Arkell Road Properties

Environmental Impact Study Addendum

Prepared for:

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NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

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1.0 Introduction

This Environmental Impact Study (EIS) Addendum has been prepared in response to the comment received from the City of Guelph Environmental Planner following their review of the December 2021 Arkell Road Properties EIS (NRSI) and Preliminary Stormwater Management Report (MTE 2021):

> *"An EIS Addendum that assesses the potential for negative impacts based on the updated Stormwater management design concept and monthly wetland water balance calculations is required"* (City March 24, 2022). "

This EIS Addendum is to be read in conjunction with the December 2021 EIS (NRSI). The following information is intended to replace the original natural feature sensitivity analysis as it relates to the proposed stormwater management plan and hydrologic changes as described in the Preliminary Stormwater Management Report (MTE 2023a). An updated impact analysis has been completed to ensure that the revised stormwater management strategy does not have a negative impact on the wetland and overall Torrance Creek Wetland Complex.

Since submission of the 2021 EIS and Tree Inventory and Preservation Plan (TIPP NRSI 2021), minor changes have been made by the team to the overall plan of development. The limit of development and buffers to the natural features as outlined in the 2021 EIS and TIPP have been maintained. The reader is referred to these documents for a full description of existing conditions, analysis of impacts and recommended mitigation. This EIS Addendum includes updated mapping of the natural feature constraints (Map 1), habitat stewardship plan (Map 2) and tree preservation plan (Map 3) to reflect the revised development plan layout.

2.0 Natural Feature Sensitivity Analysis

A sensitivity analysis, following the Wetland Water Balance Risk Evaluation (TRCA 2017), was completed based on the Preliminary Stormwater Management Plan (MTE 2023a) and associated hydrologic changes proposed as part of the Arkell Road development. The analysis focused on the Provincially Significant Wetland (PSW) vegetation community, flora composition, and anuran species documented within the subject property during field surveys conducted by NRSI to inform the original Environmental Impact Study (EIS) Reports.

The risk of a proposed development to the hydrological and ecological integrity of a wetland is determined using a suite of criteria outlined in the Risk Evaluation document (TRCA 2017). The level of risk a proposed development has is based on the magnitude of change proposed and the sensitivity of the wetland to hydrological changes. The sensitivity analysis feeds into the risk evaluation and provides critical information for the assessment of impacts to the PSW.

2.1 Vegetation Sensitivity

The existing condition of the wetland vegetation communities is a good indicator of the overall health of the PSW. The vegetation communities also provide food and critical habitat for a wide variety of wildlife species. As such, assessing the sensitivity of the PSW vegetation communities is critical to determining the resilience of the wetland to hydrological changes proposed as part of the development. Changes in duration, depth, timing and frequency of water level fluctuations can all impact the vegetation communities and therefore the habitat for wildlife on and adjacent to the subject property, and downstream to Torrance Creek.

The analysis consisted of comparing the vegetation community data (based on Ecological Land Classification, Lee et al. 1998) and species lists collected by NRSI on October 25, 2017 and June 9, 2018 to information provided in the Toronto Region Conservation Authority (TRCA) "Wetland Water Balance Risk Evaluation" (2017) and the United States (U.S.) National Database of Wetland Plant Sensitivities (Adamus and Danielson 2002). The TRCA (2017) document includes tables that rank vegetation communities and individual species by their sensitivity to hydrologic change. The U.S. Database provides sensitivity rankings for individual species. The database is not a complete list of all wetland plants; however, it does provide information to augment the TRCA's document.

Table 1 includes a list of all vegetation species identified in the three ecosites of the PSW that have sensitivity information in Appendix 3 of the Wetland Water Balance Risk Evaluation (TRCA

2017) and the U.S. National Database of Wetland Plant Sensitivities (Adamus and Danielson 2002). The remaining species that are not listed in Table 1 are not included in these two sources. Of the dominant species listed within the vegetation communities, Glossy Buckthorn (*Frangula alnus)*, a non-native species, is the only species lacking sensitivity data. The SWD3-2 and SWM1-1 communities are both listed as having 'Medium' sensitivity to hydrologic changes (TRCA 2017). SWD4 is not included in the TRCA tables and no Trembling Aspen (*Populus tremuloides*) dominated communities are listed as a comparison. Other SWD4-# communities range from High to Low sensitivity so this was determined not to be a suitable comparison for the sensitivity of the SWD4 community.

Of the 61 vascular plant species documented within the wetland, data on hydrological sensitivity or tolerance was available for 35 species (Adamus and Danielson 2002, TRCA 2017). The U.S. National Database of Wetland Plant Sensitivities (Adamus and Danielson 2002) provided data for 34 of the plant species present, with one species (2.94%) listed as 'Tolerant', three (8.82%) as 'Moderately Tolerant', and 26 (76.47%) as 'Somewhat Tolerant', and two (5.88%) as 'Intolerant'. A range of tolerance (Somewhat Tolerant to Moderately Tolerant) was listed for two species (5.88%) (Woolly Blue Violet (*Viola sororia*) and Celandine (*Chelidonium majus*)), which results from differences identified in multiple sources. The two 'Intolerant' species are Redtop (*Agrostis stolonifera*) and Riverbank Grape (*Vitis riparia*), both of which were noted to be intolerant of flooding conditions lasting more than three days (Adamus and Danielson (2002). Given that the SWM pond is designed with a minimum detention time of 12 hours (24.9hrs for the 25mm-4hr event), and that the wetland gently slopes away from the development and towards Torrance Creek, flood conditions lasting more than three days are not anticipated to occur (MTE 2023a).

The TRCA's Wetland Water Balance Risk Assessment (2017) provided data for nine of the plant species present. Of these species, one species (11.11%) was listed as having 'Low' sensitivity, and seven (77.78%) were listed as having 'Medium' sensitivity to changes in hydrology (TRCA 2017). The vegetation species list noted one unidentified sedge species (*Carex* species) that was found in the SWD3-3 community. Sedge species have a wide range of tolerances to changes in hydrology. This species was noted in the sensitivity analysis as having a Low to High sensitivity depending on the specific species (11.11%); however more detailed analysis cannot be conducted.

Table 1. PSW Community Vegetation Sensitivity

Scientific Name	Common Name	CC	CW	Weed	SRANK[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Wellington County[5]	Wellington/Dufferin County[6]	Wetland Water Balance Risk Assessment – Sensitivity[7]	U.S. National Database of Wetland Plant Sensitivities – Flood Duration Increase[8,9]
Acer negundo	Manitoba Maple	0	-2		S5					X	N/A	MT
Acer saccharinum	Silver Maple	5	-3		S5					X	Medium	T
Acer X freemanii	Freeman's Maple										Medium	N/A
Achillea millefolium ssp. millefolium	Common Yarrow		3	-1	SE?					X	N/A	N/A
Agrimonia gryposepala	Tall Hairy Agrimony	2	2		S5					X	N/A	N/A
Agrostis stolonifera	Redtop		-3		S5					X	N/A	IT to Flooding > 3 days
Alliaria petiolata	Garlic Mustard		0	-3	SE5						N/A	ST
Ambrosia artemisiifolia	Common Ragweed	0	3		S5					X	N/A	ST
Arctium minus ssp. minus	Common Burdock		5	-2	SE5					X	N/A	ST
Betula papyrifera	White Birch		2		S5					X	N/A	N/A
Carex species	Sedge species										Low to High depending on species	ST
Chelidonium majus	Celandine		5	-3	SE5					X	N/A	ST to MT
Circaea alpina	Smaller Enchanter's Nightshade	6	-3		S5					X	Medium	ST
Circaea lutetiana ssp. canadensis	Yellowish Enchanter's Nightshade	3	3		S5					X	N/A	ST
Cirsium arvense	Canada Thistle		3	-1	SE5					X	N/A	N/A
Cirsium vulgare	Bull Thistle		4	-1	SE5					X	N/A	N/A
Convallaria majalis	Lily-of-the-valley		5	-2	SE5						N/A	N/A
Conyza canadensis	Horseweed	0	1		S5					X	N/A	N/A
Cornus stolonifera	Red-osier Dogwood	2	-3		S5					X	N/A	ST
Dryopteris carthusiana	Spinulose Wood Fern	5	-2		S5					X	Medium	ST
Echinocystis lobata	Prickly Cucumber	3	-2		S5					X	N/A	N/A

Scientific Name	Common Name	CC	CW	Weed	SRANK[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Wellington County[5]	Wellington/Dufferin County[6]	Wetland Water Balance Risk Assessment – Sensitivity[7]	U.S. National Database of Wetland Plant Sensitivities – Flood Duration Increase[8,9]
Eupatorium perfoliatum	Perfoliate Thoroughwort	2	-4		S5					X	Low	ST
Fragaria virginiana	Wild Strawberry				S5					X	N/A	MT
Frangula alnus	Glossy Buckthorn		-1	-3	SE5					X	N/A	ST
Fraxinus pennsylvanica	Green Ash	3	-3		S5					X	N/A	N/A
Geum canadense	White Avens	3	0		S5					X	N/A	N/A
Hesperis matronalis	Dame's Rocket		5	-3	SE5					X	N/A	ST
Inula helenium	Elecampane		5	-2	SE5					X	N/A	N/A
Lonicera tatarica	Tartarian Honeysuckle		3	-3	SE5					X	N/A	N/A
Nepeta cataria	Catnip		1	-2	SE5					X	N/A	ST
Oenothera biennis	Common Evening-primrose	0	3		S5					X	N/A	ST
Origanum vulgare	Wild Marjarom		5	-2	SE5					X	N/A	ST
Parthenocissus vitacea	Woodbine	3	3		S5					X	N/A	N/A
Poa compressa	Canada Blue Grass	0	2		S5					X Int	N/A	
Populus balsamifera ssp. balsamifera	Balsam Poplar	4	-3		S5					X	N/A	ST
Populus tremuloides	Trembling Aspen	2	0		S5					X	N/A	N/A
Prunella vulgaris ssp. lanceolata	Heal-all	5	5		S5						N/A	ST
Prunus virginiana ssp. virginiana	Choke Cherry	2	1		S5					X	N/A	N/A
Ranunculus acris	Tall Buttercup		-2	-2	SE5					X	N/A	N/A
Rhamnus cathartica	Common Buckthorn		3	-3	SE5					X	N/A	ST
Ribes americanum	Wild Black Currant	4	-3		S5					X	N/A	ST
Sambucus canadensis	Common Elderberry	5	-2		S5					X	N/A	N/A
Solanum dulcamara	Bitter Nightshade		0	-2	SE5					X	N/A	ST
Solidago altissima var. altissima	Tall Goldenrod	1	3		S5					X	N/A	ST
Solidago canadensis	Canada Goldenrod	1	3		S5					X	N/A	ST
Solidago nemoralis ssp. nemoralis	Gray Goldenrod	2	5		S5					X	N/A	N/A

Scientific Name	Common Name	CC	CW	Weed	SRANK[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Wellington County[5]	Wellington/Dufferin County[6]	Wetland Water Balance Risk Assessment – Sensitivity[7]	U.S. National Database of Wetland Plant Sensitivities – Flood Duration Increase[8,9]
Solidago rugosa ssp. rugosa	Rough Goldenrod	4	-1		S5					X	N/A	N/A
Symphyotrichum ericoides var. ericoides	White Heath Aster				S5					X	N/A	N/A
Symphyotrichum lateriflorum var. lateriflorum	Calico Aster	3	-2		S5					X	N/A	N/A
Symphyotrichum novae-angliae	New England Aster	2	-3		S5					X	N/A	N/A
Symphyotrichum pilosum var. pilosum	Hairy Aster	4	2		S5					R	N/A	N/A
Taraxacum officinale	Common Dandelion		3	-2	SE5					X	N/A	N/A
Thuja occidentalis	White Cedar	4	-3		S5					X	Medium	ST
Tiarella cordifolia	False Mitrewort	6	1		S5					X	N/A	ST
Trifolium pratense	Red Clover		2	-2	SE5					X	N/A	ST
Trifolium repens	White Clover		2	-1	SE5					X	N/A	ST
Ulmus americana	White Elm	3	-2		S5					X	N/A	ST
Viburnum opulus	Guelder Rose		0	-1	SE4						Medium	MT
Viburnum trilobum	High Bush Cranberry	5	-3		S5					X	N/A	N/A
Viola sororia	Woolly Blue Violet	4	1		S5					X	Medium	ST to MT
Vitis riparia	Riverbank Grape	0	-2		S5					X	N/A	Intolerant to flooding > 3 days

N/A indicates data was not available or the species was not included in the list

[1]Oldham and Brinker 2009; [2,3]MNRF 2021; [4]Government of Canada 2021; [5,6]Dougan & Associates 2009; [7]TRCA 2017; [8]Adamus and Danielson 2002

[9]DEC= decrease, U= unaffected; IT= intolerant, ST= somewhat tolerant, MT= moderately tolerant, T= tolerant, VT= very tolerant.

