

# **Environmental Impact Study (EIS) & Tree Conservation Report**

## **Cedar Lakes, Phases 3 – 4, Greely South**

**Part of Lot 8, Concession 3  
City of Ottawa**

**January 8, 2024**

Prepared By:



**BCH Environmental Consulting Inc.  
20373 Bethune Street,  
South Lancaster, On  
K0C 2C0**

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20373 Bethune Street  
 South Lancaster, On  
 K0C 2C0  
 613.571.8883  
 shaun@bchenviro.ca

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## Introduction

As requested by 698048 Canada Corporation an Environmental Impact Statement (EIS) has been prepared for a village residential development in the south part of the Village of Greely, City of Ottawa. The site is just south of the Cedar Lakes Subdivision (Cedarlakes Way), west of Stagecoach Road and east of Deermeadow Drive. The site is described as Part of Lot 8, Concession 3 of the Geographic Township of Osgoode, City of Ottawa.

### 1.1. Site Context

The site is located in an area characterized primarily by developing residential use. To the west, north and east are village residential subdivisions, with existing and former agricultural lands to the south. Residential lots are being proposed for the lands. The lots will be along an internal road network that connects to Stagecoach Road and extensions of Stableview Way. Each village lot will be on full private individual water well and septic services, with roadside drainage ditches. A lake areas will be used for stormwater management and site amenities. At this time the proponent is only proposing to install the road network, storm water ponds, drainage and the creation of the lots. The lots will be created and sold as is.

Within the city's Zoning By-law No. 2008-250 the subject lands were zoned as Rural Area (Section D). Within the city's official plan (2022) the subject lands are designated as the Village of Greely and Natural Heritage Feature (Schedule C11-B). Additionally, the proposed development is located in Ecoregion 6E.

Maintained manmade drainage to Greys Creek Municipal Drain have been documented within the subject lands. Some of these drains south of the subject lands support numerous types of aquatic habitat including fish habitat.

The site is predominantly covered with a thick layer of silty sand underlain by glacial till or silty clay. Portions of the site are directly underlain by glacial till. Surficial drainage is considered to be imperfect to good (Paterson, 2010).

The stormwater management approach for the site and other servicing requirements are identified by Sabourin (2010) and ARK Engineering (2023). The approaches recommended in the Greely/Shields Creek Stormwater and Drainage Study (Stantec, 2005) have been followed. All dwellings will have their own wells for domestic water usage and septic systems for sewage treatment. Roadside ditches will be proposed and sized to accommodate the ten-year storm as a minimum to drain the lots and roads. Stormwater management ponds are being proposed to ensure that the post-development conditions of the site are similar to the pre-development conditions.

In the Shields Creek Subwatershed Study (Figure 6.2.1) the forested portions of the site are identified as a Level 2 Policy Area, indicating that an environmental impact statement is required with any development application (TSH, 2004). No Level 1 lands (no development permitted) are on or adjacent to on the site. The ecological significance of the site was considered low by TSH (2004), with the lowest level of protection (Level 2C) assigned to the site on Figure 6.2.3. No rehabilitation opportunities are recommended in proximity to the site on Figure 6.4.1 of the Shields Creek Subwatershed Study.

The forested portions of the site represent the very north portion of the Herberts Corners Bog Natural Area, identified as Area 20 in the Region of Ottawa-Carleton’s Natural Environment System Strategy (Brownell and Blaney, 1997). The Natural Area was broadly designated to have a moderate overall significance in the evaluation summary performed as part of the Region of Ottawa-Carleton’s Natural Environment System Strategy. Moderate significance was applied to two criteria, landscape attributes and vegetation community/landform and species diversity, while a high significance was applied to rare vegetation community/landform representation and endangered, threatened, and rare species criteria. The significance of three factors, seasonal wildlife concentrations, hydrological features, and condition of natural area was unknown. The southeast part of the Natural Area, east of Stagecoach Road and an extended distance, approximately 1.5 kilometres southeast of the site, contains the most sensitive feature of the natural area, the second largest open bog community in the City of Ottawa. Other features and functions of the Natural Area include a willow and alder thicket swamp adjacent to the bog, and upland deciduous and mixed forests consisting of red maple, black ash, and white cedar. The forests were considered relatively young (less than 50 years old).

There are no Areas of Natural and Scientific Interest in the general vicinity of the site. The closest provincially significant wetland is a portion of the West Osgoode Wetland Complex, approximately 2.5 kilometres southwest of the site.

Potential environmental constraints for the subject lands have been identified as Natural Heritage Features: unevaluated wetlands, watercourses (Greys Creek Municipal Drain; Fish Habitat), and significant woodlands.

## 2.0. Methodology

This report is prepared in accordance with the City of Ottawa Environmental Impact Statement Guidelines (City of Ottawa 2015) with guidance from the Natural Heritage Reference Manual (OMNR, 2010). This EIS includes an assessment of the identified environmental constraints and the potential for Species at Risk.

This EIS will provide the methodology to mitigate, as required, negative impacts on significant features and functions. Potential Species at Risk in the general area were identified from Ministry of Natural Resources and Forestry databases, the Department of Fisheries and Ocean databases, the Ontario Breeding Bird Atlas, Ontario Reptile and Amphibian Atlas, iNaturalist and the Global Biodiversity Information Facility.

Colour aerial photography was used to assess the natural environment features in the general vicinity of the proposed building.

See Table 1 for a summary of field surveys of the site and adjacent lands. Staff qualifications are available in Appendix B.

TABLE 1: Summary of Field Surveys

DATE	TIME	AIR TEMP. (°C)	WIND (Beaufort Scale)	CLOUD COVER / PRECIPITATION	% Moon Illumination	STAFF
January 16, 2022	1000h-1400h	-13	Light Breeze	Clear Skies	N/A	S.St.Pierre C.Fontaine

April 11, 2023	0930h-1215h	12	Light Breeze	Clear Skies	N/A	S.St.Pierre C.Fontaine
April 17, 2023	2000h-2145h	7	Light Breeze	Overcast / Drizzle	N/A	S.St.Pierre C.Fontaine
May 8, 2023	0930h-1300h	12	Light to Gentle Breeze	Clear Skies	N/A	S.St.Pierre
May 17, 2023	0600h-0830h	6	Light to Gentle Breeze	Clear Skies	N/A	S.St.Pierre C.Fontaine
May 23, 2023	2015h-2220h	20	Light Air	Clear Skies	N/A	S.St.Pierre C.Fontaine
May 28, 2023	2250h-2315h	16	No Wind	Clear Skies		C.Fontaine
June 1, 2023	0600h-1100h	17	No Wind	Clear Skies	N/A	C.Fontaine
June 7, 2023	0000h-0035h	12	Light to Gentle Breeze	Smoke		S.St.Pierre
June 14, 2023	1100h-1400h	18	Light to Gentle Breeze	Overcast	N/A	S.St.Pierre C.Fontaine
June 15, 2023	2130h-2300h	20	No Wind	Overcast	N/A	S.St.Pierre C.Fontaine
June 20, 2023	0600h-1300h	12	Light Air	Clear Skies	N/A	S.St.Pierre C.Fontaine
June 26, 2023	2314h-2327h	24	No Wind	80% Cloud Cover (moon visible)		C.Fontaine

Upland vegetation communities were described utilising the Ecological Land Classification Southern Manual (Lee et al. 1998), while wetland communities if present were described utilising the Ontario Wetland Evaluation System Southern Manual (MNRF 2022).

Soil sampling and analysis followed the methods described in the Field Manual for Describing Soils in Ontario, 4<sup>th</sup> Edition (OCSRE 1993) which is the method utilized by the Ecological Land Classification for Southern Ontario (Lee et al. 1998).

Headwater assessment were completed utilising the Ontario Stream Assessment Protocol (Stanfield 2013) in combination with Evaluation, Classification and Management of Headwater Drainage Features Guidelines (TRCA 2024)

Breeding bird surveys were completed to assess the potential for bird usage within the subject lands. This survey followed the Ontario Breeding Bird Atlas protocol (OBBA 2001) and included both point counts and incidental observations.

Whip-poor-will surveys were completed to assess the potential for whip-poor-will usage within the subject lands. This survey followed the Survey Protocol for Eastern Whip-poor-will (*Caprimulgus vociferus*) in Ontario (MNRF 2014) and included both point counts and incidental observations.

Amphibian surveys were completed to assess the potential for amphibian usage within the subject lands. This survey followed the Marsh Monitoring Protocol for Surveying Amphibians (MMPA 2009) and included both survey stations and incidental observations.

Observed plants were recorded for each individual community, the plants utilized in the descriptions are the most abundant specimens observed. A complete observed species list is provided in Appendix A. Plants that could not be identified in the field were collected for a more detailed examination. Nomenclature used in this report follows the Southern Ontario Vascular Plant List (Bradley, 2013) which aligns with the Integrated Taxonomic Information System (ITIS).

### 3.0. Field Surveys

A butternut survey was conducted along with a search for cavity trees by systematically moving through the subject lands and adjacent lands (discussed in section 4.3 and 4.4). A breeding bird survey (section 3.2.), a whip-poor-will survey (section 4.3) along with an amphibian survey (section 3.3.) was completed. Vegetation communities and watercourse description are described in section 3.1. Additionally, a headwater assessment was completed on the mad made drains (section 3.2).

#### 3.1. Existing Conditions

The subject lands consisted of a mosaic of meadow and thicket with forest , and watercourses. Residential buildings and accessory building were present within the northern and western adjacent lands. The southern adjacent lands were fenced and signed as private property access to these lands was limited to an over the fence survey.

FIGURE 1: SUBJECT LANDS

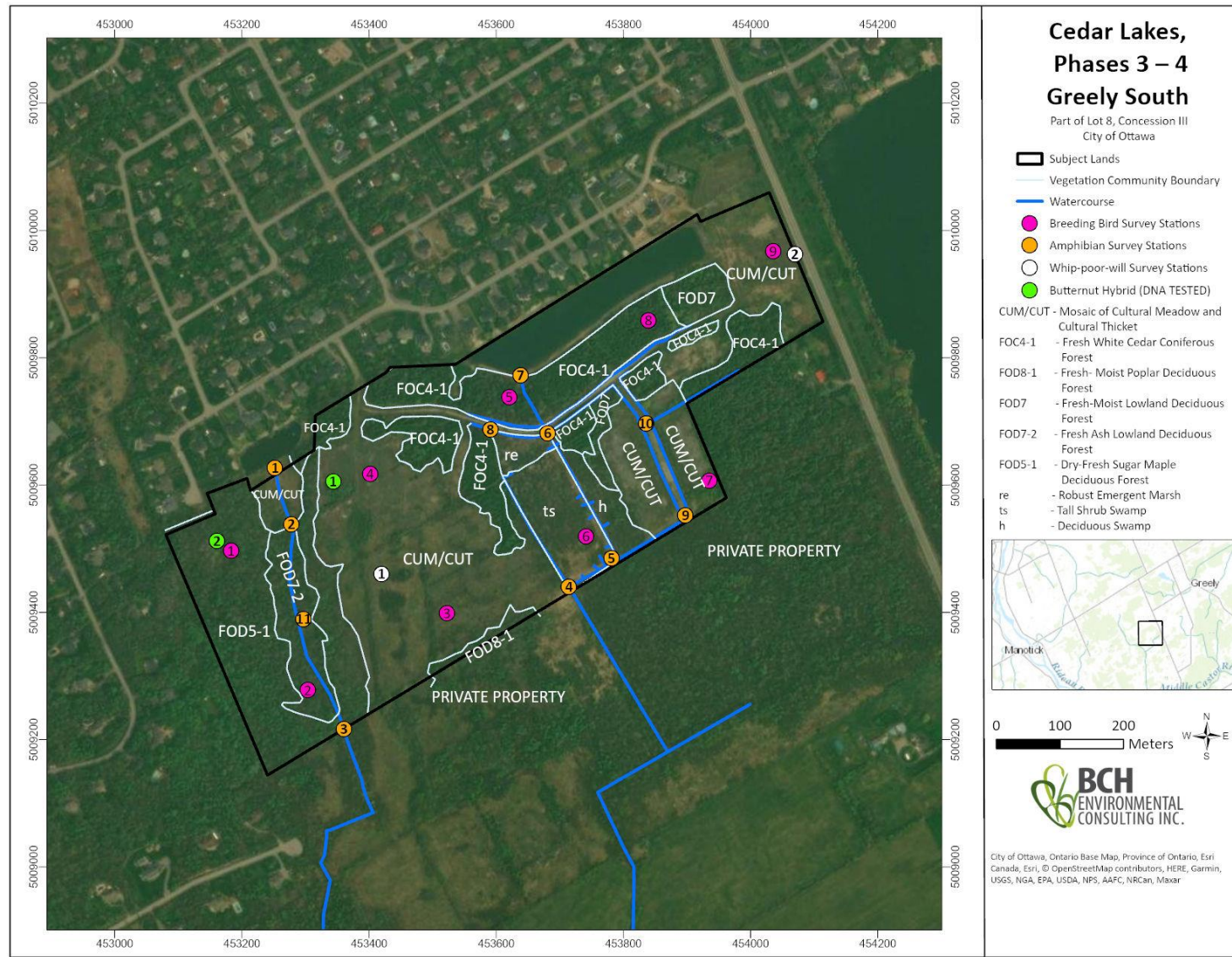
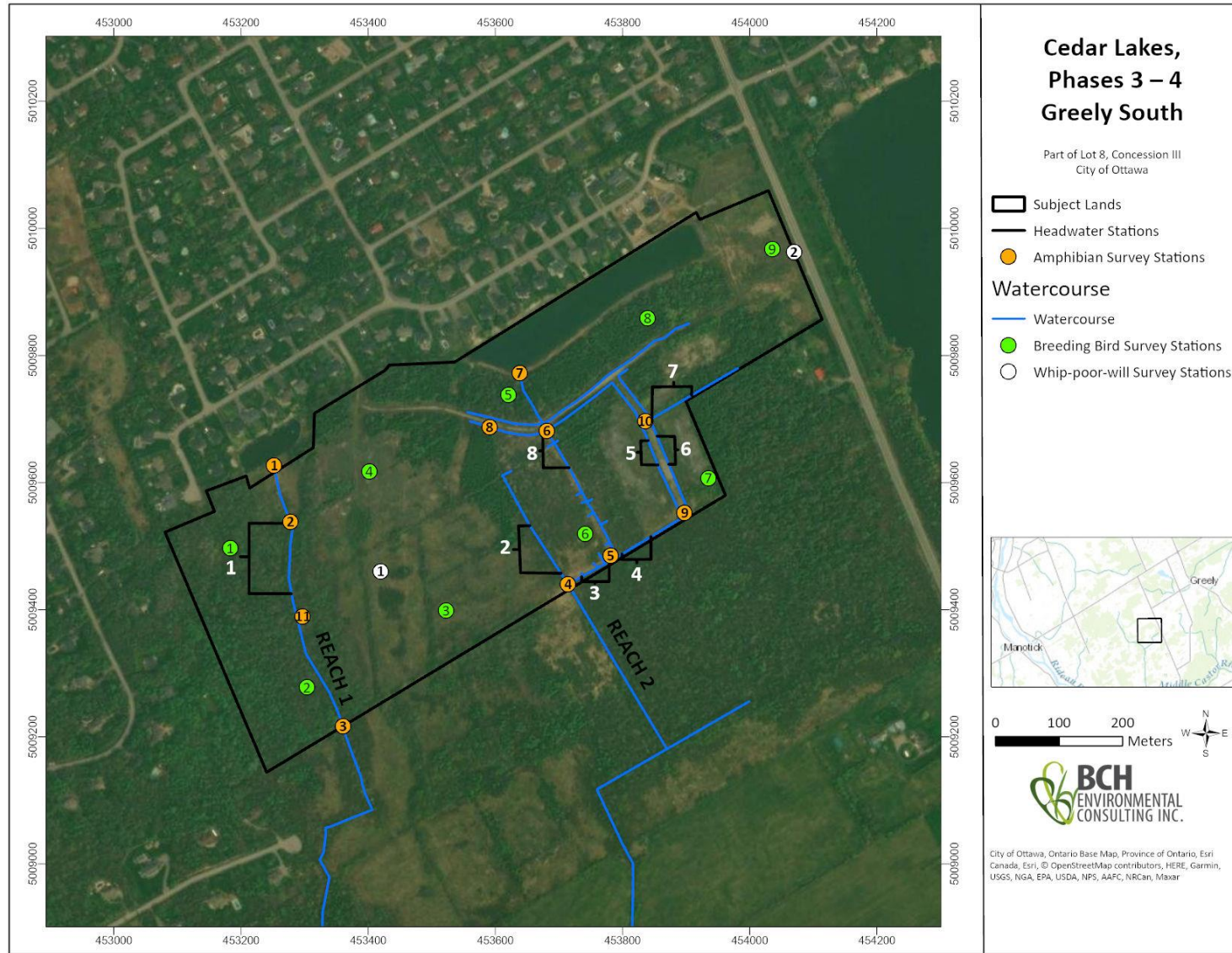




FIGURE 2: SURVEY SITES



### 3.1.1. Dry-Fresh Sugar Maple Deciduous Forest (FOD5-1)

This community was present within the western portion of the subject lands. This community consisted of 90-95% deciduous trees and 5-10% coniferous trees. The average tree diameter was 30cm with the occasional larger tree (50cm). The canopy was the dominant layer. The canopy (15-20m tall; 75% cover) was dominated by sugar maple which was more than red maple which was more than American basswood which was more than trembling aspen which was more than white birch which was equal to green ash and black cherry. The sub-canopy (6-10m tall; 40% cover) was dominated by sugar maple which was much much more than American basswood which was more than American beech which was more than black cherry. The understory (0.5-3m tall; 20-60% cover) included sugar maple, green ash, alternate-leaved dogwood, bitternut hickory, American basswood, and wild red raspberry. The ground cover ranged from 40-60% and consisted of ostrich fern, northern lady fern, grasses, poison ivy, and white trillium.



