



Report: PDL-CPL-16-36

Region of Waterloo
Planning, Development and Legislative Services
Community Planning

To: Chair Jane Mitchell and Members of the Licensing and Hearings Committee

Date: August 9, 2016 **File Code:** DO5-06/TreeBy-law

**Subject: Woodland Removal Permit Application at 2219 Ottawa Street South,
Kitchener**

Recommendation:

That the Region of Waterloo take the following actions with regard to a Woodland Removal Permit application as described in Report PDL-CPL-16-36, dated August 9, 2016:

- a) Approve Woodland Removal Permit 15-51 to allow Stephen Moxey to remove approximately 4 hectares of declining conifer plantation at 2219 Ottawa Street, Kitchener, subject to the following conditions:
 - i) That the wetland boundary (as delineated by Dougan & Associates) be confirmed by the GRCA;
 - ii) That a 30 metre buffer be established around the wetland feature and that only limited tree removal be permitted within the buffer area, and that no stump removal, grubbing or grading be permitted within the buffer area;
 - iii) That silt fencing be erected at the wetland boundary prior to any tree clearing and maintained in good order until the cleared areas revegetate and soils are stabilized;
 - iv) That protective fencing or clear demarcation of the 30 metre wetland buffer zone be established prior to any tree clearing;
 - v) That any proposed conifer or invasive hardwood trees to be removed within the 30 metre buffer to be marked beforehand and approved by the GRCA, the City of Kitchener and the Region; and
 - vi) That tree removal be done outside of bird breeding season in conformity with the Migratory Birds Convention Act, or upon demonstration, by a qualified professional, that no breeding bird activity is occurring within the plantation or wetland area.

Summary:

An application for a Woodland Removal Permit at 2219 Ottawa Street South in the City of Kitchener has been submitted by Stephen Moxey to the Region pursuant to the Region's By-law 08-026 (A By-law Respecting the Conservation of Trees in Woodlands) known as the Woodland Conservation By-law. A Woodland Removal Permit requires the approval of Regional Council, provided that "in the opinion of the Tree By-law Committee, the injuring or destruction of the tree or trees is desirable for the appropriate development or use of the property and the general intent and purpose of [this] By-law is maintained".

Currently, much of the property is designated as a Core Environmental Feature (Significant Woodland) in the Region's Official Plan (ROP), a designation which would preclude any development or site alteration such as woodland clearing. However, two studies commissioned by the owner and accepted by Regional Environmental Planning and Stewardship staff have concluded that the designation is not supported based on the definition of significant woodlands in the ROP. There is also a designated wetland feature on the property and studies indicate that protection of this feature is warranted.

It is recommended that the Woodland Removal Permit be approved subject to a number of conditions that will protect the wetland feature.

Regional and Kitchener planning staff are now collaborating on updating the mapping of Core Environmental Features in the City as part of the City's Comprehensive Review of the Zoning By-law using the most up-to-date digital mapping. If the Woodland Removal Permit is granted, this feature would no longer qualify as a Significant Woodland according to ROP policy 7.C.6. As such it would be deleted from the draft mapping of Core Environmental Features that will at a future date be submitted for Council's consideration as part of a proposed ROP amendment.

Report:

Stephen Moxey has submitted an application for a Woodland Removal Permit at 2219 Ottawa Street South in the City of Kitchener. The Region's Woodland Conservation By-law (By-law 08-026; A By-law Respecting the Conservation of Trees in Woodlands) contains provisions to grant any of three permit types: a Good Forestry Practices permit; a Diameter Limit with Residual Basal Area permit, and a Woodland Removal permit.

The Good Forestry Practices and Diameter Limit permits can be approved by "a municipal law enforcement officer appointed by the Region or a Registered Professional Forester employed by the Region." A Woodland Removal Permit, however, must be approved by Regional Council after review by the Licensing and Hearings Committee (formerly the Tree By-law Committee). Neighbouring property owners must be given prior notice of the committee meeting and provided an opportunity to address the committee when it considers the application.

Notices were mailed out to property owners within 120 metres of 2219 Ottawa Street South on July 25, 2016.

Property/Site description

The subject property is located in the City of Kitchener, on the southeast corner of the intersection of Ottawa Street and Trussler Road (Figure 1). The property is approximately 9.6 hectare in size, and is split into two blocks by an unused (closed) road allowance. The road allowance is the former alignment of Ottawa Street which is still owned by the city of Kitchener and splits the property into a block of 7.57 hectare and a 1.4 hectare triangular area. The road allowance crosses the upper third of the property diagonally from the current Ottawa Street to Trussler Road (across from the St. James Evangelical Lutheran Church).

The property is zoned residential, and contains a single detached home, currently used as office space, and an old barn.

Vegetation

Most of the property is vegetated (~4.8 hectare) and consists of two distinct blocks (compartments) of trees – a mixed conifer plantation comprising White Spruce (*Picea glauca*), Norway Spruce (*P. abies*), European Larch (*Larix decidua*), Red Pine (*Pinus resinosa*) and White Pine (*P. strobus*) and a wetland feature surrounded by a lowland deciduous forest type consisting mostly of Green Ash (*Fraxinus pennsylvanica*) but also containing various shrub species such as Willows (*Salix* spp.), Dogwoods (*Cornus* spp.) and Buckthorn (*Rhamnus* spp.).

The conifer plantation was established in the late 1960's by a former owner, most likely in an attempt to control soil erosion on the site after being farmed for a number of years.

