



Routledge Property

Understory Tree Community Summary

Prepared for:

Doman Developments
615 North Routledge Park
London, ON N6H 5L6

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NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Routledge Property

Understory Tree Community Summary

Project Team

Katharina Richter	Senior Biologist, Project Manager
Jack Richard	Registered Professional Forester #2615, Terrestrial Biologist

Report submitted on December 18, 2020



Katharina Richter
Senior Biologist

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1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained by Doman Developments in order to undertake ecological investigations to assess the feasibility and potential impacts associated with the mechanical and chemical removal of European Buckthorn (*Rhamnus cathartica*) and Glossy Buckthorn (*Frangula alnus*) throughout the Routledge property located in the City of London (see Map 1). The property is generally bound by a cultural meadow and Woodcock Street to the north, Stanton Drain to the west, North Routledge Park to the south, and commercial units and Blue Heron Drive to the east. For the purposes of this report, this property will be referred to as the subject property, and has been divided into 6 blocks generally corresponding to proposed management actions, as well as site conditions observed. Of the 6 blocks, 5 have been assessed for Buckthorn removal (Blocks B-F) (see Map 1).

Lands designated as 'Tree Protection Areas' as per the City of London's Tree Protection By-law (no. C.P.-1515-228) (2016b) are located on the subject property and have been outlined on Map 1. Under this By-law, no native tree, regardless of size, may be destroyed within a Tree Protection Area, without the approval of a Tree Protection Area Permit that authorizes injury or destruction of a tree or trees within a Tree Protection Area (City of London 2016). As the removal of Buckthorn is not operationally possible to complete without the destruction of small diameter trees and shrubs, NRSI has conducted an inventory on small diameter trees throughout the areas in which Buckthorn removal is intended. Areas that have been assessed for Buckthorn removal have been identified in Map 2.

The following Understory Tree Community Summary provides the findings of the small-diameter tree inventory and assessment, including a detailed analysis of species composition and density throughout the subject property. At this time, no trees larger than 10cm in Diameter at Breast Height are scheduled for removal, injury, or destruction.

2.0 Tree Inventory and Methodology

A detailed inventory and assessment of small-diameter trees found on the subject property was conducted by an NRSI Registered Professional Forester and Field Biologist, on December 15, 2020. Map 2 identifies vegetation communities within the subject property. Fixed area sample plot methodology was applied to the Mineral Cultural Woodland (CUW1) and the Mineral Cultural Thicket (CUT1), following guidance received from an Urban Forestry Planner at the City of London. Trees were not inventoried within the Dry - Fresh Sugar Maple - Hardwood Deciduous Forest Type (FOD5-11) community since the entire forest will be protected, as well as a 10m buffer.

Following instructions provided by Sara Rowland, the City of London's Urban Forestry Planner, invasive species such as European Buckthorn, Glossy Buckthorn, European Black Alder (*Alnus glutinosa*), and Siberian Peashrub (*Caragana arborescens*), and "shrub" species, such as Hawthorn species (*Crataegus* spp.) and Dogwood species (*Cornus* spp.) were excluded from this inventory. Based on these guidelines, only native tree species capable of growing to at least 15m in height were inventoried during this process. Individual trees <10cm Diameter at Breast Height (DBH) were inventoried and fixed area sample plot trees were assigned a numerical identifier. Size classes of small-diameter trees were organized into three categories of regeneration; Seedlings (trees <50cm in height), Saplings (trees >50cm in height but <5cm DBH), and Poles (trees >5cm DBH but <10cm DBH). A complete list of fixed area plot findings is included in Appendix I.

The following information was recorded for each plot:

- Total number of native, non-shrub trees <10cm DBH (Seeding, Sapling, or Pole),
- Species composition,
- Percentage of native, non-shrub species cover (estimated),
- Presence of invasive species and shrub species (estimated),
- Dominant species cover and,
- Overstory species.

