascribed by the TRCA to Hop Sedge (i.e., a transcription error). Accordingly, in the opinion of Terrastory and

consistent with the rationale in the TRCA’s guidelines, the overall sensitivity rating for flora is medium.

3.4 Significant Wildlife Habitat for Hydrologically Sensitive Species

According to Dillon (2020), SWH for hydrologically sensitive species is not present within wetlands. However, the presence of several Black Ash (*Fraxinus nigra*) (S3; medium hydrologic sensitivity) in the Green Ash Mineral Deciduous Swamp (SWD2-2), recorded by Terrastory, satisfies the criteria for the “special concern and rare wildlife species” category per SWH Schedule 7E (MNR 2010).

Notably, Black Ash has recently been listed as Threatened federally and may be listed as Endangered provincially on 27 January 2022. The Ontario government is currently accepting comments on the potential for suspending the listing. Should Black Ash be listed as Endangered provincially, the aforementioned deciduous swamp would be ineligible for consideration as SWH. If the listing is suspended, the Green Ash Mineral Deciduous Swamp (SWD2-2) would qualify as confirmed SWH.

3.5 Hydrological Classification

Wetlands on the Subject Property represent a topographic depression. Hydrologic inputs consist of overland sheet flow and stormwater inputs from the adjacent residential development to the north. The outlet consists of diffuse overland flow into the floodplain at the southern end of the wetland. As wetland vegetation communities on the Subject property are contiguous, for the purposes of the hydrological classification they are treated as one wetland unit. In accordance with hydrological type classification per the Ontario Wetland Evaluation System, Southern Manual (OMNR 2014), wetlands on and adjacent to the Subject Property are palustrine.

Per Table 3 of the TRCA’s guidelines (2017), the combination of palustrine wetland and the presence of medium sensitivity vegetation communities or medium or high sensitivity flora or fauna species means the wetland is highly sensitive to hydrological change.

4 CONCLUSIONS

The information in this report satisfies Step 3 of the Wetland Water Balance Risk Evaluation guidelines (TRCA 2017), which is tasked with determining the sensitivity of the wetland to hydrologic change. Per the guidelines, the highest magnitude sensitivity category determines the overall sensitivity of the wetland. As such, the overall sensitivity of the wetland to hydrologic change is high. A summary of the findings is presented below in **Table 2**.

Per TRCA (2017), “the focus of the Risk Evaluation is on protecting the ecology of a wetland by assessing the risk of a proposal to the maintenance of hydrological conditions”. As previously noted, wetlands on and adjacent to the Subject Property receive storm water inputs from the adjacent residential development to the north. When considering wetland monitoring, including but not limited to vegetation responses to hydrological change (particularly trees), in the opinion of Terrastory it is necessary to differentiate between conditions of and changes in wetland hydrology resulting from the existing development and those resulting from the proposed development.