The entire vegetated area on the property is designated as a Core Environmental Feature (significant woodland) on Map 4 of the Region's Official Plan (ROP). The wetland feature is a designated significant wetland regulated by the Grand River Conservation Authority (GRCA).

A significant woodland must meet three criteria set out in ROP Policy 7.C.6:

- a) greater than four hectares in size, excluding any adjoining hedgerows;
- b) consisting primarily of native species of trees; and
- c) meets the criteria of a woodland in accordance with the provisions of the Regional Woodland Conservation By-law.

Permit for harvesting and application for woodland removal

In 2014, the owner of 2219 Ottawa Street South applied for a Good Forestry Practices

permit pursuant to the Region's Woodland Conservation by-law in order to remove trees from the northwestern extent of the plantation where excessive tree decline and die-back were occurring, particularly in the Red Pines.

Decline and dieback in Red Pine plantations is a common occurrence across southern Ontario where plantations were most often established on dry (excessively to somewhat excessively drained), nutrient poor to medium sands on which farming had been unsuccessfully attempted. While productivity can be good to excellent on the best sites (moister and richer loamy soils), it is marginal at best on dry, nutrient poor sands. Red Pine generally does not grow well on alkaline surface soils (pH >6.5) or on poorly drained soils.

Red Pine plantations on poorer soils often show signs of stress and decline very early, around 20-30 years old, and by age 40-50 years growth slows significantly and significant mortality can result. Stressed trees lack vigor, crowns may be small and thin, and the tips of branches may end in tufts of small, stunted needles. If plantations with stressed trees are thinned to allow remaining trees better access to nutrients, water and sunlight to promote growth, the trees generally do not show the desired response. In general, many red pine plantations do not remain productive much beyond 60 years of age. Environmental factors causing early decline of Red Pine stands have not been determined with certainty, however, it appears that fine textured calcareous soils probably are a major factor. Interactions between climate, insects and diseases and Red Pine growth patterns are also contributors to Red Pine decline.

A Good Forestry Practices permit (GFP 14-30; issued Sept 8, 2014) was approved for partial removal and thinning of Red Pines at the northern edge of the plantation. Under this permit, approximately 0.53 hectare of Red Pine plantation was removed by a contractor specializing in conifer thinning and harvest

Subsequent to the completion of the work, a number of pine trees located along the edge of the stand were blown over as occasionally happens when trees are removed from the upwind edge of a woodlot (Figure 2). Interior trees are usually less wind-firm than those established on the exterior edge. Edge trees develop in such a way that they are able resist the prevailing winds over time, and provide shelter to interior trees. The result of this sheltering effect is that the root systems of interior trees are less developed and the trees are prone to toppling when exposed to wind.



Figure 2. Windblown pine trees at edge of plantation at 2219 Ottawa Street South, Kitchener

After the tree removal was completed, the owner decided that the condition of the remaining plantation was so poor that it would be preferable to remove the entire wooded area as stated on the application to “use the property for its intended use of agricultural.”

Wildwood Tree Services Ltd., of Oakville, Ontario, was retained by the property owner in the spring of 2015 to evaluate the health and vigour of the plantation. Their conclusion was that “due to the poor management of the plantation, the health and sustainability are extremely low”. The report recommends that while several sections of trees “are in good health and should be protected and preserved” the majority of “trees located in the plantations” should be “cleared for the use of biofuel”. (Forest Plantation Assessment, Wildwood Tree Services Ltd, April 2015)

Upon submission of the tree assessment and a follow-up site visit, Regional staff, in consultation with Environmental Planning staff at the City of Kitchener, and the GRCA agreed with the evaluation of overall tree quality, but that before approving any removals it would be necessary to first determine the extent of the wetland area in order to place constraint lines to protect the feature.

In the spring of 2016, Dougan & Associates submitted a report to the owner (Boundary delineation of the wetland at 2219 Ottawa Street North (sic), Kitchener, Ontario). The

report identified four vegetation communities – two coniferous plantations and two wetland areas. The coniferous plantations are described consistent with the Wildwood report, and the two wetland areas are characterized by the presence of wetland vegetation including ash trees – which are currently threatened by the Emerald Ash Borer (*Agrilus planipennis*). Although the report does not specifically endorse or recommend removal of the plantation types, it does make several recommendations regarding measures to protect wetland areas if woodland (plantation) clearing takes place.

Both reports identify the dominant tree species on the property as White and Norway Spruce, European Larch and Red Pine.

As noted previously, the entire wooded area of the property was designated as a Core Environmental Feature – significant woodland - under the ROP because it was considered to meet the three criteria set out in ROP Policy 7.C.6. quoted above.

Based on the Forest Plantation Assessment (Wildwood Tree Services) and the Boundary Delineation report (Dougan and Associates), it is apparent that criterion (b) of the designation is not met as the plantation on the property is made up of primarily non-native species (Norway Spruce and European Larch) and White Spruce which is native, but not normally found in this part of the Region of Waterloo.

Conclusion

Based on the analysis of the tree composition in the plantation, staff recommend that the Woodland Removal Permit be granted to Mr. Moxey for the removal of the plantation as illustrated on Attachment 1. To protect the adjoining wetland, it is recommended that the following conditions be attached to the permit:

- i) That the wetland boundary (as delineated by Dougan & Associates) be confirmed by the GRCA;
- ii) That a 30 metre buffer be established around the wetland feature and that only limited tree removal be permitted within the buffer area, and that no stump removal, grubbing or grading be permitted within the buffer area;
- iii) That silt fencing to be erected at the wetland boundary;
- iv) That protective fencing at, or clear demarcation of, the 30 metre wetland buffer zone;
- v) That any proposed conifer or invasive hardwood trees to be removed within the 30 metre buffer to be marked beforehand and approved by the GRCA, the City of Kitchener and the Region; and
- vi) That tree removal be done outside of bird breeding season in conformity with the Migratory Birds Convention Act, or upon demonstration, by a qualified professional, that no breeding bird activity is occurring within the plantation or wetland area.