**Photo 1: Dry-Fresh Sugar Maple Deciduous Forest (June 20, 2023)**

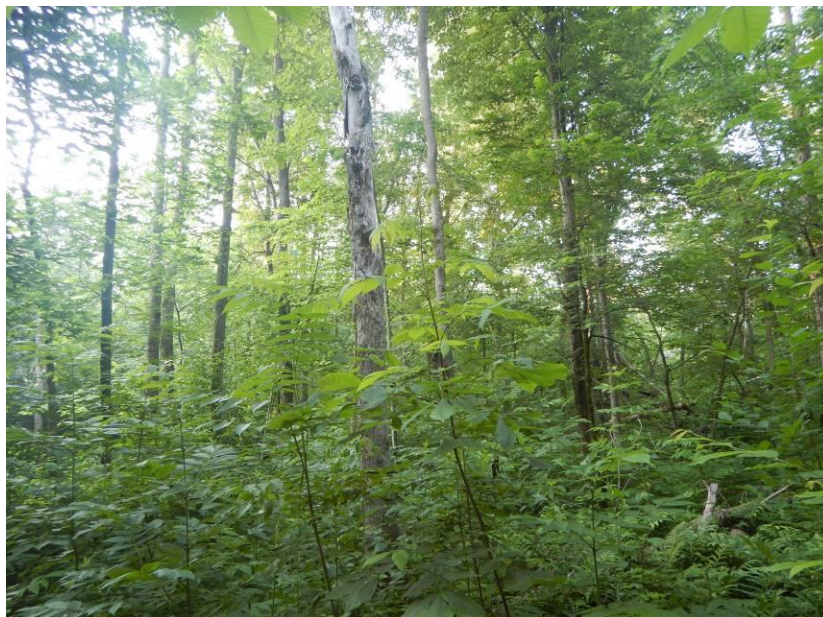
### 3.1.2. Fresh Ash Lowland Deciduous Forest (FOD7-2)

This community was present within the western portion of the subject lands, a watercourse (reach 1) is present centrally within this community. This community consisted of deciduous trees and the average tree diameter was 20-30cm. The canopy was the dominant layer. The canopy (15m tall; 55-75% cover) was dominated by green ash which was more than red maple which was more than American elm. There is a high percentage of dead ash within this forest both standing and fallen, this can be attributed to the emerald ash borer. The sub-canopy (6-8m tall; 40% cover) was dominated by green ash which was more than American elm which was more than red maple. The understory (1-3m tall; 40-60% cover) consisted of green ash, wild red raspberry, bitternut hickory, and alternate-leaved dogwood. The ground

cover was 80% and consisted of ostrich fern, northern lady fern, sensitive fern, European stinging nettle, spotted jewelweed, and dwarf raspberry.

Soils analysis determined the moisture regime within the forest to be Fresh (3).

The Ontario Wetland Evaluation System (OMNR 2022) classifies wetlands as those areas with hydric soils, which have a Moisture Regime of 6 or higher, and nearly hydric soils which have a Moisture Regime of 5. Under this classification this forest did not contain hydric or nearly hydric soil, which under the Ontario Wetland Evaluation System would not be considered wetlands. Furthermore, there is a high percentage of upland plants present within this community (bitternut hickory and alternate-leaved dogwood to name a few).



**Photo 2: Fresh Ash Lowland Deciduous Forest (June 20, 2023)**

### 3.1.3. Fresh-Moist Lowland Deciduous Forest (FOD7)

There were two fresh-moist lowland deciduous forest within the subject lands. The first community was present within the north eastern portion of the subject lands, north of the access road. This community consisted of 80% deciduous trees and 20% coniferous trees. The average tree diameter was 30cm. The canopy and sub-canopy were co-dominant. The canopy (12m tall; 45-60% cover) was dominated by balsam poplar which was much much more than crack willow. The sub-canopy (6-8m tall; 40-60% cover) was dominated by balsam poplar which was more than green ash which was more than white cedar. The understory (1-3m tall; 60% cover) consisted of glossy buckthorn, wild red raspberry, and green ash. The ground cover was 20-40% and consisted of wood nettle, riverbank grape, and violets. There is a small swale that did not contain water during any visit and appears to be a remnant connection to the northern pond, but is not connected anymore.

The second community was present within the northern portion of the subject lands. This community consisted of 80% deciduous trees and 20% coniferous trees. The average tree diameter was 30cm. The sub-canopy was the dominant layer. The canopy (6-8m tall; 10-20% cover) was dominated by balsam

poplar which was more than Manitoba maple which was more than green ash which was more than white cedar. The sub-canopy (3m tall; 90% cover) was dominated by balsam poplar which was more than Manitoba maple which was more than trembling aspen which was more than slender willow. The understory (1m tall; 30% cover) consisted of trembling aspen, balsam poplar, willows, and glossy buckthorn. The ground cover was 60% and consisted of grasses, sedges, and poison ivy. This community is highly disturbed most likely due to the infilling activities to the east and south.



**Photo 3: Fresh-Moist Lowland Deciduous Forest (June 20, 2023)**



**Photo 4: Fresh-Moist Lowland Deciduous Forest (June 20, 2023)**

#### 3.1.4. Fresh- Moist Poplar Deciduous Forest (FOD8-1)

This community was present within the southern portion of the subject lands. This community consisted of deciduous trees and the average tree diameter was 20cm. The canopy and sub-canopy were co-dominant. The canopy (10-12m tall; 60% cover) was dominated by balsam poplar which was equal to trembling aspen which was equal to large-toothed aspen which was more than white ash. The sub-canopy (6-8m tall; 60% cover) was dominated by balsam poplar which was more than American basswood which was more than white ash. The understory (0.5-3m tall; 80% cover) consisted of American basswood, common blackberry, green ash, and ironwood. The ground cover was 80% and consisted of grasses, goldenrods, and smooth bedstraw.



**Photo 5: Fresh- Moist Poplar Deciduous Forest (June 20, 2023)**

#### 3.1.5. Fresh White Cedar Coniferous Forest (FOC4-1)

This community was present within the northern portion of the adjacent lands, south of the eastern pond and on both sides of the access road. This community consisted of coniferous trees and the average tree diameter was highly variable and ranged from 5 to 30cm. The canopy was the dominant layer. The canopy (6-8m tall; 100% cover) consisted entirely of white cedar. There was no sub-canopy, understory, or ground cover. Often the edges of these communities consisted of deciduous trees along with the occasional inclusion (trembling aspen, American elm, balsam poplar, red maple, green ash, and Manitoba maple).

Soils analysis determined the moisture regime within the forest to be Fresh (3).

The Ontario Wetland Evaluation System (OMNR 2022) classifies wetlands as those areas with hydric soils, which have a Moisture Regime of 6 or higher, and nearly hydric soils which have a Moisture Regime of 5. Under this classification this forest did not contain hydric or nearly hydric soil, which under the Ontario Wetland Evaluation System would not be considered wetlands.



**Photo 6: Fresh White Cedar Coniferous Forest (June 20, 2023)**

### 3.1.6. Mosaic of Cultural Meadow and Cultural Thicket (CUM/CUT)

This community is present throughout the subject lands. This community was dominated by thicket and meadow habitat with occasional trees. Community composition varied depending on the locations. All these areas are highly disturbed by past clearing, infilling, and contain rock/spoil piles throughout. On average trees represented 10% cover and consisted of green ash, trembling aspen, white cedar, and American elm. The thicket portions (0.5-3m tall; 5-55% cover which was highly variable) consisted of a variable mix of species (green ash, trembling aspen, American elm, willows, common buckthorn, glossy buckthorn, balsam poplar, wild red raspberry, common raspberry, and common blackberry). The ground layer (100% cover) was dominated by grasses followed by goldenrods, wild carrot, and smooth bedstraw. Remnant windrows were present and consisted of American elm, green ash, and trembling aspen. Much of the ash present within these communities were dead.



**Photo 7: Mosaic of Cultural Meadow and Cultural Thicket (June 20, 2023)**

### 3.1.7. Wetland

The remnant wetland communities are highly affected by the drainage practices within Reach 2. Dredging, channelization and the removal of beaver dams have all contributed to the lowering of the water table. These wetlands appear to be within the early stages of transitioning to upland (upland plants starting to be present; wild red raspberry). As Reach 2 will need to be continuously maintained, these wetlands are no longer viable and in time will convert to an upland community. Water was present in isolated pockets only during the April 11, 2023 field visit. This system now drains very rapidly. Further to this, since the wetland is now surrounded by drainage ditches on all sides, there is no more water from the site being infiltrated into the wetland, it is all being captured by the ditches and conveyed offsite.

#### 3.1.7.1. Robust Emergent Marsh (re)

This community is present centrally within the subject lands south of the access road. This wetland presented two forms: robust emergent (broad-leaved cattail) and dead deciduous tree. This wetland does not represent fish habitat and turtle habitat is fairly unlikely as water lacked suitable depth and tree cover limits basking opportunity.

Soils analysis determined the moisture regime within the marsh to be Moist (5).

The Ontario Wetland Evaluation System (OMNR 2014) classifies wetlands as those areas with hydric soils, which have a Moisture Regime of 6 or higher, and nearly hydric soils which have a Moisture Regime of 5. Under this classification this marsh did contain hydric or nearly hydric soil, which under the Ontario Wetland Evaluation System would be considered wetlands.



**Photo 8: Robust Emergent Marsh (June 14, 2023)**

3.1.7.2. Tall Shrub Swamp (ts)

This community is present centrally within the subject lands south of the access road. This wetland presented three forms: tall shrub (slender willow, pussy willow, white meadowsweet, and glossy buckthorn), narrow-leaved emergent (reed canary grass, sedges, and fowl mana-grass) and herbaceous plant (purple loosestrife, sensitive fern, early goldenrod, and common boneset).



**Photo 9: Tall Shrub Swamp (June 14, 2023)**



### 3.1.7.3. Deciduous Swamp (h)

This community is present centrally within the subject lands, south of the access road. This wetland presented four forms: deciduous tree (green ash, crack willow, American elm, and black ash; average DBH 20-30cm), tall shrub (slender willow, pussy willow, and glossy buckthorn), narrow-leaved emergent (sedges), and herbaceous plant (sensitive fern, tall buttercup, purple loosestrife, and common boneset).

Soils analysis determined the moisture regime within the marsh to be Moist (5).

The Ontario Wetland Evaluation System (OMNR 2014) classifies wetlands as those areas with hydric soils, which have a Moisture Regime of 6 or higher, and nearly hydric soils which have a Moisture Regime of 5. Under this classification this marsh did contain hydric or nearly hydric soil, which under the Ontario Wetland Evaluation System would be considered wetlands.



**Photo 10: Deciduous Swamp (June 14, 2023)**

### 3.1.8. Reach 1: Stormwater Outlet to Grey's Creek Municipal Drain

A man-made stormwater pond outlet forming an open water network to Grey's Creek Municipal Drain was located within the subject lands. This outlet originates within the northwestern portion of the subject lands at a large (approximately 110m by 40m) stormwater pond and exits the pond along the southern bank, flowing towards the southern end of the subject lands. Within the subject lands the outlet travels through different types of riparian habitat consisting mostly of forest with some meadow and scrubland habitat at the upstream end. The entire outlet within the subject lands was man-made and confined with a straight pattern. One culvert crossing was noted at the upstream end, approximately 15m downstream of the stormwater pond (not a barrier to fish movement). One site was established within the outlet (Site 1). Evidence of dredging/maintenance activities were present (spoil piles).

### 3.1.8.1. Site 1

This site was established approximately 95m downstream of the smaller (western) man-made stormwater pond. It is located within forest habitat, with many fallen trees along both banks due to recent storms. Site 1 was approximately 110m in length and flows in a southern direction. The average channel width was 2.8m and the average bankfull height 27cm. The substrate consisted of fines. Where in-water cover was present, it was provided by aquatic vegetation (reed canary grass, algae, purple loosestrife, and jewelweed), and small and large woody debris. The site had full canopy and bank cover. The most common species were: green ash, American elm, trembling aspen, common buckthorn, common elderberry, alternate-leaved dogwood, grasses, sensitive fern, and field horsetail. Some signs of erosion were noted along both banks.

During the April 11, 2023 visit, the average wetted width and water depth was 2m and 9cm (range: 5-17cm), respectively. The hydrological flow habitat consisted of substantial flow.

During the May 8, 2023 visit, the average wetted width and water depth was 1.4m and 7cm (range: 4-14cm), respectively. The hydrological flow habitat consisted of substantial flow.

During the June 1, 2023 visit, the average wetted width and water depth was 1.3m and 4cm (range: 1-14cm), respectively. The hydrological flow habitat consisted of substantial flow with mostly glide and the occasional pool habitat (max depth: 15cm).

During a site visit on September 25, 2023 completed by ARK Engineering, this entire reach was dry (Photo 13).



**Photo 11: Site 1 Looking Upstream from the Downstream End (April 11, 2023)**



**Photo 12: Site 1 Looking Upstream from the Downstream End (June 1, 2023)**



**Photo 13: Site 1 Looking Upstream from the Downstream End (September 25, 2023)**

### 3.1.8.2. Western Pond

This pond is present within the western subject lands with the purpose of stormwater management. This is a large pond, mostly devoid of aquatic vegetation. Vegetation is fairly limited to 1-2m from the shore and consisted of narrow-leaved cattail. This pond is void of any in-water structures. The pond does represent fish habitat and can be utilised by turtles such as painted turtles and snapping turtles.



**Photo 14: Western Pond (June 20, 2023)**

### 3.1.9. Reach 2: Stormwater Outlet to Grey's Creek Municipal Drain

A man-made stormwater pond outlet forming an open drainage network to Grey's Creek Municipal Drain was located within the subject lands. This outlet originates within the northeastern portion of the subject lands at a large (approximately 410m by 60m) stormwater pond and exits the pond along the southern bank, flowing towards the southern end of the subject lands. Within the subject lands the outlet travels through different types of riparian habitat including: wetland, forest, scrubland, meadow, and bare/exposed soil (access roads). The entire outlet within the subject lands was man-made and confined with a straight pattern. Portions of this outlet represent seasonal fish habitat. Several culvert crossings were noted within areas where the outlet passes through the access road (no barriers to fish movement noted). A total of seven sites were established within the outlet (Site 2 to Site 7).

#### 3.1.9.1. Site 2

This site was established approximately 410m southeast of Site 1. It is located within wetland and scrubland riparian habitat. Site 2 was approximately 85m in length and flows in a southern direction. The average channel width was 2m and the average bankfull height 17cm. The substrate consisted of fines. The in-water cover consisted entirely of small woody debris. The station had full canopy and bank

cover. The most common species were: grasses, goldenrod, Virginia creeper, common buckthorn, and ash. No signs of erosion were noted. This portion of the reach represents seasonal fish habitat.

During the April 11, 2023 visit, the average wetted width and water depth was 1.8m and 9cm (range: 4-20cm), respectively. The hydrological flow habitat consisted of standing water.

During both the May 8 and June 1, 2023 visit the site was dry.



**Photo 15: Site 2 Looking Upstream from the Downstream End (April 11, 2023)**



**Photo 16: Site 2 Looking Upstream from the Downstream End (June 1, 2023)**

### 3.1.9.2. Site 3

This site was established approximately 35m southeast of Site 2. It is located within wetland and forest riparian habitat. Site 3 was approximately 40m in length and flows in a southwest direction. The average channel width was 2.8m and the average bankfull height 32cm. The substrate consisted of fines. The in-water cover consisted entirely of aquatic vegetation. The most common species included: Canada waterweed, pondweed, and duckweed. The station had poor canopy cover and full bank vegetation cover. The most common species were: ash, willow, common buckthorn, and reed canary grass. Some signs of erosion were noted along both banks. Some areas of sediment deposition were noted just outside of the downstream end of the site. This portion of the reach represents seasonal fish habitat.

During the April 11, 2023 visit, the average wetted width and water depth was 2.4m and 22cm (range: 12-48cm), respectively. The hydrological flow habitat consisted of substantial flow.

During the May 8, 2023 visit, the average wetted width and water depth was 1.4m and 17cm (range: 6-37cm), respectively. The hydrological flow habitat consisted of substantial flow.

During the June 1, 2023 visit, the average wetted width and water depth was 1.7m and 14cm (range: 7-47cm), respectively. The hydrological flow habitat consisted of substantial flow with glide habitat throughout the site.



**Photo 17: Site 3 Looking Upstream from the Downstream End (April 11, 2023)**



**Photo 18: Site 3 Looking Upstream from the Downstream End (June 1, 2023)**

#### 3.1.9.3. Site 4

This site was established approximately 30m northeast of Site 3. It is located within wetland and forest riparian habitat. Site 4 was approximately 51m in length and flows in a southwest direction. The average channel width was 2m and the average bankfull height 21cm. The substrate consisted of fines. Where in-water cover was present, it was provided by aquatic vegetation. The most common species included: Canada waterweed, pondweed, and purple loosestrife with areas of cattail at the upstream end. The site had good canopy cover and full bank vegetation cover. The most common species were: ash, willow, common buckthorn, reed canary grass, and field horsetail. No signs of erosion were noted. This portion of the reach represents fish habitat.

During the April 11, 2023 visit, the average wetted width and water depth was 1.6m and 11cm (range: 8-19cm), respectively. The hydrological flow habitat consisted of substantial flow.

During the May 8, 2023 visit, the average wetted width and water depth was 1.2m and 7cm (range: 5-13cm), respectively. The hydrological flow habitat consisted of substantial flow.