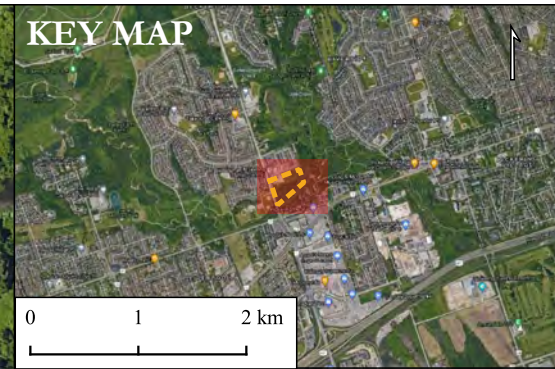
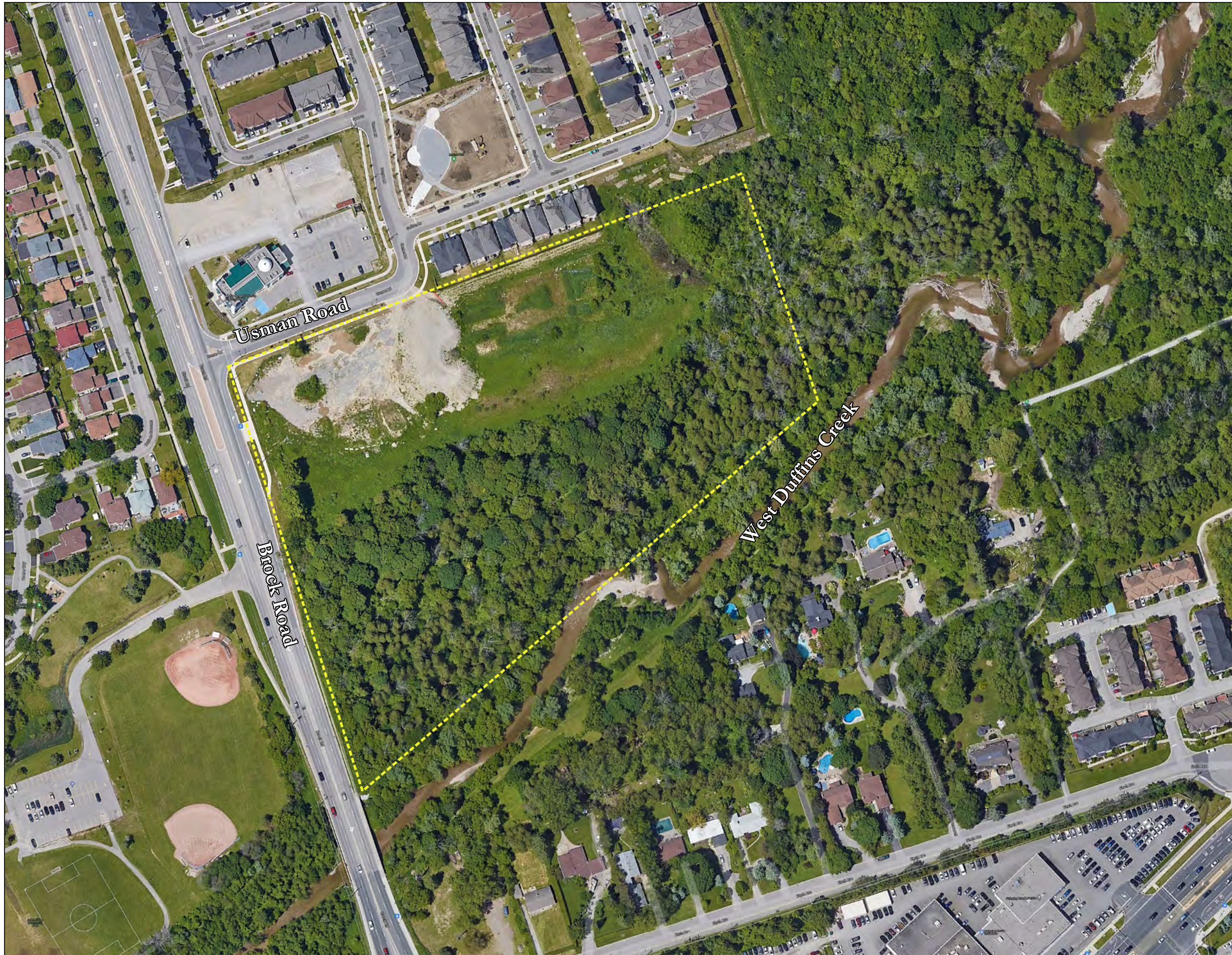
Table 2. Summary of Wetland Sensitivity

Metric	Sensitivity	Assumption / Basis
Vegetation Community	Medium	Two of the three wetland communities are tolerant of slight hydrological change.
Fauna	High	Two highly sensitive species, Grey Treefrog and Northern Leopard Frog, are present in the wetland. Species' sensitivity periods are late April – early Oct. and late Sept. – mid August, respectively.
Flora	Medium	Species are moderately sensitive to hydrological change.
Significant Wildlife Habitat for Hydrologically Sensitive Species	Present*	Black Ash is present in the Green Ash Mineral Deciduous Swamp (SWD2-2). Both the species and the vegetation community in which it is located have a hydrologic sensitivity rating of medium.
Hydrological Classification	High	Palustrine wetland and presence of medium sensitivity vegetation communities / high sensitivity fauna / medium sensitivity flora
Overall sensitivity rating: High		

*Note that should Black Ash be listed as Endangered, the wetland would be ineligible for classification as SWH based on the presence of this species (see **Section 3.4** for explanation).