2.1 Fixed Area Sample Plot Methodology

Due to the size of the property, as well as the density and inaccessibility of the thicket (CUT) and woodland (CUW1) communities, a modified approach to individual tree inventories was undertaken using fixed area sample plots, which was discussed with the City's Urban Forestry Planner. Sample plots were randomly selected throughout Blocks B, C, D, E, and F to capture adequate representation of native tree species regeneration. A total of 11, 10m x 10m, fixed area plots were established throughout the subject property to ensure that a sufficient inventory sample as taken within each block. All native trees <10cm DBH within the plots were inventoried as per the tree inventory methodology detailed above, and coverage and composition of regenerating species and trees <10cm DBH were quantitatively assessed. A tally was completed to identify the number of trees within each size class (Seedling, Sampling, Pole).

3.0 Summary of Fixed Area Plot Findings

In total, NRSI staff inventoried 719 small-diameter native trees across 11 fixed area plots. This accounts for 1.7% of the total area proposed to be cleared of Buckthorn on the subject property. In order to estimate the total number of trees <10cm DBH within each block that would be cleared during Buckthorn removals, the tree density within each plot (0.010ha) was extrapolated to the total removal area within each block. Removal areas are the areas where Buckthorn removal will occur. For Blocks C, D, and E, the block is the same as the removal area, as the entire block will be cleared of Buckthorn. However, in Block B, the woodland will be retained, so the removal area is smaller than the block area. Buckthorn will be removed from Block B outside the surveyed dripline buffer. Buckthorn will also be removed from Block F, with the exception of the wetland areas (SWT, SWT2-8) and the dog agility course. It is estimated, based on the survey work, that there are 45,509 small-diameter trees within the removal areas in which Buckthorn removal is planned. This does not include European Buckthorn, Glossy Buckthorn, European Black Alder, Siberian Peashrub, and “shrub” species, such as Hawthorn species and Dogwood species (*Cornus spp.*), all of which were observed to be the abundant throughout the property. Invasive species and shrub species were observed to be the dominant species present in each plot, while native, non-shrub species averaged less than 10% of the total small-diameter species observed across all plots. The total inventory data of each plot is presented in Appendix I and while Appendix II presents species composition data and stem density for each removal area.

3.1 Removal Area Descriptions

Stem density and species compositions of native, non-shrub trees <10cm DBH for each block that are scheduled for the removal of Buckthorn is summarized below, as well as overall descriptions of the removal areas in each block.

Block B

This block contains only 0.09ha of cultural meadow and thicket that is planned to be cleared of Buckthorn. The canopy and subcanopy throughout this area is predominantly comprised of Hawthorn and Buckthorn. Intermittent Sugar Maple (*Acer saccharum*) and White Ash (*Fraxinus americana*) Seedlings have established within the cultural meadow and thicket communities in Block B, although they make up less than 1% of the small-diameter tree cover observed within this block. Dogwood and Hawthorn species, in addition to invasive species, dominate the understory of this area.

Species Composition: White Ash 75%, Sugar Maple 15%, Cottonwood 10%

Stem Density: 2,076 native stems per hectare; 189 stems estimated to be removed from within removal area in block B

Block C

This block consists of the largest of the 5 removal areas, as the entire 2.29ha are planned to be cleared of Buckthorn and small-diameter stems. An estimated 9,389 native, non-shrub stems <10cm DBH occur within this block, although they make up less than 5% of the total vegetative cover in this size class. The majority of understory vegetation consists of Glossy Buckthorn, European Buckthorn, European Black Alder, Hawthorn species, and Red-osier Dogwood (*Cornus stolonifera*). Native species observed within this block include Eastern Cottonwood (*Populus deltoids*), Sweet Cherry (*Prunus avium*), Sugar Maple, and White Ash.

Species Composition: White Ash 65%, Cottonwood 25%, Other species 10% (Sweet Cherry, Sugar Maple)

Stem Density: 4,201 native stems per hectare; 9,389 stems estimated to be removed from within block C

Block D

This block is planned to be entirely cleared of Buckthorn and small-diameter stems, totaling 0.81ha. This area contains a greater percentage of understory native tree species, although they still only account for less than 10% of vegetation within this size class. An estimated total of 15,206 native, non-shrub stems occur within this removal area. Similar to adjacent blocks, the dominant understory vegetation throughout this area consists of mix of invasive species and native shrub species. Overstory species within this block include Basswood (*Tilia americana*), Black Cherry, Cottonwood, Sweet Cherry, Sugar Maple, White Ash, and White Elm (*Ulmus americana*).

Species Composition: White Ash 80%, Sweet Cherry 10%, Other species 10% (Cottonwood and Sugar Maple).

