Cityview Ridge Environmental Impact Study

Prepared for Carson Reid Homes Ltd.
February 2012

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1.0 INTRODUCTION

The proposed Cityview Ridge development is located in the east end of the City of Guelph, north of York Road. It extends east of Cityview Drive to the Watson Parkway, and west of Cityview Drive to the limits of existing development, comprising 17.68 ha. It includes frontage onto Cityview Drive and the Watson Parkway (Figure 1). The CN rail line bounds the property to the south. The plan is comprised of Part of Lot 4, Concession 3, Division 'C' and Lot 34 and Parts of Lots 30, 32 and 33, Registered Plan 53 in the City of Guelph. This site is proposed to be developed for a mixed density residential community including park land, stormwater management (SWM) facilities and open space. For the purpose of description in the report, Cityview Drive is considered to be oriented in a north-south direction.

Work on the environmental characteristics of the site east of Cityview Drive was initiated in 1993 when in the ownership of Mr. P.T. Valeriote. At that time, a constraint analysis was undertaken to identify the area of the site that was suitable for development. An initial development concept was developed that responded to the constraints identified. In the intervening years, many changes have occurred including a change in ownership of the site, refinements to the status of natural heritage features and individual species, and most recently, the Council approval of the City's Natural Heritage System (NHS) as part of OPA 42. The identification of features and the evaluation of their significance has evolved in response to these changes, and this Environmental Impact Study (EIS) incorporates consideration of the City's NHS. In late 2010, the current owner also acquired land west of Cityview Drive and this was added to the application, with the necessary environmental work being undertaken in the spring and early summer of 2011.

1.1 Purpose

North-South Environmental Inc. (NSE) was initially retained to identify environmental constraints on the subject lands to provide input into development concepts that would, to the extent possible, avoid impacts through design. NSE is part of a multi-disciplinary team that also includes Black, Shoemaker, Robinson and Donaldson (BSRD, planning); Gamsby and Mannerow Limited (engineering), Gartner Lee Ltd. (now AECOM) (fish habitat), Naylor Engineering Associates (geotechnical) and Banks Groundwater Engineering Limited (hydrogeology). The Environmental Impact Assessment was initially undertaken in response to Section 6.3.1 of the City of Guelph Official Plan (November 2006 Office Consolidation), which requires that an Environmental Impact Study (EIS) be completed owing to the proximity of valued environmental features. In February 2011, the Province approved the City's revised environmental policies in OPA 42. Although this amendment is under appeal, it was used as the guiding document for the purpose of identifying features and policy constraints.

1.2 Existing Designations

The City of Guelph Official Plan (City of Guelph 2006) identifies Cityview Ridge as part of the Eastview Community Secondary Plan (Schedule 1A) and designates the lands as General Residential, Mixed Use Node, Open Space, Core Greenlands and Non-Core Greenlands Overlay

on Schedule 1 - Land Use Plan. A Regulatory Flood Line is identified on Schedule 2 - Natural Heritage Features and Development Constraints.

The City of Guelph Zoning By-law zones the property Urban Reserve (UR) and Floodplain lands (FL). The by-law also includes an overlay of "Lands with one of the following: locally significant wetlands, significant woodlots, natural corridor or linkage." This overlay is located along the creek at the southeast corner of the property, which identifies the extreme southeast corner as a natural corridor or linkage.

Schedules 2 and 10 in OPA 42 identify the eastern part of the site as being a “Significant Natural Area” within the City’s Natural Heritage System. This designation is predicated on the presence of several natural heritage features including: a wetland, significant woodland, significant valleyland and a cold water stream (Schedules 10A to 10D). These features are described in Section 4 of the report.

An area of steep slopes is identified by the Grand River Conservation Authority (GRCA) (GRCA on-line mapping tool, November 2011) on the central portion of the study site. A geotechnical study was completed by Naylor Engineering Associates (Naylor 2012) to identify any constraints associated with these slopes.

1.3 General Site Description

The Cityview Ridge property is 17.68 ha in size. The site has varied topography, being dominated by a drumlin feature that slopes off to the east and west. The east-facing slope is relatively steep, with the easterly part of the site “below” the drumlin consisting of a lower flatter area adjacent to Watson Parkway. West of the drumlin crest the site slopes gently toward Cityview Drive. Clythe Creek enters the site in the southeast corner of the property.

The study area west of Cityview Drive is mainly a large existing residential lot with a single dwelling and out-buildings on it. The area along the west side of Cityview Drive was cleared as part of the existing adjacent development, prior to its recent purchase by Carson Reid Homes Ltd. A single residence and associated residential yard (former home of P.T. Valeriote) exists on the east side of Cityview Drive. The majority of the area east of Cityview had in the past supported a Christmas tree plantation composed of scots pine (*Pinus sylvestris*). These trees were harvested in 2006 and the area is now substantially open, although there are scattered trees that had established among the Christmas trees and some ornamental plantings associated with the residence. East of this, the property slopes down toward Watson Parkway. Thus approximately one third of the property at the eastern end of the site is a combination of steep slopes and low-lying land. The slopes mainly support planted conifers and hawthorn, with some hardwoods. The easternmost portion of the subject property, adjacent to Watson Parkway, is predominately flat and is vegetated with a coniferous plantation, scattered deciduous tree species, thickets and a wetland area along Clythe Creek.

Cityview Ridge

Figure 1: Location of Study Area

Legend

Creeks

Study Area

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W E
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N
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September 23, 2011

1.4 Adjacent Land Use

The Cityview Ridge property is within an area that is transforming from an urban fringe land use (*e.g.*, low density of residential dwellings intermixed with some small agricultural operations) to an urban land use. Within the last 10 years, several developments in the general area to the north, west and east have been approved and constructed (Figure 1).

To the south of the Cityview Ridge property is a CN railway line and immediately south of that is a mix of commercial and residential uses located along York Road (Highway 7). The lands immediately east of Watson Parkway are currently vacant, but are expected to be developed in the future as part of a mixed use node. The lands west and north of the portion of the subject lands west of Cityview Drive support a new residential development. Lands to the north of the site east of Cityview Drive are currently vacant but development plans are being prepared for them. Beyond that, are existing residential subdivisions. In general, land uses within the Eastview Community Secondary Plan are medium density residential, multiple residential, a mixed use node, recreational, and schools.

2.0 APPROACH AND METHODS

Collectively, the consulting team has worked toward the development of a plan that respects the environmental characteristics of the site, and has sought to avoid impacts through design, to the maximum extent possible. In 1994, a Draft Environmental Constraint Study was prepared for the Eastview Planning Area and Valeriote Lands, by North-South Environmental Inc. staff (then employed by Geomatics International Inc.) to guide the development concept and prevent or minimize impacts to natural heritage features. Since then there have been numerous visits to the site to update and complete the biophysical inventory and re-evaluate features in response to changing policy requirements. This current EIS evaluates the natural heritage characteristics of the site, identifies potential impacts, provides a Tree Compensation Plan based on the proposed draft plan of subdivision, identifies net impacts and recommends mitigation, comments on policy conformity, and provides recommendations for monitoring.

A Terms of Reference and draft Table of Contents for this EIS were presented to Guelph's Environmental Advisory Committee (EAC) on June 14th 2006, and circulated to the City and Grand River Conservation Authority (GRCA) for comment. Subsequently, comments were received from EAC, the GRCA, Planning and Community Services. The comments have been incorporated into this EIS.

Over 15 site visits were made (Table 1 lists principal visits) to assess vegetation communities, and bird, amphibian, fish and mammal presence on the study site. Landform was based on assessments undertaken for the 1994 Geomatics study. Soil samples were taken using a standard Dutch auger and soil samples were analyzed in the field to determine soil type. Vegetation communities were classified using the Ecological Land Classification system for Southern Ontario (Lee *et al*. 1998). While delineating ecological communities within the study area, a complete floral inventory was completed for each vegetation unit. Breeding bird surveys followed the Breeding Bird Atlas protocols for collecting evidence of breeding birds. There is

no habitat for amphibian breeding on the site, however, to confirm this, amphibian surveys were undertaken adjacent to the wetland along Clythe Creek. Incidental wildlife sightings were also recorded while in the field on all dates.

Table 1. Summary of principal field investigations

Date	Task	Personnel
2004		
March 25th	evaluate wetland for amphibian breeding	MJS
2005		
June 8th	breeding birds, spring botanical inventory	SM
July 6th	Ecological Land Classification - update	MJ
Sept. 15th	Ecological Land Classification, fall botanical inventory	MJ
2006		
June 12th	confirm wetland boundary with GRCA	MJS, NF, NS, TZ, AK
July 14th	fish habitat evaluation	LG
2009		
March 30th	woodland boundary delineation	MJS, SP
2010		
April 8th	amphibian breeding survey (Clythe Creek wetland)	MJS
June 29th	tree inventory and evaluation	SP, LL
July 8th, 9th, and 12th	tree inventory and evaluation	SP, LL
Nov 10th	plantation inventory and evaluation	LL, SS
2011		
May 27th	breeding bird survey, ELC, and tree evaluation west of Cityview	SP
July 9th	tree evaluation update west of Cityview; update/confirm ELC east of Cityview	SP

MJS = Mirek Sharp*; SM = Sarah Mainguy*; MJ = Mary Ann Johnson*; NF = Nancy Falkenburg*; NS = Nancy Shoemaker; TZ = Tony Zammit; AK = Angela Kroetsch, LG = Lisa Guenther; SP = Sarah Piett*; LL = Leah Lefler*; SS = Sal Spitale* (* = NSE staff)

The wetland boundary was delineated by NSE staff and subsequently reviewed with GRCA (Tony Zammit) on 12th June 2006. Minor revisions were made and the boundary was subsequently surveyed. The digital wetland boundary was subsequently sent to the GRCA in order to update their wetland records for the area.

The low-lying area adjacent to Watson Parkway had been included within the regulated floodplain by the GRCA. The floodplain modelling was subsequently refined and re-done by Gamsby and Mannerow Limited (2012) as part of this development application. The revised

floodplain mapping is provided in this EIS, but the reader is referred to Gamsby and Mannerow Limited (2012) for details on the calculations and other engineering aspects of the application.

A hydrogeology study of the property was undertaken by Banks Groundwater Engineering Limited (2012). In preparing that study, special attention was given to establishing any potential impacts of development on the seepage in the wetland area in the eastern area of the property. The findings of the groundwater study are summarized in this report, but the reader is referred to the full hydrogeology report (Banks 2012) for details.

2.1 Review of Existing Information

Several documents were examined that are relevant to the study site including:

- The Official Plan for the City of Guelph (Office Consolidation November 2006);
- Envision Guelph, Official Plan Amendment OPA 42, as adopted by Council July 27th 2010 and approved by the minister of MMAH 22 February 2011 (under appeal);
- City of Guelph Zoning Bylaw (2006);
- Draft Environmental Constraint Study (Geomatics 1994);
- Clythe Creek Subwatershed Overview (Ecologistics Limited 1998);
- Hydrogeological Investigation, Proposed Cityview Ridge Development, Guelph, Technical Memorandum, 2012 (Banks Groundwater Engineering Limited 2012); and
- Geotechnical Investigation (Naylor 2012).

In addition to these, the provincial NHIC database was searched for records of significant species (*i.e.*, rare, threatened, endangered species and Species at Risk). Evaluation of locally significant floral and faunal species was based on Dougan (2009), which constitutes the background study for the City's Natural Heritage System as presented in OPA 42.

2.2 Agency Consultation

A site visit on June 12, 2006 was made to discuss the steep slope line and the wetland boundary. In attendance was Angela Kroetsch (Gamsby and Mannerow Limited), Nancy Shoemaker (Black, Shoemaker, Robinson and Donaldson), Tony Zammit (GRCA), Mirek Sharp and Nancy Falkenberg (North-South Environmental Inc).

2.3 Tree Inventory and Assessment

The initial tree inventory was completed in 2010, with the area west of Cityview Drive being updated in 2011. All trees greater than 10 cm in diameter were measured approximately 1.4 m from the base of the tree (at breast height,(dbh)). All trees were evaluated based on trunk integrity, crown structure, and crown vigour using standard criteria (Appendix 3) to determine tree vigour class. These classes range from excellent (1) to dead (6) (Appendix 2) Each evaluated tree was marked, numbered and, for open areas of the subject lands, located using a hand-held GPS unit. All of these trees were subsequently mapped and over-laid with the proposed development. The proposed plan of subdivision and preliminary grading plan were used to identify impacts to surveyed trees.