5 REFERENCES

- Beacon Environmental Ltd. 2019. Breeding Bird Survey: 2055 Brock Road, Pickering, Ontario.
Prepared for Brock Road Duffins Forest Inc. on behalf of Kohn Partnership Architects Inc.
October 2, 2019.
- Dillon Consulting Ltd. 2020. Environmental Impact Study: 2055 Brock Road, Pickering, Ontario.
Prepared for Brock Road Duffins Forest Inc. March 2020.
- Lee, H. T. 2008. “Southern Ontario Ecological Land Classification: Vegetation Type List.”
- Lee, H. T., W. D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998.
“Ecological Land Classification for Southern Ontario: First Approximation and Its
Application.”
- MNRF. 2014. “Significant Wildlife Habitat Mitigation Support Tool.”
- . 2015. “Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E.”
- OMNRF. 2014. *Ontario Wetland Evaluation System: Southern Manual*.
- MNDMNRF. 2021. Natural Heritage Information Centre Ontario Species List. “All species:
Vascular Plants.”
- Toronto and Region Conservation Authority (TRCA). 2017. “Wetland Water Balance Risk
Evaluation.”




Legend

Study Area
 Subject Property

GENERAL NOTES:
 - Features depicted herein should not be used in place of a professional survey.
 - Numeric scale is for a 11x17 inch print.

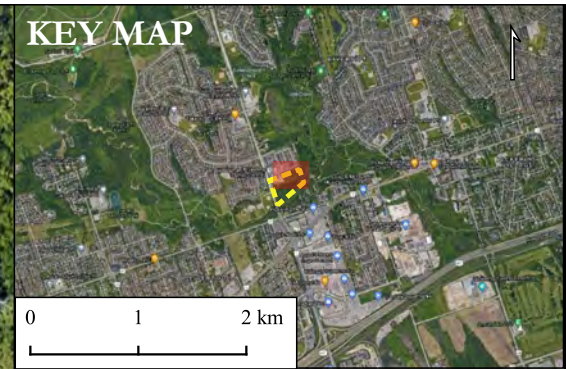

TERRASTORY
 environmental consulting inc.
 info@terrastoryenviro.com 905.745.5398


 1:2,000 0 10 20 30 m

Location:
 2055 Brock Road,
 City of Pickering

Project No.: 21171
 Date: 2021-10-13
 By: AB Checked: RA
 Orthophotograph Date:
 2015 (Google Maps).

Figure 1:
 Location of the
 Subject Property



Legend

Study Area
 [Yellow dashed line] Subject Property

Built Structures and Infrastructure
 [Yellow circle] Storm Water Outlet

Biophysical Conditions - Terrastory
 [Green outline] Wetland Vegetation Communities
 [Purple diamond] Black Ash

WETLAND VEGETATION COMMUNITY CODES:
 MAS2-1: Cattail Mineral Shallow Marsh
 MAM2-10: Forb Mineral Meadow Marsh
 SWD2-2: Green Ash Mineral Deciduous Swamp

GENERAL NOTES:
 - Features depicted herein should not be used in place of a professional survey.
 -Numeric scale is for a 11x17 inch print.

info@terrastoryenviro.com 905.745.5398

1:1,000 0 10 20 30 m

Location:
 2055 Brock Road,
 City of Pickering

Project No.: 21171
 Date: 2021-10-13
 By: AB Checked: RA
 Orthophotograph Date:
 2015 (Google Maps).