Stem Density: 18,681 native stems per hectare; 15,206 stems estimated to be removed from within block D

Block E

This block is planned to be entirely cleared of Buckthorn and small-diameter stems, resulting in 1.72 hectares cleared. The canopy of this area is dominated by Buckthorn and Hawthorn,

although mature native tree species occur intermittently throughout this block. Basswood, Bur Oak (*Quercus macrocarpa*), Cottonwood, White Ash, and White Elm are located in the overstory. Black Locust and Common Apple (*Malus domestica*) were also observed. Native tree species smaller than 10cm DBH made up less than 5% of the total understory vegetation and included Cottonwood, Sweet Cherry, and White Ash. Dominant species within the understory of this block consists of invasive and shrub species, consistent with adjacent areas. Access throughout this block was fair to good, while topography was primarily undulating.

Species Composition: White Ash 70%, Cottonwood 20%, Sweet Cherry 10%

Stem Density: 8,896 native stems per hectare; 15,283 stems estimated to be removed from within block E

Block F

A significant proportion of this block consists of open meadow and does not require intensive Buckthorn removal. 1.51 hectares of this block will undergo Buckthorn removal. The small wetland areas and the dog agility course will not be managed. The majority of understory vegetation and regeneration throughout this block consists of invasive species and native shrub species. Hawthorn and Red-osier Dogwood were observed to be abundant throughout this area. Sample Plot #2 consisted entirely of Red-osier Dogwood. Native tree species smaller than 10cm DBH included Black Walnut (*Juglans nigra*), Cottonwood, and White Ash. Native trees larger than 10cm DBH in this block segment included Black Walnut, Cottonwood, Sugar Maple, and White, and comprised a significantly higher percentage of native cover at 25% within the cultural woodland (CUW) community. Access throughout this block was good and topography was undulating to hilly.

Species Composition: Cottonwood 85%, Black Walnut 5%, White Ash 5%

Stem Density: 3,608 native stems per hectare; 5,441

stems estimated to be removed from within block F

4.0 Tree Protection Measures and Recommended Mitigation

Buckthorn removal of trees within the subject property is scheduled for January, and as such removal activities will not impact migratory birds or Species at Risk bats, and there will be no contravention of the Migratory Birds Convention Act or Endangered Species Act. Should further removals be required on the subject property, it is recommended that all necessary removals be scheduled to occur outside of the active nesting period for migratory birds (April 1 to August 31) and the active season for Species at Risk bats (April 1 to October 31).