An alternative tree inventory method was used for the narrow extension of the conifer plantation along the railway tracks (stormwater block 112) and the conifer plantation adjacent to Watson Parkway where the apartment building is proposed (block 115). Due to the uniformity and density of these plantations, the areas were assessed as a unit and trees were not individually evaluated. Instead, of the number of trees greater than 10 cm dbh in each stand was determined and the range of dbh sizes and general class condition was recorded. Any regenerating trees (*i.e.*, not planted) over 10cm dbh in the extension of the conifer plantation were measured and their condition and class recorded. In the conifer plantation along Watson Parkway 10 transects were walked with all trees greater than 10cm dbh along these transects measured and their condition and class noted. This represented a sample of approximately 10% of the entire area of the conifer plantation proposed for removal. The results were multiplied by 10 in order to provide an estimate of the total trees in the stand for the purpose of determining appropriate compensation.

A comparison of the mapped locations of existing trees, the preliminary grading plan and the proposed plan of subdivision was used to determine which trees would be lost due to the proposed development and which trees might be retained. The comparison permitted an assessment of the development impacts on trees resulting from the proposed development plan including the location of buildings, roads, parking areas and sidewalks as well as areas where proposed grade changes exceeded approximately 0.5 m. There is a high likelihood that where grade changes of 0.5 m or more (cut or fill) removes, exposes or smothers greater than one third of the root zone, the tree health of the tree will be compromised and likely lead to the death of the tree (Harris 1992; Helliwell 1985 (as sited in Matheny and Clark 1998)). This evaluation was used as a basis for determining tree compensation.

3.0 DESCRIPTION OF THE SITE

3.1 Physiography and Surficial Geology

The Cityview Ridge property is located within the Guelph Drumlin field east of the Guelph city centre. The southeastern edge of the property (within the low-lying area adjacent to Watson Parkway) is occupied by a portion of a former meltwater channel which formed part of the Eramosa/Grand River meltwater system that operated during the final stages of the Late Wisconsinan glaciation in this area.

The majority of the property is occupied by two northwest-southeast trending drumlins. These drumlins have a local relief of approximately 15 to 20 m with slopes ranging from a high of 32 degrees on one flank to near flat on their uppermost surfaces. The highest slopes occur on the eastern flank of the eastern drumlin and are likely over-steepened due to the extraction of till to construct a small farm access road along the hill slope. The till is referred to as Wentworth Till and is silty sand to sandy till (Karrow 1968). A sample taken from the uppermost part of the eastern drumlin was hand textured as a sandy loam (silty sand). The sample was collected from about 75 to 90 cm depth using a standard Dutch Auger.

The former meltwater channel, represented in the southeasternmost part of the property, is currently occupied by Clythe Creek, a small tributary to the Eramosa River. Drainage in the tributary is toward the west, however, through most of the site, runoff from the drumlin field is generally toward the south, southeast and southwest depending on local topography (see Figure 3 in Preliminary Servicing & Stormwater Management Report for drainage areas). The meltwater channel may have cut into the lowermost flanks of the drumlins depositing sand, gravels and cobbles over the till. Except in the southeastern corner of the site, most of the meltwater channel and tributary lie south of the rail tracks, off of the property.

3.2 Soils

The surface material bordering Clythe Creek is identified as modern alluvium (silts and sands) (Karrow 1968). Surrounding the alluvial deposits are outwash gravels forming a low-lying, level area. These outwash gravels border on the southeast edge of the drumlinized till plain of the Guelph drumlin field. The composition of the drumlins is generally a mix of gravelly sands and the sandy Wentworth Till.

Specifically, soils of two series have been identified within the study property: the Burford and Guelph loams (Hoffman *et al*. 1963). The dominant soil type associated with the Guelph Drumlin field is the Guelph loam, which is derived from the Wentworth Till. The Burford and Guelph loams are well-drained, considered only slightly stony, and are classified as Gray Brown Luvisols. Luvisolic soils typically have an accumulation of clay sized material in the upper portion of the soil profile.

The Cityview Ridge property is characterized by a mixture of the Gray Brown Luvisols belonging to the Guelph and Burford loams. The outwash gravels of the Burford loam are located to the west and east extremes of the property while the Guelph soils are dominantly in the central portions of the property.

Most of the western side of the property was disturbed long ago when it was cleared for the purposes of farming. A soil core was extracted and analysed for a previous review (Geomatics 1994). The surface horizon was identified as an Ap horizon which is related to the land having been ploughed in the past for agricultural purposes with the surface horizon being a near homogenous mixture of mineral and organic material. The soil core was located in the central area of the property, within what was then the Christmas Tree plantation, on a mid-upper slope position. A very dark brown (10YR2/2) loam identified as an Ap/Ah horizon was found to a depth of 22 cm. It was underlain by a Bt horizon which consisted of a dark brown (10YR3/3) loam with a minor pebble content. This continued to 45cm below the surface where larger stones became more abundant. There were no stones evident on the surface, however, to the east, areas of steeper slopes had surface stones. This area was identified by Hoffman *et al*. (1963) as Guelph loam and classed as an Orthic Grey Brown Luvisol.

3.3 Surface Drainage

Clythe Creek enters the site in the southeast corner, adjacent to Watson Parkway. It runs through a narrow white cedar wetland that extends along the base of the CN railway embankment. The

Creek eventually drains into a culvert which conveys the flows southerly under the rail line and York Road, emerging in the former reformatory lands and running along the south side of York Road before draining into the Eramosa River. The reach on the study property is approximately 155 m long.

Clythe Creek originates approximately 5 km to the east of the site, and is a perennially flowing watercourse. Within the cedar wetland on the subject property, the slopes to the Creek are gentle and support a number of seepages that contribute cool groundwater in the spring. Clythe Creek has been identified as a providing cold water fish habitat (Section 3.8).

Historically, there was a second watercourse that once flowed onto the site from the north and presumably flowed into Clythe Creek, probably near the point where the latter now flows beneath the CN rail line. This historic watercourse was located east of the toe of the easternmost drumlin on the subject lands. This watercourse disappeared at some point in the past and there is no evidence of a channel or riparian vegetation, suggesting that it was removed a long time ago. A former landowner constructed a low (1-1.5 m high) berm across this former watercourse, evidently impounding the water, the level of which appears to have been controlled through an outlet structure in the berm. Although the date of the impoundment is not known, we estimate that the berm became dysfunctional 50 to 60 years ago, based on its current condition. The impoundment created a shallow bowl-like depression on the "up-gradient" side of the berm, which is a mix of open meadow and buckthorn thickets and some early succcessional shrubs. The control structure in the berm has disappeared, a gap in the berm is the only clue as to its location. The area "down-gradient" of the berm is treed and groundwater seepage occurs within it, which flows toward Clythe Creek. The treed area and the seepage is all within the wetland and the berm now forms part of the wetland boundary (Figure 2).

3.4 Hydrogeology

There is an area of groundwater discharge on the site in the southeast corner that contributes to the wetland and assists in the maintenance of water quality in Clythe Creek. This portion of Clythe Creek is located in sub-catchment 10 of the Clythe Creek sub-watershed (Ecologistics 1998). Their report notes that recharge in this sub-catchment is limited owing to the predominance of sandy till at surface, however it also recognizes areas of discharge where there is a "*possible convergence of significant groundwater flow in the upper bedrock…*" (Ecologistics 1998, p. 42). The seepages in the extreme southeast corner of the Cityview site appear to be an example of this. The Ecologistics study also notes that, "*This is potentially the most sensitive groundwater/surface water linkage within the subwatershed.*" (Ecologistics 1998, p. 42).

A hydrogeological study was completed by Banks Groundwater Engineering Limited (Banks 2012) for the subject property, in part to specifically address potential impacts to the seepage area. The reader is referred to that report for details on the hydrogeological investigation. On the basis of an assessment of current site conditions, it is estimated that the average annual rate of recharge to the groundwater system in the eastern 7.44 ha of the site (*i.e.,* Catchments 202 and 300 (Gamsby and Mannerow Limited 2012), primarily east of the area proposed for development) is 21 300 m^3/year. Much of this recharge currently maintains the shallow groundwater discharging to the wetland and Clythe Creek occurring in the wetland in the

southeastern part of the site. Under the proposed draft plan, only a limited area along the top of the eastern slope would be developed for residential use and most of this area will comprise rear yards. Groundwater recharge along the eastern slope of the drumlin, which represents about 30 percent of the recharge in the eastern part of the site, is expected to remain unchanged. Groundwater recharge within the remaining eastern part of the site should also remain unchanged all but a small portion of this area (an apartment block) will remain undeveloped. The proposed apartment block (adjacent to Watson Parkway), constituting a 0.68 ha area of the northeastern part of the site, will require stormwater management facilities designed to maintain the current rate of groundwater recharge in this area. Groundwater discharge to the wetland located on-site and to Clythe Creek should, therefore, continue to be maintained following the proposed development of this site (Banks 2012).

3.5 Vegetation Communities

Several site visits were made to investigate the local flora and delineate the plant communities using the Ecological Land Classification (Lee *et al*. 1998). Five vegetation communities were identified during these site visits, consisting of: two wetland communities, two cultural communities, and two hedgerows (Figure 2).

The ELC designations are generally consistent with those mapped in Appendix 1 of the City's NHS (OPA 42), with some minor amendments that reflect site-specific investigation as follows:

- The wetland community is all mapped as Coniferous Swamp in OPA 42, but is split into Coniferous Swamp and Deciduous Swamp in this EIS;
- A narrow treed area on the south boundary was mapped as Cultural Plantation in OPA 42, but is included in the southern hedgerow in this EIS;
- a treed area along the north property line (on the north side of the existing residence) was mapped in the OPA as Cultural Woodland, but is described as a hedgerow in this EIS; and
- part of the Cultural Meadow on the OPA mapping is identified as Cultural Woodland and hedgerow on the EIS mapping.

White Cedar Organic Coniferous Swamp (SWC3-1)
The swamp is almost entirely dominated by eastern white cedar (*Thuja occidentalis*) in the canopy and sub-canopy. The canopy is 10-15 m in height and covers more than 70% of the canopy. The understory is 2-10 m in height and is less dense than the canopy; covering only 25-35% of the community. There is little understory vegetation growing in this community. The ground layer is 0.2-0.5 m in height and covers 10-25% of the community. There were several ferns found within the ground layer including sensitive fern (*Onoclea sensibilis*), and fragile fern (*Cystopteris fragilis*). Other ground flora species include swamp buttercup (*Ranunculus hispidus*), turtlehead (*Chelone glabra*) and spotted Joe-pye-weed (*Eupatorium maculatum*). This swamp is situated on organic soils. At the time of the ELC field visit on September 15, 2005, the ground was wet at the surface.

Willow Mineral Deciduous Swamp (SWD4-1)
The canopy of this community is dominated by hybrid reddish willow (*Salix* x *rubens*). The canopy is 10-25 m in height and covers greater than 60% of the community. The canopy also contains the occasional trembling aspen (*Populus tremuloides*). There is no sub-canopy in this community. The understory is 2-5 m in height and covers 35-60% of the community. This layer is dominated by highbush cranberry (*Viburnum trilobum*) and red raspberry (*Rubus ideaus* ssp. *ideaus*), as well as an abundance of green ash (*Fraxinus pennsylvanica*) and alder-leaved buckthorn (*Rhamnus alnifolia*). The ground layer vegetation in this community covers greater than 60%; growing in scattered patches. The dominant flora in this layer is jewelweed (*Impatiens capensis*). Other ground flora found within this community are generally typical of wetter habitats such as sensitive fern and spotted Joe-pye-weed.

Scots Pine Coniferous Plantation (CUP3-3)
There are two cultural plantation communities at the east end of the site. The two communities are separated by a low-lying area that was formerly a shallow impoundment (Section 3.3). One of the cultural plantations is located on the ease slope of a drumlin and the second occurs along the easternmost portion of the site, adjacent to Watson Parkway. These two communities have very similar species compositions. The canopy and sub-canopy are dominated by scots pine (*Pinus sylvestris*). The canopy is 10-25 m high and the sub-canopy is 2-10 m in height. The canopy vegetation covers 35-60% while the sub-canopy vegetation covers greater than 60% of the community. In addition to the scots pine in the sub-canopy, occasional black walnut (*Juglans nigra*) and white spruce (*Picea glauca*) are found in this layer. The understory (1-2 m) contains an abundance of European buckthorn (*Rhamnus cathartica*), as well as occasional black walnut and green ash saplings, and riverbank grapevine (*Vitis riparia*), all of which cover greater than 60% of the community. The ground layer (0.2-0.5 m high, 25-35% cover) contains a variety of floral species which grow in scattered patches. Typical species in the ground layer include enchanter's nightshade (*Circaea lutietana*), European buckthorn seedlings, kentucky bluegrass (*Poa pratensis)*, and wild strawberry (*Fragaria virginiana*). It appears that this community is transforming into a buckthorn thicket and as the relatively short-lived scots pine die off, the buckthorn will likely take its place.