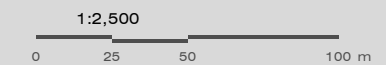
Figure 2:
 Biophysical
 Features and
 Conditions



**BROCK ROAD DUFFINS FOREST INC.
2055 BROCK ROAD
ENVIRONMENTAL IMPACT STUDY**

**FIGURE 3
FIELD INVESTIGATION RESULTS**

- Property Boundary
 - Study Area
 - Watercourse
 - Butternut
 - Staked ESA (April 2009)
 - Staked ESA (May 2006)
 - Staked Top of Bank (November 1990, rev April 2009)
 - Wetland Boundary (Beacon and TRCA; ESPU, 2011)
- Ecological Land Classification**
- CGL_2: Parkland
 - CVC: Commercial and Institutional
 - CVL_1: Transportation
 - CVR_3: Single Family Residential
 - FOCM4-1: Fresh Moist White Cedar Coniferous Forest
 - FOD: Deciduous Forest
 - FODM6: Fresh Moist Sugar Maple Deciduous Forest
 - WOCM1-2: Dry Fresh Cedar Coniferous Woodland
 - WODM5: Fresh Moist Deciduous Woodland
 - MEMM3: Dry Fresh Mixed Meadow Ecosite
 - MASM1-2: Bulrush Mineral Shallow Marsh
 - SWDM2-2: Green Ash Mineral Deciduous Swamp
 - OAO: Open Aquatic
 - TAGM5: Treed Hedgerow
 - THDM2: Deciduous Shrub Thicket



MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF, TRCA

MAP CREATED BY: LK
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 UTM Zone 17N