Based on the sensitivity analysis and background review, the composition of the vegetation community is moderately sensitive to changes in hydrology. The dominant tree species in the wetland (Trembling Aspen, Silver Maple (*Acer saccharinum*), and Green Ash (*Fraxinus pennsylvanica*)) are known to inhabit locations with substantial fluctuations in water levels. Swamp communities tend to have fluctuating water levels with periods of inundation and dry periods. Swamp communities rely on both of these periods to maintain their vegetation communities and their ecological function. This vegetation community is tolerant of the proposed wetland water balance changes post-development. The water balance will generally maintain the existing hydroperiods, allowing for periods of inundation in the spring and early summer (April-July), and slightly drier periods in mid-summer to mid-autumn (August to October). Runoff volumes to the wetland will be higher than in the pre-development condition; however, the monthly distribution of excess runoff is generally balanced and reflects the pre-development distribution of runoff volumes. Runoff depths to the wetland also increase in the post-development water balance. These depths are spread out across runoff events occurring during each month. The post-development distribution of runoff depths over each month generally reflects the pre-development runoff distribution. The overall wetland complex west of Arkell Road covers an area of approximately 57ha and any surplus in runoff in each month is likely to distribute throughout the larger wetland complex. As such, the proposed changes to the water balance, and runoff to the wetland is not expected to have an impact on the wetland vegetation communities and the overall function of the wetland.

2.2 Wildlife Sensitivity

Anurans require shallow aquatic habitats with suitable water depth and hydroperiod for breeding, egg deposition, and successful larval development (BSC 2009). Two species of anurans (frogs and toads) were documented in the PSW within the subject property by NRSI staff in 2017:

- Approximately five Gray Treefrogs (*Hyla versicolor*) were heard calling from the east side of the SWD4 community within the subject property on May 29, 2017 and three Gray Treefrogs were heard calling on June 15, 2017 in the SWD4 community in the subject property; and
- Two American Toad (*Anaxyrus americanus*) were heard calling in the SWD4 community at the northern edge of the subject property on June 15, 2017.

According to the TRCA (2017), Gray Treefrogs have a 'High' sensitivity to changes in wetland hydrology and American Toads have a 'Medium' sensitivity. Wood Frogs (*Lithobates sylvatica*) were heard calling from the isolated man-dug pond on the subject property during anuran breeding surveys in 2017; however, no Wood Frogs were heard calling from the main PSW wetland during any of the surveys. As such, Wood Frogs were not considered as part of the sensitivity analysis for the wetland.

Gray Treefrogs typically breed in May and June in Ontario and American Toads typically breed between April and June (BSC 2009). There are no specific depth thresholds reported for breeding habitats used by these species; however, they are known to breed in a variety of ephemeral or permanent wetlands or ponds at a range of depths. Gray Treefrogs' eggs are laid at the surface of the water, while American Toads have been reported to lay their eggs at a range of depths (Dodd 2013) (Table 2).

Tadpoles of these two species develop in breeding ponds for 2-4 months until they metamorphosize (Pfingsten et al. 2013). No specific water depth thresholds for larvae are reported in the literature (Table 2). Hydro-period, water temperatures, water chemistry, resource availability, and presence of predators are likely more important factors for tadpole development and survival compared to overall water depth (assuming it doesn't shorten the hydro-period) (Dodd 2013)

Additional information on the breeding habitat requirements for the anuran species documented within the Study Area is provided in Table 2.

The proposed water balance generally maintains the distribution of wet and dry periods throughout the year, which will maintain the existing hydroperiod of the wetland. An increase in the runoff volumes to the wetland will occur post-development; however, due to the size of the overall wetland catchment, the volume and depths will not be sufficient to change the overall hydroperiod that Tree frogs and American toads rely on. As such, the proposed development is not anticipated to have a negative impact on the life cycle of these anuran species or other common anurans known to occur in the area.

Table 2. Breeding Habitat Requirements for Anuran Species Documented in the Study Area

	Species	
	American Toad (*Anaxyrus americanus*)	**Tetraploid Gray Treefrog (*Hyla versicolor*)**
Adult Habitat*		
Habitat Description	Open deciduous forests and grasslands, as well as disturbed habitats such as plantations, urban areas, and farmland.	Moist hardwood forests in close proximity (<40m) to breeding ponds.
Breeding Habitat*		
Habitat Description	Seasonal temporary ponds, permanent wetlands (bogs, fens, marshes), stream and river backwaters, flooded meadows, small pools, beaver ponds, as well as ditches, road ruts, sinkhole ponds, storm water management ponds.	Small wetlands and woodland pools adjacent to, or within, woodlands, as well as ditches, pasture ponds, quarries, sand pit ponds. Breeding ponds typically have shrubs and/or emergent or floating vegetation.
Hydroperiod	>4 months, may also be permanent	>4 months, may also be permanent
Water Depth	• No specific water depth thresholds for egg deposition or larvae are reported in the literature. • Eggs are laid in shallow water 10-30 cm in depth. • Larvae prefer shallow water, but have been observed at a record 8m depth.	• No specific water depth thresholds for egg deposition or larvae are reported in the literature. • Eggs are laid at the surface of the water. • Hydro-period, water temperatures, water chemistry, resource availability, and presence of predators are likely more important factors for larvae.

* Dodd 2013

3.0 Stormwater Management Plan and Water Balance Approach

MTE has developed a Preliminary Stormwater Management Plan (2023a) and Functional Servicing Report (2023b) that are provided under separate cover and are part of this resubmission package.

As detailed in the Preliminary Stormwater Management Plan and Functional Servicing Report, storm drainage for the proposed development will be provided through a combination of minor (piped) and major (overland) drainage systems, with several catchments conveyed to the stormwater management facility (SWMF). The majority of the onsite conveyance will be collected via a storm sewer network. The proposed street-fronting townhouse units will have individual service connections to sump pumps. Blocks 1 and 2 will be connected to storm sewer pipes.

The stormwater management plan for the subject property includes water quality, quantity, and erosion and sedimentation control. Water quality and quantity control will be provided by a 2-cell SWMF, consisting of a wet cell and an infiltration cell, as well as infiltration galleries. The reader is referred to the MTE reports for a fulsome description of the stormwater and functional services strategy (MTE 2023a, 2023b).

Discharge from the SWMF will be controlled via a multi-staged outlet. The infiltration cell downstream of the wet cell is sized to infiltrate the 25mm-4hr storm. Larger storms, up to and including the 100-year events, are infiltrated as much as possible up to the elevation of the overflow weir at the SWMF outlet. Any flows that cannot be infiltrated will be discharged to the Torrance Creek Wetland. Table 5.6 in the Preliminary Stormwater Management Report (MTE 2023a) identifies pre- and post-development discharges to the Torrance Creek Wetland. Table 3 below summarizes this information. Post-development peak runoff to the wetland will be less than the existing condition.

Table 3. Pre- and Post Development Peak Runoff Rates (MTE 2023a)

	25mm	2-year	5-year	10-year	25-year	50-year	100-year	Regional
Pre-development								
Total Discharge to Wetland (m^3/s)	0.038	0.069	0.122	0.166	0.213	0.252	0.302	0.392
Post-development								
Total Discharge to Wetland (m^3/s)	0.009	0.022	0.046	0.077	0.124	0.156	0.192	0.306

Stormwater runoff will drain internally for the majority of the subject property through the use of constructed drainage swales and the proposed storm sewer network. However, runoff from a small portion of the developed area, consisting of sloped pervious areas, will flow uncontrolled elsewhere (MTE 2023a). A high point is present along Arkell Road near the entrance to 202 Arkell Road. East of the high point, flows are directed towards storm sewers that are connected to an existing infiltration gallery in the boulevard adjacent to the Arkell Meadows subdivision SWM facility. On the western side of the high point, flows will be directed to an existing side inlet catchbasin, through a stone energy dissipater, and eventually into the Torrance Creek wetland complex. As such, flow generated from uncontrolled portions of the subject lands will ultimately contribute to recharging surface water inputs to the wetland feature and subsurface water inputs to the local groundwater table. These measures will provide quality and quantity control of runoff prior to discharge into the adjacent Torrance Creek wetland.

3.1 Monthly Water Balance

A detailed description of the monthly water balance is provided in MTE's Stormwater Management Plan report (2023a). The following provides a brief summary of the results.

3.1.1 Infiltration Volumes

Under pre-development conditions, the subject property infiltrates 6,615m^3/year. The post-development subject property has a passive infiltration of 4,857m^3/year. With the proposed stormwater management plan, which uses infiltration galleries and an end-of-pipe infiltration cell, the post-development total annual infiltration rate is 7,544^3/year. This provides a volume surplus of 928m^3/year (243mm/year) over pre-development conditions. Infiltration volumes increase from pre-development to post-development through implementation of the on-site infiltration galleries (MTE 2023a). Infiltration from the subject property contributes to the shallow groundwater table that flows from the north to the south/southwest, toward Burke Well and ultimately the overall wetland complex west of the subject property. Figure 1 (Figure 5.5, MTE

2023a) summarizes the pre- and post- infiltration volumes throughout a year. The TCSS states that baseflow enhancement is encouraged on lands within this zone and the proposed SWM strategy satisfies this criterion.