There was a third plantation which occupied the majority of the central and western portions of the site. The trees in this portion of the property were grown for the purposes of Christmas trees. Since the initial vegetation surveys were completed in June 2005 the Christmas trees have been harvested (2006). There are scattered trees that established within the Christmas tree area including white spruce, black walnut and basswood (*Tilia americana*) which are still standing (see Tree Conservation Plan, Section 6). Apart from the remaining trees, this area is currently vacant and is occupied by a variety of weedy species that established after the plantation was removed (described below as cultural meadow).

Mineral Cultural Woodland (CUW1)
This community has been affected by a history of disturbance and anthropogenic influence. The canopy trees include trembling aspen, basswood, and green ash. The canopy trees are 10-25 m in height and cover 35-60% of the community. The sub-canopy (2-10 m) is sparsely vegetated with the occasional trembling aspen and Manitoba maple (*Acer negundo*) which covers 10-25%

Cityview Ridge

Figure 2: Natural Heritage Inventory

Legend

Ecological Land Classification
CUM1 - Mineral Cultural Meadow
CUP3-3 - Scotch Pine Coniferous Forest
CUT1 - Mineral Cultural Thicket
CUW1 - Mineral Cultural Woodland
SWC3-1 - White Cedar Organic Coniferous Swamp
SWD4-1 - Willow Mineral Deciduous Swamp

Significant Fauna in Wellington County

- American Redstart
- Baltimore Oriole
- Field Sparrow
- Yellow-billed Cuckoo

- Clythe Creek
- Wetland Boundary (Verified with GRCA, June 12, 2006)
- Cultural Plantation Boundary (staked and surveyed March 30, 2009)
- Areas of Seepage
- Study Area

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November 22, 2011

Anthropogenic
CUP3-3
CUT1
CUP3-3
SWC 3-1
SWD4-1
Watson Parkway N.
CUW1
Hedgerow
CUM1
Anthropogenic
Hedgerow
Hedgerow
Anthropogenic
York Road
N
W
E
S
0
50
100
200
Meters

Imagery provided by:
First Base Solutions, 2006
Projection:
Universal Transverse Mercator, Zone 17
North American Datum 1983

of the vegetation community. The understory is also sparsely vegetated; consisting of patches of red-osier dogwood (*Cornus stolonifera*) and red raspberry. The understory vegetation is 1-2 m in height and covers 25-35% of the community. The ground layer is dominated by old field species including: Canada goldenrod (*Solidago canadensis*), smooth brome (*Bromus inermis*) and Kentucky bluegrass.

Mineral Cultural Thicket (CUT1)
This community is located in the low-lying area in the easternmost part of the site. It is dominated by a dense layer of hawthorn (*Crataegus* sp.) and buckthorn in the sub-canopy and understory. The canopy of this community is sparsely vegetated with coniferous and deciduous trees including: scots pine, white spruce, American elm (*Ulmus americana*), and trembling aspen. Some of the scots pine trees near the top of the slope are dying. The canopy vegetation is 7-12 m in height and covers 25-35% of the community. The sub-canopy (2-6 m) is densely vegetated (greater than 60%) with hawthorn and European buckthorn. Hawthorn and European buckthorn grow in large dense clumps throughout the community, with small open cultural meadow patches between. The understory (1-2 m) is also dominated by European buckthorn and covers 35-60% of the community. The ground layer (greater than 60% cover) consists of old field species such as smooth brome (*Bromus inermis*), wild carrot (*Daucus carota*) and common mullein (*Verbascum thapsus*). Other species include red raspberry, black raspberry (*Rubus occidentalis*), Canada goldenrod, tufted vetch (*Vicia cracca*), strawberry, and yellow avens.

Mineral Cultural Meadow (CUM1)
The majority of the cultural meadow community was once part of a Christmas tree farm, as described above. Since the Christmas trees have been harvested in 2006, the area has developed into a cultural meadow. There are a number of trees which remain scattered throughout the meadow including basswood and green ash. These canopy trees cover less than 10% of the community and are 2-10 m in height. The understory is dominated by Canada goldenrod as well as the occasional wild carrot (*Daucus carota*). The understory vegetation is 1-2 m in height and covers greater than 60% of the community. The ground layer is densely vegetated (greater than 60%) with old field species including: smooth brome, kentucky bluegrass, birds-foot trefoil (*Lotus corniculatus*) and common evening-primrose (*Oenothera biennis*).

Hedgerows
The hedgerows within the study area consist of a variety of tree species. However, the predominant tree species include scots pine, white spruce (*Picea glauca*), green ash and Manitoba maple. The canopy trees are typically 10-20 m in height and cover approximately 60% of the community. The sub-canopy is equally as dense as the canopy and consists primarily of European buckthorn (*Rhamnus cathartica*) with the occasional Manitoba maple. The sub-canopy vegetation is 2-10 m in height and covers approximately 60% of the community. The understory is densely vegetated (greater than 60% cover) with Canada goldenrod, wild carrot, riverbank grape (*Vitis riparia*), and red-osier dogwood. The ground layer has been influenced by the adjacent cultural meadow and contains many of the same species including kentucky bluegrass and smooth brome, as well as yellow avens and black-eyed susan (*Rudbeckia hirta*).

3.6 Floristics

A total of 128 vascular plant species were documented from the study site (Appendix 1). However, 4 of those species were identified only to genus and were not included in any analyses. Consequently, the total number of species used for FQI analysis was 124 and of these 68 species are considered native (55%) and 56 (45%) are considered to be non-native. The percentage of native plants is relatively low in comparison with the flora of Ontario as a whole, which has approximately 73% native plant species (Kaiser 1983). This is a reflection of past disturbance on the site, particularly the former Christmas tree plantation.

The Floristic Quality Analysis (Table 2) summarizes the quality of the plant communities on the property, based on the "conservatism" of the native plants found within them. Each plant species has been assigned a Coefficient of Conservatism (CC) by the Province, a number between 1 and 10 that represents the conservatism of a species to a particular community. Species that can live in a wide variety of habitats, such species include Kentucky bluegrass (*Poa pratensis*), have a low CC. Species that grow in a narrow range of habitat conditions are deemed to be highly conservative and have a high CC. Most woodland species typically have high a CC. The mean CC of a community (native mean coefficient) provides a measure of a habitat's floristic quality.

Native mean C for plant communities with fewer than 30 native plant species was not calculated as it would not provide a statistically valid analysis. Consequently, analyses were not carried out for the two swamp communities, cultural thicket, nor the anthropogenic area.

Table 2. Analysis of flora of the Cityview Ridge study site.

Ecosite	Number of Plant Species				FQI	Native Mean C
	Native	Non-Native	Unknown	Total		
CUM1	33	26	1	60	13.06	2.27
CUT1	11	13	1	25	-	-
CUW1	25	20	1	46	9.38	1.88
CUP3-3	23	25	0	48	13.76	2.87
HDG	18	29	0	47	6.60	1.56
SWC3-1	18	2	0	20	-	-
SWD4-1	17	5	1	23	-	-
Anthropogenic[1]	3	2	0	5	-	-

The vegetation communities at Cityview Ridge for which the analyses were undertaken have relatively low floristic quality. This is not surprising in view of the land use history of these communities. The only community deemed to be predominantly native is the white cedar

[1] Based on tree survey data only. Ground layer flora not documented.

swamp, and it had too few species to undertake a FQI analysis. The white cedar and deciduous swamp communities have very low numbers of exotic plants, and on this basis are considered to be the communities on site with the highest quality.

3.6.1 Significant Flora

Provincially Significant Species

There were no provincially or locally (based on Dougan & Associates 2009) significant plants identified from the subject land. Almost all species are categorized as common to widespread with secure populations.

3.7 Fauna

No reptiles or amphibians were noted on the site. There are no vernal pools that would support breeding amphibians, and there were no amphibians found on the site despite searches at the appropriate time of the year. There is little woody debris on the site that could provide cover for wildlife, and no snags (standing dead trees) were noted that could provide nest cavities.

3.7.1 Birds

Twenty-four bird species were noted on the site during 2005 field work (Appendix 2). The diversity of bird species on the site is low, probably because the site is relatively small and the surrounding landscape is becoming urbanized. The plant community habitats within the study area are mainly early to mid-successional except for the swamps in the southeastern corner. Microhabitat diversity is also relatively low.

None of the bird species noted are considered Species at Risk in Ontario, and none are considered provincially rare. Most of the species are ubiquitous in southern Ontario in small patches of forest, wetland and cultural communities. The most common birds noted on the site were black-capped chickadee, song sparrow, indigo bunting and northern cardinal, which can be found in many habitats.

3.7.2 Mammals

Two mammals were observed within the study area; eastern cottontail and groundhog. However, it is expected that other mammals tolerant of urban conditions occur on site for example: raccoon, white-tailed deer, and grey squirrel.

3.7.3 Significant Fauna

Provincially Significant Species

No provincially significant wildlife species were found on the subject lands. Milksnake has been reported within a 1-1.5 km radius from the study area (NHIC 2009). This species is ranked as vulnerable (S3) within Ontario, and listed as Special Concern by the MNR and COSEWIC. The habitat on the study site is not particularly suitable for this species, and although woody debris was often overturned to look for snakes, none were found. Although the precise location of the milksnake record is not available from MNR (for confidentiality reasons), it is suspected that it may have been associated with one of the small agricultural operations that historically existed in the general area. As the surrounding lands are largely developed, there will be no suitable habitat for milksnake and it is not expected to persist in the area, and likely no longer occurs.

Locally Significant Species

According to the Guelph Natural Heritage Study (Dougan & Associates 2009), there are four locally significant birds which have been documented from the site:

- yellow-billed cuckoo,
- American redstart,
- field sparrow, and
- Baltimore oriole.

Three of these species (yellow-billed cuckoo, American redstart, and Baltimore oriole) were documented from within the woodland/swamp communities at the eastern end of the study area. The field sparrow was observed calling from the cultural meadow in the central part of the study area.

American redstart was noted in two of the vegetation communities at the east end of the site, cultural plantation and in the cedar swamp near the Clythe Creek. Two singing males were noted on the site. This species nests in open woods and thickets. Field sparrow is specific to open fields with scattered shrubs and small trees. Baltimore oriole nests in open woodlands and woodland edges, often in residential areas. Yellow-billed cuckoo was documented from the cultural plantation at the edge of the cultural meadow. Yellow-billed cuckoo typically inhabit open woodlands in rural landscapes.

3.8 Aquatic Resources

A survey of fish habitat was undertaken to investigate the portion of Clythe Creek that flows through the site in the southeast corner. As a part of the review, the GRCA Pre-consultation Checklist for Aquatic Resources was also completed. The location of the Creek is described in Section 3.3. Clythe Creek is identified as a cold water habitat on Schedule 10B of OPA 42.

The creek substrate is composed of mostly fine to coarse-grained sands with gravel and cobbles with traces of silt and clay. The creek flows throughout the year with an average temperature reading of 20.5ºC indicating a cool water habitat. Approximately 95% of this section of the channel was covered by a canopy of cedar trees and there was approximately 30% vegetation cover in the stream. An abundance of woody debris, such as fallen branches and trees, and exposed roots, were also present throughout this section of the channel. Collectively, these conditions provide for good fish habitat. Crayfish, small minnows, frogs, and other adult aquatic invertebrates were observed. Other species noted within Clythe Creek include brook stickleback, creek chub, blacknose dace, minnows and shiners (GRCA 1995). No significant species or cold water species were noted, although the conditions appeared to be present for the latter. Ecologistics (1998, pg. 33) note that MNR has identified the reach on the subject property as an important invertebrate production area. Ecologistics (1998, pg. 27) also note that although no brook trout have been reported from the stream, it is managed as a coldwater stream by MNR.

4.0 ANALYSIS OF FEATURES AND CONSTRAINTS

4.1 Wetland

The wetland occurs in the extreme southeast of the site (Figure 3) and extends off-site to the east, well past Watson Road. At the outset of this study, Clythe Creek wetland was not considered a provincially significant wetland. It is currently identified as "other" in MNR's NHIC database and the MNR summary explicitly indicates it is not Provincially Significant. However, this information appears out of date and discussion with the local MNR office (Ken Cornelisse, pers comm. Aug 8, 2011) confirmed that the wetland has been re-evaluated and is now considered to be Provincially Significant, consistent with the designation on Schedule 10A of the OPA 42 mapping.