The analysis of the tree composition in the plantation and the anticipated reduction in size of the woodland from 4.8 hectare to 1.4 hectare (i.e. the wetland communities as delineated by Dougan & Associates plus a 30 m buffer) means that the property would no longer qualify as a significant woodland pursuant to ROP Policy 7.C.6. Regional and Kitchener planning staff are now collaborating on updating the mapping of Core Environmental Features in the City as part of the City's Comprehensive Review of the Zoning By-law using the most up-to-date digital mapping. If the Woodland Removal Permit is granted, this feature would no longer qualify as a Significant Woodland, and should therefore be deleted from the draft mapping of Core Environmental Features that will at a future date be submitted for Council's consideration as part of a proposed amendment to the ROP.

Area Municipal Coordination/Cooperation

A draft version of this report was circulated to Environmental Planning staff at the City of Kitchener and the GRCA. Regional and City staff have collaborated in the review of this Application as the City also has a Tree Conservation By-law (2010-042).

Corporate Strategic Plan:

Permitting the removal of the poor quality conifer plantation will allow for the improvement of the livability of this property (3.5 Improve environmental sustainability and livability in intensifying urban and rural settlement areas), while maintaining and protecting the wetland feature on the property (3.6. Preserve, protect and enhance green space, agricultural and environmentally sensitive lands, and Regionally owned forests).

Financial Implications:

The required \$1000.00 fee was included with the submission of the permit application.

Other Department Consultations/Concurrence:

Nil.

Attachments:

Attachment 1 - Showing location of woodland on 2219 Ottawa Street South including area of plantation removed under ROW Permit GFP 14-30

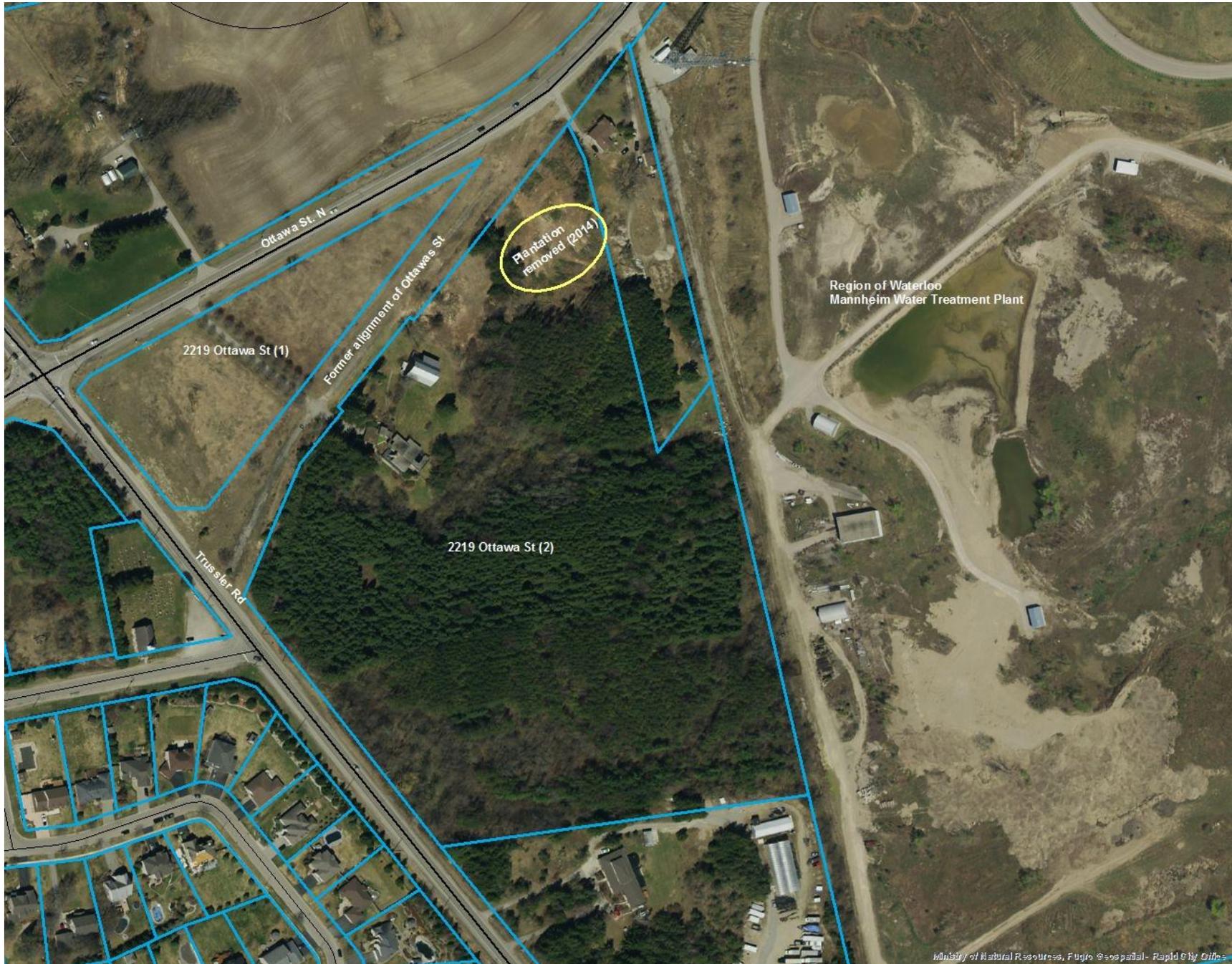
Attachment 2 - Forest Plantation Assessment, Wildwood Tree Services Ltd, April 2015