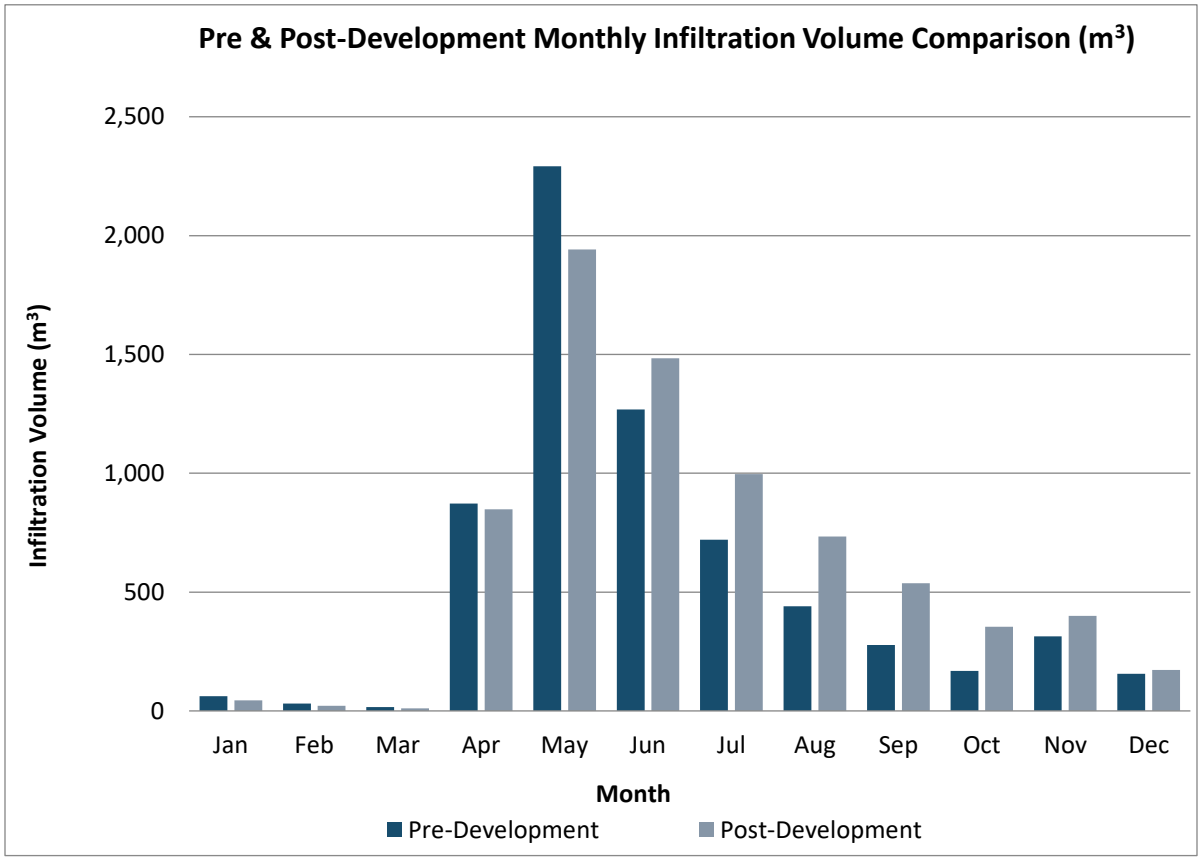

Figure 1. Pre & Post Development Monthly Infiltration Volume Comparison to the Wetland (MTE 2023a)

3.1.2 Surface Runoff Volumes

Under pre-development conditions, runoff from the subject property drains to the northwest and provides surface water inputs to the Torrance Creek wetland complex. The subject property currently generates 5,413m^3/year in runoff, based on an imperviousness of 13.8%. Under post-development conditions, the catchment area from within the Arkell Road subject property draining to the wetland is slightly smaller (a decrease in catchment size of approximately 0.394ha), and the imperviousness is higher (45.20%), which results in an increase in runoff. Approximately 7,308m^3/year of runoff is generated by the development area under post-development conditions, which equates to an annual surplus of 1,895m^3/year (254mm/year) of surface runoff volume to the wetland complex. Figure 2 (Figure 5.4, MTE 2023a) is provided

below and illustrates the distribution of excess runoff over the course of a year relative to the existing runoff conditions and patterns.

Throughout the year, June, July and August are estimated to have the highest monthly runoff volumes compared to pre-development levels (327, 326 and 315m^3, respectively). Runoff from the stormwater management facility to the wetland will outlet through a gabion mat and overland flow path where additional evapotranspiration and infiltration may occur over the 30m buffer to the wetland. To take a conservation approach, the water balance analysis completed by MTE (2023a) does not include the additional evapotranspiration or infiltration that may occur within the wetland buffer.

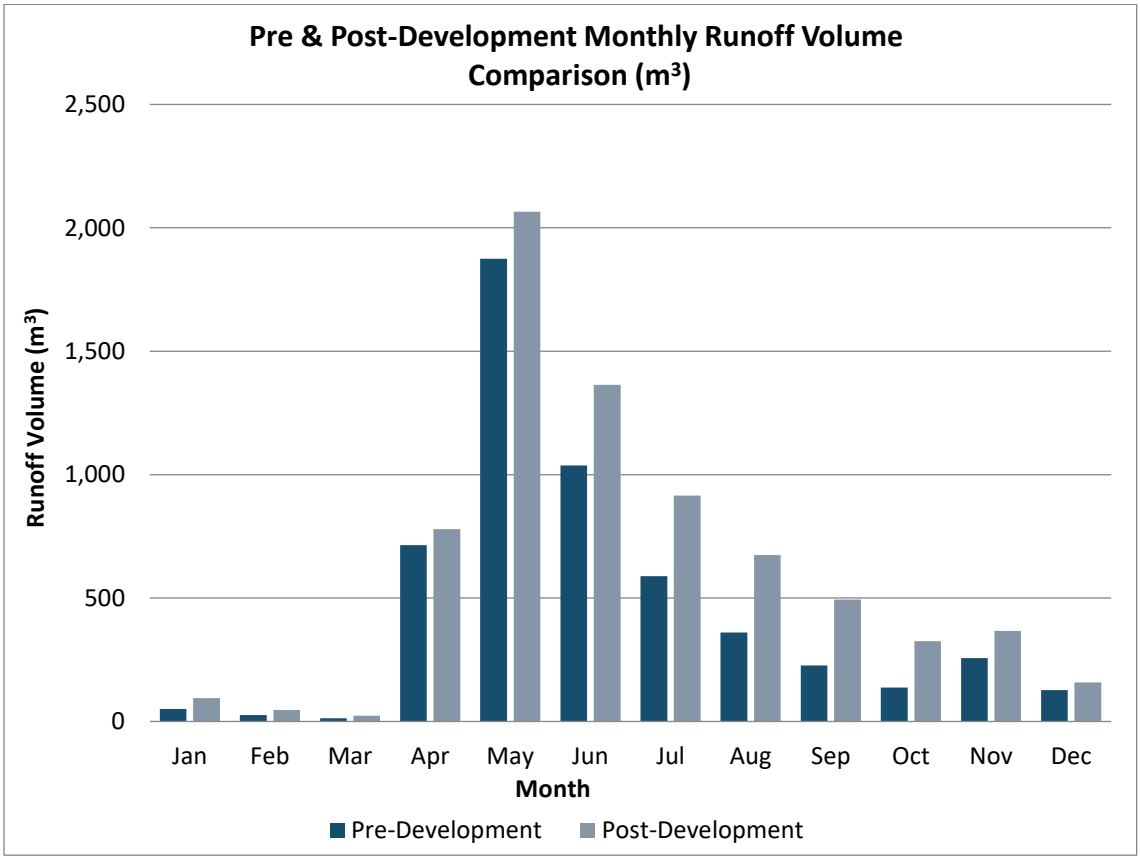

Figure 2. Pre & Post Development Monthly Runoff Volume Comparison to the Wetland (MTE 2023a)

3.1.3 Overall Recharge Volumes to the Wetland

MTE completed an existing conditions assessment (pre-development) that considered the entire existing site surface and groundwater flow to the wetland, which included a drainage area of 3.11ha and was inclusive of Catchment 101, 102, 103, 104 and 105. Under post-development conditions, the surface drainage area to the wetland will be reduced to 2.87ha, with the remaining surface area out-letting to Arkell Road uncontrolled. The catchments out-letting surface water to the wetland will include 201, 202 and 203. The catchments that outlet surface water uncontrolled to Arkell Road will include 204 and 205 (MTE 2023a, 2023b).

The post development runoff volume calculation to the wetland was calculated to consider the 2.87ha surface drainage area. The post development infiltration augmentation was calculated considering the entire site area (surface and groundwater) of 3.11ha. Through this method, MTE was able to calculate monthly runoff volumes to the wetland and monthly infiltration over the site. The total increase in recharge and runoff from predevelopment to post development is 125mm annually and has been designed to meet the TCSS baseflow criteria through infiltration augmentation (rooftop galleries and infiltration cell downstream of the SWM facility) while reducing surplus runoff to the wetland. A comparison of the pre and post development recharge volumes to the wetland is shown in Table 4 (MTE 2023a, MTE 2023b).

Table 4. Pre & Post Development Recharge Volume Comparison to the Wetland

	Pre-Development Water Balance to Wetland		Post-Development Water Balance to Wetland		Value Difference	
Month	**Total Recharge & Runoff (mm)**	**Total Recharge & Runoff (m^3)**	**Enhanced Recharge & Runoff (mm)**	**Enhanced Recharge & Runoff (m^3)**	**Depth (mm)**	**Volume (m^3)**
Jan	3.7	114	4.7	145	1.0	31
Feb	1.8	57	2.3	72	0.5	15
Mar	0.9	28	1.2	36	0.3	8
Apr	51.1	1,587	54.9	1,707	3.8	120
May	134	4,166	145.5	4,524	11.5	358
Jun	74.2	2,305	96.0	2,987	21.8	682
Jul	42.1	1,309	64.4	2,004	22.3	695
Aug	25.7	800	47.5	1,477	21.8	677
Sept	16.2	505	34.8	1,082	18.6	577
Oct	9.8	305	22.9	713	13.1	408
Nov	18.3	570	25.9	804	7.6	234
Dec	9.1	284	11.1	347	2.0	63
Total	**387**	**12,030**	**511**	**15,898**	**124**	**3,868**

4.0 Impact Analysis

4.1 Management of Stormwater Quantity

The approach to stormwater management for the proposed redevelopment is summarized in the Stormwater Management Report (MTE 2023a) and Functional Servicing Report (MTE 2023b).

Under the proposed stormwater management strategy there will be an overall increase in the amount of infiltration within the development area. The infiltrated water will contribute to the shallow groundwater system, flowing away from the wetland, and no negative impacts to the wetland will occur based on the increased infiltration volumes.

The post-development monthly runoff volumes and rates reflect the existing runoff cycle to the wetland, with an overall increase in runoff volume occurring in all months (MTE 2023a). The overall runoff volumes represent a small component of the broader hydrology of the Torrance Creek Subwatershed area (1,060 ha), given that the subject property represents 0.24% of the Torrance Creek Subwatershed area (Totten Sims Hubicki et al. 1999, Dougan and Associates 2009). An analysis of local impacts to the wetland based on increases in runoff volumes was completed to fully assess impacts to the PSW. A wetland water balance risk evaluation was also conducted to assess the hydrological and ecological capacity of the wetland to assimilate the proposed changes. The risk evaluation is summarized below.

4.2 Wetland Water Balance Risk Evaluation

A Wetland Water Balance Risk Evaluation (TRCA 2017) was completed for the proposed development. The Risk Evaluation uses information about the proposed development, proposed changes to the hydrology of the wetland, and natural heritage information about the wetland to assign a level of risk for 1) the potential magnitude of hydrological change, and 2) the sensitivity of the wetland to hydrological change. The assigned level of risk for these two factors are then evaluated together using a Wetland Risk Evaluation Decision Tree to assign an overall risk to the wetland from the proposed development and determine monitoring needs.

The criteria used to evaluate the probability and magnitude of hydrological change as a result of the proposed development are shown in Table 3 (TRCA 2017). The criteria used to Evaluate the Sensitivity of the Wetland to Hydrological Change are provided in Table 4 (TRCA 2017).

According to the completed Wetland Water Balance Risk Evaluation (TRCA 2017), the proposed development is considered to have an overall ‘Medium to High’ risk to the wetland due

to an increase in impervious surfaces and change in catchment area. The stormwater management plan has been prepared to provide a balance between the surplus pre- and post-development runoff and infiltration volumes to the wetland. The stormwater management plan uses infiltration galleries throughout the development and an end-of-pipe infiltration cell in the SWMF to provide enhancement of infiltration, thereby reducing surplus runoff to the wetland.

While the risk to the wetland is considered 'Medium to High' the runoff out-letting to the wetland throughout the year generally reflects pre-development conditions in terms of volumes and patterns of seasonal highs and lows.