The wetland boundary as mapped on Schedule 10A of OPA 42, and GRCA and MNR data layers appears to reflect the historic watercourse that flowed into the site from the north and associated small impoundment that formerly existed in the low-lying area west of Watson Parkway (see Section 3.3). Neither of these features have been present on the site for many years and the floodline has been refined (Section 4.5). A site visit was undertaken to establish the wetland boundary as reflected by the current conditions, and was subsequently refined with the GRCA (12th June 2006) and surveyed. This boundary is shown on Figures 2 and 3, as well as the proposed draft plan of subdivision, and represents the current extent of the wetland on this site.

A 30 m buffer to the wetland is recommended, consistent with OPA 42 (OPA 42, Table 6.1), and is shown on Figure 3. Seepages were noted along the northern edge of the cedar swamp as well as near the western side of the wetland in the deciduous swamp and these are included within the wetland boundary (Figure 2). These seepages contribute to the cold water habitat provided by Clythe Creek. It is important that these groundwater discharge points be protected. Habitat for a regionally significant species, American redstart will also be protected within the wetland area (See Section 4.4).

All components of the development plan are outside of the 30 m wetland buffer. The nearest area proposed for development is approximately 50 m from the wetland boundary and is located at the top of the slopes generally to the west of the wetland. The proposed apartment block is located approximately 60 m from the wetland boundary. The areas between the wetland and proposed development are well-vegetated, and in places a dense buckthorn thicket limits easy access. The 30 m buffer will protect the wetland feature and its functions.

4.2 Aquatic Resources

The banks of Clythe Creek within the study site are generally stable with no areas being undercut by stream flow. Only very minor erosion has occurred due to the soft organic soils of which the banks are composed. Stream flow widths varied from approximately 0.5 m to 3.0 m and creek center depths varied from approximately 0.15 m to 0.30 m. The permanent flow of water in the creek is moderate with good quality cold water fish habitat (Gartner Lee 2006). Seepage of groundwater adjacent to the north side of the creek contributes to baseflow. Watercress (*Nasturtium officinale*), an indicator of cold water, was found within the creek. The supply of

groundwater and the high degree of shade provided by the presence of the cedar and willow swamps help to moderate excessive stream temperatures.

A 30 metre buffer would normally be recommended, consistent with the recommendations for cold water fish habitat in City of Guelph OPA 42 (OPA 42, Table 6.1). However, since the creek is contained entirely within the wetland, this buffer occurs entirely within an area that is already protected and buffered. The nearest development to the Creek is the apartment block located on Watson Parkway, and this is approximately 100 m from the watercourse (Figure 3).

As noted in Section 3.3, there was formerly a second watercourse that has disappeared in the past, probably owing to upstream development, and there are no aquatic resources associated with this historic feature.

4.3 Woodlands

Figure 2 illustrates the extent of three woodland communities on the site. The two swamp communities, deciduous swamp (SWD) and coniferous swap (SWC) are identified as "Significant Woodland" on Schedule 10C in OPA 42, and continue on the east side of Watson Parkway, outside the property. On the site, these two woodlands are almost entirely contained within the wetland boundary, and are well within the proposed 30 m wetland buffer. There is no development proposed adjacent to either community. Table 6.1 in OPA 42 indicates a minimum 10 m buffer from drip-line for significant woodlands. This is deemed adequate to protect the significant woodland edge and as shown on Figure 3, especially given that there is no development proposed within approximately 50 m of the edge of the significant woodland edge. Also, the 10 m significant woodland buffer occurs entirely within the 30 m wetland boundary.

The third woodland community is mapped as coniferous plantation (CUP) on Figure 2. It occurs in two units separated by a Cultural Thicket (CUT). The westernmost plantation occurs primarily on the drumlin slope that separates the eastern low-lying part of the site and the western area where development is proposed (Figures 2 and 3). Although the cultural plantation on the drumlin slope is of relatively low value from a botanical perspective, and does not fulfil the criteria for significant woodland, it does help stabilize the slope and provides some wildlife habitat for species adapted to urban conditions. The entire plantation also serves to limit access to the significant woodland, wetland and Clythe Creek in the eastern part of the site. The cultural plantation on the drumlin supports three locally significant bird species (Section 4.4) and thus fulfils the criteria for "natural area" in the City's NHS.

The mapping on Schedule 10C in OPA 42 also includes an area either side of the railway tracks along the south property boundary, and partly overlapping the study site, as "Cultural Woodland". Based on our field investigations, this area is considered part of a hedgerow that extends along the southern boundary of the site (Figure 2).

The more easterly section of plantation occurs along Watson Road and is composed mainly of extremely dense Scots Pine, with some regeneration of native tree species. Part of this plantation unit is proposed to be removed for the area identified for the apartment units (Figure 3). The

Cityview Ridge

Figure 3: Constraints and Development

Legend

- Wetland Boundary (Verified with GRCA, June 12, 2006)
- Wetland - 30m Buffer
- Significant Woodlands - 10m Buffer
- Significant Woodlands
- Clythe Creek
- Clythe Creek - 30m Buffer
- Cultural Plantation Boundary (staked and surveyed March 30, 2009)
- Cultural Plantation Boundary - 10m Buffer
- Top of Bank (per Naylor Engineering 2006)
- Top of Bank Setback (per Naylor Engineering 2006)
- Significant Valleyland and 100 Year Floodplain
- Regional Floodline
- Approximate "Steep Slope Valley" and "Steep Slope Erosion" (from GRCA on-line mapping November 16 2011)
- Recommended Natural Heritage System
- Streets
- Lot Layout
- Study Area

Watson Parkway N.

York Road

N W E S

0 50 100 200

Meters

Imagery provided by: First Base Solutions, 2006

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Specialists in Sustainable Landscape Planning

December 23, 2011

area proposed for removal is not within the City's Natural Heritage System (Schedule 10 in OPA 42) and no buffer is required along this section of CUP.

4.4 Significant Flora and Fauna

No significant floral species were found on the site. Four locally significant bird species as defined by Dougan & Associates (2009) were found on the subject lands (Section 3.7.3 and Figure 2).

Field Sparrow
Field sparrow was found in the cultural meadow which currently provides suitable breeding habitat. This species is significant, but not rare in Wellington County (Dougan & Associates 2009). Field sparrow has a provincial rank of "S4B", meaning it is "Apparently Secure - uncommon but not rare; some cause for long-term concern due to declines or other factors".

The existence of single species that is only locally significant, within a former Christmas tree plantation, is not considered sufficient to warrant a "Natural Area" designation in the City's NHS. Policy 6.1.6.3.3.5 in OPA 42 indicates that protection of habitat for open meadow species will be encouraged and supported "where appropriate". Given that this site is within the urban boundary, that the areas around the site are urbanizing, and that only one individual of one species was recorded, this cultural meadow is not considered to be an appropriate site to protect a species of open meadow. Moreover, this species is marginally area-sensitive, and with the general urbanization of the area, the cultural meadow at Cityview may not be sufficiently large to maintain breeding habitat. Lastly, based on our experience throughout Wellington County, we are of the opinion that there is ample habitat for this species and that we think the status of the species as "locally significant" in the county should be re-assessed. Accordingly no Natural Area was designated in the cultural meadow on the basis of this occurrence.

American Redstart
American redstart is considered moderately area-sensitive, however, the minor reduction in wooded area (0.68 ha) resulting from the proposed apartment adjacent to Watson Parkway is not considered to be significant in this respect. This species is somewhat intolerant of urban conditions, although it is found in larger wooded ravines and waterfront areas in intensively urban landscapes such as Toronto, Mississauga and Ottawa. It is not a ground-nesting species, although it does nest in low branches in early to mid-successional woodlands, and may be somewhat vulnerable to predation from any increase in cat populations resulting from urbanization. Our expectation is that this species will continue to breed at the Cityview site unless the gradual maturation of the woodlands creates unsuitable habitat, which may happen regardless of development.

Yellow-billed Cuckoo
Yellow-billed cuckoo is typically found in open woodlands in rural landscapes and is only occasionally found in urban areas where its habitat requirements are met. Yellow billed cuckoo is known to wander during the breeding season, and its breeding status at Cityview is uncertain, although the wooded areas in the east at least seem to provide foraging habitat. The presence and abundance of yellow-billed cuckoo is generally related to the availability of its principal

food source, hairy caterpillars (*e.g.*, eastern tent caterpillar (*Malacosoma americana*) and fall webworm (*Hyphantria cunea*). These caterpillars occur in cyclic outbreaks and thus affect the presence/absence of species that prey on them. The habitat at Cityview Ridge is marginal for yellow-billed cuckoo, mainly owing the limited size of the woodland, as they generally prefer larger wooded areas (Hughes 1999). Our opinion is that this species may be a sporadic breeder at the site at present. It is expected to continue to breed there occasionally when there is an abundant food source. This species also nests in low branches and may be vulnerable to predation from cats. Yellow-billed cuckoo generally avoids large urban areas (Hughes 1999) and thus as the City of Guelph continues to expand this species may no longer occur.

Baltimore Oriole

Baltimore oriole nests in the high canopy of edge trees or in open woodlands. It can be found in treed urban parks and well-treed residential areas. There is ample habitat in the open woodland that exists in the area that is being protected and we expect this species will not be impacted by the proposed development.

The cultural plantation on the drumlin slope supports three locally significant species: American redstart, Baltimore oriole and yellow-billed cuckoo. Although the plantation is not a native community and would not by itself fulfil criteria to warrant inclusion in the NHS, the presence of three locally significant species and its proximity to additional wooded area (the significant woodland) was deemed sufficient to warrant a Natural Area status. It is recommended that the entire cultural plantation be included within the Natural Area designation (Figure 3).

OPA 42 requires the determination of buffers for potential habitat for significant species to be determined through an EIS (OPA 42, Table 6.1). A buffer of 10 m from the drip-line of the cultural plantation on the drumlin slope is considered adequate to protect this feature for the purpose of preserving habitat for the locally significant species (Figure 3). Owing to the irregular shape of the woodland, this buffer actually ranges from 10 m to approximately 20 m. Some encroachment into the buffer will be required to construct the proposed retaining wall behind lots 51 to 57, as well as a stormwater dissipation/dispersion structure. However this encroachment is temporary, will not exceed 5 m, and is not expected to affect the suitability of the community as habitat for the locally significant species. It is recommended that construction of the retaining wall and stormwater structure be undertaken outside of the breeding season (approximately mid-may to mid July) to further reduce the possibility of impacts to these species. If this is not possible, a field investigation to determine if any locally significant bird species are breeding near the proposed construction should be undertaken to determine if construction should proceed.

4.5 Floodline

Cosburn Patterson Wardman developed floodline mapping as part of the Eastview Secondary Plan. This mapping was subsequently revised by the GRCA as discussed in the Preliminary Servicing and Stormwater management Report (Gamsby and Mannerow Limited 2012). The revised Regional and 100 year floodplains are shown on Figure 3. The predicted storm flows are accommodated by the stormwater controls for the proposed development. The reader is referred

to the Gamsby and Mannerow Limited report for details and supporting analysis for storm water management and the floodplain analysis.

4.6 Significant Valleyland

Schedule 10D in OPA 42 maps the drumlin slopes in the eastern are of the proposed development as "other valleylands" and a second area that correlates with the 100 year floodplain as "undeveloped portions of the Regulatory Floodplain". Together, these two areas constitute Significant Valleyland as mapped on Schedule 10D in OPA 42 and form a part of the City's Natural Heritage System (Schedule 10 in OPA 42). There is no contention with the identification of the "undeveloped portions of the regulatory floodplain" designation, however, we recommend refinement of the Significant Valleyland based on site-specific analysis of the "other valleylands" designation, as allowed by Section 6.1.4.4 (4) in OPA 42.

Areas designated as Significant Valleyland need to fulfil at least one of the two criteria provide in OPA 42 policy 6.1.5.6.2:

1. *Undeveloped areas within the regulatory floodplain areas, riverine flooding hazards, riverine erosion hazards, as identified by the GRCA.*

2. *The remnant portions of the Speed and Eramosa Rivers, identified by the City that are relatively undisturbed and represent the quality and diversity of the physical expression of the river system on the landscape and measured to the uppermost break in slope associated with the valley and including the terraces on the valley slopes.*

With respect to the subject lands, it is the first criterion that has resulted in the Significant Valleyland designation. This results from the "other valleylands" mapping in OPA 42 which is based on the GRCA "Slope Valley – steep" and "Slope Erosion - steep" (Figure 3). This constitutes the eastern slope of the drumlin, east of the main area where development is proposed.

The Significant Valleyland designation appears to be in error primarily because the slope that is mapped by the GRCA and subsequently by the City as "other valleyland" is not a valley. The slope in question is the eastern flank of a drumlin (see Section 3.1 for landform description). Drumlins are depositional features resulting from glacial action circa 10,000 years ago. Valleys are erosion features created by the movement of water. Valleys may also be relicts of glacial meltwater, but are always erosion features.