Attachment 3 - Boundary delineation of the wetland at 2219 Ottawa Street North (sic), Kitchener, Ontario, Dougan & Associates, April 15, 2016

Prepared By: **Albert Hovingh**, Principal Planner, Environmental and Stewardship Planning

Approved By: **Debra Arnold**, Acting Commissioner, Planning, Development and Legislative Services

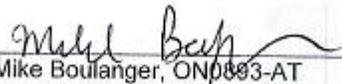
Attachment 1 - Showing location of woodland on 2219 Ottawa Street South including area of plantation removed under ROW Permit GFP14-30



Forest Plantation Assessment

2219 Ottawa Street South, Kitchener ON

Report to: Stephen Moxey 519-241-1015 s.moxey@me.com	Submitted by: Michael Boulanger ISA Certified Arborist & Forestry Technician 905-337-8733
Re: 2219 Ottawa St.	Report Author: Jennifer Kreller wildwoodtree@bellnet.ca
Date: April 9, 2015	
# of Pages: 7	


Mike Boulanger, ON0893-AT

1.0 INTRODUCTION

Certified Arborist and Forestry Technician, Michael Boulanger and assistant, Jennifer Kreller visited the above mentioned site on Tuesday March 10, 2015.

The purpose of our visit was to collect data and assess the health of the trees located within the property.

2.0 PROPERTY INFORMATION

The property is located at 2219 Ottawa Street South in the city of Kitchener is owned by Stephen C. Moxey. Mr. Moxey has owned this property since August 15, 2012.

Located on the property is a residential house with pool, a barn and a plantation. This land is currently zoned for Residential use, however this was changed from Agricultural use in the year of 2013 as per the request of the City of Kitchener.

For the purpose of this report, we have divided the property into 2 sections; Section 1 and Section 2. The total area of section 1 is 13,832m² and the area of section 2 is 75,508m² for a total of 89,340m² or 8.934 hectares.

Figure 1:



2.0 Property Management History

Mr. Moxey acquired the property in 2012 from the original owner. There is a large plantation located on the property and is approximately 6 hectares. This is comprised of Red Pine (*Pinus resinosa*) and White Spruce (*Picea glauca*) with no understorey. This plantation was planted in the late 1960's by the original owner at a planting rate of 1700 to 2100 trees per hectare. The current diameter at breast height (DBH) of the trees located in the plantation are between 15 and 30 centimeters. A small portion of this plantation, under one hectare, has recently been cleared which can be identified as 2.7 in Figure 2 under a harvest permit number GFP 14-30 (see figure 3). The health of this plantation has suffered due to poor mismanagement over the years.

3.0 Tree Inventory and Overview of Health

Section 1.0

Section 1.0 is approximately 13,832.46m². Section 1 is made up of 22 Norway maple (*Acer platanoides*) trees. These trees vary between 15 to 30 centimetres in diameter at breast height (DBH) and are in good condition.

For the purpose of this report, section 2 has been subdivided into 8 subsections (2.1-2.8). This was done to better understand the makeup and transition of species throughout the property.

Figure 2:



Section 2.1

Is approximately 6,751.68m². This area is a secondary growth naturally generated forest. It is predominantly made up of Crack Willow (*Salix species*), and White Ash (*Fraxinus Americana*) with a White Ash (*Fraxinus Americana*) and buckthorn (*Rhamnus*) Understorey. This area is located in a low land and the Ash Trees are beginning to show signs of Emerald Ash Borer (EAB).

Section 2.2

Section 2.2 is approximately 7,427.90m² and begins to transition from White Ash (*Fraxinus Americana*) into the edge of the plantation. This area is primarily made up of White Pine (*Pinus strobus*) and Red Pine (*Pinus resinosa*) with a White Ash (*Fraxinus Americana*) understorey. The health of these trees is poor as they are light suppressed due to poor forestry practices.

Section 2.3

Section 2.3 is approximately 11,060.27m². This section is located in the southern portion of the plantation just north of 2.1 and 2.2. This section is almost entirely made up of Red Pine (*Pinus resinosa*) with no understorey due to poor light conditions. The health of this section of the plantation is very poor due to poor forestry practices over the years. The majority of these trees are seventy to seventy-five percent dead with a live crown ratio (LCR) of twenty-five percent.

Section 2.4

Section 2.4 is approximately 1,686.79m². This area is a predominantly naturally regenerated area on the edge of the plantation with White Ash (*Fraxinus Americana*) and White Pine (*Pinus strobus*) with a Buckthorn (*Rhamnus*) understorey. The health of these trees are moderate as it was naturally created, however the White Ash (*Fraxinus Americana*) is infected with Emerald Ash Borer.

Section 2.5

Section 2.5 is approximately 6,510.58m². This area is located on the east side of the property just north of section 2.4. It is a mixed plantation of White Pine (*Pinus strobus*), Red Pine (*Pinus resinosa*) and White Spruce (*Picea glauca*). The health of these trees is fair as they appear to be planted at a rate of 1200-1500 stems per hectare.