MTE's monthly water balance estimates that the proposed development, and associated stormwater management design, will result in a 35.0% increase in annual runoff volume, contributing to an estimated 254mm increase in the annual depth of runoff discharged to the wetland. The distribution of runoff to the wetland over the course of the year generally matches pre-development conditions. The gentle slope of the wetland, towards Torrance Creek, and the permeability and hydraulic conductivity of the local soils will prevent the surplus runoff from ponding for extended periods. As a result, changes to the wetland hydroperiod and composition of the vegetation community are not anticipated to occur post development.

A surplus of runoff will outlet to the wetland throughout the year; however, this is not anticipated to impact the duration of ponding in the PSW, as indicated above. Some surface ponding may occur in pockets throughout the PSW based on local topography; however, the hydraulic conductivity and infiltration rates of local soils will prevent ponding from occurring for excessive durations. The peak of surplus runoff delivered to the PSW may enhance anuran habitat by providing additional water in localized areas. A couple of vegetation species (Riverbank Grape and Redtop) in the wetland observed by NRSI biologists in 2017 are sensitive to flood conditions lasting greater than 3 months. Based on MTE's groundwater elevation observations in the wetland, hydraulic conductivity tests, and in-situ infiltration testing, ponding greater than three months is not anticipated to occur, since the groundwater table drops by over 1m following early spring (March and April) freshet conditions. As such, the vegetation species that are at highest risk of impact are not anticipated to be affected. It is anticipated that the duration of additional ponding will be temporary and will not impact the ecological or hydrological function of the wetland or the vegetation composition.

It is anticipated that the wetland vegetation community, vascular plant species, and the two anuran species documented within the wetland will not be negatively impacted as a result of the proposed development.

Figure 5.4 from MTE's Stormwater Management Plan (2023a) (Figure 2 in this EIS Addendum) shows the distribution of runoff to the wetland during pre- and post-development. May through November are estimated to have the largest increases in surface runoff to the wetland, with increased runoff ranging from 111m^3/year to 327m^3/year. April through June are important months for breeding anurans and runoff in these months is estimated to range between 27.2mm – 72.0mm per month. These differences, while not inconsequential, are considered tolerable for the wetland community and anuran species present. The hydrologic changes are not anticipated to negatively impact breeding anurans based on available data on their life cycle requirements (Table 2, TRCA 2017). Any increases in wetland water level in the months of April through June may benefit breeding amphibians, and the overall hydroperiod of the wetland is not anticipated to change considerably post-development.

The detailed monthly runoff and infiltration volumes were used to determine whether the proposed changes in local hydrology will significantly alter the form or function of the Torrance Creek Wetland Complex from its pre-development condition. According to the sensitivity analysis completed, which focused on the wetland vegetation community and anuran species documented within the study area, it is anticipated that no negative impact will occur due to the proposed development and resulting changes in local hydrology.

It is recommended that wetland water level monitoring, anuran call survey monitoring, and vegetation monitoring is implemented before and after construction of the proposed development to determine whether the stormwater management design is functioning as anticipated. A detailed monitoring program to track changes to the PSW and provide recommendations for suitable mitigation measures (i.e., SWM runoff alterations, etc.) should be provided in the Environmental Implementation Report.

5.0 References

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Maps

565100 565200 565300

4819900

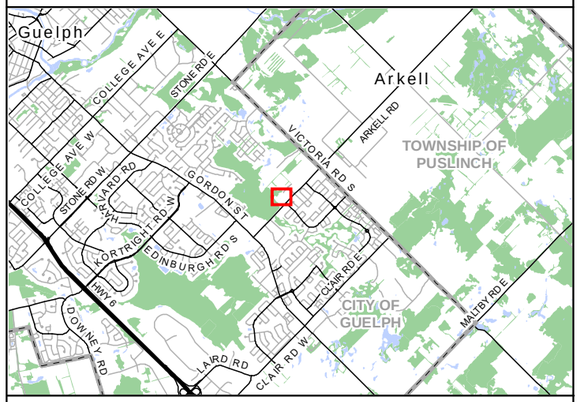
4818800

SWD4
SWD3-2
SWD4
SWM1-1
H
FOD8-1
CUM
CUT
Residential
DAWES AVE
AMOS DR
ARKELL ROAD
SUMMERFIELD DRIVE

Map 1

Arkell Road Properties Environmental Impact Study

Natural Heritage Constraints



Legend

- Subject Property
- Proposed Development
- Proposed Retaining Wall
- Significant Woodland Dripline (NRSI Flagged, City Approved July 22, 2016)
- Significant Woodland Buffer (10m)
- Wetland Boundary (NRSI Flagged, GRCA Approved July 22, 2016)
- Wetland Buffer (30m)

Significant Wildlife Habitat

- Special Concern and Rare Wildlife (Eastern Wood-Pewee)
- Deer Winter Congregation Area

Species at Risk Habitat

- Little Brown Myotis - Candidate Foraging Habitat
- Ecological Land Classification (ELC)

(CUM) Cultural Meadow
(CUT) Cultural Thicket
(FOD8-1) Fresh - Moist Poplar Deciduous Forest Type
(H) Hedgerow
(SWD3-2) Silver Maple Mineral Deciduous Swamp Type
(SWD4) Mineral Deciduous Swamp Ecosite
(SWM1-1) White Cedar Mineral Mixed Swamp Ecosite

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1771
Date: April 25, 2023

NAD83 - UTM Zone 17
Size: 11x17"
1:1,000

0 10 20 30 40 50 60 Metres

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565100 565200 565300

4819900

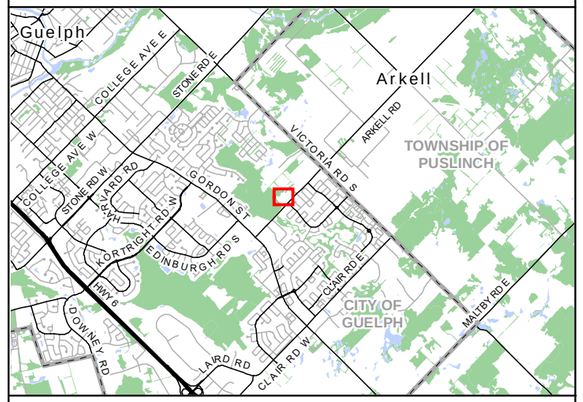
4818800

SWD4
SWD3-2
Torrence Creek Provincially Significant Wetland Complex
SWD4
SWM1-1
H
FOD8-1
CUM
CUT
Residential
DAWES AVE
AMOS DR
ARKELL ROAD
SUMMERFIELD DRIVE

Map 2

Arkell Road Properties Environmental Impact Study

Habitat Stewardship Plan



Legend

- Subject Property
- Proposed Development
- Proposed Retaining Wall
- Significant Woodland Dripline (NRSI Flagged, City Approved July 22, 2016)
- Significant Woodland Buffer (10m)
- Wetland Boundary (NRSI Flagged, GRCA Approved July 22, 2016)
- Wetland Buffer (30m)
- NHS and Buffer Enhancement Area
- Ecological Land Classification (ELC)

(CUM) Cultural Meadow
(CUT) Cultural Thicket
(FOD8-1) Fresh - Moist Poplar Deciduous Forest Type
(H) Hedgerow
(SWD3-2) Silver Maple Mineral Deciduous Swamp Type
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Project: 1771
Date: April 25, 2023

NAD83 - UTM Zone 17
Size: 11x17"
1:1,000

0 10 20 30 40 50 60 Metres

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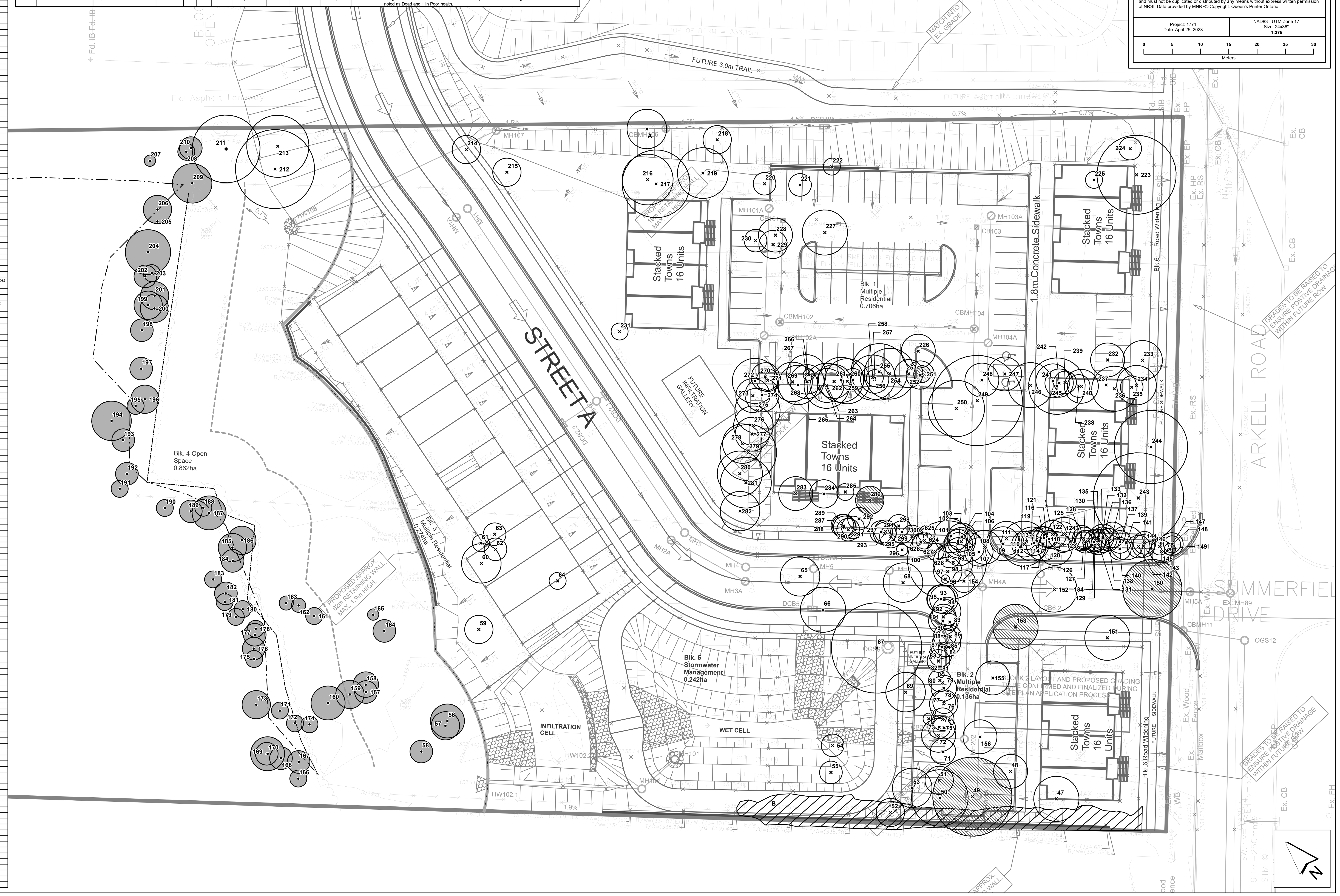
Map 3