During the June 1, 2023 visit, the average wetted width and water depth was 0.3m and 1cm (range: 1-5cm), respectively. The hydrological flow habitat consisted of standing water.



**Photo 19: Site 4 Looking Downstream from Upstream (April 11, 2023)**



**Photo 20: Site 4 Looking Downstream from Upstream (June 1, 2023)**

#### 3.1.9.4. Site 5

This site was established approximately 117m north of Site 4, along the western side of an access road (roadside ditch). It is located within forest and scrubland riparian habitat with areas of bare soil/gravel along the right bank (access road). Site 5 was approximately 40m in length and flows in a southern direction. The average channel width was 2.1m and the average bankfull height 23cm. The substrate consisted of fines. The in-water cover consisted terrestrial vegetation. The station had good canopy



cover. Bank cover on the left bank was well vegetated, along the right bank had some exposed soil areas where no vegetation was present due to the access road. The most common species were: willow, common buckthorn, field horsetail, cow vetch, and red clover. No signs of erosion were noted. This portion of the reach represents seasonal fish habitat.

During the April 11, 2023 visit, the average wetted width and water depth was 1.5m and 5cm (range: 1-12cm), respectively. The hydrological flow habitat consisted of substantial flow.

During the May 8, 2023 visit, the average wetted width and water depth was 1.1m and 6cm (range: 1-21cm), respectively. The hydrological flow habitat consisted of standing water.

During the June 1, 2023 visit the site was dry.



Photo 21: Site 5 Looking Upstream from the Downstream End (April 11, 2023)



Photo 22: Site 5 Looking Upstream from the Downstream End (June 1, 2023)

#### 3.1.9.5. Site 6

This site was established approximately 12m east of Site 5, along the eastern side of an access road (roadside ditch). It is located within forest and scrubland riparian habitat with areas of bare soil/gravel along the left bank (access road). Site 6 was approximately 49m in length and flows in a southern direction. The average channel width was 3m and the average bankfull height 23cm. The substrate consisted of fines. The in-water cover consisted aquatic (cattail and common reed), and terrestrial vegetation. The canopy cover ranged from poor to good. Bank cover on the right bank was well vegetated, along the left bank had some exposed soil areas where no vegetation was present due to the access road. The most common species were: willow, common buckthorn, field horsetail, red clover, and goldenrod. No signs of erosion were noted. This portion of the reach represents seasonal fish habitat.

During the April 11, 2023 visit, the average wetted width and water depth was 1.7m and 8cm (range: 4-16cm), respectively. The hydrological flow habitat consisted of substantial flow.

During the May 8, 2023 visit, the average wetted width and water depth was 1.4m and 7cm (range: 4-14cm), respectively. The hydrological flow habitat consisted of standing water.

During the June 1, 2023 visit the site was dry.



Photo 23: Site 1 Looking Upstream from the Downstream End (April 11, 2023)



Photo 24: Site 1 Looking Upstream from the Downstream End (June 1, 2023)

#### 3.1.9.6. Site 7

This site was established approximately 30m south of Site 6. It is located within forest, scrubland and meadow riparian habitat. Site 7 was approximately 71m in length and flows in a southwest direction. The average channel width was 2.9m and the average bankfull height 24cm. The substrate consisted of fines. The in-water cover consisted aquatic (cattail and purple loosestrife), and terrestrial vegetation. The site had good canopy cover and full bank vegetation cover. The most common species were: willow,

balsam poplar, field horsetail, and grasses. No signs of erosion were noted. This portion of the reach represents seasonal fish habitat.

During the April 11, 2023 visit, the average wetted width and water depth was 2.9m and 7cm (range: 2-16cm), respectively. The hydrological flow habitat consisted of substantial flow.

During the May 8, 2023 visit, the average wetted width and water depth was 2.4m and 7cm (range: 3-14cm), respectively. The hydrological flow habitat consisted of standing water.

During the June 1, 2023 visit the site was dry.



Photo 25: Site 7 Looking Downstream from Upstream (April 11, 2023)



Photo 26: Site 7 Looking Downstream from Upstream (June 1, 2023)

#### 3.1.9.7. Site 8

This site was established approximately 160m north of Site 3. It is located within wetland and forest riparian habitat. Site 8 was approximately 61m in length and flows in a southern direction. The average channel width was 2.8m and the average bankfull height 28cm. The substrate consisted of fines. Where in-water cover was present, it was provided by aquatic vegetation. The most common species included: cattail, Canada waterweed, and pondweed. The site had none to moderate canopy cover and good to full bank vegetation cover. The most common species were: white cedar, ash, common buckthorn, field horsetail and grasses. Some signs of erosion and exposed soil were noted along both banks. Evidence of dredging/maintenance activities were present (spoil piles). This portion of the reach represents permanent fish habitat (fish observed, no sampling was conducted).

During the April 11, 2023 visit, the average wetted width and water depth was 1.2m and 12cm (range: 4-30cm), respectively. The hydrological flow habitat consisted of substantial flow.

During the May 8, 2023 visit, the average wetted width and water depth was 0.9m and 8cm (range: 4-17cm), respectively. The hydrological flow habitat consisted of substantial flow.

During the June 1, 2022 visit, the average wetted width and water depth was 1.1m and 8cm (range: 4-24cm), respectively. The hydrological flow habitat consisted of substantial flow with glide habitat throughout the site.



**Photo 27: Site 8 Looking Downstream from Upstream (April 11, 2023)**



**Photo 28: Site 8 Looking Downstream from Upstream (June 11, 2023)**

#### 3.1.9.8. Eastern Pond

This pond is present within the north eastern subject lands with the purpose of stormwater management. This is a large pond, mostly devoid of aquatic vegetation. Vegetation is fairly limited to 1-2m from the shore and consisted of narrow-leaved cattail and common reed, some aquatic vegetation was noted. This pond is void of any in-water structures. The pond does represent fish habitat, and can

be utilised by turtles such as painted turtles and snapping turtles. Painted turtles were observed in this pond.



**Photo 29: Eastern Pond (June 20, 2023)**

### 3.2. Breeding Bird Survey

A breeding bird survey was completed to assess the potential for species of at risk and of species concern utilising the subject lands (May 17, 2023, June 1, 2023, and June 20, 2023; weather conditions available in table 1). During the 3 visits, 9 listening stations were established (10 minutes at each station). Within the subject lands the most likely species utilising these lands for nesting were: American goldfinch, red-winged blackbird, song sparrow, field sparrow, swamp sparrow, American robin, warbling vireo, mourning dove, common yellowthroat, blue jay, northern cardinal, black-capped chickadee, killdeer, and Eastern phoebe. Additional species heard or observed mostly flying over and not suspected to be nesting within the subject lands include: chipping sparrow, great crested flycatcher, American crow, white-breasted nuthatch, downy woodpecker, scarlet tanager, ovenbird, red-eyed vireo, winter wren, ruffed grouse, Eastern towhee, alder flycatcher, European starling, yellow warbler, veery, gray catbird, chestnut-sided warbler, northern flicker, belted kingfisher, rose breasted grosbeak, Eastern kingbird, pileated woodpecker, Canada goose, mallard, black-and-white warbler, great blue heron, green heron, and Eastern wood-pewee. No species at risk were heard or observed during these surveys. One species of concern was observed (Eastern wood-pewee) within the western forest on May 17, 2023 (station 1), the bird was not heard or observed during any subsequent visits and is considered to be a transient, not permanently utilizing the subject lands (see section 4.2 for further discussion).

### 3.3. Amphibian Survey

An amphibian surveys was completed to assess the potential for amphibian breeding habitat (April 17, 2023, May 23, 2023, and June 15, 2023; weather conditions available in table 1). During the 3 visits. 11 listening stations were established (3 minutes at each station), listening stations were positioned to

capture data within the ponds, tributaries, wetlands, and the western forest. All calls were discernible and no full choruses were heard throughout the survey period.

No amphibians were heard calling within the western forest and reach 1 during all the survey visits. Within the western pond throughout the entire survey period the following species and numbers were heard/identified; 10 American toads, 10 spring peepers, 11 green frogs, 3 gray treefrogs, and 1 northern leopard frog.

Within the eastern pond throughout the entire survey period the following species and numbers were heard/identified; 2 American toads, 19 green frogs, and 4 northern leopard frogs.

Within station 4, 5, 6 and 8, throughout the entire survey period the following species and numbers were heard/identified as present within Reach 2; 1 American toad and 3 spring peepers. Very few frogs were heard within the wetlands (also surveyed from these four stations), throughout the entire survey period the following species and numbers were heard/identified; 1 American toads, 22 spring peepers, and 2 gray treefrogs.

Within the road side ditches at station 9 and 10 throughout the entire survey period the following species and numbers were heard/identified; 1 wood frog, 20 spring peepers, and 2 green frogs.

None of the surface water features present or forest constitute significant wildlife habitat as it pertains to amphibians.

### 3.4. Headwater Drainage Features Assessment

Headwater assessment were completed utilising the Ontario Stream Assessment Protocol (Stanfield 2013) in combination with Evaluation, Classification and Management of Headwater Drainage Features Guidelines (TRCA 2024)

#### 3.4.1. Classification

##### 3.4.1.1. Hydrology Classification

The flow is classified based on the amounts recorded during the three visits. These are summarized in Table 2 (as per OSAP S4.M10).

TABLE 2: HYDROLOGY CLASSIFICATION

Site #	Definition of Flow Influence	Flow Condition	Types of Headwater Drainage Features	Hydrology Classification
1	April 11, 2203	Surface Flow Substantial (5)	Channelized (2)	Values Function
	May 8, 2023			
	June 1, 2023			
	September 25, 2023	Dry (1)		
2	April 11, 2203	Standing Water (2)	Swale (7)	Limited Function
	May 8, 2023	Dry (1)		
	June 1, 2023			
3	April 11, 2203	Surface Flow Substantial (5)	Channelized (2)	



	May 8, 2023			Important Function
	June 1, 2023			
4	April 11, 2023	Surface Flow Substantial (5)	Channelized (2)	Values Function
	May 8, 2023			
	June 1, 2023	Standing Water (2)		
5	April 11, 2023	Surface Flow Substantial (5)	Channelized (2)	Contributing Function
	May 8, 2023	Standing Water (2)		
	June 1, 2023	Dry (1)		
6	April 11, 2023	Surface Flow Substantial (5)	Channelized (2)	Contributing Function
	May 8, 2023	Standing Water (2)		
	June 1, 2023	Dry (1)		
7	April 11, 2023	Surface Flow Substantial (5)	Channelized (2)	Contributing Function
	May 8, 2023	Standing Water (2)		
	June 1, 2023	Dry (1)		
8	April 11, 2023	Surface Flow Substantial (5)	Channelized (2)	Important Function
	May 8, 2023			
	June 1, 2023			

The amount of rainfall recorded in the seven days preceding each station visit is summarized in Table 3 to provide context to Tables 2.

TABLE 3: Rainfall Recorded in the Seven Days Preceding Each Site Visit.

Date	Cumulative Amount of Rain (7 Day Before Site Visit)*
April 11, 2023	29.2mm
May 8, 2023	30.3mm
June 1, 2023	0mm

\*Taken from Environment Canada

### 3.4.1.2. Riparian Classification

The riparian habitat is classified based on the width and type of vegetation on the banks. These are summarized in Table 4.

TABLE 4: Riparian Classification

Site #	OSAP S4.M10 Code	Riparian Classification
1	6 (Forest)	Important Functions
2	6 (Forest)/4 Meadow	Important Functions
3	7 (Wetland)	Important Functions
4	7 (Wetland)	Important Functions
5	1 (None) / 4 and 5 (Meadow and Scrubland)	Valued Function
6	1 (None) / 4 and 5 (Meadow and Scrubland)	Valued Function
7	4 and 5 (Meadow and Scrubland)	Valued Function
8	7 (Wetland)	Important Functions

### 3.4.1.3. Fish and Fish Habitat Classification

Site 3, and 8 are classified as Important Functions (Fish are present year-round).

Site 1 is classified as Valued Function (Suitable habitat identified for feeding, cover, refuge, and migration)

Site 2, 4, 5, 6 and 7 are classified as Contributing Functions (Transport of allochthonous materials to downstream fish-bearing reaches provides sources of food)

### 3.4.1.4. Terrestrial Habitat Classification

This is more of a classification of amphibian habitat than of the terrestrial habitat. Results are present in Table 5 and are based on the results from the amphibian breeding survey.

TABLE 5: Terrestrial Habitat Classification

Site #	Terrestrial Habitat Classification
1	Contributing Functions (No amphibians heard using the site)
2	Limited Functions (No amphibians heard using the site)
3	Valued Functions (Migration Corridor)
4	Valued Functions (Migration Corridor)
5	Contributing Functions (No amphibians heard using the site)
6	Contributing Functions (No amphibians heard using the site)
7	Contributing Functions (No amphibians heard using the site)
8	Valued Functions (Migration Corridor)

### 3.4.1.5. Management Recommendations

The options for management recommendations are grouped into six categories: protection, conservation, mitigation, maintain recharge, maintain/ replicate terrestrial linkage, and no management required.

Utilising the guideline and the data collected at each site and throughout the watercourse the management recommendations are identified within table 6.

Table 6: Evaluation, Classification and Management Summary

Site #	Hydrology Classification	Riparian Classification	Fish and Fish Habitat Classification	Terrestrial Habitat Classification	Management Recommendations
1	Values Function	Important Functions	Valued Function	Contributing Functions	Conservation
2	Limited Function	Important Functions	Contributing Functions	Limited Functions	No Management Required
3	Important Function	Important Functions	Important Functions	Valued Functions	Protection
4	Values Function	Important Functions	Contributing Functions	Valued Functions	Conservation
5	Contributing Function	Valued Function	Contributing Functions	Contributing Functions	Mitigation
6	Contributing Function	Valued Function	Contributing Functions	Contributing Functions	Mitigation
7	Contributing Function	Valued Function	Contributing Functions	Contributing Functions	Mitigation
8	Important Function	Important Functions	Important Functions	Valued Functions	Protection

As seen in Table 6, Site 3, and Site 8 (both portions of the main channel going to the pond; Reach 2) through the headwater assessment have been identified as being managed through protection.

Meaning if disturbances are sought after within these portions of the drain, the following must be addressed:

- Protect and/or enhance the existing feature and its riparian zone corridor, and groundwater discharge or wetland in-situ;
- Maintain hydroperiod;
- Incorporate shallow groundwater and base flow protection techniques such as infiltration treatment;
- Use natural channel design techniques or wetland design to restore and enhance existing habitat features, if necessary; realignment not generally permitted;
- Design and locate the stormwater management system (e.g. extended detention outfalls) are to be designed and located to avoid impacts (i.e. sediment, temperature) to the feature.

Site 1 (Reach 1), Site 4 (Reach 2) and its associated areas should be managed through conservation.

Meaning if disturbances are sought after within these portions of the drains the following must be addressed:

- Maintain, relocate, and/or enhance drainage feature and its riparian zone corridor;
- If catchment drainage has been previously removed or will be removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e. restore original catchment using clean roof drainage), as feasible;
- Maintain or replace on-site flows using mitigation measures and/or wetland creation, if necessary;
- Maintain or replace external flows;
- Use natural channel design techniques to maintain or enhance overall productivity of the reach;
- Drainage feature must connect to downstream.

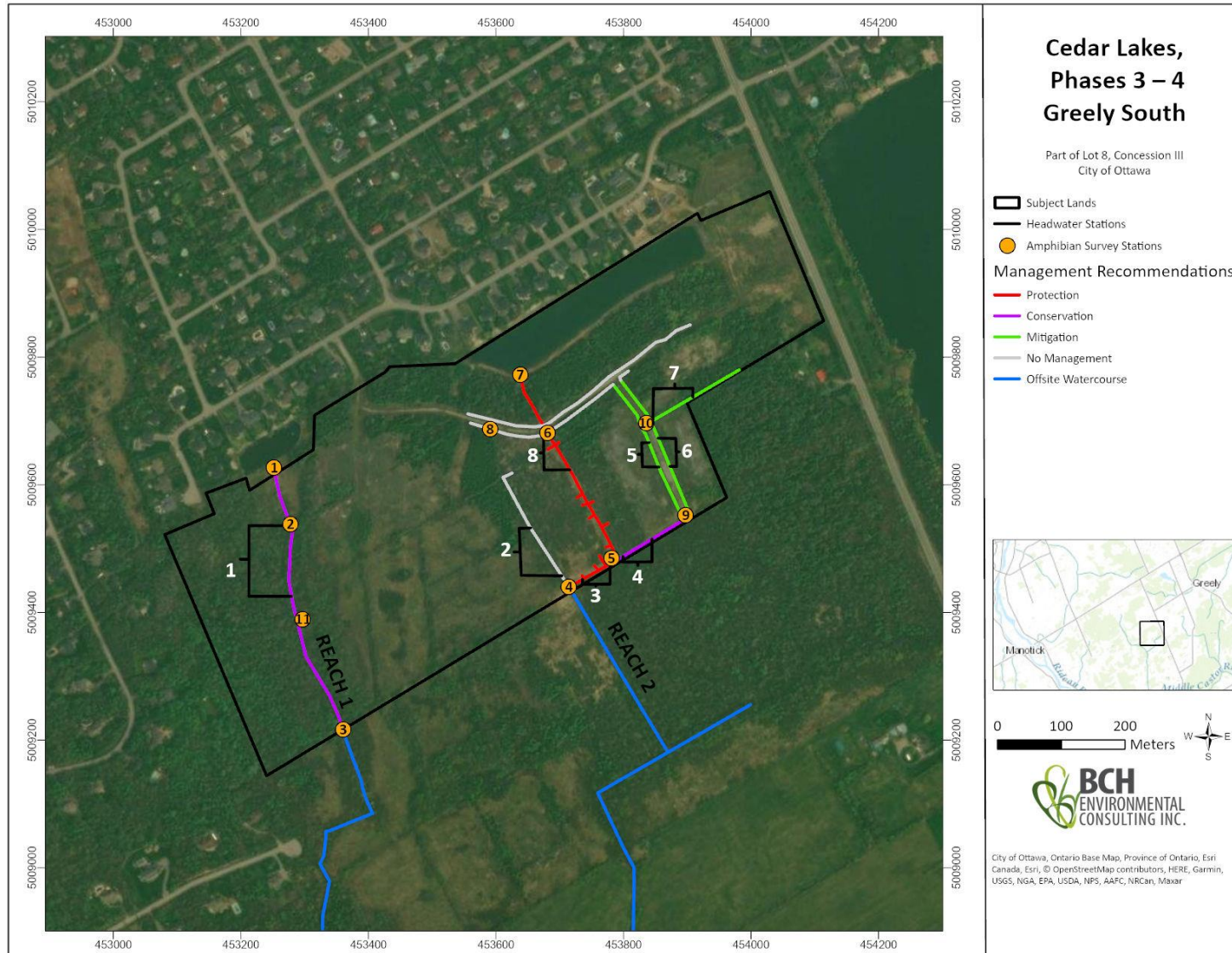
Site 5, 6 and 7 (Reach 2) and its associated area should be managed through mitigation. Meaning if disturbances are sought after within these portions of the drains the following must be addressed:

- Replicate or enhance functions through enhanced lot level conveyance measures, such as well-vegetated swales (herbaceous, shrub and tree material) to mimic online wet vegetation pockets, or replicate through constructed wetland features connected to downstream;
- Replicate on-site flow and outlet flows at the top end of system to maintain feature functions with vegetated swales, bioswales, etc. If catchment drainage has been previously removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e. restore original catchment using clean roof drainage);
- Replicate functions by lot level conveyance measures (e.g. vegetated swales) connected to the natural heritage system, as feasible and/or Low Impact Development (LID) stormwater options (refer to Conservation Authority Water Management Guidelines for details);

If disturbances are sought after within Site 2 and its associated area, no management is required.