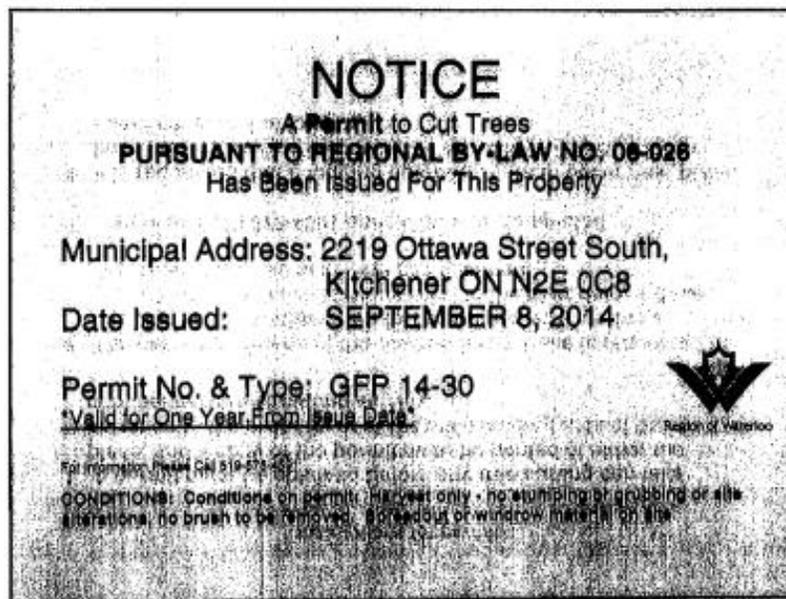
Section 2.6

Section 2.6 is approximately 26,387.68m². This area is a large plantation located in the center of the property. It is entirely made up of White Spruce (*Picea glauca*) and these trees are in very poor condition due to poor forestry management practices. The majority of these trees are seventy to seventy-five percent dead with a live crown ratio (LCR) of twenty-five percent.

Section 2.7

Section 2.7 is approximately 0.6 of a hectare and was previously cleared by the current owner under a harvesting permit. All of the material, debris and stumps are left on site as recommended in the harvesting permit.

Figure 3:



Section 2.8

Section 2.8 is approximately 15,683.26m² (which includes the area of section 2.7). Located in this area is a residential house with pool and a barn. To the south of the house is a naturalized low land made up of Crack Willow (*Salix species*), White Ash (*Fraxinus Americana*) and Black Cherry (*Prunus serotina*) with a dense understorey of Trembling Aspen (*Populus tremuloides*), Dogwood (*Cornus*) and Buckthorn (*Rhamnus*). There are also a number of ornamental plantings surrounding the house and barn. The makeup of these trees is 30 Norway spruce (*Picea abie*), 3 White Spruce (*Picea glauca*), 9 White Ash (*Fraxinus Americana*), 1 Silver Maple (*Acer saccharinum*), 1 Black Walnut (*Juglans nigra*), and 1 Cherry (*Prunus cerasus*). All of these trees are in good condition and should try and be retained if possible.

4.0 Conclusion and Recommendation

Due to the poor management of the plantation, the health and sustainability are extremely low. The majority of the trees in the plantation are of poor health and poor growth rates. There is no possibility of young seedlings establishing themselves due to the poor light conditions and foliage density. This plantation is at extreme risk of forest fire due to the large amounts of deadwood and dry conditions. It is also at risk for insect infestation in the future. The lumber in this plantation is of no economic value due to poor forestry management practices and low growth rates.

It is unfortunate that this plantation was not managed by a professional forester over the years. It appears that the plantation was planted and neglected with no forestry plan in place. If proper thinning operations occurred on a regular basis, this plantation could have been thriving with a young understory in development. At this point, establishing any thinning practices would have no effect or improve the conditions of the plantation. The crowns of these trees have a live crown ratio (LCR) of twenty five percent making this plantation unsustainable.

It is my professional recommendation that the trees located in section 1 and 2.8 are in good health and should be protected and preserved. However, I recommend the trees located in the plantations (2.1, 2.2, 2.3, 2.4, 2.5, 2.6) are cleared for the use of biofuel.

Attachment 3 - Boundary delineation of the wetland at 2219 Ottawa Street North (sic), Kitchener, Ontario, Dougan & Associates, April 15, 2016 (Docs #2192146)



April 15th, 2016

Stephen Moxey
2219 Ottawa Street North,
Kitchener, Ontario
Email: c.moxey@me.com

Dear Mr. Moxey:

Re: Boundary Delineation of the wetland at 2219 Ottawa Street North, Kitchener, Ontario

Dougan & Associates was retained to delineate the boundary of a small wetland within the property of Mr. Stephen Moxey at 2219 Ottawa Street North, Kitchener, Ontario (Figure 1). The purpose of this exercise was to assist in making a formal submission for a Woodland Removal Permit under By-law 08-026, as per the request of the Region of Waterloo. The following letter outlines our methods and findings; we recommend that this letter be appended with the application for the Woodland Removal Permit for 2219 Ottawa Street North.