The City provides a definition of Significant as it applies to valleylands:

"*in regard to valleylands means a natural heritage feature or area that occurs in a valley or other landform depression that has water flowing though or standing for some period of the year. This includes regulatory floodplains/riverine flooding hazards, riverine erosion hazards and apparent/other valleylands ecologically important in terms of features, functions, representativeness, or amount, and contributing to the quality and diversity of an identifiable area or NHS*;"

The first sentence in the definition is basically taken from the Provincial Policy Statement (2005). Fundamental to satisfying this definition is that the feature "occurs in a valley or other landform depression". As the slope is part of a drumlin, it is a deposition, not a depression, and thus from an earth science perspective is not a valley, and does not conform with the definition in the Official Plan.

The GRCA also defines valleyland: "*Valleyland means land that has depressional features associated with a river or stream, whether or not it contains a watercourse*." (GRCA 2009). Although there was a historic watercourse in area below the slope (Section 3.3), it did not create or otherwise modify the drumlin slope, but simply was flowing through the low point in the landscape. The exact position of the historic watercourse cannot be determined as it has filled long ago and no remnant exists, however, it would appear to have been approximately 50 metres east of the toe of the drumlin. The GRCA policy document provides further clarification on the application of the "Riverine Erosion Hazard" designation: "*The Riverine Erosion Hazard within river or stream valleys is that area of a river bank and lands adjacent to watercourses where erosion is actively occurring and/or where development could create slope stability issues.*" (GRCA 2009, Section 8.2, page 24). As the slope is 1) not within a river or stream valley; 2) no erosion is occurring; and 3) no development is proposed that could create slope stability issues, the slope is not a Riverine Erosion Hazard.

Based on this site-specific analysis, the slope does not fulfil the criteria for riverine erosion hazard and is not subject to flooding, and thus does not fulfil the criteria for designation as a Significant Valleyland. Only that part of the Significant Valleyland designation based on the 100 year floodplain is considered to be correctly identified. Notwithstanding this, it is recognized that the drumlin slope has the potential for erosion that could represent a constraint to development, and thus a geotechnical investigation was undertaken by Naylor Engineering (Naylor 2012) (Section 4.7).

Since there are no erosion issues or significant ecological features or functions associated with the floodplain *per se*, no buffer is recommended for the significant valleyland. It is noted that the other three significant natural features (woodland, wetland and surface water/fish habitat) all occur within the significant valleyland, as defined by the 100 year floodplain, and all three features have buffers.

4.7 Steep Slopes

As noted in the preceding section, GRCA has mapped steep slopes on the site, on the east-facing slopes of the drumlin (Figure 3). Accordingly a geotechnical investigation was undertaken by Naylor Engineering (Naylor 2012). The Naylor study resulted in a "top of bank" line as illustrated on Figure 3. This line is taken as the appropriate constraint to limit development from a slope stability perspective. However, a much larger area is actually protected as a result of the intent to protect the cultural plantation (Figure 3).

The proposed development is substantially outside of the GRCA slope line and completely outside the Naylor top of bank line and associated setback. The rear portions of lots 56-57 (two

lots) encroach minimally into the GRCA steep slope area, as well as parts of Block 113 (open space), Block 111 (park) and Block 112 (stormwater).

The two lots 56-57 will be graded per the grading plan (Gamsby and Mannerow Limited 2012, dwg No. 2). This will entail a low retaining wall at the rear of the lot line that will allow grades to be matched to the existing elevations at the rear of the lots. Surface drainage will be taken southerly along the rear lot line, then piped directly to the dissipation structure in the stormwater block (Block 112). Thus the run-off from the rear of these lots is not expected to result in any erosion or sedimentation issues, and as noted in Section 7.4 is not expected to impact the cultural plantation on the slope. The lot area that encroaches on the GRCA steep slope designation is approximately 168m^2.

Parts of three Blocks will be graded to create a berm along the south boundary of the railway (Block 111 and 113), and for stormwater retention (Block 112). Surface drainage in the area affected will be directed to the stormwater facility in Block 112 and no erosion or sedimentation issues associated with these grade changes in the GRCA identified slope area are anticipated. The reader is referred to the Preliminary Servicing and Stormwater Management Report (Gamsby and Mannerow Limited 2012) for details of the grading plans.

4.8 Natural Heritage System (OPA 42)

The City's Natural Heritage System is composed of Significant Natural Area and Natural Area. There are four areas on the subject lands that fulfil criteria for Significant Natural Area: significant wetlands (Schedule 10A), surface water and fish habitat (Schedule 10B), significant woodlands (Schedule 10C) and significant valleylands (Schedule 10D). These are shown on Figure 3. The area identified as wetlands fully encompasses the surface water (Clythe Creek) and the significant woodland.

As discussed in Section 4.6, we believe that the Significant Valleyland mapped as "other valleylands" on Schedule 10 needs to be refined. The refinement results from the site-specific application of the criteria for designation as allowed in Section 6.1.4.4 (4) of OPA 42. This refinement would result in the Significant Valleyland being defined by the floodline.

The cultural plantation unit on the drumlin slopes supports three species of birds considered "locally significant" (Dougan & Associates 2009), and thus fulfils a criterion (OP policy 6.1.6.3.2) for "Natural Area". Based on the site-specific investigations that were undertaken, this community does not fulfil the criteria for "Significant Natural Area".

The Natural Heritage System proposed on the subject lands thus includes the four Significant Natural Areas, the one Natural Area, and their buffers (Figure 3).

5.0 DESCRIPTION OF PROPOSED DEVELOPMENT

5.1 Description of Draft Plan of Subdivision

The proposed draft plan is shown on Figure 3, however, the reader is referred to the actual draft plan (BSRD 2011) for detail regarding the plan. The proposed development consists of a mixture of residential units including single family dwellings (101 units), semi-detached residential (40 units), on-street townhouses (66 units) and an apartment block (54 units). There are also 8 Blocks to accommodate a park, open space, stormwater management and "reserves".

5.2 Stormwater Management Concept

The stormwater concept is described in the Preliminary Servicing and Stormwater Management Report (Gamsby and Mannerow Limited 2012) and is summarized below. One new stormwater management facility (SWM) is proposed along the southeastern edge of the development. The apartment block in Watson Parkway (Block 115) is proposed to be serviced by privately owned and operated on-site storm water management control(s). An existing facility located west of Cityview Drive is also utilized for stormwater management.

The proposed eastern SWM pond would receive run-off generated from the central portion of the development. This SWM pond is proposed to outlet to an "energy dissipation/dispersion structure". This structure will disperse outflow from the pond and is designed to prevent erosion on the slopes leading down to the wetland. Stormwater from the westerly part of the Cityview application (including the westerly part of the area east of Cityview Drive and all of the area west of Cityview Drive), will be directed westerly to the existing stormwater management facility built as part of Phase 3 of the Valleyhaven Subdivision.

Stormwater management control for the apartment block (Block 115) is to be provided via privately owned and operated on-site stormwater management controls (quantity and quality) to attenuate post-development flows to the pre-development level. At this time, it is anticipated that the privately owned and operated on-site stormwater management controls may include, but are not limited to, the following (or a combination of the following):

- on-site stormwater management facility (*i.e.* SWM pond);
- rooftop storage;
- parking lot ponding (to a maximum depth of 0.3 metres);
- below grade storage (*i.e.* clear stone storage, superpipe storage, *etc.*); and/or
- oil/grit separator structure (*i.e.* Stormceptor or approved equivalent).

As noted above, the on-site stormwater management controls depends on the final site layout.

The Preliminary Servicing and Stormwater Management Report also identifies the location of sediment control fencing.

6.0 TREE INVENTORY AND COMPENSATION PLAN

6.1 Tree Inventory

A total of 1017 trees were assessed for health, condition and location within the proposed draft plan, to determine those that can be retained or need to be removed. Appendix 3 provides a detailed list of all trees surveyed within the study area, including the condition and class. Only trees within the area proposed for development and in the buffers were evaluated, thus the total number of trees on the site (*i.e.*, including those outside of the development area) is substantially greater.

Owing to the general grading requirements across the site and requirement for a berm for the rail-line there is little opportunity to retain trees in the development area. The trees that constitute the edge of the cultural woodland along the east of the proposed development will be protected from development. As all these edge trees will be retained, they were not included in the Tree Inventory.

Six eastern white cedar in the eastern extent of the hedgerow bounding the south of the site can be retained. The remaining trees along the south hedgerow will be removed to make way for a road, the berm along the railway and a storm water management facility.

There are 100 trees in the hedgerow that is situated along the northern boundary line of the site that are within the subject lands as determined by the location of the existing wire fencing. Of these, all will be removed for grading of the lots and construction of the residences.

There are 14 trees located on the boundary on the east side of Cityview Drive that were evaluated for retention. The scheduled upgrades to Cityview Drive (underground servicing and road improvements) are expected to result in the loss of these trees.. This includes a large double-stemmed sugar maple located where the right-of-way for Cityview Drive is intersected by the northern property boundary of the subject lands.

There is no opportunity to retain trees on the lands to the west of Cityview Drive due to their location with respect to the proposed development footprint and grading requirements.

An estimated 440 trees, 320 of which are Scots pine, will be removed from the Scots pine plantation for the proposed apartment block adjacent to Watson Parkway. The remaining 120 trees are native. There is no opportunity to retain any of the trees in this area.

Table 3 provides a summary of the condition of the 1017 trees inventoried. This shows that:

- 81 are in excellent condition;
- 378 are in good condition;
- 398 are in fair condition;
- 116 are in poor condition; and
- 44 are in very poor condition.

Table 3. Summary of the 1017 trees surveyed

Scientific Name	Common Name	Total	Number in class				
			1	2	3	4	5
Acer negundo*	Manitoba maple	50	1	3	19	20	7
Acer platanoides*	Norway maple	6	2	3	1	0	0
Betula pumila*	dwarf birch	2	0	0	1	1	0
Larix decidua*	European larch	1	0	0	1	0	0
Malus sp.*	crabapple species	20	0	1	11	3	5
Morus alba*	white mulberry	2	0	1	1	0	0
Picea abies*	Norway spruce	12	0	0	12	0	0
Picea pungens*	blue spruce	12	8	3	1	0	0
Pinus sylvestris[2]*	Scots pine	142	13	7	109	10	3
Pinus sylvestris*	Scots pine (apartment block)	320	0	171	110	39	0
Rhamnus cathartica*	European buckthorn	2	0	0	0	0	2
Robinia pseudo-acacia*	black locust	30	0	4	10	12	4
Salix fragilis*	crack willow	1	0	0	1	0	0
Acer saccharinum	silver maple	6	0	4	2	0	0
Acer saccharum	sugar maple	28	14	9	1	4	0
Betula papyrifera	white birch	1	0	0	1	0	0
Crataegus sp.	hawthorn sp.	4	0	0	1	1	2
Fraxinus pennsylvanica	green ash	68	12	16	12	13	15
Fraxinus pennsylvanica	green ash (apartment block)	20	0	20	0	0	0
Juglans nigra	black walnut	62	3	25	24	6	4
Picea glauca	white spruce	17	2	11	4	0	0
Picea glauca	white spruce (apartment block)	70	0	30	40	0	0
Populus balsamifera	balsam poplar	5	1	3	0	1	0
Populus tremuloides	trembling aspen	65	3	27	29	4	2
Populus tremuloides	trembling aspen (apartment block)	30	0	30	0	0	0
Quercus rubra	red oak	3	0	2	1	0	0
Thuja occidentalis	eastern white cedar	22	22	0	0	0	0
Tilia americana	basswood	6	0	2	3	1	0

[2] Approximately 100 of these trees are located in the hedgerow along the rail line. These 100 were estimated and the condition assigned based on the general condition of trees in the entire patch

Scientific Name	Common Name	Total	Number in class				
			1	2	3	4	5
Ulmus americana	American elm	10	0	6	3	1	0
Total		1017	81	378	398	116	44
Total trees for compensation			57	185	120	0	0

* = not native to the Guelph area

The 1017 trees surveyed are composed of 413 native trees and 604 trees not native to the Guelph area (marked with an asterisk in Table 3). One of the native trees, a white spruce, was planted as an ornamental in the landscaping adjacent to the existing residence. All 120 native trees in the plantation adjacent to Watson Parkway are in condition 1-3. Of the 100 trees in the northern hedgerow, only 23 are native and in good health (*i.e.*, class 1-3). The majority of the non-native trees are Scots pine.

Within the development area, the proposed residential and apartment development would result in the retention of six trees and the removal of 1,011 trees. One of the trees to be removed is an ornamental and 604 are not native to the Guelph area. The remaining 406 native trees include 362 that are in excellent (class 1) to fair (class 3) condition. It is proposed that these healthy 362 native trees be used as a basis for compensation. Trees in poor and very poor condition are not proposed to be compensated for. The large blocks of trees within the cultural plantations outside of the development areas will also be retained.