Figure 3 identified the management areas associated with each headwater feature.

FIGURE 3: HDW Management Recommendation



#### 4.0 Potential Species at Risk

The Make a Map: Natural Heritage online database (OMNRF) was reviewed on April 20, 2023. This database provides sightings of provincially tracked species including Threatened and Endangered species covered by the 2008 Endangered Species Act in 1 km squares across most of Ontario. A search was conducted on the site and adjacent lands (18VR5409, 18VR5310, 18VR5309, 18VR5308, 18VR5410, 18VR5408, 18VR5208 and 18VR5209) identified the following results:

- Snapping Turtle (Special Concern)
- Eastern Wood-Pewee (Special Concern)
- Wood Thrush (Special Concern)
- Eastern Meadowlark (Threatened)
- Butternut (Endangered)

The Ontario Breeding Bird Atlas provides a searchable database in the form of a 10km square grid. A query revealed the following Species at Risk and species of special concern were identified within the 10km square that encompasses the site and adjacent lands (18VR51 and 18VR50):

- Eastern Whip-Poor-Will (Threatened)
- Chimney Swift (Threatened)
- Eastern Wood-Pewee (Special Concern)
- Barn Swallow (Special Concern)
- Bank Swallow (Threatened)
- Wood Thrush (Special Concern)
- Bobolink (Threatened)
- Eastern Meadowlark (Threatened)

Similar to the Ontario Breeding Bird Atlas, the Ontario Reptile and Amphibian Atlas provides a searchable database in the form of a 10km square grid. A query revealed the following species of special concern was identified within the 10km square that encompasses the subject lands and adjacent lands (18VR51 and 18VR50):

- Snapping Turtle (Special Concern)
- Northern Map Turtle (Special Concern)
- Blanding's Turtle (Threatened)

iNaturalist and the Global Biodiversity Information Facility provides a searchable database. A query revealed the following Species at Risk and species of special concern:

- Snapping Turtle (Special Concern)
- Blanding's Turtle (Threatened)
- Northern Map Turtle (Special Concern)
- Eastern Musk Turtle (Special Concern)
- Butternut (Endangered)
- Wood Thrush (Special Concern)
- Eastern Wood-Pewee (Special Concern)

The Department of Fisheries and Oceans provide species at risk sightings via their online map tool. A query found no results in the vicinity of the site.

In addition to the above potential Species at Risk, many other endangered and threatened species may potentially occur in the general area:

- Little Brown Myotis (Endangered)
- Northern Myotis (Endangered)
- Tri-coloured Bat (Endangered)
- Black Ash (Endangered)

#### 4.1. Turtles and Reptiles

Snapping turtles, Northern map turtle and Eastern musk turtle are designated as special concern under the Ontario Endangered Species Act (ESA). The habitat of species of special concern is not regulated under the Ontario ESA.

Blanding's turtles are often observed within clear water eutrophic wetlands and have a strong site fidelity but may use several connected water bodies during the active season. Blanding's turtles were identified as occurring within 2km of the subject lands (Make a Map, Ontario Reptile and Amphibian Atlas and iNaturalist). The ponds are not suitable Blanding's turtle habitat, there is a lack of cover (open water) and due to the cryptic nature of Blanding's they would not prefer to be within close proximity to residential areas. The wetlands present onsite lacked water.

The Ontario Ministry of Natural Resources developed the general habitat description for the Blanding's Turtle (habitat provincially regulated), dividing habitat into three categories:

- **Category 1:** the nest and the area within 30 m or overwintering sites and the area within 30 m. Suitable nesting habitat occurs in sun-exposed areas with low vegetation cover and loose soils. They may overwinter in permanent or temporary waterbodies (young are also known to hibernate terrestrially), with the reported water depth varying from 0 to >100 cm and often show a high site fidelity. No evidence of this habitat was noted and so Category 1 habitat is not considered to be present on or adjacent to the subject lands.
- **Category 2:** the wetland complex that extends up to 2 km from an occurrence, and the area within 30 m around those suitable wetlands or waterbodies. This habitat is considered highly unlikely as there is no linkage to suitable wetlands, therefore very unlikely that turtles would be utilising the watercourses to access the pond area (pond is unsuitable for Blanding's turtles),
- **Category 3:** the area between 30m and 250m around suitable wetlands or waterbodies identified in Category 2, within 2 km of an occurrence. As there has been no Category 2 habitat present, there is also no Category 3 habitat.

Blanding's, Map, and Musk turtles are not anticipated to be utilising the subject lands. The ponds do represent suitable snapping turtle habitat, and painted turtles were noted within the eastern pond and Reach 1. No direct impacts on turtles are anticipated, indirect impacts on these species as a result of the proposed development can be mitigated provided the mitigation measures in this report are implemented.

Under the City of Ottawa's direction if a Blanding Turtle sighting is within 2km of potential development, MECP should be contacted and an IGF form be submitted, there is potential that an authorization/compensation be required by MECP for works to proceed.

#### 4.2. Birds

Eastern wood-pewee, barn swallow, and wood thrush are designated special concern under the Ontario Endangered Species Act (ESA). The habitat of species of special concern is not regulated under the Ontario ESA. The eastern wood-pewee is mostly associated with the mid-canopy layer of forest clearings and edges of deciduous and mixed forests (COSEWIC 2012a). One species of concern was observed (Eastern wood-pewee) within the western forest on May 17, 2023 (station 1), the bird was not heard or observed during any subsequent visits and is highly suspect to being a transient, not permanently utilizing the subject lands. Eastern wood-pewee are not anticipated to be nesting within the subject lands. Barn swallow nest sites are commonly found along the interior or exterior of building structures, under bridges and wharves, and in road culverts (Heagy et al. 2014.). No barn swallow, or barn swallow nests were observed. The wood thrush nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers (COSEWIC 2012b). This species was not observed during the breeding bird surveys and additional visits it is not anticipated to be utilizing the subject lands.

Eastern whip-poor-will, chimney swift, bank swallow, bobolink, and eastern meadowlark are designated as threatened under the Ontario Endangered Species Act (ESA). Eastern whip-poor-will avoids both wide-open spaces and closed canopy forests. Semi-open forests or patchy forests with clearings, such as barrens or forests that are regenerating following major disturbances, are preferred. Areas with little ground cover are also preferred (COSEWIC 2009b). A whip-poor-will survey was completed to assess the presence of these birds within the subject lands (May 29, 2023, June 7, 2023, and June 26, 2023; weather conditions available in table 1). During the 3 visits, 3 listening stations were established (6 minutes at each station). No whip-poor-will were heard or observed. Chimney swift are aerial foragers, associated with water where insects are abundant and urban and rural areas where chimneys are available for nesting and roosting (COSEWIC 2007). No suitable chimneys were observed for this species use. Bank swallow are generally associated with sand-silt vertical banks (COSWIC 2013a). This habitat was not present. Bobolink and eastern meadowlark are associated with native and non-native larger grassland habitats such as hayfields (COSEWIC 2010, and COSEWIC 2011). There is potential for these birds to be utilising the meadow, none were identified during the breeding bird survey (see section 3.2) and they are not anticipated to be present within the subject lands.

Further to this, nesting migratory birds are protected under the Migratory Birds Convention Act (MBCA). No work is permitted that would result in the destruction of active nests (nests with eggs or young birds) or the wounding or killing of bird species protected under the MBCA and/or associated regulations.

#### 4.3. Mammals

Little brown Myotis, northern Myotis, Eastern Small-footed Myotis, and tri-coloured bat are designated endangered under the Ontario Endangered Species Act (ESA). All four bats may forage in open areas on-site and may roost in trees or buildings on or adjacent to the Site. The Atlas of Mammals of Ontario (Dobbyn, 1994) suggests that the tri-colored bat is not present within this part of Ontario however, the NatureServe mapping in the COSSARO (2015) includes all southeastern Ontario. Based on this

information, this species is considered to have a very low potential of occurring. To prevent impacts to bats, no clearing of trees greater than 10cm on-site should take place between April 1 and September 30 (inclusive) without a qualified biologist first confirming the absence of bats (i.e., open work timing window from October 1 to March 3). If tree clearing is conducted between October and April, no interactions with bats are anticipated, and therefore, significant negative impacts to SAR bats would be avoided.

Maternity colonies are established by females in the summer, often in buildings, or large-diameter trees with suitable cavities (COSEWIC 2013b). No caves, bedrock fissures, mining shafts, abandoned buildings, or other features which may function as bat hibernacula habitat were noted within the subject lands. No suitable cavity trees that may be used by bats were observed within the subject lands.

#### 4.4. Vegetation

Butternut (designated as endangered by the ESA) tends to reach greatest abundance in rich well-drained mesic loams in floodplains, streambanks, terraces and ravine slopes, but can occur in a wide range of other situations (COSEWIC 2017). Two potential butternut trees were observed during the surveys (Figure 1). An assessment was completed on June 14, 2023. DNA was submitted to NatureMetrics by 6980848 Canada Corporation, lab results indicate that the butternut are indeed hybrids (Appendix G). No further action is required, hybrids are not protected by the ESA.

Black ash (designated as endangered by the ESA) occurs most frequently in floodplain forests, basin, seepage and lacustrine swamp forests, shoreline forest margins, and fens (COSEWIC 2017). The ministry temporarily suspended protections for Black Ash for a period of two years from the time the species was added to the Species at Risk in Ontario List (Ontario Regulation 230/08). During this time, proponents will not need to seek authorizations for activities that impact Black Ash and its habitat. Black ash was present within the deciduous swamp.

#### 4.5. Species at Risk Summary

In summary, based on the habitat present within the subject lands, and the field visit, Turtles are the only Species at Risk anticipated to be present.

Indirect impacts on this species as a result of the proposed development can be mitigated provided the mitigation measures in this report are properly implemented.

## 5.0 Natural Heritage Features

A Natural Heritage Features have been identified in accordance with the direction of the Provincial Policy Statement. Its intent is to reinforce the conservation, restoration, and enhancement of identified natural heritage features and areas and promote the overall diversity and interconnectivity of natural heritage features and areas.

A refined search identified the following Natural Heritage Features (discussion below): Significant Woodland and watercourse.



## 5.1. Significant Woodland

The woodland within the subject lands is part of a larger woodland that totals approximately 61.39ha in size. Clearing for this project would result in the removal of 13.08ha. The significance of this woodland was evaluated using the criteria in the Natural Heritage Reference Manual (OMNR, 2010) and the Significant Woodlands: Guidelines for Identification, Evaluation, and Impact Assessment provided by the city. The PPS does not permit development in significant woodlands south and east of the Canadian Shield unless it has been demonstrated that there will be no negative impacts on the natural features or the ecological functions. Woodlands are significant if they meet the criteria presented by the city: size, ecological function, uncommon characteristics, and economical and social functional values. If the woodland meets any one of these criteria, then it could be deemed to be significant. Table 7 demonstrates the factors determining significance pre and post construction.

Within the portion proposed to be removed there were no seasonal concentration areas of animals, rare vegetative communities, raptor overwintering sites, or caves.

TABLE 7: WOODLAND ANALYSIS

CRITERIA	PRE CONSTRUCTION	POST CONSTRUCTION	DISCUSSION
<b>WOODLAND SIZE</b>	MEETS THE CRITERIA		<p>The woodland is located within the Castor River planning area where the percent forest cover is 26.9%.</p> <p>The NHRM states that where woodland cover is about 15–30% of the land cover, woodlands 20ha in size or larger should be considered significant.</p> <p>The woodland size is 61.39ha before removal and 48.31ha after removal therefore does meet this criteria.</p>
<b>ECOLOGICAL FUNCTION CRITERIA</b> Woodland Interior	MEETS THE CRITERIA		<p>Within this planning area woodland interiors 2ha in size or larger should be considered significant.</p> <p>Woodland interior is 5.91ha before removal and 4.89ha after removal therefore does meet this criteria. Additionally, it does meet the size threshold (2ha).</p>

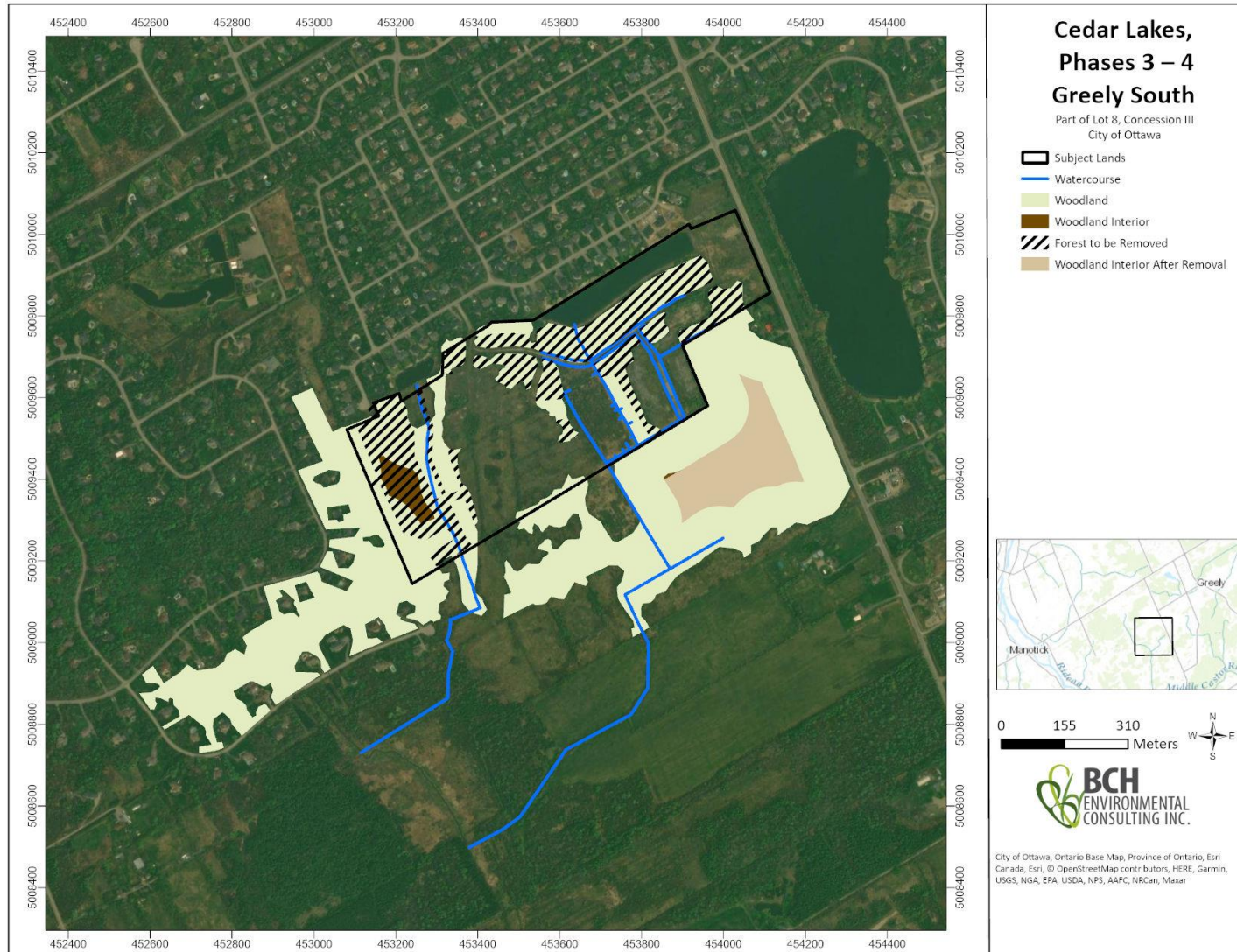
CRITERIA		PRE CONSTRUCTION	POST CONSTRUCTION	DISCUSSION
	Proximity to other woodlands or other habitats	MEETS THE CRITERIA		Both inside and outside of the development area this woodland connects with watercourses and they are likely receiving ecological benefit from the woodland.
	Linkages	MEETS THE CRITERIA		Woodland is located within a defined natural heritage system.
	Water protection	DOES NOT MEET THE CRITERIA		Does not appear this woodland is within a highly vulnerable aquifer.
	Woodland diversity	DOES NOT MEET THE CRITERIA		Within the subject lands this forest did not contain any declining natural communities or a high variety of native diversity through composition or terrain.
<b>UNCOMMON CHARACTERISTICS CRITERIA</b>		DOES NOT MEET THE CRITERIA		Within the subject lands there are no uncommon species composition, cover type, age, or structure.
<b>ECONOMIC AND SOCIAL FUNCTIONAL VALUES CRITERIA</b>		DOES NOT MEET THE CRITERIA		Within the subject lands the woodlands did not have high economic or social values through particular site characteristics or deliberate management.