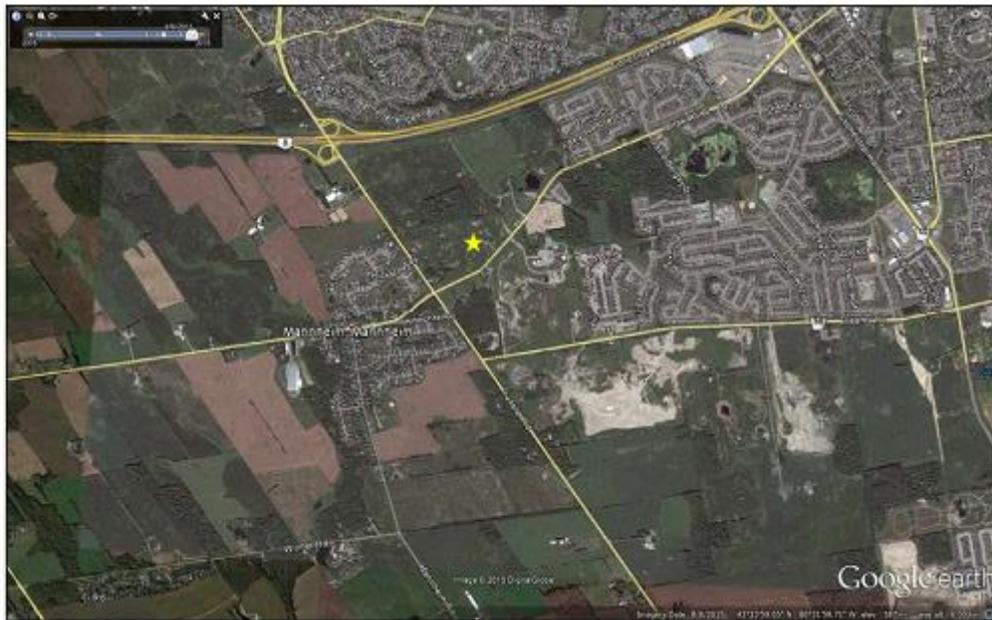


Figure 1. Location of study area (star) at 2219 Ottawa Street North, Kitchener, Ontario.

METHODOLOGY

The study area, shown in detail on Figure 2, was investigated on November 4th, 2015 to delineate the wetland boundary as per the Ontario Wetland Evaluation System (OWES) methodology (OMNRF, 2013). This involved inventorying the vegetation communities to determine if wetland indicator species were present, and characterizing soil texture and moisture regime. The vegetation communities within the study area were also characterized and mapped according to Ecological Land Classification (ELC; Lee et al. 1998) to differentiate wetland from non-wetland vegetation communities. The proposed wetland boundary was then flagged and located using a Trimble GeoExplorer 6000 Series GeoXH high-accuracy GPS unit.

RESULTS

As shown on Figure 2, four vegetation communities were identified within the study area (Table 1). A full list of species for each polygon is provided in Table 3.

Table 1: Study Area Vegetation Community Summary

Vegetation Communities	ELC Code	Polygon ID	Area (ha)
Cultural Communities			
White Spruce - European Larch Coniferous Plantation	CUP3-8	1	2.42
Norway Spruce - European Larch Coniferous Plantation	CUP3-9	2	1.68
Wetland Communities			
Red (Green) Ash Mineral Deciduous Swamp	SWD2-2	3	0.16
Forest Communities			
Fresh-Moist Ash Lowland Deciduous Forest	FOD7-2	4	0.56
Total			4.81

Cultural Communities

Polygon 1 consists of a White Spruce - European Larch Coniferous Plantation (CUP3-8) with a canopy dominated by White Spruce (*Picea glauca*) and sparsely vegetated subcanopy, understory, and groundlayer. Common Buckthorn (*Rhamnus cathartica*) was abundant in the understory and both Garlic Mustard (*Alliaria petiolata*) and Eastern Helleborine (*Epipactis helleborine*) were most common in the ground layer. Polygon 2 is a Norway Spruce - European Larch Coniferous Plantation (CUP3-9). The canopy is dominated by Norway spruce (*Pinus strobus*) but also contains Red Pine (*Pinus resinosa*). Coniferous plantations are areas where canopy cover is greater than 60% and the dominating canopy trees are conifers planted in rows. Although cultural in nature, plantations may provide substantive benefits to overall natural functions when associated with existing wetland cover and upland forest.

Wetland Communities

Polygon 3 is the only wetland community on the property and is a Red (Green) Ash Mineral Deciduous Swamp (SWD2-2) (Figure 2). It is located south of the White Spruce - European Larch Coniferous Plantation on the eastern side of Tressler Road. Both the canopy and the subcanopy are dominated by Green Ash (*Fraxinus pennsylvanica*). A few Manitoba Maple (*Acer negundo*) and White Willow (*Salix alba*) trees are also present in the canopy. Manitoba Maple are also present within the understory as well as Sweet Cherry (*Prunus avium*). The shrub layer contains abundant Common Buckthorn and the occasional Basket Willow (*Salix purpurea*), Alternate-leaved Dogwood (*Cornus alternifolia*), Staghorn Sumac (*Rhus typhina*), and Cranberry Viburnum (*Viburnum opulus ssp. opulus*). The most abundant

species in the ground layer was Garlic Mustard and Dame's Rocket (*Hesperis matronalis*). No wetland indicator species were recorded within the polygon but this may be due to the timing of the site visit. The soils within this polygon were clay loam faint mottling occurring at depths of 30cm, indicating moist soils.

Forest Communities

Polygon 4 is a Fresh-Moist Ash Lowland Deciduous Forest (FOD7-2) located to the east of the wetland community. It contains many of the same species as the wetland polygon but is topographically higher with silt loam soils with no mottles implying more effective drainage. Green Ash is dominant in the canopy and the subcanopy. Common Buckthorn was more abundant within this polygon within both the understory and the subcanopy. Manitoba Maple is also present within the subcanopy. The understory contains Common Buckthorn, Northern Red Current, Green Ash, Staghorn Sumac, and European Privet (*Ligustrum vulgare*). The ground layer is dominated by Dame's Rocket and also contains American Elm (*Ulmus americana*), Eastern Late Goldenrod (*Solidago altissima ssp. altissima*), Herb-Robert (*Geranium robertianum*), and Wild Strawberry (*Fragaria virginiana*).