In addition to the trees on the subject lands, there are trees within the hedgerow on the northern boundary that are located north of, but in close proximity to the property line. Although grades are matched to the property line, root systems of some of these trees likely extend onto the Cityview lands and may be impacted, possibly affecting the health of those trees. However, trees can withstand some reduction in their root systems without significant impact to the health of the tree, thus not all of these trees may be affected. Impact to trees is dependant on factors such as the species, age, size, current health and growing conditions. In their comprehensive review of tree preservation methods, published by the International Society of Arboriculture, Matheny and Clark (1998) note that removal of up to 30% of the root zone can be tolerated by a healthy tree (Matheny and Clark 1998, pg. 72). It is our opinion that this should be avoided and that protection of as much of the root system as possible is preferred. Owing to the possibility that some of these off-site trees could be affected by grading, we recommend that they be monitored during construction as part of normal construction monitoring.

6.2 Tree Conservation and Compensation

Guidelines for tree compensation are similar to those used and approved for previous development proposals within the City:

1. Compensate only for native trees in excellent to fair health. This would generally exclude non-indigenous and/or invasive trees such as black locust, Scots pine, domestic apple and Manitoba maple; ornamental trees, and trees that were in poor health or dying

(*i.e.*, condition 4-5). The exclusion of Manitoba maple is based on it being non-native to the Guelph area and invasive.

2. A compensation at a ratio of 3:1 (*i.e.*, provide three trees for every one removed) is recommended.

3. All compensated trees should be native, suitable for the site to be planted, and indigenous to the Guelph area, per policy 6.1.9.3 of OPA 42.

Based on the tree survey and the criteria above, 362 trees should be compensated for, which at a ratio of 3:1 will require the planting of 1,086 trees.

It is recommended that some of these 1,086 trees be planted within the open area below the forest slope. This will increase the density of the woodland there and, at minimum, partially mitigate any impact from the removal of the 0.68 ha of cultural plantation for the apartment block along Watson Parkway. Other possible planting areas on site include:

1. Block 113, between Street 4 and the property boundary; and
2. Block 143, in areas not required for storm water management, particularly west of lot 141

Plantings plan for these areas will be provided as part of the Environmental Implementation Report for the site. There is not likely sufficient space on-site to accommodate the total number of compensation trees, and alternative sites suitable for planting or a cash *in lieu* arrangement will be established in discussion with the City.

6.3 Tree Protection Recommendations

Trees to be retained should be protected during construction and monitored for damage. Any accidental damage to vegetation within a tree preservation zone should be examined by the environmental inspector and recommendations made, where necessary for treatment (*e.g.,* pruning or sealing).

The following procedures should be observed to protect trees identified for retention during construction:

1. Protective fencing should be installed prior to any grading or site clearing and should remain in place until all site work has been completed. Wherever possible fencing should be installed at the drip-line plus 1 m from the canopy edge of retained trees.

2. Proper root pruning should be undertaken when and if roots of retained trees are exposed by construction activities. Exposed roots should be covered with soil or mulch to the extent possible, as soon as possible following damage to prevent further damage and desiccation.

3. Trees to be retained should be monitored and reported on as part of the regular environmental inspections undertaken throughout the construction period.

4. In the instance construction activities are taking place in close proximity to the drip-line of trees (*e.g.,* the installation of the stormwater dissipation/dispersion structure) smaller machinery is recommended in order to minimize soil compaction and reduce the construction envelope required.

5. Within the area proposed for tree retention there should be no:
    - grade changes;
    - dumping, stockpiling or storage of any materials;
    - parking or storage of any machinery or equipment;
    - disposal of waste, garbage, brush or stumps or any burning of materials or disposal of ashes; or
    - use of any machinery without prior approval from the City.

6. Monitor trees along the northern property line for potential impacts.

7.0 POTENTIAL IMPACTS AND PROPOSED MITIGATION

Potential impacts that are addressed in this section include short-term impacts associated with construction, as well as long-term direct and indirect impacts. These include consideration of potential impacts to both the features and functions associated with natural heritage features on the site. Apart from impacts to individual trees, which are addressed in the Tree Inventory and Compensation Plan (Section 6), all the potential impacts are associated with the natural features that are located on the eastern portions of the site. The central area of the application and the area west of Cityview Drive do not support any natural features that would be subject to impacts.

7.1 Potential Direct Impacts

Natural Heritage System

As shown in Figure 3, no development or site alteration is proposed directly within the features or buffer areas of any of the significant natural areas or the natural area that compose the City's Natural Heritage System on the site, and they will be preserved in their entirety.

There are four significant natural area features on the Cityview site that compose the NHS: 1) the section of Clythe Creek that runs through the site; 2) the wetland area that is associated with Clythe Creek; 3) significant woodland; and 4) significant valleyland; and one natural area: the cultural plantation which provides potential locally significant wildlife habitat. These are described in Section 4. Note that the boundaries of the wetland have been refined from those shown on schedule 10A in OPA 42, as discussed in Section 4.1, and the delineation of the Significant Valleylands only reflect that part that fulfils the criterion related to flood lines, as discussed in Section 4.6.

The five features that compose the NHS and their respective buffers are illustrated on Figure 3. The application provides for a 30 m buffer from the wetland boundary (which includes the significant woodland per Schedule 10C in OPA 42) and from the edge of Clythe Creek. Even

though there is no policy requirement for buffers against cultural plantations, a buffer has been provided between the residential development and the cultural plantation in recognition of it providing potential habitat for locally significant species. The buffer is a minimum of 10 m, with the exception of behind lot 57, where it is 9 m at its narrowest point. This buffer is generally 12 to 15 m, and is as much as 20 m in some places. Block 112 (the stormwater block) extends into the cultural plantation, however, no site grading or removal of trees will be required to construct the stormwater facility.

Stormwater Facility

The only potential for direct impact to a natural feature results from the discharge from the SWM pond (Block 112). As described in Section 5.2, and in greater detail in the SWM report (Gamsby and Mannerow Limited 2012), stormwater discharge is directed to a dissipation/dispersion structure that will distribute the discharge over a wide area (48.5 m). This structure may encroach slightly into the proposed buffer adjacent to the Cultural Plantation. The Cultural Plantation is considered a Natural Area and thus is included in the Natural Heritage System, however the buffer is not included in the NHS (per OPA 42 policy 6.1). It is recommended that if access for construction is required down-slope of the structure, that only small machinery (*e.g.*, bobcat or similar) be used to minimize the potential for encroachment in the buffer.

Storm water discharge will occur along the length of the energy dissipation/dispersion structure and is designed to result in sheetflow run-off toward the wetland. There is low potential for erosion down-gradient from this structure and thus it should be monitored after construction, particularly following major storm events. It is recommended that contingency measures be developed as part of the Environmental Implementation Report to respond to any erosion, should it occur. We also recommend that a heavy-duty (Type 2) silt fence be installed during the construction of the energy dissipation/dispersion structure.

The SWM facility has been designed to provide "enhanced" (formerly level 1) water quality control, per the Stormwater Management Planning and Design Manual (MOE 2003). Thus no impacts to the wetland and ultimately Clythe Creek are anticipated from a water quality perspective.

Proposed Apartment Block

The proposed apartment block (Block 115) will result in the removal of approximately 0.68 ha of cultural plantation constituting approximately 320 non-native Scots Pine and 120 native trees. These are addressed in the Tree Conservation Plan (Section 6) and compensation is proposed. This area is not within the City's Natural Heritage System.

7.2 Potential Indirect Impacts

7.2.1 Increased Human Use

Increased human presence will inevitably lead to increased use of adjacent open space and natural features. This could result in building of tree forts, camp fires, trampling of vegetation, and if excessive, localized erosion on the drumlin slope. It is recognized that the area likely receives some use already, however, this is likely infrequent.

The impact of increased use is predicted to be minimal. The Scots pine plantation adjacent to the development is not a significant or sensitive feature and does not support any significant plant species. There could be some impacts on the three locally significant wildlife species in the cultural plantation from predation. However, as noted in Section 4.4, they are all expected to persist and the development is not expected to result in their loss. On the drumlin, the plantation does serve to assist in slope stabilization and the vegetation in general assists in erosion control and thus should be preserved. Overall, an increase in these human-use impacts in the cultural plantation is not considered to be an issue.

The community that is most sensitive to increased use is the cedar wetland, particularly the seepage areas adjacent to Clythe Creek. At present, there are no trails through this area and it is relatively secluded from the residential development above drumlin slopes. As there is no destination point adjacent to that area of the subject lands (*e.g.*, a school, shops, park, *etc.*), there is no reason for a trail to develop there. None-the-less, teenagers and children may be drawn to the area because of its seclusion.

Mitigation

It is recommended that fencing be provided along the rear of lots 41 to 57, and continuing through the stormwater block (Block 112), to limit access to the drumlin slope and the Scots pine cultural plantation. Likewise, fencing should be provided around the apartment block to limit access to the adjacent cultural plantation. Alternatively, fencing could be erected around the wetland community, however, it may be difficult to maintain. It suggested that the location of fencing and other deterrents to access to the wetland be discussed further during the development of the Environmental Implementation Report.

7.2.2 Changes to Wetland Hydrology

The potential for impacts to the hydrology of the wetland was specifically addressed in the hydrogeological analysis (Banks 2012) and is summarized in Section 3.4. That investigation found that the discharge is primarily fed from groundwater recharge in the low-lying area east of the drumlin. Apart from the apartment block, this area is not proposed for development and the groundwater report concludes that, "Groundwater discharge to the wetland and Clythe Creek should therefore continue to be maintained following the proposed development of the site." (Banks 2012, page 6). The Geotechnical Investigation (Naylor Engineering Associates 2012) notes that there may be a need for de-watering during excavation for a sewer in the apartment block. If required, this will be temporary and de-watering would only occur during installation of the sewer. Also, it would only extend a short distance from the building to Watson Parkway. Although there is the potential for changes to groundwater movement during excavation for the sewer, the length of the pipe is short, and the time for which dewatering would occur (if needed at all) is minimal, so that any impacts to the wetland are deemed negligible.

Mitigation

Notwithstanding the low risk of impacts to the wetland, if dewatering is determined to be required for the installation of municipal services, the appropriate application for a "Permit to Take Water" be submitted to the MOE for review and approval. We recommend that the potential for impacts from dewatering activities be addressed at that time. This could include

impacts from the discharge of water and interruption to shallow groundwater flow to the wetland.

7.3 Significant Fauna

Four locally significant bird species were located on the subject lands: Yellow-billed Cuckoo, Baltimore Oriole, American Redstart and Field Sparrow. The first three species are all located in the area to be protected and their habitat will not be directly impacted by the proposed development, and the longer term indirect impacts from this proposed development are not expected to affect their ability to breed on the site in the future. On-going urbanization of the east side of Guelph may affect the long term breeding viability of yellow-billed cuckoo in this area of the City.

The field sparrow was located in the open cultural meadow and this habitat is proposed for development. A single male was reported singing from the cultural meadow at the Cityview site. This species is not normally found in urban areas and is not expected to breed at the subject lands following development.

Mitigation
There is no mitigation that would avoid impacts to the field sparrow.

7.4 Erosion and Sedimentation

The potential for erosion on the slopes that comprise the eastern flank of the drumlin (the slope immediately east of the residential development) was recognized and a geotechnical study was undertaken (Naylor 2012). It concluded that the primary causes of instability would be from development and loading at the crest, as well as surface run-off. Recommendations are provided in that report, comprising of setbacks, to avoid potential slope instability. The Preliminary Servicing and Stormwater Management Report (Gamsby and Mannerow Limited 2012) provides for the re-direction of surface flows from the rear of lots along the top of the slope that are predicted to prevent any surface erosion from run-off. Also, there is some possibility of erosion from the discharge structure from the stormwater management pond.

Mitigation
The Scots pine cultural plantation itself is not a significant or sensitive feature, so any sediment movement into this community is not considered an issue. However, where it is located on the drumlin slope, surface run-off has the potential to create an erosion issue. In response, the grading plan has:

1. provided for sediment and erosion control fencing around the perimeter of the construction area to prevent sediment from entering the cultural plantation;
2. grading will direct surface run-off adjacent to the drumlin slope behind lots 41 to 50 to catch basins and subsequently to storm drains;
3. grading behind the remainder of the lots along the drumlin slope (lots 51-57) will be directed southerly to the discharge structure.

These three measures are designed to eliminate the potential for surface erosion and/or sediment deposition on the drumlin slope. Potential for localized erosion on the slope from excessive human use can be controlled through fencing, as noted above in Section 7.2.