PROJECT: 191589
STATUS: FINAL
DATE: 2020-03-31

Appendix 1. Vascular Plant List

Scientific Name	Common Name	SARA	ESA	S-Rank (per NHIC)	Coefficient of Conservatism	Coefficient of Wetness	Observed by Dillon	Observed by WME	TRCA Data	Additional Species Observed in Wetlands by Terrastory	TRCA Sensitivity Ranking
<i>Acer negundo</i>	Manitoba Maple	---	---	S5	0		●	---	---		
<i>Acer saccharinum</i>	Silver Maple	---	---	S5	5		●	---	---		Medium
<i>Acer saccharum</i>	Sugar Maple	---	---	S5	4		●	---	---		
<i>Acer x freemanii</i>	Freeman's Maple	---	---	SNA	---		●	---	---		Medium
<i>Actaea pachypoda</i>	White Baneberry	---	---	S5	6		---	---	●		
<i>Ageratina altissima</i>	White Snakeroot	---	---	S5	5	3				●	
<i>Agrostis stolonifera</i>	Creeping Bentgrass	---	---	SE5	0	-3				●	
<i>Alisma trivale</i>	Northern Water-plantain	---	---	L5	3	-5				●	Low
<i>Amphicarpaea bracteata</i>	American Hog-peanut	---	---	S5	4	0				●	
<i>Anemone quinquefolia</i>	Wood Anemone	---	---	S5	7		---	---	●		
<i>Apocynum androsaemifolium</i>	Spreading Dogbane	---	---	S5	3		---	---	●		
<i>Arctium minus</i>	Common Burdock	---	---	SNA	---		●	---	---		
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	---	---	S5	5		---	---	●		Medium
<i>Asarum canadense</i>	Canada Wild-ginger	---	---	S5	6		---	---	●		
<i>Asclepias syriaca</i>	Common Milkweed	---	---	S5	0		●	---	---		
<i>Betula alleghaniensis</i>	Yellow Birch	---	---	S5	6		●	---	---		
<i>Bidens frondosa</i>	Devil's Beggarticks	---	---	S5	3		●	●	---		Low
<i>Carex gracillima</i>	Graceful Sedge	---	---	S5	4	3				●	
<i>Carex lupulina</i>	Hop Sedge	---	---	S5	6	-5				●	High
<i>Caulophyllum thalictroides</i>	Blue Cohosh	---	---	S5	6		---	---	●		
<i>Cirsium arvense</i>	Canada Thistle	---	---	SE5	0	3				●	
<i>Cornus alternifolia</i>	Alternate-leaved Dogwood	---	---	S5	6	3				●	
<i>Cornus racemosa</i>	Gray Dogwood	---	---	S5	2		●	---	---		
<i>Crataegus sp.</i>	Hawthorn Species	---	---	---	---		●	---	---		
<i>Cynanchum rossicum</i>	European Swallow-wort	---	---	SNA	---		●	---	---		
<i>Dicentra canadensis</i>	Squirrel-corn	---	---	S5	7		---	---	●		
<i>Elymus virginicus</i>	Virginia Wildrye	---	---	S5	5	-3				●	
<i>Epilobium parviflorum</i>	Small-flowered Hairy Willowherb	---	---	SE4	0	3				●	
<i>Equisetum arvense</i>	Field Horsetail	---	---	S5	0	0				●	
<i>Equisetum variegatum</i>	Variiegated Horsetail	---	---	S5	5		●	---	---		Medium
<i>Erigeron hyssopifolius</i>	Daisy Fleabane	---	---	S5	10		●	---	---		
<i>Eutrochium maculatum var. maculatum</i>	Spotted Joe Pye Weed	---	---	S5	3		●	●	---		Low
<i>Fagus grandifolia</i>	American Beech	---	---	S4	6		●	---	--		
<i>Frangula alnus</i>	Glossy Buckthorn	---	---	SE5	0	0				●	
<i>Fraxinus nigra</i>	Black Ash	THR	---	S3	7	-3				●	Medium
<i>Fraxinus pennsylvanica</i>	Green Ash	---	---	S4	3		●	---	---		
<i>Galium palustre</i>	Marsh Bedstraw	---	---	S5	5		---	●	---		Medium
<i>Glyceria striata</i>	Fowl Mannagrass	---	---	S5	3	-5				●	
<i>Hesperis matronalis</i>	Dame's Rocket	---	---	SE5	0	3				●	
<i>Impatiens capensis</i>	Spotted Jewelweed	---	---	S5	4		---	●	---		Medium
<i>Juglans cinerea</i>	Butternut	END	END	S3?	6		●	---	●		
<i>Juglans nigra</i>	Black Walnut	---	---	S4	5		●	---	---		
<i>Juncus tenuis</i>	Path Rush	---	---	S5	0	0				●	
<i>Lotus corniculatus</i>	Garden Bird's-foot Trefoil	---	---	SNA	---		---	●	---		
<i>Lythrum salicaria</i>	Purple Loosestrife	---	---	SNA	---		---	●	---		
<i>Maianthemum racemosum</i>	False Solomon's-seal	---	---	S5	4		●	---	---		