Vascular Plant Species Inventory

A total of 59 vascular plant species were observed within the study area on November 4th, 2015 (see Table 3), of which 43 were identified to the species level. Native species represented 48.63% (18 species) of the flora and 51.4% (19 species) were introduced. No federal or provincial vascular plant Species at Risk were detected (Appendix 1). Regional Municipality of Waterloo (1999) was reviewed for the local rarity of the vascular plants identified; one species, White Spruce (*Picea glauca*) has R+ status which means it is significant but only if demonstrably indigenous-most populations in Waterloo are thought to be of non-indigenous origin. It was found within a cultural plantation and therefore is not considered significant. The results for the Floristic Quality Assessment (FQA) are shown in Table 1. Floristic Quality Index (FQI) is a weighted species richness estimate used to compare natural areas in order to evaluate their conservation value. FQI is calculated by multiplying the mean coefficient of conservatism by the square root of the total number of native species present within a natural area. FQI is an index of the relative level of floristic quality at the given natural area, and can be used to compare the level of floristic quality against other natural areas. This calculation was based on the total number of species for which a cc value was available. Polygon 1, 2, and 4 had a mean wetness value of 1.41, 2.93, and 3 respectively; indicating a vegetation community of predominantly upland species (i.e. mean wetness >0). Polygon 3 also contained predominately upland species but had the lowest mean wetness (0.35). It is possible due to the timing of the site visit, key wetland indicator species may have been missed. The Floristic Quality Index (FQI) was relatively low across the site. Polygon 3 had the highest Total FQI, as this feature consisted of a higher proportion of more conservative native species (Table 2).

Table 2. Results of Floristic Quality Assessment for the study area

FQA Metric	Study Area	Polygon 1 (CUP3-8)	Polygon 2 (CUP3-9)	Polygon 3 (SWD2-2)	Polygon 4 (FOD7-2)
Native Species	18	6	2	8	7
Introduced Species	19	9	0	12	5
Total Identified to the Genus Level	7	3	0	5	3
Total Identified to the Species Level	37	15	2	20	12
Mean Wetness	1.41	2.93	3	0.35	0.75
Total FQI	22.69	9.30	8.49	17.89	6.93
Average CC	3.73	2.4	6	4	2
Native FQI	15.83	5.88	8.49	11.31	5.29

The location of the wetland boundary between polygons 3 and 4 was delineated based on vegetation community composition (minimum 50% relative cover of wetland indicator species), soil moisture regime, and the overall mean wetness index. This wetland boundary, shown on Figure 2, has not been reviewed or approved by the Grand River Conservation Authority (GRCA).

CONCLUSION AND RECOMMENDATIONS

- Four vegetation communities were identified within the study area; a White Spruce - European Larch Coniferous Plantation (CUP3-8), Norway Spruce - European Larch Coniferous Plantation (CUP3-9), Green Ash Mineral Deciduous Swamp (SWD2-2), and a Fresh-Moist Ash Lowland Deciduous Forest (FOD 7-2). The boundary of the Green Ash Swamp (Figures 2) was delineated as per OWES protocols.
- The wetland boundary identified on the mapping (Figure 2) shows the location and extent of the wetland features that should be avoided during woodland clearing
- GRCA requested a minimum setback of 30 m from the wetland and forest features be established to ensure any works do not indirectly impact the wetland feature (Figure 2)
- Within the 30 m setback, some clearing should be permitted, such as clearing standing dead stems, tree stumps, etc, following best forestry practices
- Prior to clearing, D&A can conduct a site visit with the Region and/or the Grand River Conservation Authority to confirm the limit of the wetland and the deciduous forest features

Please contact us if you have any questions or concerns regarding this matter.

Sincerely,

Steven Hill, Ph.D.
 Director and Ecologist
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Table 2. List of vascular plant species observed within the study area on November 4th, 2015.

Polygon #	Scientific Name			Common Name	COSEWIC	SARO	GRANK	SRANK	RMW	CC	CW	Native Status
	1	2	3									
	x	x	<i>Acer negundo</i>	Manitoba Maple			G5	S5		0	0	N
x			<i>Achillea millefolium</i>	Common Yarrow			G5	SNA			3	N
x	x		<i>Alliaria petiolata</i>	Garlic Mustard			GNR	SNA		0	3	I
	x		<i>Arctium minus</i>	Common Burdock			GNR	SNA		0	3	I
x	x		<i>Chelidonium majus</i>	Greater Celandine			GNR	SNA		0	5	I
	x		<i>Cornus alternifolia</i>	Alternate-leaved Dogwood			G5	S5		6	3	N
x			<i>Dipsacus fullonum</i>	Fuller's Teasel			GNR	SNA		0	3	I
	x		<i>Echinocystis lobata</i>	Wild Mock-cucumber			G5	S5		3	-3	N
x			<i>Epipactis helleborine</i>	Eastern Helleborine			GNR	SNA		0	0	I
		x	<i>Fragaria virginiana</i>	Wild Strawberry			G5	S5		2	3	N
	x		<i>Frangula alnus</i>	Glossy Buckthorn			GNR	SNA		0	0	I
	x	x	<i>Fraxinus pennsylvanica</i>	Green Ash			G5	S4		3	-3	N
		x	<i>Geranium robertianum</i>	Herb-Robert			G5	S5		0	3	I
	x	x	<i>Hesperis matronalis</i>	Dame's Rocket			G4G5	SNA		0	3	I
	x		<i>Hydrophyllum virginianum</i>	Virginia Waterleaf			G5	S5		6	0	N
		x	<i>Ligustrum vulgare</i>	European Privet			GNR	SNA		0	3	I
	x		<i>Lonicera tatarica</i>	Tartarian Honeysuckle			GNR	SNA		0	3	I
x			<i>Morus alba</i>	White Mulberry			GNR	SNA		0	3	I
x			<i>Picea glauca</i>	White Spruce			G5	S5	R+	6	3	N
	x		<i>Pinus resinosa</i>	Red Pine			G5	S5		8	3	N
	x		<i>Pinus strobus</i>	Eastern White Pine			G5	S5		4	3	N
x			<i>Plantago lanceolata</i>	English Plantain			G5	SNA		0	3	I
x			<i>Potentilla recta</i>	Sulphur Cinquefoil			GNR	SNA		0	5	I
	x		<i>Prunus avium</i>	Sweet Cherry			GNR	SNA		0	5	I
	x		<i>Ranunculus recurvatus</i>	Hooked Buttercup			G5	S5		4	-3	N