The stormwater dissipation/dispersion structure has been designed to accommodate the overflow from the proposed storm water pond. It will spread any discharge over an approximately 65m length which will then sheet flow toward the Clythe Creek wetland. Additional description of the structure is provided in the Preliminary Servicing and Stormwater Management Report (Gamsby and Mannerow Limited (2012; Section 5.2.3 b). It is recommended that performance monitoring of the stormwater facility include inspection of the slopes below the dissipation/dispersion structure to evaluate its effectiveness.

8.0 POLICY CONFORMITY

8.1 Provincial Policy Statement

Policy 2.1.1 of the PPS addresses the long term protection of natural features, and Section 2.1.2 states, "*The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features*." The natural features on the subject lands, including the Natural Heritage System, have been described, evaluated and refined through this EIS. The proposed draft plan maintains the natural features, their biodiversity and functions, including the linkage function provided by Clythe Creek.

There are two categories of natural heritage areas specified in the PPS for protection. The first category (policy 2.1.3) includes areas where no development or site alteration is permitted within the feature. These areas include significant wetlands and significant habitat of endangered and threatened species. The second category (policy 2.1.4) includes areas where development and site alteration may be permitted only if it can be demonstrated that there will be no negative impacts on natural features or their ecological functions. These areas include: significant woodlands, significant valleylands, significant wildlife habitat and Provincially Significant Areas of Natural and Scientific Interest (ANSIs). Also, development and site alteration will only be permitted in fish habitat if in accordance with provincial and federal requirements (policy 2.1.5). Development or site alteration is not permitted on lands adjacent to any of the features listed in these three policies unless the ecological function of the adjacent lands have been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

The subject lands include a portion of a significant wetland, significant valleyland, a significant woodland and fish habitat. All these features are protected within the proposed draft plan including appropriate buffers. The City's Natural Heritage System, as mapped within OPA 42, includes a larger area of significant valleyland than shown on Figure 3. Based on site-specific investigation (Section 4.6) it is recommended that the boundaries of the significant valleyland

(and thus the NHS) be refined, per Section 6.1.4.4 (4) of OPA 42. No floral or faunal species of provincial significance were found on the site.

The proposed application is deemed to confirm with the natural heritage policies of the Provincial Policy Statement.

8.2 City of Guelph Official Plan

The Cityview Ridge application must conform to the applicable policies of the City of Guelph Official Plan (2006 Consolidation). It also considers OPA 42 which contains the City's Natural Heritage System (NHS). OPA 42 replaces the environmental policies in the current OP (Chapter 6). OPA 42 was approved by City Council July 27th 2010, and by the Minister of Municipal Affairs and Housing February 22nd 2011, but is under appeal. Notwithstanding its appealed status, this EIS addresses the policies of OPA 42 as if they were fully approved.

8.2.1 Floodplain

The 100 year and regional floodplains associated with Clythe Creek have been addressed through studies supporting this application (Gamsby and Mannerow Limited 2012), and are shown on the Draft plan of Subdivision (BSRD 2011) and Preliminary Grading and Drainage Plan (Gamsby and Mannerow Limited 2012, Drawing 2). The floodplains are also shown on Figure 3 in this EIS. The subject lands are subject to floodplain protection using the one zone concept and policy 5.2.3 of the OP prohibits development on such lands within the City. No development is proposed within the 100 year floodplain. A small area of the regional floodplain occurs within the apartment block (Block 115), but no development is proposed within the limits of the floodplain.

8.2.2 Steep Slopes, Hazard Erosion Areas and Unstable Soils

Section 5.3 of the City's OP addresses steep slopes and hazard lands and unstable soils. A geotechnical report (Naylor 2012) has been prepared that has identified a top of bank and associated setback for the purpose of soil stability (Figure 3), in accordance with policy 5.3.1. All proposed development is well outside the identified setback. All of the proposed development is a substantial distance from the watercourse on site (Clythe Creek) and none is proposed on muck soils. Steep slopes as it pertains to the Natural Heritage System is discussed in Section 4.6.

8.2.3 Natural Heritage Policies

The subject lands include a portion of the City's Natural Heritage System as described in Section 4.8. Four of features in the NHS that occur on the subject lands (significant woodland, significant wetland, significant valleyland, and surface water features and fish habitat) are considered "Significant Natural Areas". Policy 6.1.3 indicates that development or site alteration will not be permitted within Significant Natural Areas or their minimum buffers, and that development or site alteration may be permitted on lands adjacent to Significant Natural Areas if it has been demonstrated that there will be no impacts to the features or their functions.

As shown on Figure 3, no development is proposed with in these four features or their buffers. Development is located beyond the minimum buffers recommended in Table 6.1 of OPA 42.

From a policy perspective, no negative impacts resulting from development proposed on lands adjacent to the significant natural areas are anticipated.

One feature on the site, the cultural plantation on the drumlin slope, is considered to provide potential habitat for locally significant wildlife and it is recommended it be included in the City's NHS as a "Natural Area". No development is proposed within this feature. Some site grading may occur within the buffer, but this will only be temporary and no development is proposed there. The buffer adjacent to the "Natural Area" is not included in the NHS (policy 6.1 of the OPA 42 indicates that only buffers of Significant Natural Areas are included in the NHS). Section 6.1.3 of OPA 42 notes that development or site alteration is permitted on adjacent lands of Natural Areas providing an EIS demonstrates there will be no negative impacts on the feature or its associated ecological functions, with exceptions as provided in Section 6.1.6. As discussed in Section 4.4, it is predicted that the three locally significant species that occur in the area proposed as Natural Area will persist at the site.

Although the Field Sparrow will not persist, its occurrence is not considered sufficient to trigger a Natural Area designation, and policy 6.1.6.3.3.5 indicates that the protection of open meadow species and associated habitat will be encouraged and supported, where appropriate. Additionally, we have doubts whether this species should be considered locally significant in Wellington County (Section 4.4). As noted in Section 4.4 of this EIS, the Cultural Meadow on the site is not considered an appropriate location to preserve this species. The loss of Field Sparrow is identified as a net impact of the proposed development.

The proposed application is deemed to confirm with the natural heritage policies of the City of Guelph Official Plan, including OPA 42.

8.3 Grand River Conservation Authority

The Cityview Ridge study site falls within the jurisdiction of the GRCA and is subject to policies outlined in *Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourse Regulation, Ontario Regulation 150/06* (GRCA 2009). A pre-consultation checklist was completed by Gamsby and Mannerow Limited (June 2006) and submitted to the GRCA for comment. Comments received as a result of a site walk with GRCA (12th June 2006) were incorporated into revised checklist and re-submitted, including a second pre-consultation checklist for aquatic resources, which was prepared by Gartner Lee Ltd. (July 2006).

8.3.1 Wetlands

Section 8.4 of the GRCA policies addresses wetland protection. An area around wetlands where development could interfere with the hydrologic function of the wetland is referred to as an "area of interference" in GRCA policy. Since the wetland on site is part of a PSW, the area of interference is 120 metres from the wetland boundary. Development within an area of interference is permitted if an EIS demonstrates that policies 7.1.2 - 7.1.3 are met (policy 8.4.10)

The Clythe Creek wetland boundary was delineated and staked by NSE staff, and subsequently reviewed and refined in the field with GRCA staff (12th June 2006). The agreed wetland

boundary was provided digitally to the GRCA to update their files and to the City for input to the Natural Heritage System study. The wetland boundary is mapped on Figure 3. A 30 m buffer was delineated to protect wetland features and functions, including existing groundwater discharge seepages. The nearest proposed lot is approximately 50 metres from the wetland boundary and all stormwater management infrastructure is outside of the 30 m buffer. The area between the proposed development, including the 30 m buffer, is currently vegetated and no disturbance or site alteration is proposed in this area. This EIS concludes that there will be no impact to the wetland features or functions, and that the policies outlines in 7.1.2 and 7.1.3 of the GRCA policies (2009) are met.

Stormwater management facilities for water quality control are permitted subject to policies contained in 8.4.15. A preliminary stormwater report (Gamsby and Mannerow Limited 2012) and a hydrogeological report (Banks 2012) have been prepared to conform to these policies. All proposed infrastructure is located outside the wetland and its 30 m buffer, the hydrologic function of the wetland will not be impacted, and erosion and silt control will be implemented during construction to avoid impacts. The storm design incorporates a dissipation/dispersion structure to mitigate potential erosion issues on the slope adjacent to the wetland and to mimic, as closely as possible, current sheet flow to the wetland.

8.3.2 Floodplain

The GRCA's "Riverine Flooding Hazard" is defined as the greater of the 100-year return period flood or the Regional Storm plus an allowance (if applicable). The floodplain on the subject lands is described in Section 4.5 and a Floodplain Analysis is provided in Gamsby and Mannerow Limited (2012). The lands are subject to a "one-zone" policy area. No development is proposed within the Riverine Flooding Hazard Limit and/or the Regulatory Floodplain.

9.0 MONITORING

As noted in the Terms of Reference, monitoring requirements will be addressed as part of the Environmental Implementation Report, however, general issues to be addressed are provided below. Monitoring should be undertaken throughout the period of construction. To facilitate this, an inspector should be retained to undertake site visits approximately twice per month, including, to the extent possible, following major precipitation events. Reporting should be to the City once per month. The frequency of visits and reporting could be reduced during periods of inactivity (*e.g.*, during winter months of no construction is occurring, or if some development is postponed to the future). Areas to be monitored include:

Erosion and Sediment Control

- all sediment control fencing should be inspected for proper construction and condition;
- all slopes adjacent to areas where grading has occurred; and
- the area down-slope of the stormwater dissipation/dispersion structure.

Tree Conservation

- trees along the north property boundary; and
- other trees identified to be retained in the tree preservation plan;

Woodland Edge (Cultural Plantation)

- the edge of the cultural plantation behind lots 41-57

10.0 CONCLUSION AND RECOMMENDATIONS

This environmental impact study responds to the need to identify natural feature constraints and evaluates the potential for environmental impacts from the proposed development. An "environment first" approach was taken whereby natural features were inventoried and major constraints identified prior to the development of a draft plan, so that impacts could be avoided from the outset. A multi-season, comprehensive inventory of features was undertaken. Throughout the development of the draft plan, recommendations were made to the planner and engineers to reduce the potential for impacts to the extent possible. Accordingly, the subdivision plan was modified to address these recommendations. Impacts were identified and are discussed in Section 7, along with further mitigation recommendations. A tree conservation plan was undertaken to identify and evaluate all trees on the site, determine those that could be retained, and recommend compensation for trees which cannot be maintained. The EIS also addresses conformity with the Provincial, City of Guelph and GRCA policies.

The resulting proposed development retains the existing natural features and conforms to the relevant natural heritage policies. The only net impact is deemed to be the loss of a single bird species that is considered locally significant in Wellington County.

The following recommendations are provided to minimize impacts of the proposed draft plan:

1. The significant wetland, woodland, valleyland and Clythe Creek coldwater fish habitat, as well as their respective buffers, be protected per the proposed draft plan;
2. A 3:1 replacement ratio be used to compensate for trees that need to be removed, which will result in the planting of 1,086 trees.
3. Tree protection recommendations should be implemented per Section 6.3
4. Fencing should be provided along the rear of lots 41 to 57, and continuing through the stormwater block (Block 112), to limit access to the drumlin slope and the Scots pine cultural plantation.
5. Fencing should be provided around the apartment block to limit access to the adjacent cultural plantation and Clythe Creek.
6. It is recommended that if access for construction is required down-slope of the dissipation/dispersion structure, that only small machinery (*e.g.*, bobcat or similar) be used to minimize the potential for encroachment in the buffer.
7. A heavy-duty (Type 2) silt fence be installed during the construction of the energy dissipation/dispersion structure.
8. Owing to the potential for some erosion down-gradient from the energy dissipation/dispersion structure, it is recommended that a contingency measures be developed in the EIR to respond to any erosion, should it occur.
9. It is recommended that construction of the retaining wall behind lots 51-57, and the stormwater dissipation/dispersion structure, be undertaken outside of the breeding season (mid May to mid July) to reduce the possibility of impacts to locally significant bird species. If this is not possible, a field investigation to determine if any locally significant

bird species are breeding near the proposed construction should be undertaken to determine if construction should proceed.

10. If dewatering is required for installation of services on the apartment block, the potential for impacts should be determined as part of the process to secure a Permit to Take Water.

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APPENDIX 1: FLORA

Appendix 1. Plant species documented on the PT-Valeriote Site. An asterisk indicates a non-native species. Taxonomy follows Newmaster *et al*. (1998). Provincial rarity status follows (NHIC 2004). Rarity status for Wellington County follows Frank and Anderson 2009. Vegetation communities correspond to the broad categories discussed in Section 5.1, North-South Environmental 2004 a, b.