Arkell Road Properties

Tree Inventory and Preservation Plan

Tree Number	Common Name	Scientific Name	Native / Non-native	DBH (cm)	Stem Count	Crown Radius (m)	Potential for Structural Failure Rating	Overall Condition	Proposed Action	Rationale for Removal	Compensation Required	Comments
47	Common Pear	*Pyrus communis*	Non-Native	20.3	2	4.0	Possible	Fair	Remove	Development	No	2 dead branches; some foliar necrosis; small section shedding bark; minor crown thinning; some fruit set.
48	Manitoba Maple	*Acer negundo*	Native	14.2	1	3.0	Improbable	Fair	Remove	Development	Yes	Codominant leaders; exposed root; slight lean; branch over driveway with injury.
49	Freeman's Maple	*Acer X freemanii*	Native	45.6	3	7.0	Possible	Fair	Remove	Development	Yes	Basal sprouting; history of branch failure; minor dieback; candidate wildlife/bat cavity. Candidate bat maternity roost tree.
50	White Birch	*Betula papyrifera*	Native	28.2	2	5.0	Improbable	Good	Remove	Development	Yes	Codominant stems with included bark.
51	Eastern White Cedar	*Thuja occidentalis*	Native	23.8	4	2.5	Improbable	Good	Remove	Development	Yes	Few small broken branches; small basal cavity; near existing driveway.
52	Pin Cherry	*Prunus pensylvanica*	Native	11.8	1	2.5	Improbable	Fair	Remove	Development	Yes	Phototrophic growth, next to cedar hedge at fenceline; thin crown; light insect defoliation.
53	Freeman's Maple	*Acer X freemanii*	Native	16.1	6	3.5	Improbable	Fair	Remove	Development	Yes	1 stem dead; minor dieback.
54	Scots Pine	*Pinus sylvestris*	Non-Native	16.4	1	2.0	Improbable	Fair	Remove	Development	Yes	Minor crown thinning; poor branch structure.
55	Scots Pine	*Pinus sylvestris*	Non-Native	15.6	1	2.0	Possible	Poor	Remove	Development	No	Significant dieback; stunted needles, swollen stem.
56	White Birch	*Betula papyrifera*	Native	20.3	2	3.0	Possible	Fair	Retain		No	1 stem dead; other has dead leader; 10% dieback.
57	White Spruce	*Picea glauca*	Native	10.2	2	2.5	Improbable	Good	Retain		No	Codominant stems.
58	Scots Pine	*Pinus sylvestris*	Non-Native	15.7	1	2.0	Improbable	Good	Retain		No	Slightly crooked stem.
59	Eastern White Pine	*Pinus strobus*	Native	15.2	1	2.5	Improbable	Good	Remove	Development	Yes	Crooked stem; broken top.
60	Scots Pine	*Pinus sylvestris*	Non-Native	35.4	1	3.5	Improbable	Good	Remove	Development	Yes	Top broke at some point and new leader took over.
61	Scots Pine	*Pinus sylvestris*	Non-Native	14.1	1	1.5	Improbable	Good	Remove	Development	Yes	Lower crown thinning; vine in lower crown.
62	Scots Pine	*Pinus sylvestris*	Non-Native	18.0	1	2.0	Improbable	Excellent	Remove	Development	Yes	Vines in lower crown.
63	Scots Pine	*Pinus sylvestris*	Non-Native	14.0	1	2.0	Improbable	Excellent	Remove	Development	Yes	Vines throughout.
64	Scots Pine	*Pinus sylvestris*	Non-Native	10.5	1	1.5	Improbable	Good	Remove	Development	Yes	Very minimal dieback; landscape tree.
65	Manitoba Maple	*Acer negundo*	Native	21.8	1	3.5	Improbable	Fair	Remove	Development	Yes	Minor crown thinning.
66	Manitoba Maple	*Acer negundo*	Native	21.8	1	4.0	Possible	Fair	Remove	Development	Yes	Some crown dieback and insect feeding in foliage.
67	Black Walnut	*Juglans nigra*	Native	55.8	2	8.0	Improbable	Good	Remove	Development	Yes	Included bark; woundwood at base of 1 limb.
68	Black Walnut	*Juglans nigra*	Native	13.7	1	3.5	Improbable	Good	Remove	Development	Yes	Minimal light pruning; relatively healthy crown.
69	Black Walnut	*Juglans nigra*	Native	19.5	2	3.5	Improbable	Good	Remove	Development	Yes	Old pruning cuts low in crown.
70	Sweet Cherry	*Prunus avium*	Non-Native	12.1	1	1.0	Probable	Very Poor	Remove	Development	No	Most of crown dead with 1 living limb.
71	Eastern White Cedar	*Thuja occidentalis*	Native	24.3	2	2.3	Improbable	Good	Remove	Development	Yes	Relatively full, healthy crown; wound and prune cuts compartmentalizing.
72	Eastern White Cedar	*Thuja occidentalis*	Native	28.1	1	3.0	Improbable	Fair	Remove	Development	Yes	Main stem topped and bark stripped.
73	Eastern White Cedar	*Thuja occidentalis*	Native	15.0	2	2.0	Possible	Fair	Remove	Development	Yes	Reduced crown due to competition; wounds compartmentalized.
74	Eastern White Cedar	*Thuja occidentalis*	Native	20.5	1	2.0	Possible	Good	Remove	Development	Yes	Reduced crown due to competition, otherwise healthy.
75	Eastern White Cedar	*Thuja occidentalis*	Native	23.7	2	2.0	Improbable	Good	Remove	Development	Yes	Somewhat narrow crown, phototrophic growth.
76	Eastern White Cedar	*Thuja occidentalis*	Native	34.2	1	2.5	Improbable	Good	Remove	Development	Yes	Relatively healthy, full crown.
77	Eastern White Cedar	*Thuja occidentalis*	Native	15.9	2	2.0	Possible	Poor	Remove	Development	No	Codominant stems with included bark; upper crown dead.
78	Eastern White Cedar	*Thuja occidentalis*	Native	17.5	2	2.3	Possible	Fair	Remove	Development	Yes	Some crown dieback, stem still relatively solid.
79	Eastern White Cedar	*Thuja occidentalis*	Native	11.6	1		Probable	Dead	Remove	Development	No	Basal rot; slight lean; dead crown, no leaves.
80	Eastern White Cedar	*Thuja occidentalis*	Native	22.8	2	2.0	Improbable	Good	Remove	Development	Yes	Some bark missing from root.
81	Eastern White Cedar	*Thuja occidentalis*	Native	30.2	1	0.5	Probable	Dead	Remove	Development	No	Missing bark; insect feeding; hedgerow tree.
82	Eastern White Cedar	*Thuja occidentalis*	Native	21.4	2	2.0	Possible	Poor	Remove	Development	No	Dieback on main stem; stem still relatively solid.
83	Eastern White Cedar	*Thuja occidentalis*	Native	25.1	1	2.0	Possible	Good	Remove	Development	Yes	Codominant stems with included bark in long vertical crack.
84	Eastern White Cedar	*Thuja occidentalis*	Native	18.5	1	1.3	Possible	Poor	Remove	Development	No	Minimal crown due to competition; dieback.
85	Eastern White Cedar	*Thuja occidentalis*	Native	32.8	1	2.5	Possible	Good	Remove	Development	Yes	Codominant stems with included bark; tight branch angles.
86	Eastern White Cedar	*Thuja occidentalis*	Native	21.3	1	2.0	Possible	Poor	Remove	Development	No	Reduced crown due to competition; wound on upper stem; crown dieback.
87	Eastern White Cedar	*Thuja occidentalis*	Native	18.9	1	2.0	Improbable	Good	Remove	Development	Yes	Tight branch angles with included bark.
88	Eastern White Cedar	*Thuja occidentalis*	Native	20.7	1	2.0	Improbable	Fair	Remove	Development	Yes	Codominant leaders; exfoliating bark.
89	Eastern White Cedar	*Thuja occidentalis*	Native	28.8	1	1.5	Possible	Fair	Remove	Development	Yes	Some squirrel damage on main stem; larger open cavity with compartmentalization; crown relatively healthy.
90	Eastern White Cedar	*Thuja occidentalis*	Native	14.7	2	2.5	Possible	Fair	Remove	Development	Yes	Unbalanced crowns, leaning away from one another; minor crown thinning.
91	Eastern White Cedar	*Thuja occidentalis*	Native	22.8	2	2.3	Possible	Fair	Remove	Development	Yes	One-sided crown due to competition; some crown dieback.
92	Eastern White Cedar	*Thuja occidentalis*	Native	16.0	1	2.5	Improbable	Fair	Remove	Development	Yes	Lower crown thinning; strong taper.
93	Eastern White Cedar	*Thuja occidentalis*	Native	17.4	2	2.5	Improbable	Fair	Remove	Development	Yes	Included bark; secondary stem has laterals as leaders.
94	Eastern White Cedar	*Thuja occidentalis*	Native	23.5	2	2.5	Improbable	Good	Remove	Development	Yes	Minimal dieback; narrow crown due to competition.
95	Eastern White Cedar	*Thuja occidentalis*	Native	24.5	1	2.5	Possible	Good	Remove	Development	Yes	Codominant leaders with included bark.
96	Eastern White Cedar	*Thuja occidentalis*	Native	21.2	1	0.8	Possible	Fair	Remove	Development	Yes	Narrow crown due to competition; some crown dieback.
97	Eastern White Cedar	*Thuja occidentalis*	Native	14.2	2	2.5	Improbable	Good	Remove	Development	Yes	Tight branch angle.
98	Eastern White Cedar	*Thuja occidentalis*	Native	23.0	6	3.5	Improbable	Good	Remove	Development	Yes	Relatively healthy crown; solid stems.
99	Eastern White Cedar	*Thuja occidentalis*	Native	20.5	2	2.5	Improbable	Good	Remove	Development	Yes	Each stem with 1 dead branch; exfoliating bark.
100	Eastern White Cedar	*Thuja occidentalis*	Native	19.3	2	2.0	Possible	Fair	Remove	Development	Yes	Some crown dieback due to competition; minimal included bark.
101	Eastern White Cedar	*Thuja occidentalis*	Native	20.9	6	3.0	Improbable	Good	Remove	Development	Yes	
102	Eastern White Cedar	*Thuja occidentalis*	Native	28.0	1	1.5	Possible	Poor	Remove	Development	No	Squirrel damage; upper stems intertwining; bark cracks; narrow crown due to competition; dieback.
103	Eastern White Cedar	*Thuja occidentalis*	Native	22.5	2	2.5	Improbable	Fair	Remove	Development	Yes	Poor branch structure.
104	Eastern White Cedar	*Thuja occidentalis*	Native	18.2	1	2.5	Improbable	Good	Remove	Development	Yes	Unbalanced crown, stout laterals; codominant leaders.
105	Eastern White Cedar	*Thuja occidentalis*	Native	38.0	1	2.5	Improbable	Good	Remove	Development	Yes	Relatively healthy, full crown.
106	Eastern White Cedar	*Thuja occidentalis*	Native	18.3	3	2.5	Possible	Fair	Remove	Development	Yes	Some included bark; bark damage from squirrel; narrow crown due to competition.
107	Eastern White Cedar	*Thuja occidentalis*	Native	21.6	1	2.5	Possible	Good	Remove	Development	Yes	Codominant leaders with included bark in very tight branch angle.
108	Eastern White Cedar	*Thuja occidentalis*	Native	33.1	1	3.0	Possible	Fair	Remove	Development	Yes	Some crown dieback; minor bark cracks.
109	Eastern White Cedar	*Thuja occidentalis*	Native	30.3	1	3.0	Improbable	Good	Remove	Development	Yes	Tight branch angles.
110	Eastern White Cedar	*Thuja occidentalis*	Native	28.1	1	4.0	Improbable	Fair	Remove	Development	Yes	One-sided crown with majority leaning away from driveway; some crown dieback.
111	Eastern White Cedar	*Thuja occidentalis*	Native	30.0	3	3.0	Possible	Fair	Remove	Development	Yes	1 stem with long crack; tight branch angles with included bark.