Polygon #				Scientific Name	Common Name	COSEWIC	SARO	GRANK	SRANK	RMW	CC	CW	Native Status
1	2	3	4										
x		x	x	<i>Rhamnus cathartica</i>	Common Buckthorn			GNR	SNA		0	0	I
x		x	x	<i>Rhus typhina</i>	Staghorn Sumac			G5	S5		1	3	N
x				<i>Rubus occidentalis</i>	Black Raspberry			G5	S5		2	5	N
		x		<i>Salix alba</i>	White Willow			G5	SNA		0	-3	I
		x		<i>Salix purpurea</i>	Basket Willow			G5	SNA		0	-3	I
		x		<i>Sambucus canadensis</i>	Common Elderberry			G5T5	S5		5	-3	N
x		x		<i>Solanum dulcamara</i>	Climbing Nightshade			GNR	SNA		0	0	I
x			x	<i>Solidago altissima</i> ssp. <i>altissima</i>	Eastern Late Goldenrod			GNR	S5		1	3	N
x				<i>Solidago nemoralis</i> ssp. <i>nemoralis</i>	Gray-stemmed Goldenrod			G5T5	S5		2	5	N
			x	<i>Ulmus americana</i>	American Elm			G5?	S5		3	-3	N
		x	x	<i>Viburnum opulus</i> ssp. <i>opulus</i>	Cranberry Viburnum			GNR	SNA		0	-3	I
			x	<i>Vitis riparia</i>	Riverbank Grape			G5	S5		0	0	N
x				<i>Fraxinus</i> sp	Ash Species								
x				<i>Galium</i> sp	Bedstraw Species								
		x	x	<i>Geum</i> sp	Avens Species								
x		x	x	<i>Ranunculus</i> sp	Buttercup Species								
		x	x	<i>Ribes</i> sp	Currant Species								
		x		<i>Urtica</i> sp	Nettle Species								
		x		<i>Viola</i> sp	Violet Species								

LEGEND

COSEWIC (COSEWIC 2014)

NAR Not At Risk, a wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances; SC Special Concern, a wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats; T Threatened, a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction; E Endangered, a wildlife species facing imminent extirpation or extinction; XT Extirpated, a wildlife species that no longer exists in the wild in Canada, but exists elsewhere; X Extinct, a wildlife species that no longer exists.

MNRF SARO (NHIC 2011)

NAR Not At Risk; SC Special Concern; THR Threatened; END Endangered; EXP Extirpated

Grank (NHIC 2015a)

G1 critically imperiled on a global scale; **G2** imperiled on a global scale; **G3** vulnerable on a global scale; **G4** apparently secure on a global scale; **G5** secure on a global scale. (<http://www.natureserve.org/explorer/ranking.htm>)

SRank (NHIC 2015b)

SX Presumed Extirpated; SH Possibly Extirpated (Historical); S1 Critically Imperiled; S2 Imperiled; S3 Vulnerable; S4 Apparently Secure; S5 Secure; SNR Unranked; SU Unrankable (conflicting information about status or trends); SNA Not Applicable (A conservation status rank is not applicable because the species is not a suitable target for conservation activities.); S#S# Range Rank (used to indicate any range of uncertainty about the status of the species or community). S? Not Ranked Yet; or if following a ranking, Rank Uncertain (e.g. S3?).

RMW (Regional Municipality of Waterloo) (RMW, 1999)

R Rare in the Regional Municipality of Waterloo; R+ significant but only if demonstrably indigenous-most populations in Waterloo are thought to be of non-indigenous origin; S5 Very common and demonstrably secure in Ontario. R* significant, but may prove to be too common to be so regarded in the future

CC (Coefficient of Conservatism) (Oldham et al. 1995)

Coefficient of Conservatism is a value (0 to 10) assigned to native species in Ontario based on its degree of fidelity to a specific vegetation community type. The lower this value, the more likely the plant is to be found in a wide variety of plant community types including disturbed sites. The presence of plants with a coefficient of conservatism of 9 or 10 indicates later-successional native plants that have undergone only minor disturbance.

CW (Coefficient of Wetness) (Michigan Flora Online, 2011)

Coefficient of Wetness is a value (-5 to +5) assigned to species in Ontario based on how often it is to occur in wetland habitat. -5 Obligate Wetland; -3 Facultative Wetland; 0 Facultative; +3 Facultative Upland; +5 Obligate Upland

Native Status

I Introduced; N Native