5.0 Restoration Planting

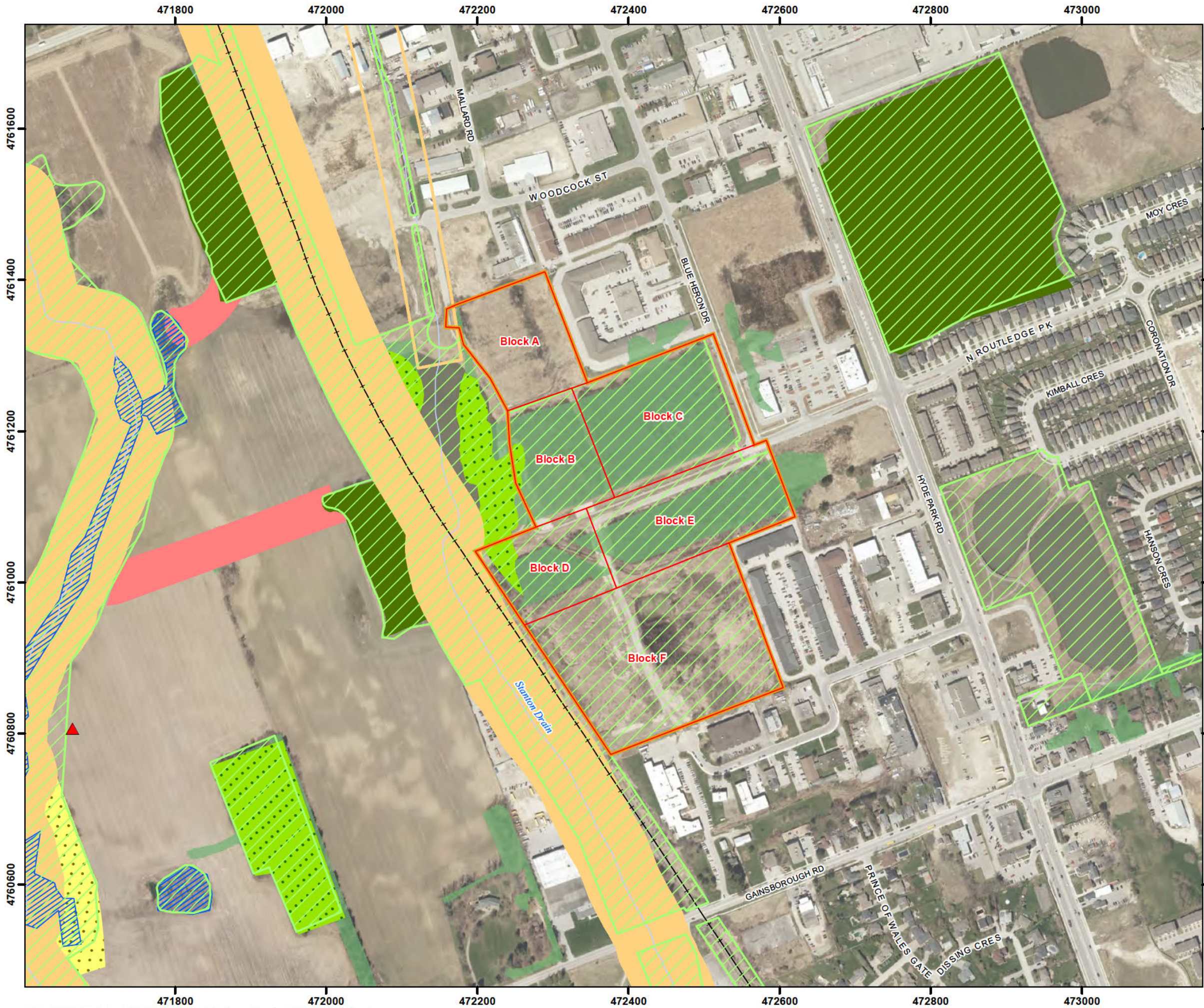
Restoration planting will be completed throughout the 5 removal areas (Blocks B-F), following the completion of mechanical and chemical Buckthorn removal. Within each removal area, Buckthorn will be cut, chipped, and left at a depth no greater than 25cm. Exposed Buckthorn stumps will be painted with a herbicidal control, in order effectively kill each plant. A secondary herbicidal treatment will be completed in each removal area in September 2021. This will ensure that Buckthorn regeneration is effectively arrested. Restoration planting will take place following these management activities, and is anticipated to occur during the fall season of 2021, or the following spring of 2022. A detailed restoration planting plan will be provided to the City of London for review and approval by August 2021.

Native species used in the restoration plantings will be site-appropriate native species whose selection has been informed by NRSI's tree and regeneration inventory work. These species have also been selected to ensure that the restored area is complementary to the adjacent retained features, while also representative of the native species that required removal. In some cases, alternative native species have been substituted for those found on the subject property to better support the restoration of the area. For example, the planting of Black Walnut is recommended as a substitute for White Ash. Native tree and shrub plantings will consist of the following species (to be confirmed through a detailed restoration planting plan):

Native Trees for Restoration Plantings		Native Shrubs for Restoration Plantings	
Common Name	Scientific Name	Common Name	Scientific Name
American Basswood	<i>Tilia americana</i>	Chokecherry	<i>Prunus virginiana</i>
Bitternut Hickory	<i>Carya cordiformis</i>	Common Snowberry	<i>Symphoricarpos albus</i>
Black Cherry	<i>Prunus serotina</i>	Downy Arrowwood	<i>Viburnum rafinesqueanum</i>
Black Walnut	<i>Juglans nigra</i>	Nannyberry	<i>Viburnum lentago</i>
Bur Oak	<i>Quercus macrocarpa</i>	Ninebark	<i>Physocarpus opulifolius</i>
Sugar Maple	<i>Acer saccharum</i>	Red-Osier Dogwood	<i>Cornus sericea</i>
Trembling Aspen	<i>Populus tremuloides</i>		
White Elm	<i>Ulmus americana</i>		
White Pine	<i>Pinus Strobus</i>		
White Spruce	<i>Picea glauca</i>		