112	Eastern White Cedar	*Thuja occidentalis*	Native	19.4	1	2.3	Probable	Poor	Remove	Development	No	Crack up main stem with hollow; crown dieback; insect holes on main stem.
113	Eastern White Cedar	*Thuja occidentalis*	Native	10.3	1	1.5	Improbable	Fair	Remove	Development	Yes	Thin crown.
114	Eastern White Cedar	*Thuja occidentalis*	Native	24.1	2	3.0	Improbable	Fair	Remove	Development	Yes	Broken branch on 1 stem.
115	Eastern White Cedar	*Thuja occidentalis*	Native	12.5	1	2.3	Possible	Fair	Remove	Development	Yes	Slight lean toward driveway; narrow crown due to competition.
116	Eastern White Cedar	*Thuja occidentalis*	Native	15.5	1	1.8	Possible	Fair	Remove	Development	Yes	Lean toward driveway; one-sided crown with dieback.
117	Eastern White Cedar	*Thuja occidentalis*	Native	28.0	2	3.0	Improbable	Good	Remove	Development	Yes	Tight branch angle.
118	Eastern White Cedar	*Thuja occidentalis*	Native	15.9	1	1.5	Possible	Poor	Remove	Development	No	One-sided crown with dieback; some evidence of rot on main stem.
119	Eastern White Cedar	*Thuja occidentalis*	Native	16.1	1	2.0	Possible	Fair	Remove	Development	Yes	Stems twist around each other, poor structure.
120	Eastern White Cedar	*Thuja occidentalis*	Native	23.9	2	3.0	Possible	Fair	Remove	Development	Yes	One-sided crown away from driveway with some dieback; split on 1 stem with staining.
121	Eastern White Cedar	*Thuja occidentalis*	Native	18.4	2	2.5	Improbable	Fair	Remove	Development	Yes	Unbalanced crown, phototrophic; smaller stem with much dieback.
122	Eastern White Cedar	*Thuja occidentalis*	Native	11.4	2	2.0	Improbable	Fair	Remove	Development	Yes	Slight lean; improper pruning cuts; unbalanced crown.
123	Eastern White Cedar	*Thuja occidentalis*	Native	12.8	1	1.5	Possible	Poor	Remove	Development	No	One-sided crown with dieback.
124	Eastern White Cedar	*Thuja occidentalis*	Native	14.3	1	3.0	Possible	Fair	Remove	Development	Yes	Heavy bend likely from ice/snow load; codominant leaders; exfoliating bark.
125	Eastern White Cedar	*Thuja occidentalis*	Native	18.4	3	2.3	Possible	Poor	Remove	Development	No	1 stem with crown snapped off; split between larger stems.
126	Eastern White Cedar	*Thuja occidentalis*	Native	11.2	2	1.5	Improbable	Fair	Remove	Development	Yes	Unbalanced crown, phototrophic growth.
127	Eastern White Cedar	*Thuja occidentalis*	Native	16.3	1	2.0	Possible	Fair	Remove	Development	Yes	One-sided crown with lean toward driveway.
128	Eastern White Cedar	*Thuja occidentalis*	Native	19.2	1	2.0	Improbable	Good	Remove	Development	Yes	Codominant leaders.
129	Eastern White Cedar	*Thuja occidentalis*	Native	18.2	3	1.3	Possible	Fair	Remove	Development	Yes	Narrow crown due to competition; some crown dieback.
130	Eastern White Cedar	*Thuja occidentalis*	Native	16.0	1	2.0	Possible	Fair	Remove	Development	Yes	Crown thinning; 1 leader dead.
131	Eastern White Cedar	*Thuja occidentalis*	Native	13.7	1	2.0	Possible	Poor	Remove	Development	No	Reduced crown; dieback; one-sided crown.
132	Eastern White Cedar	*Thuja occidentalis*	Native	12.2	1	2.0	Improbable	Good	Remove	Development	Yes	Lower crown thinning.
133	Eastern White Cedar	*Thuja occidentalis*	Native	17.3	1	1.5	Possible	Fair	Remove	Development	Yes	Narrow crown due to competition; some crown dieback.
134	Eastern White Cedar	*Thuja occidentalis*	Native	13.3	2	2.0	Possible	Fair	Remove	Development	Yes	Codominant stems with included bark; unbalanced crown, phototrophic growth.
135	Eastern White Cedar	*Thuja occidentalis*	Native	16.5	1	0.8	Improbable	Fair	Remove	Development	Yes	Narrow crown due to competition; some crown dieback; main stem still relatively solid.
136	Eastern White Cedar	*Thuja occidentalis*	Native	17.6	2	2.5	Improbable	Good	Remove	Development	Yes	Good condition but for codominant leaders.
137	Eastern White Cedar	*Thuja occidentalis*	Native	10.1	1	2.3	Possible	Poor	Remove	Development	No	One-sided crown with dieback.
138	Eastern White Cedar	*Thuja occidentalis*	Native	18.4	2	2.0	Possible	Fair	Remove	Development	Yes	Exfoliating bark; codominant leaders; secondary stem dead.
139	Eastern White Cedar	*Thuja occidentalis*	Native	18.5	4	2.0	Possible	Fair	Remove	Development	Yes	One-sided crown due to competition; stems relatively solid; some crown dieback.
140	Eastern White Cedar	*Thuja occidentalis*	Native	16.8	1	2.0	Improbable	Fair	Remove	Development	Yes	Exfoliating bark; lower crown thinning.
141	Eastern White Cedar	*Thuja occidentalis*	Native	24.0	4	3.0	Improbable	Fair	Remove	Development	Yes	Narrow crown due to competition; some crown dieback.
142	Eastern White Cedar	*Thuja occidentalis*	Native	21.4	4	2.0	Possible	Fair	Remove	Development	Yes	Some included bark; minimal dieback.
143	Eastern White Cedar	*Thuja occidentalis*	Native	18.0	1	2.0	Possible	Fair	Remove	Development	Yes	Codominant leaders with included bark.
144	Eastern White Pine	*Pinus strobus*	Native	29.0	1	2.0	Possible	Fair	Remove	Development	Yes	Narrow crown due to competition with some dieback; stem relatively solid.
145	Eastern White Cedar	*Thuja occidentalis*	Native	20.3	1	2.0	Improbable	Fair	Remove	Development	Yes	Improper pruning cuts.
146	Eastern White Cedar	*Thuja occidentalis*	Native	17.8	1	1.5	Possible	Poor	Remove	Development	No	Crown dieback; split up main stem.
147	Eastern White Cedar	*Thuja occidentalis*	Native	13.7	2	2.0	Improbable	Good	Remove	Development	Yes	Slightly narrow crown due to competition, otherwise relatively healthy; solid stem.
148	Eastern White Cedar	*Thuja occidentalis*	Native	13.8	2	1.5	Possible	Fair	Remove	Development	Yes	Wound from old failed branch.
149	Eastern White Cedar	*Thuja occidentalis*	Native	14.5	1	1.0	Improbable	Good	Remove	Development	Yes	Slightly one-sided crown due to competition, otherwise relatively healthy.
150	Golden Weeping Willow	*Salix alba var. vitellina*	Non-Native	118.0	1	5.3	Probable	Very Poor	Remove	Development	No	Large cavity with rot in main stem; dieback in large scaffold branches. Candidate bat maternity roost tree.
151	Common Apple	*Malus domestica*	Non-Native	61.6	4	4.0	Possible	Fair	Remove	Development	No	Open crown, crown thinning; 2 dead branches; minor leaf necrosis; water sprouts; tree declining.
152	Freeman's Maple	*Acer X freemanii*	Native	26.1	2	4.0	Possible	Fair	Remove	Development	Yes	Some included bark in upper scaffold; epicormic growth; full, vigourous crown.
153	Common Apple	*Malus domestica*	Non-Native	38.4	2	4.0	Possible	Poor	Remove	Development	No	Spreading crown; lower crown dead; centre rot in both stems; shedding some bark. Candidate bat maternity roost tree.
154	Plum species	*Prunus sp.*	Non-Native	16.0	1	2.0	Possible	Poor	Remove	Development	No	Sparse crown with dieback.
155	Black Walnut	*Juglans nigra*	Native	17.9	1	3.0	Improbable	Good	Remove	Development	Yes	Codominant leaders; crown extends to ground.
156	Green Ash	*Fraxinus pennsylvanica*	Native	29.9	1	3.0	Probable	Fair	Remove	Development	Yes	Some crown dieback; minimal woodpecker damage in upper stem.
157	Trembling Aspen	*Populus tremuloides*	Native	13.3	1	2.0	Improbable	Fair	Retain		No	Some foliar chlorosis; crooked stem.
158	Trembling Aspen	*Populus tremuloides*	Native	17.9	1	2.3	Improbable	Fair	Retain		No	Slightly unbalanced crown due to competition; minimal dieback.
159	White Birch	*Betula papyrifera*	Native	24.5	1	2.5	Possible	Dead	Retain		No	No leaves, catkins retained; died within last year.
160	White Birch	*Betula papyrifera*	Native	24.1	1	3.0	Possible	Dead	Retain		No	Some borer holes up main stem; looks like it died recently.
161	Balsam Poplar	*Populus balsamifera*	Native	10.8	1	1.5	Improbable	Good	Retain		No	2 dead lower branches.
162	Balsam Poplar	*Populus balsamifera*	Native	10.9	1	1.3	Possible	Fair	Retain		No	Wound on main stem with some staining; narrow crown with minimal dieback.
163	Balsam Poplar	*Populus balsamifera*	Native	12.7	1	1.3	Improbable	Good	Retain		No	Small amount of included bark in upper branch union; full crown.
164	Trembling Aspen	*Populus tremuloides*	Native	13.3	1	2.0	Possible	Fair	Retain		No	Discolored, sunken canker on stem; some chlorosis.
165	White Spruce	*Picea glauca*	Native	10.5	1	1.0	Improbable	Excellent	Retain		No	Full, vigourous tree; some competition with dogwood.
166	Trembling Aspen	*Populus tremuloides*	Native	12.8	1	1.5	Improbable	Fair	Retain		No	Codominant leaders with included bark; healthy crown.
167	Trembling Aspen	*Populus tremuloides*	Native	11.7	1	2.0	Improbable	Fair	Retain		No	Thin crown; strong leader.
168	Balsam Poplar	*Populus balsamifera*	Native	11.5	1	2.0	Improbable	Fair	Retain		No	Unbalanced crown; 3 dead branches; minor leaf chlorosis.
169	Trembling Aspen	*Populus tremuloides*	Native	12.7	1	2.0	Improbable	Fair	Retain		No	Dead lower branches; healthy form and canopy.
170	Trembling Aspen	*Populus tremuloides*	Native	13.8	2	3.0	Improbable	Fair	Retain		No	Thin crown.
171	Trembling Aspen	*Populus tremuloides*	Native	15.2	2	1.5	Improbable	Fair	Retain		No	Included bark; dead lower branches; minor dieback.
172	Trembling Aspen	*Populus tremuloides*	Native	10.9	1	1.5	Improbable	Fair	Retain		No	Dead branches; dieback; debris around base.
173	Trembling Aspen	*Populus tremuloides*	Native	15.3	1	2.5	Improbable	Good	Retain		No	Good health.
174	Green Ash	*Fraxinus pennsylvanica*	Native	13.4	1	1.5	Improbable	Fair	Retain		No	D-shaped exit holes; minor dieback; minor epicormic growth.
175	Balsam Poplar	*Populus balsamifera*	Native	13.7	1	1.5	Improbable	Fair	Retain		No	Dieback; dead branches; minor damage at base.
176	Balsam Poplar	*Populus balsamifera*	Native	13.4	1	2.0	Possible	Fair	Retain		No	Stem wound, bark discoloration; minor leaf chlorosis; 1 dead branch.
177	Balsam Poplar	*Populus balsamifera*	Native	12.2	1	2.0	Improbable	Poor	Retain		No	30% dieback; asymetrical crown to southeast.
178	Balsam Poplar	*Populus balsamifera*	Native	10.3	1	1.5	Possible	Fair	Retain		No	Leaning; minor dieback.
179	Balsam Poplar	*Populus balsamifera*	Native	13.6	1	1.5	Improbable	Fair	Retain		No	15% dieback; minor pistol butt.