As per the criteria set out in the NHRM and the City this woodland should be considered significant, furthermore the woodland retains this designation of significant even after construction is completed. This woodlands significance was established from the following criteria: size, woodland interior, proximity to other habitats, and linkages. After removal (13.08ha), the woodland (48.31ha after removal) still meets the criteria for significance (Table 7). There are no significant features within the development area.

Although this woodland has been classified as significant, it is important to note that this was attributed to the woodland size, interior, proximity to other habitats, and linkages. Removal of 13.087ha of the forest at this location will not negatively impact this feature or its ecological functions. Woodland significance is retained.

Indirect impacts on this woodland as a result of the proposed development can be mitigated provided the mitigation measures in this report are properly implemented.

FIGURE 4: WOODLAND



## 5.2. Wetland

The remnant wetland communities are highly affected by the drainage practices within Reach 2. Dredging, channelization and the removal of beaver dams have all contributed to the lowering of the water table. These wetlands appear to be within the early stages of transitioning to upland (upland plants starting to be present; wild red raspberry present within the southern portions as well as the deciduous swamp). Reach 2 will need to be continuously maintained, these wetlands are no longer viable and in time will convert to an upland community. Water was present in isolated pockets only during the April 11, 2023 field visit. This system now drains very rapidly. Further to this, due to the fact that the wetland is now surrounded by drainage ditches on all sides, there is no more water from the site being infiltrated into the wetland, it is all being captured by the ditches and conveyed offsite.

Through communication with Mathieu Haley (July 11, 2023), it was agreed that this wetland would not meet the criteria necessary to be considered provincially significant, and an official evaluation was deemed unnecessary.

The official plan defined surface water feature as:

“Water-related features on the earth’s surface, including headwater drainage features, rivers, stream channels, drains, inland lakes, seepage areas, recharge/discharge areas, springs, wetlands and associated riparian lands that can be defined by their soil moisture, soil type, vegetation or topographic characteristics, including fish habitat”

Although the remnant vegetation present within this area meets the definition of wetland, through the changes in drainage, the function is no longer viable and should not be considered a surface water feature. The wetland should not be considered as a constraint to development.

## 5.3. Watercourses

The proponent is currently proposing the removal of all drains with the exception of the main channels of Reach 1 and 2. The removal of these drains is supported by this EIS, the headwater study and the Shields Creek Subwatershed Study. Management recommendations present in section 3.4.1.5 of this EIS should be applied for the removal of these drains. Figure 3 provides a visual representation of these areas. DFO standards / codes of practice must be followed where applicable, DFO authorization may be required if the standards / codes of practice cannot be adhered to. In-water work is not to occur between March 15 to June 30.

Reach 1 and Drains identified on Figure 3 as protection (main portions of Reach 2) are all man-made and are subject to maintenance to maintain flow, they are relatively featureless, and the HDW management recommendations are significantly based on the presence of fish habitat and the surrounding lands. It is important to note that these drain are fed from storm pond outlets which were artificially created and the entire network forms part of an open drainage network. These drains have a registered 15m maintenance easement to the city of Ottawa. Within this easement a trail/access road is being proposed, for recreational and maintenance purposed.

Although the headwater study recommends protection for the main branch of Reach 2, this systems would be considered as type 3 fish habitat within the Shields Creek Subwatershed Study. Type 3 fish habitats are considered to have no reasonable potential for enhancement or restoration, and are often degraded by human activities which clearly applies to this drain. These tributaries are part of an open drainage network of first order and according to the Shields Creek Subwatershed Study would receive a protection level of 3. As such diverting flow, realignment, and the installation of culvert at the crossing can be supported. Recommendation of the HDW study should be considered during the design of these works (section 3.4.1.5).

Furthermore, two newly created stormwater ponds will be created and tied into Reach 1 and the main portion of Reach 2 and all upstream flows diverted into these ponds and the remnant channel removed.

A single road crossing is currently being proposed within reach 1 and the main portion of reach 2. The culvert will meet the applicable standards for the volume of traffic and to properly convey the correct volume of water.

The above proposed is consistent with the wording and meets the intent in the Shields Creek Subwatershed Study.

If in-water work is required within fish bearing reaches then DFO standards / codes of practice must be followed where applicable, DFO authorization may be required if the standards / codes of practice cannot be adhered to. In-water work is not to occur between March 15 to June 30.

As these features represent surface water features, additional authorization from the conservation authority may be required.

#### 5.4. Significant Wildlife Habitat

The potential for significant wildlife habitat was assessed using the guidance in OMNR (2010) and MNRF (2015). Potential components which may lead to a designation of significant wildlife habitat include seasonal concentration areas of animals, rare vegetation communities or specialized habitat for wildlife, habitat for species of conservation concern, and animal movement corridors. No rare vegetative communities, raptor overwintering sites, old growth forest, caves were located within the subject or adjacent lands.

There was nothing regarding the characteristic within the subject lands to warrant significance. The majority of the subject lands have been highly disturbed for a couple of years. Prescribed mitigation measures in section 9.0 will limit the potential for indirect impacts.

#### 5.5. Herbert Corner Bog

The site is isolated from a natural environment perspective by adjacent village residential developments and agricultural activity. Several residential developments have occurred in portions of the Herberts Corner Bog Natural Area since the natural area mapping was completed. The sensitive bog component of the natural area is approximately 1.5 kilometres southeast of the site, on the opposite side of

Stagecoach Road. There is no hydrological connection between the site and the bog, with surface runoff from the site entering tributaries of Grey's Creek and eventually the Middle Castor River.

## 6.0. Wildland Fire Risk Assessment

The wildland fire policy was introduced in the 2014 Provincial Policy Statement to ensure communities consider and plan for avoiding and mitigating losses to their communities due to wildland fire. As outlined in the Provincial Policy Statement, "Development shall generally be directed to areas outside of lands that are unsafe for development due to the presence of hazardous forest types for wildland fire. Development may however be permitted in lands with hazardous forest types for wildland fire where the risk is mitigated in accordance with wildland fire assessment and mitigation standards".

To assist planning city of Ottawa has identified potential hazardous forest types for wildland fire. The subject lands have been identified as being a Low risk for wildland fire.

### 6.1. Level 1 Site Assessment

Following review of the available information provided by the city, the subject lands have been identified as having a low risk of wildland fires. Following the guidelines as outlined in the MNRF Wildland Fire Risk Assessment and Mitigation Guidebook no further mitigation measures are required for the proposed development.

## 7.0. Tree Conservation Report

Under the Tree Protection By-law, the following protected trees cannot be injured or removed without a tree permit from the City:

- All City-owned trees throughout the urban and rural area
- All trees 10 cm or more in diameter at breast height on private properties within the urban area that are subject to a Planning Act application for Site Plan, Plan of Subdivision, or Plan of Condominium
- All trees 10 cm or more in diameter at breast height on private properties within the urban area that are over 1 hectare in size
- All distinctive trees on private properties 1 hectare or less in size, where distinctive trees are defined as:
  - o Trees measuring 30 cm or more in diameter at breast height within the inner urban area (urban lands inside the Greenbelt)
  - o Trees measuring 50 cm or more in diameter at breast height within the suburban area (urban lands outside the Greenbelt)

The properties in question is located within:

**Part of Lot 8, Concession 3  
City of Ottawa**

The property is currently owned by:  
**698048 Canada Corporation**



**7610 Village Centre Place, Unit 105  
Greely, Ontario  
K4P 0C8**

20373 Bethune Street  
South Lancaster, On  
K0C 2C0  
613.571.8883  
shaun@bchenviro.ca

Sunset Lakes Developments Contact Information:

**Dan Anderson**  
**[sunsetlakes@rogers.com](mailto:sunsetlakes@rogers.com)**

The subject lands are within the Rural Areas and this is private property which is larger than 1 ha in size. No city trees greater than 10cm in dbh have been identified within the property. For a description of the onsite vegetation and the average dbh within the forest see section 3.1.

Tree removal will occur as needed within the subject lands, the majority of trees within the subject lands will be removed due necessary grading activities and proposed development. Areas of tree retention are present in Figure 5.

Potential impacts during construction and associated removal of trees and other vegetation includes impacts on wildlife, increased erosion and release of sediments and other potential contaminants from truck traffic and construction activity, harm to wildlife remaining in the work area during construction, and impacts associated with an increase in noise, dust and light. Prescribed mitigation measures in section 9.0 will limit these impacts. Removal of tree cover within the subject lands is not anticipated to result in significant negative impacts to the environmental features and functions of the general area. There is no protection afforded through the city of Ottawa's Tree Protection By-law to the trees present within the subject lands.

Remaining tree cover within the subject lands and adjacent lands provides some ecological function such as local wildlife habitat and climate, air quality, wildlife, and nature appreciation benefits. All trees/forest patches within the subject lands and adjacent lands will have their critical root zone protected by temporary fencing (snow fencing) to ensure they are not affected (Figure 5). All development will occur outside of their critical root zone, and these trees will not be impacted by this development. Prescribed mitigation measures in section 9.4 will limit the potential for indirect impacts.

At this time the proponent is only proposing to install the road network, storm water ponds and drainage, protective fencing present in Figure 5 reflects this. The lots will be created and sold as is, and will be the purchaser responsibility to ensure that the tree protection plan is respected.

Table 8 shows the average diameter and critical root zone for the remaining forest patches within the subject lands (Figure 5). The forest patches and individual trees present within the adjacent lands had on average a DBH of 30cm with a critical root zone of 3m (Figure 5).

Prescribed mitigation measures in section 9.4 will limit the potential for indirect impacts.

TABLE 8: AVERAGE DIAMETER AND CRITICAL ROOT ZONE FOR THE REMAINING FOREST PATCHES WITHIN THE SUBJECT LANDS AND THE FOREST PATCHES PRESENT WITHIN THE ADJACENT LANDS

Patch #	Forest Type (ELC / OWES CODE)	Average DBH (cm)	Average Critical Root Zone (m)
1	FOD5-1	30	3.0
2	FOD5-1 / FOD7-2	30	3.0
3	FOD5-1	30	3.0
4	FOD7-2	30	3.0
5	FOD5-1 / FOD7-2	30	3.0
6	FOC4-1	5-30	3.0
7	FOC4-1	5-30	3.0
8	FOD8-1	20	2.0
9	h	20-30	3.0



FIGURE 5: TREE CONSERVATION



## 8.0. Development Constraints, Cumulative Impacts and Climate Change

Constraints that have been identified are discussed below (Figure 6):

Drains: see section 5.3.

Blanding's Turtle: Under the City of Ottawa's direction if a Blanding Turtle sighting is within 2km of potential development, MECP should be contacted and an IGF for be submitted, there is potential that an authorization/compensation be required by MECP for works to proceed.

The Canadian Environmental Assessment Agency (CEAA) defines cumulative effects as..."the effects on the environment caused by an action in combination with other past, present, and future human actions..." They occur when two or more project-related environmental effects, or two or more independent projects, combine to produce an augmented effect. These cumulative effects may be positive or negative.

There are no significant natural heritage features within the subject lands that will be negatively impacted. Given that the proposed location is bordered to the west, east and south by similar residential development the cumulative impacts will be the same, a slow chipping away at the natural landscape.

With proper implementation of the mitigation measures described in this report it is anticipated that the construction of the proposed development will not increase the potential for cumulative effects in the general landscape.

As per the EIS guidelines climate change should be taken into account when developing the property. The main concerns with climate change are the following: extreme heat and drought, changing seasons, rain and flooding and extreme weather events.

The subject lands currently consist of cleared lands with no tree cover. To aid in mitigating the potential for extreme heat and drought, where possible, native trees should be considered for planting within remnant green spaces after development and tree retention should be accomplished where possible. The shade produced by these trees will aid in mitigating heat being produced by hardened surfaces. To aid in the mitigation of the increased risk of rain and flood, the design of the stormwater infrastructure should accommodate the potential increased flows. Additional measures such as designing building and infrastructure to be resilient in future climate conditions such as extreme weather, greater rainfall and higher temperatures should be considered.

For further information see the City of Ottawa Climate Resiliency webpage (<https://ottawa.ca/en/living-ottawa/environment-conservation-and-climate/climate-change-and-energy/climate-resiliency#section-a8783773-3a10-4998-b516-b4d9c5e73cf0>)

FIGURE 6: ENVIRONMENTAL CONSTRAINTS & RETAINED WOODLAND



## 9.0. Recommendations and Conclusion

This study's recommendations are intended to mitigate potential negative impacts due to the proposed development within the subject lands. This should be implemented through a development agreement between the owners and the municipality in order to control development of the site. Properly implemented controls within this agreement are deemed sufficient to mitigate the potential impacts of the proposed development on the Natural Heritage Features, and any identified potential Species at Risk. At this time the proponent is only proposing to install the road network, storm water ponds and drainage. The lots will be created and sold as is, it will be the purchaser responsibility to ensure that all regulations and mitigation measures are followed.

### 9.1. Mitigation for the Species at Risk and Migratory Birds Convention Act

- 1- To protect breeding birds, no tree or shrub removal should occur between April 1<sup>th</sup> and August 30<sup>th</sup>, unless a breeding bird survey is completed by a qualified biologist within two days of the woody vegetation removal and identifies no nesting activity.
- 2- To prevent impacts to bats, no clearing of trees greater than 10cm on-site should take place between April 1 and September 30 (inclusive) without a qualified biologist first confirming the absence of bats (i.e., open work timing window from October 1 to March 3). If tree clearing is conducted between October and April, no interactions with bats are anticipated, and therefore, significant negative impacts to SAR bats would be avoided.
- 3- With regard to turtles, clearing of vegetation should be undertaken between October 15<sup>th</sup> and April 15<sup>th</sup>, which is outside of the more active season for turtles. Additionally, exclusion fencing should be installed around the perimeter of the site, watercourses, and ponds to prevent turtles from entering work areas (properly installed sediment fencing can be utilised for exclusion fencing).
- 4- Under the City of Ottawa's direction if a Blanding Turtle sighting is within 2km of potential development, MECP should be contacted and an IGF for be submitted, there is potential that an authorization/compensation be required by MECP for works to proceed.
- 5- The contractor is to be aware of potential Species at Risk in the vicinity of the site. Appendix 1 of City of Ottawa Protocol for Wildlife Protection during Construction (2022) and Appendix D of this report for descriptions of these species. Any Species at Risk sightings are to be immediately reported to the project biologist and the MECP, and activities modified to avoid the potential for impacts until further direction is received by the Ministry.

### 9.2. Fish Habitat, Watercourse and Swale Recommendations and Mitigation Measures

- 1- The drains should be managed in accordance with the recommendations present in section 3.4.1.5 and 5.3.
- 2- Storm water management facility will be designed in such a way as to not impact the quality of the water contributing to the downstream watercourses.

- 3- Should dust particles be created during construction they will be suppressed using the appropriate method (i.e. water spraying).
- 4- Install and maintain the erosion control measures during construction. No work will occur until the appropriate sediment and erosion control measures have been designed and implemented prior to any work. At a minimum these will include:
  - a. Provide regular maintenance to the sediment and erosion control measures during construction. Contractor shall be responsible for ensuring that the sediment and erosion control measures are maintained. No turbid water is permitted to leave the work area.
  - b. Additional materials (i.e. rip rap, filter cloth and silt fencing) will be readily available in case they are needed promptly for erosion and/or sediment control.
  - c. Any stock piles of soil or fill material will be stored as far as possible from the watercourse and wetland and protected by silt fencing.
  - d. Sediment fencing will be installed at the edge of the work area, and kept in good working condition. The sediment fencing will not be removed until the area has stabilized.
- 5- DFO standards / codes of practice must be followed where applicable, DFO authorization may be required if the standards / codes of practice cannot be adhered to. In-water work is not to occur between March 15 to June 30.
- 6- Surface water features may require additional authorization from the conservation authority.

### 9.3. Sediment and Erosion Recommendations and Mitigation Measures

- 1- Should dust particles be created during construction they will be suppressed using the appropriate method (i.e. water spraying).
- 2- Install and maintain the erosion control measures during construction. No work will occur until the appropriate sediment and erosion control measures have been designed and implemented prior to any work. At a minimum these will include:
  - a. Provide regular maintenance to the sediment and erosion control measures during construction. Contractor shall be responsible for ensuring that the sediment and erosion control measures are maintained. No turbid water is permitted to leave the work area.
  - b. Additional materials (i.e. rip rap, filter cloth and silt fencing) will be readily available in case they are needed promptly for erosion and/or sediment control.
  - c. Any stock piles of soil or fill material will be protected by silt fencing.
  - d. Sediment fencing will be installed at the edge of the work area, and kept in good working condition. The sediment fencing will not be removed until the area has stabilized.