Attachments

Maps
Appendices



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Map 1

Routledge Property

Background Mapping

Legend

- Subject Property
- Property Block
- Railway
- Watercourse
- Water Body
- Wooded Area
- Tree Protection Areas (City of London Tree Protection By-law, 2016)

Natural Heritage System (City of London OP, 2016)

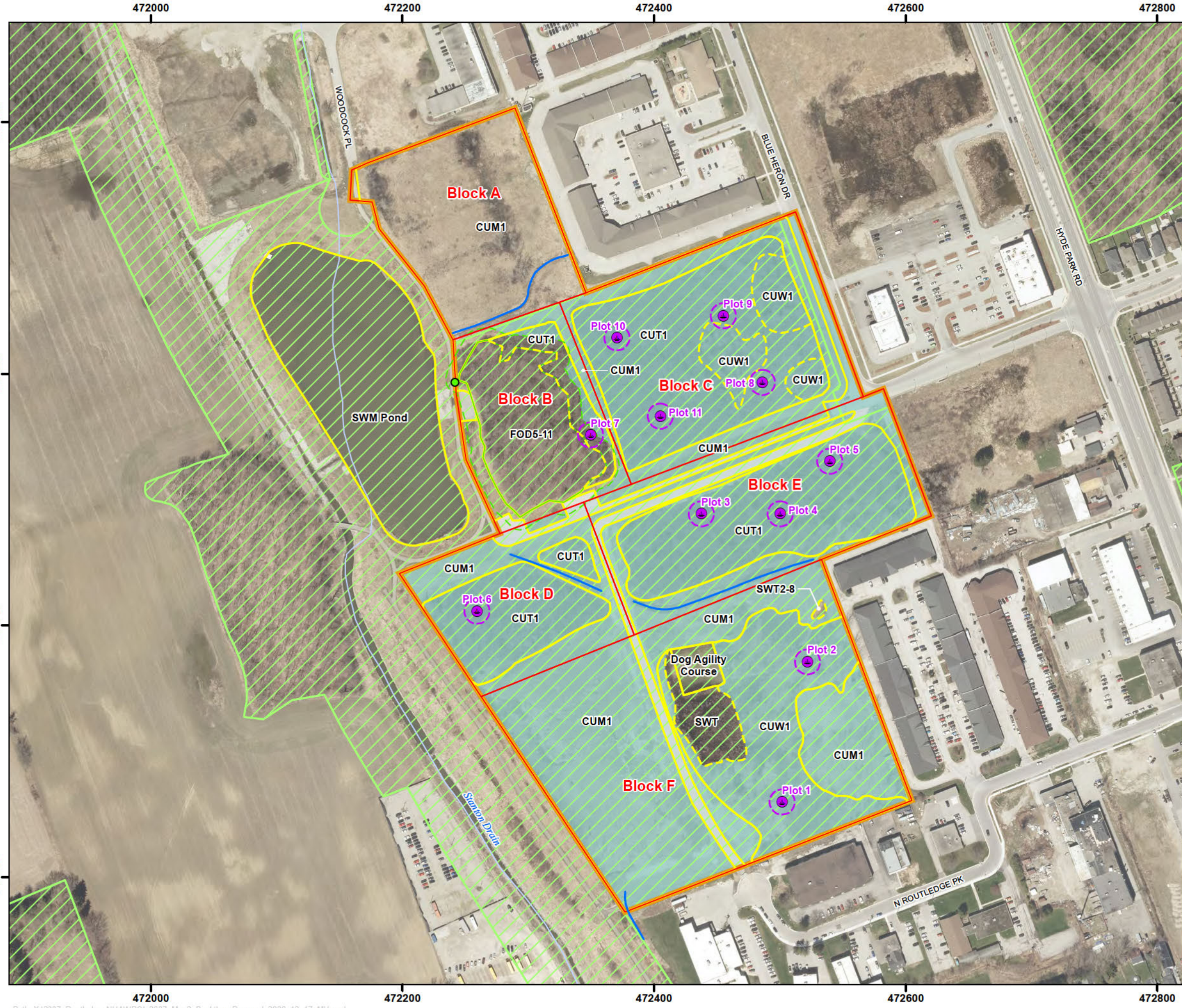
- Potential Environmentally Significant Area
- Significant Valleylands
- Valleylands
- Significant Woodlands
- Unevaluated Vegetation Patches
- Unevaluated Wetlands
- Upland Corridors
- Potential Naturalization Areas