180	Balsam Poplar	*Populus balsamifera*	Native	10.1	1	1.5	Improbable	Fair	Retain		No	Minor pistol butt; minor lean south.
181	Trembling Aspen	*Populus tremuloides*	Native	11.0	1	1.5	Improbable	Fair	Retain		No	Open seam near base, good reaction wood; healthy crown.
182	Trembling Aspen	*Populus tremuloides*	Native	12.6	1	2.0	Improbable	Fair	Retain		No	Exposed roots, 1 girdling; bark rubbing; codominant leaders.
183	Trembling Aspen	*Populus tremuloides*	Native	13.8	1	1.5	Improbable	Fair	Retain		No	20% dieback; minor dead branches.
184	Trembling Aspen	*Populus tremuloides*	Native	12.2	1	2.0	Possible	Poor	Retain		No	Stem canker; sapwood rot; sunken lesion.
185	Trembling Aspen	*Populus tremuloides*	Native	14.7	1	2.5	Improbable	Fair	Retain		No	Minor dieback; thin canopy.
186	Trembling Aspen	*Populus tremuloides*	Native	13.2	1	2.5	Improbable	Fair	Retain		No	Small cankers; slight lean south; minor dieback.
187	Trembling Aspen	*Populus tremuloides*	Native	18.2	1	3.0	Improbable	Fair	Retain		No	Bark lesion in crown; dead lower branches.
188	Trembling Aspen	*Populus tremuloides*	Native	12.9	1	1.5	Improbable	Fair	Retain		No	Minor dieback.
189	Trembling Aspen	*Populus tremuloides*	Native	10.9	1	2.0	Improbable	Good	Retain		No	Leaning, phototrophic growth.
190	Trembling Aspen	*Populus tremuloides*	Native	18.2	1	1.5	Improbable	Good	Retain		No	Minor dieback of lower branches.
191	Green Ash	*Fraxinus pennsylvanica*	Native	12.3	1	1.5	Improbable	Fair	Retain		No	Vines in canopy; minor dieback.
192	White Elm	*Ulmus americana*	Native	11.1	1	2.0	Improbable	Good	Retain		No	Very minor insect defoliation.
193	Balsam Poplar	*Populus balsamifera*	Native	20.9	1	2.0	Possible	Poor	Retain		No	Open cankers; sapwood rot; 30% dieback.
194	Eastern Cottonwood	*Populus deltoides*	Native	29.8	1	3.5	Possible	Poor	Retain		No	40% dieback; crooked stem.
195	Green Ash	*Fraxinus pennsylvanica*	Native	17.7	1	1.5	Improbable	Good	Retain		No	Healthy crown; minor exfoliating bark.
196	Green Ash	*Fraxinus pennsylvanica*	Native	13.0	1	2.5	Improbable	Good	Retain		No	Excurrent growth with strong leader; minor crown thinning.
197	Trembling Aspen	*Populus tremuloides*	Native	29.6	1	2.0	Possible	Poor	Retain		No	Sapwood rot; open canker; poor reaction wood; dieback.
198	Trembling Aspen	*Populus tremuloides*	Native	11.3	1	2.0	Possible	Fair	Retain		No	Leaning south.
199	Trembling Aspen	*Populus tremuloides*	Native	25.6	1	2.5	Improbable	Fair	Retain		No	Open wounds, poor reaction wood; dieback.
200	Balsam Poplar	*Populus balsamifera*	Native	24.1	1	2.5	Possible	Fair	Retain		No	Vines along stem; minor dieback; asymetrical crown to south.
201	Green Ash	*Fraxinus pennsylvanica*	Native	14.0	1	2.5	Improbable	Good	Retain		No	No exit holes observed.
202	Trembling Aspen	*Populus tremuloides*	Native	24.7	1	2.0	Improbable	Fair	Retain		No	Dead lower branches; healthy canopy.
203	White Ash	*Fraxinus americana*	Native	10.6	1	1.5	Possible	Poor	Retain		No	30% dieback; epicormic growth; vines in crown.
204	Manitoba Maple	*Acer negundo*	Native	29.5	1	4.0	Possible	Fair	Retain		No	Leaning; chlorosis; minor thinning,; vine in crown.
205	White Ash	*Fraxinus americana*	Native	22.8	1		Probable	Dead	Retain		No	Recently dead.
206	Silver Maple	*Acer saccharinum*	Native	11.9	1	2.5	Improbable	Fair	Retain		No	Heavy lean, weighed by other branches; minor leaf necrosis and some pustules.
207	Green Ash	*Fraxinus pennsylvanica*	Native	11.4	1	1.0	Improbable	Fair	Retain		No	Dieback; dead lower branches.
208	Green Ash	*Fraxinus pennsylvanica*	Native	13.3	1	1.5	Improbable	Fair	Retain		No	Minor dieback; dead lower branches.
209	White Ash	*Fraxinus americana*	Native	25.0	1	3.5	Improbable	Fair	Retain		No	Epicormic growth; no EAB exit holes observed.
210	White Ash	*Fraxinus americana*	Native	10.8	1	2.0	Improbable	Fair	Retain		No	Minor dieback.
211	White Ash	*Fraxinus americana*	Native	57.8	1	6.0	Possible	Poor	Remove / Retain Stump	Road grading/safety	No	Vines in crown; 30% dieback; no EAB exit holes observed.
212	Manitoba Maple	*Acer negundo*	Native	55.1	2	7.0	Possible	Poor	Remove	Road grading	No	Codominant leaders with included bark; dieback and dead branches; poor structure; epicormic growth.
213	Golden Weeping Willow	*Salix alba var. vitellina*	Non-Native	80.7	1	5.5	Improbable	Good	Remove	Road grading	Yes	2 instances of past branch failure.
214	Norway Maple	*Acer platanoides*	Non-Native	25.6	1	2.5	Possible	Poor	Remove	Development	No	Large vertical open wound; exit holes; dead branches; poor reaction wood.
215	Colorado Spruce	*Picea pungens*	Non-Native	28.3	1	2.5	Improbable	Excellent	Remove	Development	Yes	No apparent problems.
216	Trembling Aspen	*Populus tremuloides*	Native	30.5	2	4.5	Possible	Fair	Remove	Development	Yes	Codominant stems with included bark; minor crown thinning.
217	Eastern Cottonwood	*Populus deltoides*	Native	47.4	4	6.0	Improbable	Fair	Remove	Development	Yes	Small witch's broom; minor dieback; codominant leaders with included bark.
218	Chanticleer Pear	*Pyrus calleryana 'Chanticleer'*	Non-Native	17.2	1	2.5	Improbable	Fair	Remove	Development	Yes	Minor dieback; minor wounds with good reaction wood; minor included bark.
219	Common Apple	*Malus domestica*	Non-Native	13.8	1	4.5	Probable	Poor	Remove	Development	No	80% dieback; epicormic growth; large dying branches.
220	Eastern Red Cedar	*Juniperus virginiana*	Native	11.2	1	2.0	Improbable	Good	Remove	Development	Yes	Heavy fruit set.
221	Eastern Red Cedar	*Juniperus virginiana*	Native	10.7	1	2.0	Improbable	Good	Remove	Development	Yes	Heavy fruit set; 1 subordinate branch with tight angle.
222	Alaska Yellow Cedar	*Cupressus nootkatensis*	Non-Native	11.4	1	1.5	Improbable	Excellent	Remove	Development	Yes	No apparent problems.
223	Norway Maple	*Acer platanoides*	Non-Native	57.2	2	7.0	Improbable	Fair	Remove	Development	Yes	Codominant stems with included bark; old pruning cuts; exposed roots; very minor crown thinning; hydro wires through crown.
224	Alaska Yellow Cedar	*Cupressus nootkatensis*	Non-Native	13.6	1	2.0	Improbable	Good	Remove	Development	Yes	Suppressed by nearby Norway Maple.
225	Flowering Crab Apple	*Malus baccata*	Non-Native	14.9	1	1.5	Improbable	Fair	Remove	Development	Yes	Pruned to spreading, umbrella-shaped crown; healed stem wound.
226	Common Apple	*Malus domestica*	Non-Native	29.3	1	3.0	Possible	Poor	Remove	Development	No	Major bark wound, sapwood and heartwood rot; water sprouts; thin crown.
227	Crimson King Norway Maple	*Acer platanoides 'Crimson King*	Non-Native	29.4	3	4.0	Possible	Fair	Remove	Development	Yes	Codominant leaders; rotting at base; vertical crack with good reaction wood; open wound.
228	Common Apple	*Malus domestica*	Non-Native	24.0	1	3.0	Improbable	Fair	Remove	Development	No	Dense interior crown.
229	Common Apple	*Malus domestica*	Non-Native	15.1	1	2.5	Improbable	Fair	Remove	Development	No	Stem wound nearly compartmentalized.
230	Common Apple	*Malus domestica*	Non-Native	25.9	1	2.0	Improbable	Fair	Remove	Development	No	Epicormic growth; dieback.
231	Common Pear	*Pyrus communis*	Non-Native	13.3	3	1.5	Possible	Very Poor	Remove	Development	No	Crown mostly dead; epicormic growth along stem.
232	Common Apple	*Malus domestica*	Non-Native	27.3	1	3.0	Possible	Fair	Remove	Development	No	Epicormic growth; dieback; wounds with some reaction wood.
233	Common Apple	*Malus domestica*	Non-Native	29.9	1	3.5	Possible	Fair	Remove	Development	No	Open wound; epicormic growth; dieback.
234	White Spruce	*Picea glauca*	Native	24.7	1	3.5	Improbable	Fair	Remove	Development	Yes	Asymmetrical crown to south; minor dieback.
235	White Spruce	*Picea glauca*	Native	15.2	1	2.0	Improbable	Fair	Remove	Development	Yes	Suppressed; minor dieback; minor vines along stem.
236	Silver Maple	*Acer saccharinum*	Native	66.8	1	4.0	Possible	Poor	Remove	Development	No	Large split along stem, 2m tall; broken top; healthy remaining crown.
237	White Spruce	*Picea glauca*	Native	14.2	1		Probable	Dead	Remove	Development	No	Hazardous snag.
238	White Spruce	*Picea glauca*	Native	18.2	1	2.0	Possible	Poor	Remove	Development	No	Strong taper; crown thinning; dead leader.
239	White Spruce	*Picea glauca*	Native	13.2	1	2.0	Improbable	Fair	Remove	Development	Yes	Leaning stem; bark crack; thin, narrow crown.
240	White Spruce	*Picea glauca*	Native	27.8	1	3.0	Improbable	Fair	Remove	Development	Yes	Minor thinning; cone production.
241	White Spruce	*Picea glauca*	Native	20.5	1	3.0	Improbable	Fair	Remove	Development	Yes	Strong taper; minor dieback; bark stem wound.
242	White Spruce	*Picea glauca*	Native	23.2	1	2.5	Improbable	Fair	Remove	Development	Yes	Minor thinning; seed production.
243	Silver Maple	*Acer saccharinum*	Native	58.1	4	8.0	Possible	Good	Remove	Development	Yes	Codominant stems; 1 limb dying; minor dieback.
244	Silver Maple	*Acer saccharinum*	Native	56.6	1	6.5	Improbable	Fair	Remove	Development	Yes	Codominant stems with included bark; minor leaf necrosis; exposed roots with lawnmower injuries.
245	Silver Maple	*Acer saccharinum*	Native	37.1	2	5.0	Possible	Poor	Remove	Development	No	Unbalanced crown; 40% dieback; epicormic growth; sooty lesions; vine in crown.
246	Tamarack	*Larix laricina*	Native	36.4	1	4.0	Improbable	Good	Remove	Development	Yes	Minor broken branches.
247	Tamarack	*Larix laricina*	Native	22.4	1	3.0	Improbable	Fair	Remove	Development	Yes	Bark wounds; epicormic growth; bent top.
248	Tamarack	*Larix laricina*	Native	30.1	1	3.0	Possible	Fair	Remove	Development	Yes	Bent top/crooked stem; vertical crack closed.
249	Silver Maple	*Acer saccharinum*	Native	72.5	1	8.0	Possible	Fair	Remove	Development	Yes	Open crack in 1 limb; another limb dead and pruned; bark discoloration; history of branch failure.
250	White Ash	*Fraxinus americana*	Native	48.8	1	5.0	Probable	Very Poor	Remove	Development	No	Dead crown; sprouting from base; EAB exit holes; broken branches.