### 9.4. Recommendation and Mitigation for Tree Protection and the Tree Conservation Plan

- 1- Any tree in the vicinity of works but not slated for removal will have its critical roots zone protected by sturdy temporary fencing at least 1.3 metres in height installed from the tree trunk to a distance of ten times the retained tree's diameter where possible. See figure 5 for protective fencing locations. Signs shall be posted on the protective fencing to clearly indicate that: a) the

fencing is to protect the critical root zones of the retained trees; b) the fencing is not be moved, and; c) fencing is to be maintained until the construction is complete.

- 2- No grading, heavy machinery traffic, stockpiling of material, machinery maintenance and refueling, or other activities that may cause soil compaction are to occur within three metres of the critical root zone of the trees to be protected.
- 3- The root system, trunk, and branches of the trees to be protected are to be protected and not damaged. If any roots of trees to be retained are exposed during site alterations, the roots shall be immediately reburied with soil or covered with filter cloth, burlap or woodchips and kept moist until the roots can be buried permanently. A covering of plastic should be used to retain moisture during an extended period when watering may not be possible. Any roots that must be cut are to be cut cleanly to facilitate healing and as far from the tree as possible. Overhanging branches from protected trees that may be damaged during construction are to be pruned by a qualified arborist prior to construction.
- 4- Exhaust fumes from all stationary equipment during construction will not be directed towards the canopy of the adjacent protected trees.

## 9.5. Climate Change Recommendations

- 1- To aid in mitigating the potential for extreme heat and drought where possible native trees should be considered for planting within remnant green spaces after development. The shade produced by these trees will aid in mitigating heat being produced by hardened surfaces.
- 2- To aid in the mitigation of the increased risk of rain and flood, the design of the stormwater infrastructure should accommodate the potential increased flows.
- 3- Additional measures such as designing building and infrastructure to be resilient in future climate conditions such as extreme weather, greater rainfall and higher temperatures should be considered.

## 9.6. Additional Mitigation Measures

- 4- The extent of any vegetation removal within the development area is to be minimized where possible.
- 5- All rules governing septic systems and wells must be followed and be kept in good operational order.
- 6- There will be no use of herbicides in clearing of vegetation.
- 7- Municipal by-laws and provincial regulations for noise will be followed.
- 8- To discourage wildlife from entering the work areas during construction, the site should be kept clear of food wastes and other garbage. Proper drainage should be provided to avoid accumulation of standing water, which could attract amphibians, birds, and other wildlife to the work areas.
- 6- As recommended in City of Ottawa Protocol for Wildlife Protection during Construction (2022), prior to beginning work each day, wildlife is to be checked for by conducting a thorough visual inspection of the work space and immediate surroundings. See Section 2.0 of City of Ottawa Protocol for Wildlife Protection during Construction (2022) and Appendix C for additional recommendations on construction site management with respect to wildlife. It is the responsibility of the contractor to be familiar with all components of City of Ottawa Protocol for



20373 Bethune Street  
South Lancaster, On  
K0C 2C0  
613.571.8883  
shaun@bchenviro.ca

Wildlife Protection during Construction (2022). Any sensitive wildlife in the work area are to be relocated to the South-West the subject lands. Animals should be moved only far enough to ensure their immediate safety.

To conclude this EIS, it is the professional opinion of the authors that with proper implementation and maintenance of the mitigation measures (see above), the proposed development will not negatively impact any natural heritage feature, or any habitat of Species at Risk.

Thank you for the opportunity to work with you. If you have any questions or comments, please do not hesitate to contact our office.

A handwritten signature in black ink, appearing to read "Shaun St. Pierre".

Shaun St.Pierre, B.Sc. Biology

A handwritten signature in black ink, appearing to read "Cody Fontaine".

Cody Fontaine, Wildlife Technologist

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20373 Bethune Street  
South Lancaster, On  
K0C 2C0  
613.571.8883  
shaun@bchenviro.ca

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## APPENDIX A: OBSERVED SPECIES LIST

COMMON NAME	SCIENTIFIC NAME	SRANK	SARA STATUS	SARO STATUS	COEFF. CONSERVATISM
Cinnamon Fern	<i>Osmundastrum cinnamomeum</i>	S5			Common
Field Horsetail	<i>Equisetum arvense</i>	S5			Common
Water Horsetail	<i>Equisetum fluviatile</i>	S5			Common
Bracken Fern	<i>Pteridium aquilinum</i>	S5			Common
Northern Maidenhair Fern	<i>Adiantum pedatum</i>	S5			Uncommon
Common Lady Fern	<i>Athyrium filix-femina</i>	S5			Common
Ostrich Fern	<i>Matteuccia struthiopteris</i>	S5			Common
Sensitive Fern	<i>Onoclea sensibilis</i>	S5			Common
Christmas Fern	<i>Polystichum acrostichoides</i>	S5			Uncommon
Balsam Fir	<i>Abies balsamea</i>	S5			Common
White Spruce	<i>Picea glauca</i>	S5			Common
Jack Pine	<i>Pinus banksiana</i>	S5			RS
Eastern White Pine	<i>Pinus strobus</i>	S5			Common
Eastern White Cedar	<i>Thuja occidentalis</i>	S5			Common
Narrowleaf Cattail	<i>Typha angustifolia</i>	SNA			Common
Broad-leaved Cattail	<i>Typha latifolia</i>	S5			Common
Richardson's Pondweed	<i>Potamogeton richardsonii</i>	S5			Common
Lake Sedge	<i>Carex lacustris</i>	S5			Uncommon
Slender Willow	<i>Salix petiolaris</i>	S5			Common
Canada Waterweed	<i>Elodea canadensis</i>	S5			Common
Smooth Brome	<i>Bromus inermis</i>	SNA			Common
Yellow Trout-lily	<i>Erythronium americanum</i>	S5			Common
Orchard Grass	<i>Dactylis glomerata</i>	SNA			Common
Large Barnyard Grass	<i>Echinochloa crus-galli</i>	SNA			Common
Fowl Mannagrass	<i>Glyceria striata</i>	S5			Common
European Common Reed	<i>Phragmites australis spp. australis</i>				Uncommon
Bladder Sedge	<i>Carex intumescens</i>	S5			Common
Cottongrass Bulrush	<i>Scirpus cyperinus</i>	S5			Common
Awl-fruited Sedge	<i>Carex stipata var. stipata</i>	S5			Common
Jack-in-the-pulpit	<i>Arisaema triphyllum</i>	S5			Common
Lesser Duckweed	<i>Lemna minor</i>	S5?			Common
Wild Lily-of-the-valley	<i>Maianthemum canadense</i>	S5			Common
Large False Solomon's Seal	<i>Maianthemum racemosum</i>	S5			Common

COMMON NAME	SCIENTIFIC NAME	SRANK	SARA STATUS	SARO STATUS	COEFF. CONSERVATISM
Red Trillium	<i>Trillium erectum</i>	S5			Common
White Trillium	<i>Trillium grandiflorum</i>	S5			Common
Balsam Poplar	<i>Populus balsamifera</i>	S5			Common
Large-toothed Aspen	<i>Populus grandidentata</i>	S5			Common
Trembling Aspen	<i>Populus tremuloides</i>	S5			Common
Bebb's Willow	<i>Salix bebbiana</i>	S5			Common
Pussy Willow	<i>Salix discolor</i>	S5			Common
Bitternut Hickory	<i>Carya cordiformis</i>	S5			Common
Butternut Hybrid					
Black Walnut	<i>Juglans nigra</i>	S4?			Rare
Speckled Alder	<i>Alnus incana ssp. rugosa</i>	S5			Common
Yellow Birch	<i>Betula alleghaniensis</i>	S5			Common
White Birch	<i>Betula papyrifera</i>	S5			Common
Gray Birch	<i>Betula populifolia</i>	S4			Common
Ironwood	<i>Ostrya virginiana</i>	S5			Common
American Beech	<i>Fagus grandifolia</i>	S4			Common
Bur Oak	<i>Quercus macrocarpa</i>	S5			Common
American Elm	<i>Ulmus americana</i>	S5			Common
False Nettle	<i>Boehmeria cylindrica</i>	S5			Uncommon
Wood Nettle	<i>Laportea canadensis</i>	S5			Common
European Stinging Nettle	<i>Urtica dioica</i>	SNA			Common
Bladder Champion	<i>Silene vulgaris</i>	SNA			Common
White Baneberry	<i>Actaea pachypoda</i>	S5			Common
Virginia Virgin's-bower	<i>Clematis virginiana</i>	S5			Common
Tall Buttercup	<i>Ranunculus acris</i>	SNA			Common
Garlic Mustard	<i>Alliaria petiolata</i>	SNA			Common
Field Mustard	<i>Brassica rapa</i>	SNA			Rare
Heart-leaved Foam-flower	<i>Tiarella cordifolia</i>	S5			Common
Wild Black Currant	<i>Ribes americanum</i>	S5			Common
Skunk Currant	<i>Ribes glandulosum</i>	S5			Common
Common Strawberry	<i>Fragaria virginiana</i>	S5			Common
Common Apple	<i>Malus pumila</i>	SNA			Common
Cinguefoils	<i>Potentilla sp.</i>				
Pin Cherry	<i>Prunus pennsylvanica</i>	S5			Common
Black Cherry	<i>Prunus serotina</i>	S5			Common
Choke Cherry	<i>Prunus virginiana</i>	S5			Common
Common Blackberry	<i>Rubus allegheniensis</i>	S5			Common
Black Raspberry	<i>Rubus occidentalis</i>	S5			Uncommon

COMMON NAME	SCIENTIFIC NAME	SRANK	SARA STATUS	SARO STATUS	COEFF. CONSERVATISM
Dwarf Raspberry	<i>Rubus pubescens</i>	S5			Common
True Forget-me-not	<i>Myosotis scorpioides</i>	SNA			
Goldenrods	<i>Solidago sp.</i>				
Canada Goldenrod	<i>Solidago canadensis</i>	S5			Common
Barren Strawberry	<i>Geum fragarioides</i>	S5			Common
Wild Red Raspberry	<i>Rubus idaeus ssp. strigosus</i>	S5			Common
Bird's-foot Trefoil	<i>Lotus corniculatus</i>	SNA			Common
Black Medic	<i>Medicago lupulina</i>	SNA			Common
Red Clover	<i>Trifolium pratense</i>	SNA			Common
White Clover	<i>Trifolium repens</i>	SNA			Common
Cow Vetch	<i>Vicia cracca</i>	SNA			Common
Western Poison Ivy	<i>Toxicodendron radicans var. rydbergii</i>	S5			Common
Staghorn Sumac	<i>Rhus hirta</i>	S5			Common
Manitoba Maple	<i>Acer negundo</i>	S5			Common
Red Maple	<i>Acer rubrum</i>	S5			Common
Sugar Maple	<i>Acer saccharum</i>	S5			Common
Black Maple	<i>Acer nigrum</i>	S4?			Uncommon
Spotted Jewelweed	<i>Impatiens capensis</i>	S5			Common
Common Buckthorn	<i>Rhamnus cathartica</i>	SNA			Common
Glossy Buckthorn	<i>Frangula alnus</i>	SNA			Common
Virginia Creeper	<i>Parthenocissus quinquefolia</i>	S4?			Uncommon
Riverbank Grape	<i>Vitis riparia</i>	S5			Common
American Basswood	<i>Tilia americana var. americana</i>	S5			Common
Purple Loosestrife	<i>Lythrum salicaria</i>	SNA			Common
Wild Sarsaparilla	<i>Aralia nudicaulis</i>	S5			Common
Wild Carrot	<i>Daucus carota</i>	SNA			Common
Wild Parsnip	<i>Pastinaca sativa</i>	SNA			Common
Alternate-leaved Dogwood	<i>Cornus alternifolia</i>	S5			Common
Bunchberry	<i>Cornus canadensis</i>	S5			Common
Red-osier Dogwood	<i>Cornus sericea</i>	S5			Common
Northern Starflower	<i>Lysimachia borealis</i>	S5			Common
White Ash	<i>Fraxinus americana</i>	S4			Common
Black Ash	<i>Fraxinus nigra</i>	S4	END	END	Common
Green Ash	<i>Fraxinus pennsylvanica</i>	S4			Common
Common Milkweed	<i>Asclepias syriaca</i>	S5			Common
Common Viper's Bugloss	<i>Echium vulgare</i>	SNA			Common
American Water-horehound	<i>Lycopus americanus</i>	S5			Common

COMMON NAME	SCIENTIFIC NAME	SRANK	SARA STATUS	SARO STATUS	COEFF. CONSERVATISM
Common Mullein	<i>Verbascum thapsus</i>	SNA			Common
Common Speedwell	<i>Veronica officinalis</i>	SNA			Common
Common Elderberry	<i>Sambucus canadensis</i>	S5			Uncommon
Red Elderberry	<i>Sambucus racemosa</i>	S5			Common
Common Plantain	<i>Plantago major</i>	SNA			Common
Smooth Bedstraw	<i>Galium mollugo</i>	SNA			Common
Tatarian Honeysuckle	<i>Lonicera tatarica</i>	SNA			Common
Wild Mock-cucumber	<i>Echinocystis lobata</i>	S5			Common
Common Yarrow	<i>Achillea millefolium</i>	SNA			Common
Common Ragweed	<i>Ambrosia artemisiifolia</i>	S5			Common
Common Wormwood	<i>Artemisia vulgaris</i>	SNA			Common
Large-leaved Aster	<i>Eurybia macrophylla</i>	S5			Common
Spotted Joe Pye Weed	<i>Eutrochium maculatum</i>	S5			Common
Common Boneset	<i>Eupatorium perfoliatum</i>	S5			Common
Common White Snakeroot	<i>Ageratina altissima var. altissima</i>	S5			Common
Grass-leaved Goldenrod	<i>Euthamia graminifolia</i>	S5			Common
Mouse-ear Hawkweed	<i>Pilosella officinarum</i>	SNA			Uncommon
Oxeye Daisy	<i>Leucanthemum vulgare</i>	SNA			Common
Black-eyed Susan	<i>Rudbeckia hirta</i>	S5			Common
Early Goldenrod	<i>Solidago juncea</i>	S5			Common
Common Sow-thistle	<i>Sonchus oleraceus</i>	SNA			Uncommon
Common Dandelion	<i>Taraxacum officinale</i>	SNA			Common
Yellow Goat's-beard	<i>Tragopogon dubius</i>	SNA			Common
Colts Foot	<i>Tussilago farfara</i>	SNA			Uncommon
Tall Goldenrod	<i>Solidago altissima spp. Altissima</i>	S5			Common
Canada Goldenrod	<i>Solidago canadensis var. canadensis</i>	S5			Common
Pondweeds	<i>Potamogeton sp.</i>				
Black-girdle Bulrush	<i>Scirpus atrocinctus</i>	S5			
Hawthorns	<i>Crataegus sp.</i>				
Fescue	<i>Festuca</i>				
Sedges					
Southern Rough-stemmed Goldenrod	<i>Solidago rugosa ssp. aspera</i>	SU			Common
Willows	<i>Salix sp.</i>				
Crack Willow	<i>Salix euxina</i>	SNA			Common
Canada Enchanter's Nightshade	<i>Circaea canadensis ssp. canadensis</i>	S5			Common

COMMON NAME	SCIENTIFIC NAME	SRANK	SARA STATUS	SARO STATUS	COEFF. CONSERVATISM
Common St. John's-wort	<i>Hypericum perforatum ssp. perforatum</i>	SNA			Common
Reed Canary Grass	<i>Phalaris arundinacea var. arundinacea</i>	S5			Common
Scots Pine	<i>Pinus sylvestris var. sylvestris</i>	SNA			Rare
White Meadowsweet	<i>Spiraea alba var. alba</i>	S5			Common
Grasses					
Common Juniper	<i>Juniperus communis var. communis</i>	SNA			Common
American Toad	<i>Bufo americanus</i>	S5			
Tetraploid Gray Treefrog	<i>Hyla versicolor</i>	S5			
Spring Peeper	<i>Pseudacris crucifer</i>	S5			
Green Frog	<i>Rana clamitans</i>	S5			
Wood Frog	<i>Rana sylvatica</i>	S5			
Northern Leopard Frog	<i>Rana pipiens</i>	S5			
Midland Painted Turtle	<i>Chrysemys picta marginata</i>	S5			
Eastern Garter Snake	<i>Thamnophis sirtalis</i>	S5			
Great Blue Heron	<i>Ardea herodias</i>	S4			
Green Heron	<i>Butorides virescens</i>	S4B			
Turkey Vulture	<i>Cathartes aura</i>	S5B			
Canada Goose	<i>Branta canadensis</i>	S5			
Mallard	<i>Anas platyrhynchos</i>	S5			
Ruffed Grouse	<i>Bonasa umbellus</i>	S4			
Wild Turkey	<i>Meleagris gallopava</i>	S5			
Killdeer	<i>Charadrius vociferus</i>	S5B, S5N			
Mourning Dove	<i>Zenaida macroura</i>	S5			
Belted Kingfisher	<i>Ceryle alcyon</i>	S4B			
Downy Woodpecker	<i>Picoides pubescens</i>	S5			
Northern Flicker	<i>Colaptes auratus</i>	S4B			
Pileated Woodpecker	<i>Dryocopus pileatus</i>	S5			
Eastern Wood-Pewee	<i>Contopus virens</i>	S4B	SC		
Alder Flycatcher	<i>Empidonax alnorum</i>	S5B			
Eastern Phoebe	<i>Sayornis phoebe</i>	S5B			
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	S4B			
Eastern Kingbird	<i>Tyrannus tyrannus</i>	S4B			
Warbling Vireo	<i>Vireo gilvus</i>	S5B			
Red-eyed Vireo	<i>Vireo olivaceus</i>	S5B			
Blue Jay	<i>Cyanocitta cristata</i>	S5			
American Crow	<i>Corvus brachyrhynchos</i>	S5B			