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Project: 2337A Date: December 13, 2019	NAD83 - UTM Zone 17 Size: 11x17" 1:5,000
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0100200300 Metres



Map 2

Routledge Property

Buckthorn Removal Management Areas

Legend

- Subject Property
- Property Block
- Fixed Area Sample Plot
- Fixed Area Sample Plot Buffer (10m)
- Surveyed Woodland Dripline
- Surveyed Woodland Dripline Buffer (10m)
- Drainage Channel
- Watercourse
- Gravel Trail
- Buckthorn Removal Area
- Tree Protection Areas (City of London Tree Protection By-law, 2016)
- Ecological Land Classification (ELC)
- ELC Inclusion

(CUM1) Mineral Cultural Meadow Ecosite
(CUT1) Mineral Cultural Thicket Ecosite
(CUW1) Mineral Cultural Woodland Ecosite
(FOD5-11) Dry - Fresh Sugar Maple - Hardwood Deciduous Forest Type
(SWT) Thicket Swamp
(SWT2-8) Silky Dogwood Mineral Thicket Swamp Type

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Project: 2337A Date: December 17, 2020	NAD83 - UTM Zone 17 Size: 11x17" 1:3,000
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Metres

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2337A Routledge Property

Small-diameter Inventory Data (Fixed Area Sample Plots)

Block	Plot ID	Removal Area (ha)	Native trees <10cm DBH Inventoried				Native Species Cover By Removal Area (Estimate)
			Seedlings (<50cm height)	Saplings (>50cm height & <5cm DBH)	Poles (5-9.9cm DBH)	Total Stems <10cm DBH	
Block B	7	0.091	10	9	2	21	1%
	8		22	13	0	35	5%
	9		14	5	0	19	5%
	10		33	16	1	50	5%
	11		38	22	2	62	5%
Block C		2.2890					
Block D	6	0.8140	133	43	13	189	10%
	3		44	29	2	75	5%
	4		53	38	0	91	5%
	5		72	32	0	104	5%
	1		53	13	7	73	50%
Block E		1.7180					
Block F	2	1.5080	0	0	0	0	0%
Total Removal Area		6.42	472	220	27	719	8.73%
Note*	"Shrubs species" and invasive species exlcuded from inventory, as per guidelines provided by City of London. Excluded species = Hawthorn species (Crataegus sp.), Dogwood (Cornus sp.), Black Alder (Alnus glutinosa), Buckthorn (Rhamnus & Frangula spp.)						

Block	Removal Area (ha)	Total Stems <10cm DBH	Native Species Coverage by Removal Area	Species Composition by Removal Area (Estimate)	Estimated Average Stem Density (per ha)	Estimated Total of Stems per Removal Area to be Removed
Block B	0.091	21	1%	Aw 75%, Ms 15% Cd 10%	2076	189
Block C	2.2890	35	5%	Aw 65%, Cd 25%, Other species 10% (Ms + Cm)	4102	9389
		19	5%			
		50	5%			
		62	5%			
Block D	0.8140	189	10%	Aw 80%, Cm 10%, Other species 10% (Cd + Ms)	18681	15206
Block E	1.7180	75	5%	Aw 70%, Cd 20%, Cm 10%	8896	15283
		91	5%			
		104	5%			
Block F	1.5080	73	50%	Cd 85%, Wb 5%, Aw 5%	3608	5441
		0	0%			
All Removal Areas	6.42	719	8.73%		7473	45509
Species Codes:	White Ash (Aw), Sugar Maple (Ms), Eastern Cottonwood (Cd), Sweet Cherry (Cm), Black Walnut (Wb)					
Note*	Inventoried species, "stems" only includes native tree species smaller than 10cm DBH. "Shrubs species" and invasive species excluded from inventory, as per guidelines provided by City of London. Excluded species = Hawthorn species (Crataegus sp.), Dogwood (Cornus sp.), Black Alder (Alnus glutinosa), Buckthorn (Rhamnus & Frangula spp.)					