Tree Number	Common Name	Scientific Name	Native / Non-native	DBH (cm)	Stem Count	Crown Radius (m)	Potential for Structural Failure Rating	Overall Condition	Proposed Action	Rationale for Removal	Compensation Required	Comments
251	Red Pine	*Pinus resinosa*	Non-Native	15.3	1	1.5	Improbable	Fair	Remove	Development	Yes	Crooked stem; unbalanced crown; thin crown. Candidate bat maternity roost tree.
252	Red Pine	*Pinus resinosa*	Non-Native	20.8	1	2.5	Improbable	Good	Remove	Development	Yes	Lower branches dead.
253	Scots Pine	*Pinus sylvestris*	Non-Native	22.3	1	2.5	Improbable	Fair	Remove	Development	Yes	Compartmentalized stem wound; crooked stem.
254	Scots Pine	*Pinus sylvestris*	Non-Native	29.1	1	4.5	Improbable	Fair	Remove	Development	Yes	Unbalanced crown; 10% dieback.
255	Scots Pine	*Pinus sylvestris*	Non-Native	29.5	1	5.0	Possible	Fair	Remove	Development	Yes	Crooked stem; sapsucker holes.
256	White Spruce	*Picea glauca*	Native	20.4	1	2.5	Probable	Dead	Remove	Development	No	Shedding bark, showing insect galleries and stem crack; no leaves.
257	White Spruce	*Picea glauca*	Native	11.4	1	1.5	Improbable	Good	Remove	Development	Yes	
258	White Spruce	*Picea glauca*	Native	24.1	1	4.0	Improbable	Excellent	Remove	Development	Yes	
259	White Spruce	*Picea glauca*	Native	23.0	1	4.0	Improbable	Fair	Remove	Development	Yes	Healed bark cracks; gumosis.
260	White Spruce	*Picea glauca*	Native	16.8	1	2.0	Possible	Dead	Remove	Development	No	Shedding bark; insect galleries; no leaves.
261	White Spruce	*Picea glauca*	Native	24.4	1	4.0	Improbable	Good	Remove	Development	Yes	Unbalanced crown.
262	White Spruce	*Picea glauca*	Native	28.7	1	3.0	Improbable	Good	Remove	Development	Yes	Broken branches in lower crown.
263	White Spruce	*Picea glauca*	Native	26.2	1	3.0	Improbable	Good	Remove	Development	Yes	Good fruit set.
264	White Spruce	*Picea glauca*	Native	26.5	1	4.0	Improbable	Fair	Remove	Development	Yes	Narrow, thin crown; strong taper.
265	White Spruce	*Picea glauca*	Native	20.8	1	3.0	Improbable	Fair	Remove	Development	Yes	Narrow crown.
266	White Spruce	*Picea glauca*	Native	12.4	1	1.0	Possible	Dead	Remove	Development	No	No bark, no leaves.
267	White Spruce	*Picea glauca*	Native	23.8	2	3.5	Possible	Fair	Remove	Development	Yes	Codominant stems with included bark; 1 stem topped, other has codominant leaders.
268	White Spruce	*Picea glauca*	Native	22.7	2	3.5	Improbable	Fair	Remove	Development	Yes	Mildly crooked stem; 2nd stem dead.
269	White Spruce	*Picea glauca*	Native	22.3	1	3.5	Improbable	Good	Remove	Development	Yes	
270	White Spruce	*Picea glauca*	Native	21.3	1	2.5	Improbable	Good	Remove	Development	Yes	Thin crown.
271	White Spruce	*Picea glauca*	Native	15.0	1	2.0	Improbable	Good	Remove	Development	Yes	
272	Norway Spruce	*Picea abies*	Non-Native	41.0	1	4.0	Improbable	Good	Remove	Development	Yes	
273	White Spruce	*Picea glauca*	Native	24.2	1	3.0	Improbable	Good	Remove	Development	Yes	Lower branches dead.
274	White Spruce	*Picea glauca*	Native	25.7	1	3.0	Improbable	Good	Remove	Development	Yes	
275	White Spruce	*Picea glauca*	Native	36.2	1	4.0	Improbable	Good	Remove	Development	Yes	
276	White Spruce	*Picea glauca*	Native	30.6	1	3.5	Improbable	Good	Remove	Development	Yes	Dead lower branch.
277	White Spruce	*Picea glauca*	Native	26.8	1	3.0	Improbable	Good	Remove	Development	Yes	Dead lower branch.
278	White Spruce	*Picea glauca*	Native	28.4	1	3.5	Improbable	Good	Remove	Development	Yes	
279	Norway Spruce	*Picea abies*	Non-Native	42.5	1	5.0	Improbable	Excellent	Remove	Development	Yes	
280	Norway Spruce	*Picea abies*	Non-Native	32.7	1	4.0	Improbable	Excellent	Remove	Development	Yes	
281	Norway Spruce	*Picea abies*	Non-Native	29.7	1	4.5	Possible	Fair	Remove	Development	Yes	Sap running; topped, lateral has become leader.
282	White Spruce	*Picea glauca*	Native	32.3	1	3.5	Improbable	Good	Remove	Development	Yes	
283	Common Apple	*Malus domestica*	Non-Native	21.5	1	3.0	Possible	Poor	Remove	Development	No	Open crown; history of branch failure; foliar necrosis; basal bark wounds.
284	Common Apple	*Malus domestica*	Non-Native	16.0	1	2.5	Probable	Poor	Remove	Development	No	Heavy lean; missing much bark; fruiting bodies.
285	Common Pear	*Pyrus communis*	Non-Native	25.5	1	1.5	Probable	Very Poor	Remove	Development	No	Major stem crack with heartwood rot; 1 broken scaffold limb; 20% dieback; still bearing fruit.
286	Common Pear	*Pyrus communis*	Non-Native	27.4	3	2.5	Possible	Poor	Remove	Development	No	1 stem broken; heartwood rot; frass at base; 10% dieback; history of branch failure; bearing fruit. Candidate bat maternity roost tree.
287	Eastern White Cedar	*Thuja occidentalis*	Native	27.1	2	2.0	Improbable	Fair	Remove	Development	Yes	Closely planted; codominant leaders.
288	Eastern White Cedar	*Thuja occidentalis*	Native	13.0	2	2.0	Improbable	Fair	Remove	Development	Yes	Closely planted; codominant leaders.
289	Eastern White Cedar	*Thuja occidentalis*	Native	17.6	2	2.0	Improbable	Fair	Remove	Development	Yes	Closely planted; codominant leaders.
290	Eastern White Cedar	*Thuja occidentalis*	Native	22.9	2	2.0	Improbable	Fair	Remove	Development	Yes	Closely planted; codominant leaders.
291	Eastern White Cedar	*Thuja occidentalis*	Native	17.3	2	2.0	Improbable	Fair	Remove	Development	Yes	Closely planted; codominant leaders.
292	Eastern White Cedar	*Thuja occidentalis*	Native	14.5	1	2.0	Improbable	Fair	Remove	Development	Yes	Closely planted.
293	Eastern White Cedar	*Thuja occidentalis*	Native	13.4	3	2.0	Improbable	Fair	Remove	Development	Yes	Closely planted.
294	Eastern White Cedar	*Thuja occidentalis*	Native	15.2	3	2.0	Improbable	Fair	Remove	Development	Yes	Closely planted; codominant leaders.
295	Eastern White Cedar	*Thuja occidentalis*	Native	17.2	2	2.0	Improbable	Fair	Remove	Development	Yes	Closely planted; codominant leaders.
296	Eastern White Cedar	*Thuja occidentalis*	Native	17.3	2	1.0	Improbable	Fair	Remove	Development	Yes	Closely planted.
297	Eastern White Cedar	*Thuja occidentalis*	Native	14.7	1	2.0	Improbable	Fair	Remove	Development	Yes	Closely planted.
298	Eastern White Cedar	*Thuja occidentalis*	Native	15.8	1	2.0	Improbable	Fair	Remove	Development	Yes	Closely planted.
299	Eastern White Cedar	*Thuja occidentalis*	Native	15.6	2	2.0	Improbable	Fair	Remove	Development	Yes	Closely planted; codominant leaders.
300	Eastern White Cedar	*Thuja occidentalis*	Native	16.1	2	2.0	Improbable	Fair	Remove	Development	Yes	Closely planted; codominant leaders.
624	Eastern White Cedar	*Thuja occidentalis*	Native	12.7	1	1.5	Improbable	Fair	Remove	Development	Yes	Closely planted; next to shed.
625	Eastern White Cedar	*Thuja occidentalis*	Native	11.8	1	1.5	Improbable	Fair	Remove	Development	Yes	Closely planted; near shed.
626	Eastern White Cedar	*Thuja occidentalis*	Native	15.9	1	1.5	Improbable	Fair	Remove	Development	Yes	Closely planted; near shed.
627	Eastern White Cedar	*Thuja occidentalis*	Native	13.7	3	1.5	Improbable	Fair	Remove	Development	Yes	Closely planted; near shed; codominant leaders.
628	Freeman's Maple	*Acer X freemanii*	Native	44.3	4	7.0	Possible	Good	Remove	Development	Yes	4 large, codominant stems with included bark.
A	Eastern White Cedar	*Thuja occidentalis*	Native	25.0	5	3.5	Improbable	Good	Remove	Development	Yes	Included bark; near fence and hydro wire; located off property.
B	Eastern White Cedar	*Thuja occidentalis*	Native	10-25	79	2-2.5	Improbable	Dead-Good	Remove	Development	Yes	Hedgerow of Eastern White Cedars planted closely to one another along the fence. 4 trees were noted as Dead and 1 in Poor health.



Legend

- Subject Property
- Inventoried Tree to be Retained (Crown to Scale)
- Inventoried Tree to be Removed / Retain Stump (Crown to Scale)
- Inventoried Tree to be Removed (Crown to Scale)
- Candidate Bat Maternity Roost Tree to be Removed (Crown to Scale)
- Cedar Hedgerow to be Removed
- Subject Property
- Proposed Development
- Proposed Retaining Wall
- Proposed Grading
- Proposed Services
- Existing Conditions
- Wetland Boundary (NRSI Flagged, GRCA Approved July 22, 2016)
- Wetland Buffer (30m)
- Significant Woodland Dripline (NRSI Flagged, City Approved July 22, 2016)
- Dripline Buffer (10m)

Natural Resource Solutions Inc.
Aquatic, Terrestrial and Wetland Biologists

Project: 1771
Date: April 25, 2023

NAD83 - UTM Zone 17
Size: 24x36"
1:375

0 5 10 15 20 25 30
Meters