COMMON NAME	SCIENTIFIC NAME	SRANK	SARA STATUS	SARO STATUS	COEFF. CONSERVATISM
Black-capped Chickadee	<i>Poecile atricapilla</i>	S5			
Tufted Titmouse	<i>Baeolophus bicolor</i>	S2S3			
Nuthatch sp.	<i>Sitta sp.</i>				
White-breasted Nuthatch	<i>Sitta carolinensis</i>	S5			
Veery	<i>Catharus fuscescens</i>	S4B			
American Robin	<i>Turdus migratorius</i>	S5B			
Gray Catbird	<i>Dumetella carolinensis</i>	S4B			
European Starling	<i>Sturnus vulgaris</i>	SNA			
Yellow Warbler	<i>Dendroica petechia</i>	S5B			
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	S5B			
Black-and-white Warbler	<i>Mniotilta varia</i>	S5B			
Ovenbird	<i>Seiurus aurocapillus</i>	S4B			
Common Yellowthroat	<i>Geothlypis trichas</i>	S5B			
Scarlet Tanager	<i>Piranga olivacea</i>	S5			
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	S4B			
Chipping Sparrow	<i>Spizella passerina</i>	S5B			
Field Sparrow	<i>Spizella pusilla</i>	S4B			
Song Sparrow	<i>Melospiza melodia</i>	S5B			
Swamp Sparrow	<i>Melospiza georgiana</i>	S5B			
Northern Cardinal	<i>Cardinalis cardinalis</i>	S5			
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	S4			
Common Grackle	<i>Quiscalus quiscula</i>	S5B			
American Goldfinch	<i>Carduelis tristis</i>	S5B			
Eastern Cottontail	<i>Sylvilagus floridanus</i>	S5			
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	S5			
Porcupine	<i>Erethizon dorsatum</i>	S5			
Red Fox	<i>Vulpes vulpes</i>	S5			
Black Bear	<i>Ursus americanus</i>	S5			
White-tailed Deer	<i>Odocoileus virginianus</i>	S5			





20373 Bethune Street  
South Lancaster, On  
K0C 2C0  
613.571.8883  
shaun@bchenviro.ca

## APPENDIX B: QUALIFICATIONS

**SHAUN M. ST.PIERRE, B.Sc. Biology**

### EDUCATION

B.Sc. Biology, Trent University 2007

Fisheries and Wildlife Technology, Frost Campus, Sir Sandford Fleming College, 2005

Fisheries and Wildlife Technician, Frost Campus, Sir Sandford Fleming College, 2004

### LANGUAGES

Fluent in French and English

### POSITIONS HELD

2018 - : BCH Environmental Consulting Inc., Biologist / Owner

2006-2017: Bowfin Environmental Consulting Inc., Biologist / GIS Specialist / Environmental Site Inspector

2005: St. Lawrence River Institute of Environmental Sciences, Field Research Assistant

2004: MNR Kawartha Lakes, Field Research Assistant

2003: DFO- Experimental Lake Area, Field Research Assistant

2001: Resource Stewardship S, D &G, Stewardship Ranger

### CERTIFICATIONS / PROFESSIONAL AFFILIATIONS

MTO/DFO/OMNR Fisheries Protocol, Ecological Land Classification, Certified in Inventory and Identification Methods for Ontario's Reptiles and Amphibians, North American Benthological Society (NABS) Certified Family Level Taxonomist, Ontario Benthos Biomonitoring Network (OBBN), Ontario Stream Assessment Protocol (OSAP), Certified Ontario Wetland Evaluator (OWES), Butternut Health Assessor (BHA), first aid, CPR, Pleasure Craft Operator Card, Marine Radio Operator, WHMIS, WHSA, Hazard Identification, Assessment and Control, All Terrain Vehicle Riders Course (issued by the Manitoba Safety Council), Water Safety Training (Bronze Cross), Possession / Acquisition Firearms Licence, Ontario Hunter Education Course Certificate, Ontario Trapper Education Course Certificate, Wildlife Chemical Immobilization, Vaccination, and Euthanasia- Certificate of Knowledge, South Lancaster Fish and Game Club (SLFGC; president 2012 and 2013; executive member 2014-2018), Ontario class G driver's license, and Snowmobile License.

### EXPERIENCE

Experience in environmental impact assessments, environmental monitoring, environmental assessments, terrestrial habitat assessment, species at risk surveys, amphibian surveys, avian surveys, freshwater habitat assessment, collection and identification of plants, collection and identification of aquatic invertebrate, collection and identification of fish, fish salvage, fish behavioral studies, winter bat hibernaculum inventories and fisheries inventories including habitat mapping, electroshocking, FWIN and RIN. Other experience include GIS mapping.

### Environmental and Fisheries Inspections

- Provided environmental and fisheries inspections for the construction of the Cataraqui Crossing HWY 401-MTO (Kingston, ON).
- Provided environmental and fisheries inspections for the construction of the Three Nations Bridge including surveys for nesting species at risk (Cornwall, ON).
- Provided environmental and fisheries inspections for construction (Ottawa, ON).
- Conducted nest surveys (Kemptonville, ON.; Stittsville, ON.; Cornwall, ON.)
- Conducted environmental inspections for the construction of the Clarkson WWTP outfall, Lake Ontario.
- Conducted environmental inspections for the construction of a new bridge crossing Bearbrook Creek along the 417.

- Provided environmental and fisheries inspections for the blasting and drilling operation for the Burloak Water Purification Tunnel project (Burlington, ON).
- Provided environmental and fisheries inspections for the construction of the Poole Creek Re-alignment/Huntmar Drive Crossing.

#### **Species at Risk Inventories / Monitoring**

- Butternut survey and assessment for proposed developments (Brockville, Carleton Place, Carp, Clarence-Rockland, Cornwall, Munster, Hawkesbury, Kemptville, Ottawa, South Lancaster, Smith Falls, Stittsville, Prospect, Vars, Moose Creek, Prescott, Westminster, Renfrew, Battersea, Jones Falls, and Millbrook).
- American Eel surveys using the boat electrofisher on the Mississippi River (Almonte, ON), South Nation River (Casselman, ON) and Ottawa River (Renfrew, ON; Ottawa, ON: Shawville, QC)
- American Eel collection on the St. Lawrence River for the St. Lawrence River Institute (Cornwall, ON)
- American Ginseng survey for proposed development (Kanata, South Lancaster and Renfrew).
- Whip-poor-will survey for proposed development (Navan, ON; Kemptville, ON; Stittsville, ON; Prescott, ON; Alexandria, ON) and quarries (Avonmore, Moosecreek, Prospect, Stittsville, Kanata, Ottawa)
- Assisted in a Least Bittern survey (Avonmore, ON)
- Conducted turtle surveys: Blanding's turtle, Eastern musk turtle (Carleton Place, ON; Ottawa, ON; Stittsville, ON; Kanata, ON, Prospect, ON)
- Conducted rapid clubtail surveys (Almonte, ON)
- Bat maternal nesting site surveys (Prescott, ON; Battersea, ON; Prescott, ON; Hawkesbury, ON; Russell, ON)

#### **Aquatic Inventories**

- Boat electrofishing along the shoreline of the Ottawa River (Chat Falls, ON) along the shoreline of the Cataraqui River (Kingston, ON), downstream of the Carillion Dam (Pointe-Fortune, QC), Lake St. Francis (South Lancaster, ON), South Nation River (Casselman, ON), Raisin River (Lancaster, ON), and the St. Lawrence River (Cornwall, ON)
- Collecting and data entry for benthic macroinvertebrate community surveys on several watercourses within Ontario including: Bonnechere River (Renfrew, ON), Montreal River (Latchford, ON), Jock River (Ottawa, ON), tributaries of the Bonnechere River (Renfrew, ON), tributaries to Feedmill Creek (Ottawa, ON), tributary to Chippewa Creek (North Bay, ON) and tributary to the Beaudette River (Alexandria, ON).
- Collecting and data entry for several fish community surveys including: Black Creek (Westminster, ON), Bonnechere River (Renfrew and Douglas, ON), Butler's Creek (Brockville, ON), East Branch of Little Cataraqui Creek (Kingston, ON), Kehoe Ditch (Greely, ON), Lac Opemisca (Ouje-Bougoumou, QC), Marshall Seguin Municipal Drain (Vars, ON), Montreal River (Latchford, ON), tributaries of Lavelle Creek (Carleton Place), tributaries to Feedmill Creek (Ottawa, ON), tributaries to Lafontaine Creek (Clarence-Rockland), tributaries to Shirley's Brook (Kanata, ON), tributaries to the Beaudette River (Alexandria, ON), tributaries to the Bonnechere River (Renfrew, ON), tributaries to the Ottawa River (Carp, ON; Ottawa, ON; Wendover, ON; Clarence-Rockland, ON), tributaries to the South Nation River (Casselman, ON), tributaries to the South Nation River (Jessup Falls, ON), tributary to Hawkesbury Creek (Hawkesbury, ON), Hawkesbury Creek (Hawkesbury, ON), tributary to the St. Lawrence River (Prescott, ON) and tributary to the North Castor River (Greely, ON).
- Mapped fish habitat in many watercourses including: Black Creek (Westminster, ON), Bonnechere River (Renfrew and Douglas, ON), Butler's Creek (Brockville, ON), Kehoe Ditch (Greely, ON), Lac Opemisca/Lac Barlow Bypass channel (Ouje-Bougoumou, QC), Marshall Seguin Municipal Drain (Vars, ON), McKinnons Creek (Navan, ON), Montreal River (Latchford, ON), tributaries of Lavelle Creek (Carleton Place), tributaries of the Bonnechere River (Renfrew, ON), tributaries to Lafontaine Creek (Clarence-Rockland), tributaries to McKinnons Creek (Navan, ON), tributaries to Shirley's Brook (Kanata, ON), tributaries to the North Castor River (Greely, ON), tributaries to the Ottawa River (Ottawa, ON; Wendover, ON), tributaries to the South Nation River (Casselman, ON), tributaries to the South Nation River (Jessup Falls, ON), tributary to the St. Lawrence River (Prescott, ON) and tributary to Hawkesbury Creek (Hawkesbury, ON).
- Assisted in YOY sampling on the Raisin River (Lancaster, ON).
- Conducted riverine index netting on the Bonnechere River (Renfrew, ON).

- Assisted in gill netting on Bonnechere River (Renfrew, ON), Lac Barlow (Ouje-Bougoumou, QC), Lac Opemisca (Ouje-Bougoumou, QC), Montreal River (Latchford, ON), and Raisin River (Lancaster, ON).
- Assisted in conducting larvae surveys on Bonnechere River, Hoople Creek, Montreal River and Raisin River,
- Collected walleye eggs from the spawning grounds on the Bonnechere River, Montreal River, Raisin River and Hoople Creek.
- Assisted in the monitoring of a new wetland channel created in the Little Cataraqui River.
- Marsh monitoring program breeding amphibian survey at Stittsville, ON; Cornwall, ON; Kanata, ON; Hoople Creek and the Bonnechere River.
- Assisted in conducting fall walleye index netting for the MNR in Kawartha Lakes
- Conducted turtle surveys (Carleton Place, ON; Ottawa, ON)
- Conducted headwater waters assessment (Kanata, ON; Navan, ON, Ottawa, ON)

#### **Terrestrial Inventories**

- Multiple Environmental Impact Assessments across Ontario
- Tree Inventory for construction of the light rail (LRT; Ottawa, ON)
- Winter white-tailed deer survey (Edwardsburgh, ON)
- Plant community inventories for proposed developments, quarries, sand pits and road extensions (Brockville, Carleton Place, Carp, Casselman, Elgin, Griffith, Hamilton, Jessup Falls, Navan, Ottawa, Stittsville, Rockland, Simcoe, Cornwall, Kemptville, Hawkesbury, Smith Falls, Wendover, Moosecreek, Westminster, Prescott, Renfrew, Jones Falls, Michipicoten Island and in Ouje-Bougoumou in QC)

#### **Aquatic Habitat Mapping for Municipal, City Roads and Provincial Highways**

- Conducted MTO habitat assessments at Galetta Side Road, Torbolton Road, Kinburn Side Road (Ottawa, ON)
- Conducted MTO habitat assessments at Prince of Wales, Fernbank Road, Fallowfield Road, HWY 115, Arbuckle drain, the Carp river, tributaries to the Carp river and tributaries to Mud creek (Ottawa, ON)
- Conducted MTO habitat assessments at Innes Road, Ottawa, ON.
- Conducted MTO habitat assessments at MacLaren Side Road, Ottawa, ON.

#### **Other**

- Fish salvage: Mississippi River (Almonte, ON), Monaghan Drain (Ottawa, ON), tributary to the Rideau Canal (Kemptville, ON), and tributary to Feedmill Creek (Ottawa ON), Bonnechere River (Renfrew, ON)
- Assisted in conducting a winter bat hibernaculum inventory (Plantagenet, ON)
- Field research assistant for the Metalicuous study and EDC study (Experimental Lakes Area, ON)
- Captured, pit tagged, telemetry tagged and tracked Northern Pike (Experimental Lakes Area, ON)
- Construction and maintenance of nature trail (the Cornwall Outdoor Recreational Area, ON)
- Conducted frog deformities surveys (Glengarry, ON)
- Organized youth fishing derbies through SLFGC (2011-2013; South Lancaster)
- Organized the St.Francis Walleye Tournament through SLFGC (2012-2013; South Lancaster)



20373 Bethune Street  
South Lancaster, On  
K0C 2C0  
613.571.8883  
shaun@bchenviro.ca

**CODY J.C FONTAINE, Fisheries and Wildlife Technologist**

**EDUCATION**

Fisheries and Wildlife Technology, Frost Campus, Sir Sandford Fleming College, 2012  
Fisheries and Wildlife Technician, Frost Campus, Sir Sandford Fleming College, 2011

**LANGUAGES**

Fluent in English

**POSITIONS HELD**

2022: BCH Environmental Consulting Inc., Fisheries and Wildlife Technologist  
2014: Bowfin Environmental Consulting Inc., Fisheries and Wildlife Technologist  
2009: Raisin Region Conservation Authority, Field Research Assistant

**CERTIFICATIONS / PROFESSIONAL AFFILIATIONS**

MTO/DFO/OMNR Fisheries Protocol, Environmental Monitoring For Construction Projects Practitioner (EMCPP), Ontario Stream Assessment Protocol (OSAP), Class 2 Electroshocking, first aid, CPR, Pleasure Craft Operator Card, WHMIS, WHSA, Hazard Identification, Assessment and Control, Ice Safety Training, Possession / Acquisition Firearms License, Fish Identification Certificate, Radio Telemetry Certificate, Fish Hatchery Operations Certificate, Ontario Hunter Education Course Certificate, Ontario trapper Education Course Certificate, Ontario class G driver's license.

**EXPERIENCE**

Experience in environmental monitoring, environmental assessments, terrestrial habitat assessment, species at risk surveys, amphibian surveys, freshwater habitat assessment, collection and identification of plants, collection and identification of fish, fish salvage, bat hibernaculum inventories and fisheries inventories including netting and electroshocking. Other experiences include GIS mapping.