Scientific Name	Common Name	SARA	ESA	S-Rank (per NHIC)	Coefficient of Conservatism	Coefficient of Wetness	Observed by Dillon	Observed by WME	TRCA Data	Additional Species Observed in Wetlands by Terrastory	TRCA Sensitivity Ranking
<i>Mattencia struthiopteris</i>	Ostrich Fern	---	---	S5	5		●	---	---		
<i>Onoclea sensibilis</i>	Sensitive Fern	---	---	S5	4		●	---	---		Medium
<i>Osmorhiza longistylis</i>	Smooth Sweet Cicely	---	---	S5	6		---	---	●		
<i>Parthenocissus vitacea</i>	Thicket Creeper	---	---	S5	4	3				●	
<i>Persicaria maculosa</i>	Spotted Lady's-thumb	---	---	SE5	0	-3				●	
<i>Phalaris arundinacea</i>	Reed Canary Grass	---	---	S5	0		●	●	---		
<i>Picea glauca</i>	White Spruce	---	---	S5	6		---	---	●		
<i>Pinus strobus</i>	Eastern White Pine	---	---	S5	4		●	---	●		
<i>Pinus sylvestris</i>	Scotch Pine	---	---	SNA	---		●	---	---		
<i>Podophyllum peltatum</i>	May-apple	---	---	S5	5		---	---	●		
<i>Populus balsamifera</i>	Balsam Poplar	---	---	S5	4		●	---	---		
<i>Populus deltoides ssp. deltoides</i>	Eastern Cottonwood	---	---	S5	4		●	---	---		
<i>Populus grandidentata</i>	Large-tooth Aspen	---	---	S5	5		●	---	---		
<i>Prunus serotina</i>	Wild Black Cherry	---	---	S5	3		●	---	---		
<i>Ranunculus acris</i>	Common Buttercup	---	---	SE5	0	0				●	
<i>Ranunculus acris</i>	Tall Buttercup	---	---	SNA	---		---	●	---		
<i>Rhamnus cathartica</i>	Common Buckthorn	---	---	SNA	---		●	---	---		
<i>Rhus hirta</i>	Staghorn Sumac	---	---	S5	1		●	---	---		
<i>Ribes americanum</i>	American Black Currant	---	---	S5	4	-3				●	
<i>Rubus idaeus ssp. idaeus</i>	Common Red Raspberry	---	---	SNA	---		●	---	---		
<i>Rudbeckia hirta var. hirta</i>	Black-eyed Susan	---	---	SU	0		---	---	●		
<i>Rumex crispus</i>	Curly Dock	---	---	SNA	---		---	●	---		
<i>Salix euicina</i>	Crack Willow	---	---	SE	0	0				●	
<i>Salix sp.</i>	Willow Species	---	---	---	---		●	---	---		
<i>Scirpus microcarpus</i>	Red-tinge Bulrush	---	---	S5	4		---	---	●		
<i>Solidago canadensis var. canadensis</i>	Canada Goldenrod	---	---	S5	1		---	●	---		
<i>Solidago rugosa</i>	Rough-stemmed Goldenrod	---	---	S5	4	0				●	
<i>Solidago Sp.</i>	Goldenrod Species	---	---	---	---		●	---	---		
<i>Symphotrichum lanceolatum</i>	Panicled Aster	---	---	S5	3	-3				●	
<i>Symphotrichum lateriflorum</i>	Calico Aster	---	---	S5	3	0				●	
<i>Symphotrichum novae-angliae</i>	New England Aster	---	---	S5	2		●	---	---		
<i>Symphotrichum puniceum</i>	Purple-stemmed Aster	---	---	S5	6	-5				●	Medium
<i>Thalictrum pubescens</i>	Tall Meadow-rue	---	---	S5	5	-3				●	
<i>Thuja occidentalis</i>	Eastern White Cedar	---	---	S5	4		---	---	●		Medium
<i>Tilia americana</i>	American Basswood	---	---	S5	4		●	---	---		
<i>Toxicodendron radicans</i>	Poison Ivy	---	---	S5	2	0				●	
<i>Trifolium pratense</i>	Red Clover	---	---	SNA	---		●	---	---		
<i>Trillium erectum</i>	Red Trillium	---	---	S5	6		---	---	●		
<i>Trillium grandiflorum</i>	White Trillium	---	---	S5	5		---	---	●		
<i>Tsuga canadensis</i>	Eastern Hemlock	---	---	S5	7		●	---	●		
<i>Tussilago farfara</i>	Coltsfoot	---	---	SE5	0	3				●	
<i>Typha angustifolia</i>	Narrow-leaved Cattail	---	---	SNA	3		●	---	---		
<i>Ulmus americana</i>	American Elm	---	---	S5	3		●	---	---		
<i>Urtica dioica</i>	Stinging Nettle	---	---	S5	2	0				●	
<i>Viburnum opulus var. opulus</i>	Cranberry Viburnum	---	---	S5	5	-3				●	
<i>Vicia americana</i>	American Purple Vetch	---	---	S5	9		●	---	--		
<i>Vitis riparia</i>	Riverbank Grape	---	---	S5	0	0				●	