**Aquatic Inventories**

- Assisted with boat electrofishing along the shoreline of the Ottawa River (Chat Falls and Ottawa, ON), Lake St. Francis (South Lancaster, ON), Bonnechere (Renfrew, ON), Raisin River (Lancaster, ON), Buckhorn Lake (Peterborough, ON) and the St. Lawrence River (Cornwall, ON)
- Assisted in collecting and data entry for several fish community surveys including: Bonnechere River (Renfrew, ON), tributaries to Feedmill Creek (Ottawa, ON), tributaries to Shirley's Brook (Kanata, ON), tributaries to the Ottawa River (Ottawa, ON), tributaries to the Rideau River (Manotick, ON), tributaries to the Castor River (Vars, ON), tributaries to the Otonabee River (Lakefield, ON), tributary to the Madawaska River (Arnprior, ON), tributaries to Kemptville Creek (Kemptville, ON), tributary to Blairs Creek (Clarence Creek, ON), tributaries to South Indian Creek River (Russell, ON) tributaries to the South Nation River (Casselton, ON), tributaries to Fraser Clarke Drain (Nepean, ON), tributaries to the Raisin River (Long Sault, ON), Oliver-Magee drain (South Glengarry, ON) and tributary to Hawkesbury Creek (Hawkesbury, ON).
- Assisted in collecting walleye eggs from the spawning grounds on the Raisin River.
- Marsh monitoring program breeding amphibian surveys (Stittsville, Lakefield, Cornwall, Long Sault, South Glengarry, Bourget, Manotick and Kanata, ON).
- Conducted turtle surveys (Carleton Place, Ottawa, Cornwall and Lancaster, ON)
- Conducted Headwater Assessments (Ottawa, Stittsville and Manotick, ON)
- Invasive Species Survey (Ottawa, ON)

**Species at Risk Inventories / Monitoring**

- Assisted in butternut surveys, inventories and assessments for proposed developments (Carleton Place, Casselman, Cornwall, South Glengarry, Long Sault, Kemptville, Smiths Falls, Ottawa, Stittsville, Peterborough, Lakefield, Brockville, Alfred, Orleans, Kanata and Prescott, ON).
- American Eel surveys using the boat electrofisher on the Ottawa River (Ottawa, ON)
- American Eel collection on the St. Lawrence River for the St. Lawrence River Institute (Cornwall, ON)
- Conducted tailrace surveys for hydro facilities regarding American eel and lake sturgeon fatalities (Almonte, Renfrew, Ottawa and Fitzroy Harbour, ON)
- Whip-poor-will survey for proposed development (Ottawa, Kemptville, Bourget, Stittsville, Alfred, South Glengarry and Alexandria, ON) and quarries (Ottawa and Cornwall, ON)
- Surveyor for Little Brown bat, Eastern Small Footed Bat and Northern Long Eared Bat surveys at Ernestown Windpark (Ernestown, ON)
- Gray Ratsnake Survey (Smiths Falls and Lakefield, ON)
- Bat Cavity Survey (Lakefield, Smiths Falls, Bourget, Clarence Creek, Casselman, Orleans, Kanata, South Glengarry and Embrun, ON)
- Conducted Least Bittern surveys (Prospect, Alexandria, and Lancaster, ON)
- Conducted Black Tern nest surveys (Alexandria, and Cornwall, ON)
- Conducted turtle surveys: Blanding's turtle, Musk turtle and Northern Map turtle, Painted turtle and Snapping turtle (Carleton Place, Ottawa, Stittsville, Kanata, Rockland, Cornwall, Lakefield, Alfred, Clarence Creek and Lancaster, ON)
- Conducted American Ginseng Survey (Alfred, ON)
- Conducted rapid clubtail surveys (Almonte, ON)
- Conducted Osprey nest surveys (Cornwall, ON)

#### **Terrestrial Inventories**

- Assisted plant community inventories for proposed developments (Ottawa, Cornwall and Prescott, ON)
- Assisted in ELC inventories (Ottawa, Lakefield, Alfred, Kanata, Long Sault, South Glengarry and Peterborough ON)
- Nesting Bird Survey (Stittsville and Brockville ON)
- Large Tree Survey (Carp, Kanata and Orleans, ON)
- Deer and Moose Overwintering Survey (Alfred, ON)

#### **Environmental and Fisheries Inspections**

- Assisted in providing environmental and fisheries inspections for construction (Ottawa, ON)
- Assisted in turtle salvage during construction at the Cavanagh Snow Dump (Kanata, ON)

#### **Fish Salvage**

- Highway 401 Fish Salvage – Brockville, ON and Prescott, ON (Cruikshank, MTO Contract)
- Other fish salvages: Cardinal Creek (Ottawa, ON), Monaghan Drain (Ottawa, ON), tributary to the Rideau Canal (Kemptville, ON), tributary to Feedmill Creek (Ottawa ON), Bonnechere River (Renfrew, ON), Mississippi River (Almonte, ON), Ottawa River (Ottawa, ON), Tributary to Fraser Clarke Drain (Nepean, ON), tributary to St.Lawrence River (Newington, ON), Davidson Pond (Ottawa, ON),. Hazeldean tributary (Ottawa, ON), tributary to Jock River (Richmond, ON), culvert on Thunder Road (Gloucester, ON), culvert on Dunning Road (Cumberland, ON)

#### **Other**

- Organized fishing derby through RRCA (2008-2012; Cornwall, ON)
- Conducted environmental education presentations to many school groups (Cornwall, and Lancaster, ON)
- Tree Planting (2008-2012; Cornwall, ON)

## APPENDIX C: On-site Reference Handout

**General Provisions:**

- Watch out for wildlife while driving, and avoid hitting them, provided that it is safe to do so.
- Ensure sediment and erosion control measures (i.e., silt fencing) and other protective measures are in place prior to beginning work. Inspect them regularly, and particularly after storm events, to ensure their continued effectiveness.
- Prior to beginning work each day, check for wildlife by conducting a thorough visual inspection of the work space and immediate surroundings.
- Restrict all activities, vehicles and materials to the designated work space. Do not disturb areas identified for retention.
- Secure stockpiled materials, vehicles and structures against wildlife entry.
- Litter and other waste materials must be appropriately contained and promptly disposed of.
- Do not feed any wildlife or leave food out where it could attract them.





**For health and safety reasons, and for protection of animals, removal and relocation of mammals must only be done by qualified and properly equipped personnel. Call the wildlife service provider [BCH ENVIRONMENTAL CONSULTING INC.] at (613) 571-8883 for assistance.**

**Scratches and bites from animals, whether domestic or wild, can result in serious infections and/or transmit diseases. Seek medical treatment immediately for any person injured by an animal.**

**Wildlife Encounters:**

- **Do not harm any wildlife.** Many species are protected under provincial and/or federal legislation. Legal protection of egg-laying species applies to their eggs as well. Penalties for contravening these Acts can be severe.
- **Stand back** and allow the animal to leave the site. Wildlife may be encouraged to move away from the work area by shouting, waving of arms, clapping of hands or gentle redirection using a push broom. Contact project biologist / wildlife service provider for assistance if needed (e.g., if young animals are found). Do not unnecessarily harass any wildlife.
- **Turtles** may need to be helped to safety. Our most common species, Painted and Snapping Turtles, are protected under the Fish and Wildlife Conservation Act, 1997. If one of these turtles is found in the work area, it can be gently removed to a safe location nearby. Wear gloves, or use a broom to steer the turtle into a bucket or other container. Handle with care to avoid injury to the turtle or yourself, particularly when dealing with Snapping Turtles, which may bite or scratch. Turtles may also wet themselves when handled.
- Most of Ottawa's **snakes** are protected under the Fish and Wildlife Conservation Act, 1997. None of them are venomous, but bites may cause infections. Some produce a foul-smelling musk when handled, instead of biting. Snakes will usually try to escape or hide when disturbed, and only defend themselves when trapped. If a snake is found in the work area, it should be gently herded out to a safe location.
- **Stop work immediately** if any species protected under the Endangered Species Act, 2007 are seen in or near the work site (see attached sheet for tips on identifying some commonly encountered species). Take a photograph if possible, to confirm the sighting, and contact the project biologist at (613) 571-8883 and the Ministry of Environment, Conservation and Parks at [SAROntario@ontario.ca](mailto:SAROntario@ontario.ca). Additional measures to avoid impacts may be required by the Ministry before work can restart.

APPENDIX D: Commonly Encountered Species Protected under the Endangered Species Act,  
2007

<p><b>Blanding's Turtle</b></p> <p>Bright yellow chin and throat. Highly domed, speckled shell up to 28 cm (11 in) in length.</p> <p>Eggs small, oval and white. Usually less than 12 eggs per nest.</p>	 <p>Photo courtesy of R. van de Lande</p>
<p><b>Bobolink</b></p> <p>Males black with white back and cream hood during spring and summer breeding season. Females and non-breeding males streaky brown. Nests on the ground in open grasslands and hayfields.</p>	 <p>Photo courtesy of A. MacPherson</p>
<p><b>Eastern Meadowlark</b></p> <p>Streaky grayish-brown bird with bright yellow front marked by black "V." Short tail has white edges on each side. Nests on the ground in open grassy areas; often seen perching on fence posts or shrubs.</p>	 <p>Photo courtesy of A. MacPherson</p>
<p><b>Butternut</b></p> <p>Each leaf has several pairs of leaflets on either side of the main stalk, and one leaflet at the tip. Leaves and twigs grow in an alternating pattern along the branches. The nuts resemble limes or lemons in shape, and have greenish-yellow fuzzy rinds covering a hard, brown, ridged shell. The closely related Black Walnut. Its leaves are very similar to Butternut's leaves, but the terminal leaflet at the tip of each leaf is often much smaller than the other leaflets, or missing entirely.</p>	 <p>Photo courtesy of A. MacPherson</p>

## APPENDIX E: Agency Contact

Agency	Staff Contact(s)	Telephone	Information/Authority on:
City of Ottawa	Planner	(613) 580-2424	Development application review process
	Environmental Planner	(613) 580-2424	EIS and other municipal environmental policies
	Forester-Planning	(613) 580-2424	Tree Conservation Report and urban tree removal
Conservation Authority – usually only one will be involved in any given application	Mississippi Valley Rideau Valley South Nation	(613) 253-0006  (613) 692-3571 (613) 984-2948	Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation
Fisheries and Oceans Canada	Fish and Fish Habitat Protection Program (Ontario)	1-855-852-8320 <a href="mailto:FisheriesProtection@dfo-mpo.gc.ca">FisheriesProtection@dfo-mpo.gc.ca</a>	Fish and fish habitat issues
Ministry of Environment, Conservation and Parks	Management Biologist	<a href="mailto:SAROntario@ontario.ca">SAROntario@ontario.ca</a>	Provincially protected species at risk (occurrence data, habitat information, advice and applications for permits under the <i>Endangered Species Act, 2007</i> ).
Ministry of Natural Resources and Forestry (Kemptville District office)	Management Biologist	(613) 258-8204 (main office)	Wetlands; Areas of Natural and Scientific Interest; significant wildlife habitat.



APPENDIX F: PLANS



## APPENDIX G: BUTTERNUT HYBRID TESTING RESULTS



## BUTTERNUT HYBRIDITY TESTING RESULTS

<b>Order number:</b>	NA-SO00317
<b>Report number:</b>	NM-ALV976
<b>Company:</b>	6980848 Canada Corporation
<b>Contact:</b>	Daniel Payer
<b>Project:</b>	Cedar Lakes Ph3-4
<b>Sample type:</b>	Plant tissue
<b>Date of report:</b>	13 Oct 2023
<b>Number of samples:</b>	2

Thank you for sending your samples for analysis by NatureMetrics. Your samples have been **analysed** following our **Butternut RFLP (Restriction Fragment Length Polymorphism)** pipeline supplemented by **Sequence Characterized Amplified Region (SCAR)** codominant marker.

Butternut (*Juglans cinerea* L.) is considered an **endangered (EN)** tree species in Ontario. This report contains biodiversity information that may be sensitive, particularly with respect to endangered or protected species. It is the responsibility of the client to ensure that due consideration is given to the data and that the information is shared in a responsible way.

**Disclaimer:** Provided test only detects the occurrence of a hybridization event between butternut (*J. cinerea* L.) and Japanese Walnut (*J. ailantifolia* Carr.) similar to the previous OFRI test derived from the publication by Zhao and Woeste (2011).

Here we present an overview of the key results, followed by a more detailed report that starts with the taxonomic composition of the samples followed by a more detailed look at the steps taken to extract, amplify, sequence, and analyse your DNA. A glossary for terms in **bold** is provided at the end of the report to define key terms used within the report.

### OVERVIEW OF YOUR RESULTS

- A total of 0 **butternut** sample(s) and 2 **hybrid** sample(s) (see **Disclaimer**) were identified.
- All laboratory **controls** performed as expected.

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## FULL REPORT

### Sample composition

A total of 0 butternut sample(s) and 2 hybrid sample(s) were identified (**Table 1**).

*High-quality PCR products were obtained from all four tested markers with corresponding restriction enzyme profiles, where applicable.*

*All laboratory controls performed as expected.*

**Table 1.** The summary of RFLP and SCAR results of the sample(s) submitted.

Customer ID	Barcode	Date arrived	trnT-R RFLP	ITS RFLP	15R-8 RFLP	22-5 SCAR	Identification
BN 1	NAS-01-H0464	27-Sept-23	<i>J. ailantifolia</i>	<i>J. ailantifolia</i>	<i>J. cinerea</i>	<i>J. ailantifolia</i>	Hybrid
BN 2	NAS-01-H0465	27-Sept-23	<i>J. ailantifolia</i>	Hybrid	<i>J. cinerea</i>	Hybrid	Hybrid



## METHODS

DNA from plant sample(s) was extracted using a commercial plant DNA extraction kit with a protocol modified to produce standard DNA yields suitable for PCR and restriction analysis. An extraction blank was also processed for the extraction batch.

Extracted DNAs for sample(s) and negative extraction control were amplified with **PCR** for four regions: trnT-F, ITS, 15R-8 and 22-5.

All PCRs were performed using pre-validated PCR mixes in the presence of both a **negative DNA extraction control** and a **negative PCR control**. Amplification and restriction enzyme digestion products were analyzed by **gel electrophoresis**.

### Markers and corresponding restriction digests:

Assay #1) PCR amplification of chloroplast gene trnT-F, followed by restriction digest with enzyme MbolI.

Assay #2) PCR amplification of ITS region of ribosomal nuclear DNA, followed by restriction digest with enzyme BsiEI.

Assay #3) PCR amplification of random nuclear fragment called "15R-8", followed by restriction digest with enzyme AclI.

Assay #4) PCR amplification of SCAR marker 22-5 without restriction digest.

**Comment:** PCR reactions were consistently successful for all four markers for 2 sample(s). Electrophoresis bands were strong and of the expected size and no PCRs required repeating. No bands were observed on electrophoresis gels for the extraction blank or negative controls.

## END OF REPORT

---

Report issued by: **May Mei**  
Report reviewed by: **Natalia Ivanova**  
Contact: [team@naturemetrics.co.uk](mailto:team@naturemetrics.co.uk)

## REFERENCES

Zhao, P. & Woeste, K. E. (2011). DNA markers identify hybrids between butternut (*Juglans cinerea* L.) and Japanese walnut (*Juglans ailantifolia* Carr.). *Tree Genetics & Genomes*, 7, 511-533.

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## GLOSSARY

**Butternut  
Extraction Blank**

*Juglans cinerea* L.

A DNA extraction with no sample added to assess potential contamination during the DNA extraction process.

**Gel Electrophoresis**

The process in which DNA is separated according to size and electrical charge via an electric current, while in a gel. The process is used to confirm the successful amplification of a specific size fragment of DNA.

**Inhibitors/inhibition**

Naturally-occurring chemicals/compounds that cause DNA amplification to fail, potentially resulting in false negative results. Common inhibitors include tannins, humic acids and other organic compounds. Inhibitors can be overcome by either diluting the DNA (and the inhibitors) or by additional cleaning of the DNA, but dilution carries the risk of reducing the DNA concentration below the limits of detection. At NatureMetrics, inhibition is removed using a commercial extraction/purification kit.

**Hybrid**

In this report – hybrid between butternut (*J. cinerea* L.) and Japanese Walnut (*J. ailantifolia* Carr.).

**IUCN Red List**

The IUCN (International Union for the Conservation of Nature) is a global union of government and civil organisations that disseminates information to assist conservation. The IUCN Red List of Threatened Species is an inventory of the conservation status of over 100,000 species worldwide. The Red List evaluates data such as population trends, geographic range and the number of mature individuals in order to categorise species based on their extinction risk:

**Extinct (EX)** - No individual of this species remains alive.

**Extinct in the Wild (EW)** - Surviving individuals are only found in captivity.

**Critically Endangered (CE)** - species faces an extremely high risk of extinction in the wild. e.g. Population size estimated at fewer than 50 mature individuals.

**Endangered (EN)** - species faces a very high risk of extinction in the wild. e.g. Population size estimated at fewer than 250 mature individuals.

**Vulnerable (VU)** - species faces a high risk of extinction in the wild. e.g. Population size estimated at fewer than 10,000 mature individuals and declining.

**Near Threatened (NT)** - species is below the threshold for any of the threatened categories (CE, E, V) but is close to this threshold or is expected to pass it in the near future.

**Least Concern (LC)** - species is not currently close to qualifying for any of the other categories. This includes widespread and abundant species.

**Data Deficient (DD)** - There is currently insufficient data available to make an assessment of extinction risk. This is not a threat

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<b>Negative Control PCR</b>	category - when more data becomes available the species may be recategorised as threatened. Used to determine if PCR reactions are contaminated. Short for Polymerase chain reaction. A process by which millions of copies of a particular DNA segment are produced through a series of heating and cooling steps. Known as an 'amplification' process. One of the most common processes in molecular biology and a precursor to most sequencing-based analyses.
<b>RFLP</b>	Short for Restriction Fragment Length Polymorphism which is a difference in homologous DNA sequences that can be detected by the presence of fragments of different lengths after digestion of the DNA samples in question with specific restriction endonucleases.
<b>Positive Control Primers</b>	Used to determine whether the assay is working correctly. Short sections of synthesised DNA that bind to either end of the DNA segment to be amplified by PCR. Can be designed to be totally specific to a particular species (so that only that species' DNA will be amplified from a community DNA sample), or to be very general so that a wide range of species' DNA will be amplified. Good design of primers is one of the critical factors in DNA-based monitoring.
<b>SCAR</b>	Short for Sequence Characterized Amplified Region. SCARs are DNA fragments amplified by the PCR using specific 15-30 bp primers, designed from nucleotide sequences established from cloned RAPD fragments linked to a trait of interest. Obtaining a codominant marker may be an additional advantage of converting RAPDs into SCARs, although SCARs may exhibit dominance when one or both primers partially overlap the site of sequence variation. Length polymorphisms are detected by gel electrophoresis.
<b>Taxon (s.) / taxa (pl.)</b>	Strictly, a taxonomic group. Here we use the term to describe groups of DNA sequences that are equivalent to species. We do not use the term species because we are unable to assign complete identifications to all of the groups at this time due to gaps in the available reference databases.
<b>Taxonomy</b>	<p><b>species (s./pl.)</b> - A group of individuals capable of interbreeding. This is the most important taxonomic unit defined by scientists and the population trends of individual species are a key indicator in judging the effect of conservation programs. Related species are grouped together into progressively larger taxonomic units, from genus to kingdom. <i>Homo sapiens</i> (human) is an example of a species.</p> <p><b>genus (s.) / genera (pl.)</b> - A group of closely related species. Each genus can include one or more species. <i>Homo</i> is an example of a genus.</p> <p><b>family (s.) / families (pl.)</b> - A group of closely related genera. <i>Homo sapiens</i> is in the family Hominidae (great apes).</p> <p><b>order (s.) / orders (pl.)</b> - A group of closely related families. <i>Homo sapiens</i> is in the order Primates.</p> <p><b>class (s.) / classes (pl.)</b> - A group of closely related orders. <i>Homo sapiens</i> is in the class Mammalia.</p>

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