* indicates a non-native species

	Scientific Name	Common Name	Rarity Status			Vegetation Community				
			G Rank	S Rank	Wellington	CUW1	CUP3-3	SWC3-1	SWD4-1	HDG
	Equisetaceae									
	Equisetum arvense L.	Field Horsetail	G5	S5		✓		✓		
	Dryopteridaceae									
	Cystopteris bulbifera (L.) Bernh.	Bulblet Bladder Fern	G5	S5				✓		
	Cystopteris fragilis (L.) Bernh.	Fragile Fern	G5	S5	R3			✓		
	Dryopteris carthusiana (Vill.) H.P. Fuchs	Spinulose Wood Fern	G5	S5				✓		
	Dryopteris marginalis (L.) A. Gray	Marginal Wood Fern	G5	S5				✓		
	Onoclea sensibilis L.	Sensitive Fern	G5	S5				✓	✓	
	Pinaceae									
	Picea glauca (Moench) Voss	White Spruce	G5	S5		✓	✓			
*	Picea abies (L.) Karsten	Norway Spruce	G5	SE3						✓
*	Pinus sylvestris L.	Scotch Pine	G?	SE5		✓	✓			✓
	Cupressaceae									
	Thuja occidentalis L.	Eastern White Cedar	G5	S5				✓	✓	
	Ranunculaceae									
	Thalictrum dioicum L.	Early Meadowrue	G5	S5				✓		
	Thalictrum pubescens Pursh	Tall Meadow-rue	G5	S5				✓	✓	

	Scientific Name	Common Name	Rarity Status			Vegetation Community				
			G Rank	S Rank	Wellington	CUW1	CUP3-3	SWC3-1	SWD4-1	HDG
	Caltha palustris L.	Marsh Marigold	G5	S5				✓		
	Ranunculus hispidus Michx. var. caricetorum (Greene) T. Duncan	Swamp Buttercup	G5T5	S5				✓		
*	Ranunculus acris L.	Tall Butter-cup	G5	SE5			✓			✓
	Ulmaceae									
	Ulmus americana L.	American Elm	G5?	S5		✓				
	Juglandaceae									
	Juglans nigra L.	Black Walnut	G5	S4			✓			
	Betulaceae									
	Betula populifolia Marshall	Gray Birch	G5	S5			✓			
	Caryophyllaceae									
*	Silene vulgaris (Moench) Garcke	Bladder Campion	G?	SE5		✓				
*	Silene latifolia Poir.	Bladder Campion	G?	SE5			✓			✓
	Polygonaceae									
*	Rumex crispus L.	Curly Dock	G?	SE5			✓			✓
	Guttiferae									
*	Hypericum perforatum L.	Common St. John's-wort	G?	SE5		✓	✓			
	Tiliaceae									
	Tilia americana L.	American Basswood	G5	S5		✓				✓
	Malvaceae									
*	Malva moschata L.	Musk Mallow	G?	SE5		✓				
	Salicaceae									
	Populus tremuloides Michx.	Trembling Aspen	G5	S5		✓			✓	✓

	Scientific Name	Common Name	Rarity Status			Vegetation Community				
			G Rank	S Rank	Wellington	CUW1	CUP3-3	SWC3-1	SWD4-1	HDG
	Salix discolor Muhlenb.	Pussy Willow	G5	S5		✓				
	Salix exigua Nutt.	Sandbar Willow	G5	S5		✓				
*	Salix alba L.	White Willow	G5	SE4			✓			✓
*	Salix fragilis L.	Crack Willow	G?	SE5					✓	
	Brassicaceae									
*	Alliaria petiolata (M. Bieb.) Cavara & Grande	Garlic Mustard	G?	SE5						✓
	Rosaceae									
?	Crataegus sp.	Hawthorn sp.	G?	S?		✓				
	Fragaria virginiana Miller ssp. glauca (S. Watson) Staudt	Strawberry	G5	S5		✓	✓			✓
	Geum aleppicum Jacq.	Yellow Avens	G5	S5		✓	✓		✓	✓
	Prunus virginiana L.	Choke Cherry	G5	S5		✓				
	Rubus idaeus L. ssp. melanolasius (Dieck) Focke	Red Raspberry	G5T5	S5		✓			✓	
	Rubus occidentalis L.	Black Raspberry	G5	S5						✓
	Spiraea alba Du Roi	Narrow-leaved Meadow-sweet	G5	S5		✓				
*	Sorbus aucuparia L.	European Mountain-ash	G5	SE4						✓
*	Malus pumila Miller	Common Crabapple	G5	SE5			✓			✓
*	Potentilla recta L.	Sulphur Cinquefoil	G?	SE5			✓			✓
	Fabaceae									
*	Trifolium pratense L.	Red Clover	G?	SE5		✓				
*	Vicia cracca L.	Tufted Vetch	G?	SE5		✓	✓			✓
*	Robinia pseudo-acacia L.	Black Locust	G5	SE5						✓
*	Lotus corniculatus L.	Birds-foot Trefoil	G?	SE5		✓				

	Scientific Name	Common Name	Rarity Status			Vegetation Community				
			G Rank	S Rank	Wellington	CUW1	CUP3-3	SWC3-1	SWD4-1	HDG
*	Trifolium hybridum L. ssp. elegans (Savi) Asch. & Graebn.	Alsike Clover	G?	SE5		✓				
	Onagraceae									
	Circaea lutetiana L. ssp. canadensis (L.) Aschers. & Magnusson	Enchanter's Nightshade	G5	S5			✓		✓	
	Epilobium ciliatum Raf. ssp. ciliatum	Hairy Willow-herb	G5	S5		.	✓	.	.	.
	Oenothera biennis L.	Common Evening-primrose	G5	S5		.	✓	.	.	✓
	Cornaceae					.	.	.	.	.
	Cornus stolonifera Michx.	Red-osier Dogwood	G5	S5		✓	✓	.	✓	✓
	Cornus foemina Miller ssp. racemosa (Lam.) J.S. Wilson	Grey Dogwood	G5	S5		✓	✓	.	.	✓
	Euphorbiaceae					.	.	.	.	.
*	Euphorbia esula L.	Leafy Spurge	G5	SE5		✓	.	.	.	.
	Rhamnaceae					.	.	.	.	.
	Rhamnus alnifolia L'Hér.	Alder-leaved Buckthorn	G5	S5		.	✓	.	✓	.
*	Rhamnus cathartica L.	European Buckthorn	G?	SE5		✓	✓	✓	.	✓
	Vitaceae					.	.	.	.	.
	Parthenocissus inserta (A. Kern.) Fritsch	Virginia Creeper	G5	S5		✓	✓	.	✓	✓
	Vitis riparia Michx.	Riverbank Grape	G5	S5		✓	✓	.	.	✓
	Aceraceae					.	.	.	.	.
	Acer negundo L.	Manitoba Maple	G5	S5		✓	.	.	.	✓
	Oxalidaceae					.	.	.	.	.
	Oxalis stricta L.	Upright Yellow Wood-sorrel	G5	S5		.	.	.	.	✓
	Geraniaceae					.	.	.	.	.
*	Geranium robertianum L.	Herb-robert	G5	SE5		.	✓	.	.	✓

	Scientific Name	Common Name	Rarity Status			Vegetation Community				
			G Rank	S Rank	Wellington	CUW1	CUP3-3	SWC3-1	SWD4-1	HDG
	Balsaminaceae					.	.	.	.	.
	Impatiens capensis Meerb.	Spotted Jewel-weed	G5	S5		.	.	.	✓	.
	Apiaceae					.	.	.	.	.
	Sium suave Walter	Water-parsnip	G5	S5		.	.	✓	.	.
	Cicuta bulbifera L.	Bulb-bearing Water-hemlock	G5	S5				✓		
*	Daucus carota L.	Wild Carrot	G?	SE5		✓				✓
	Asclepiadaceae									
	Asclepias syriaca L.	Common Milkweed	G5	S5		✓	✓			
	Solanaceae									
*	Solanum dulcamara L.	Climbing Nightshade	G?	SE5		✓	✓	✓	✓	
	Convolvulaceae									
*	Convolvulus arvensis L.	Field Bindweed	G?	SE5		✓				
	Boraginaceae									
*	Echium vulgare L.	Common Viper's-bugloss	G?	SE5		✓				
	Lamiaceae									
	Mentha arvensis L.	Field Mint	G5	S5		✓				
	Prunella vulgaris L. ssp. lanceolata (W.C. Barton) Hultén	Heal-all	G5T5	S5		✓	✓			✓
*	Leonurus cardiaca L.	Motherwort	G?	SE5		✓				
	Plantaginaceae					.				
*	Plantago lanceolata L.	English Plantain	G5	SE5		✓				
*	Plantago major L.	Nipple-seed Plantain	G5	SE5		✓				✓
	Oleaceae									
	Fraxinus pennsylvanica Marshall	Green Ash	G5	S5		✓	✓		✓	✓

	Scientific Name	Common Name	Rarity Status			Vegetation Community				
			G Rank	S Rank	Wellington	CUW1	CUP3-3	SWC3-1	SWD4-1	HDG
*	Ligustrum vulgare L.	European Privet	G?	SE5		✓				
	Scrophulariaceae									
	Chelone glabra L.	Turtlehead	G5	S5				✓		
*	Linaria vulgaris Miller	Butter-and-eggs	G?	SE5			✓			✓
*	Verbascum thapsus L.	Great Mullein	G?	SE5		✓				
*	Veronica officinalis L.	Gypsy-weed	G5	SE5			✓			
	Caprifoliaceae									
	Viburnum trilobum Marshall	Highbush Cranberry	G5T5	S5					✓	
*	Viburnum opulus L.	Guelder Rose	G5	SE4		✓				
*	Lonicera tatarica L.	Tartarian Honeysuckle	G?	SE5		✓	✓			✓
	Asteraceae									
?	Hieracium sp.	Hawkweed sp.	G?	S?		✓				
	Symphyotrichum urophyllus Lindl.	Arrow-leaved Aster	G4	S4		✓				
	Eupatorium maculatum L. ssp. bruneri (A. Gray) G. Douglas	Spotted Joe-pye-weed	G5T4T5Q	S4?				✓		
	Solidago gigantea Aiton	Smooth Goldenrod	G5	S5		✓			✓	
	Ambrosia artemisiifolia L.	Annual Ragweed	G5	S5		✓				
	Eupatorium maculatum L. ssp. maculatum	Spotted Joe-pye-weed	G5T?	S5				✓	✓	
	Eupatorium perfoliatum L.	Common Boneset	G5	S5				✓		
	Rudbeckia hirta L.	Black-eyed Susan	G5	S5		✓				✓
	Solidago altissima L. var. altissima	Tall Goldenrod	G5T5	S5		✓	✓			✓
	Solidago canadensis L.	Canada Goldenrod	G5	S5		✓				
	Erigeron pulchellus Michx.	Robin's Plantain	G5	S5			✓			
	Euthamia graminifolia (L.) Nutt.	Flat-top Fragrant-golden-rod	G5	S5		✓				

	Scientific Name	Common Name	Rarity Status			Vegetation Community				
			G Rank	S Rank	Wellington	CUW1	CUP3-3	SWC3-1	SWD4-1	HDG
	Erigeron philadelphicus L.	Philadelphia Fleabane	G5T5	S5			✓			
	Symphyotrichum puniceus L.	Purple-stemmed Aster	G5T?	S5				✓		
	Symphyotrichum novae-angliae L.	New England Aster	G5	S5		✓				
	Symphyotrichum lateriflorus (L.) Britton var. lateriflorus	One-sided Aster	G5T5	S5		✓				
	Solidago nemoralis Aiton ssp. nemoralis	Gray Goldenrod	G5T5	S5		✓				
	Symphyotrichum ericoides L. ssp. ericoides	White Heath Aster	G5T?	S5		✓				
	Erigeron annuus (L.) Pers.	White-top Fleabane	G5	S5		✓	✓			✓
*	Achillea millefolium L.	Common Yarrow	G5T?	SE						✓
*	Taraxacum officinale G. Weber	Common Dandelion	G5	SE5		✓	✓			✓
*	Tanacetum vulgare L.	Common Tansy	G?	SE5			✓			
*	Sonchus arvensis L. ssp. arvensis	Field Sow-thistle	G?T?	SE5		✓				
*	Tussilago farfara L.	Colt's Foot	G?	SE5		✓				
*	Tragopogon dubius Scop.	Meadow Goat's-beard	G?	SE5		✓				
*	Hieracium caespitosum Dumort. ssp. caespitosum	Yellow Hawkweed		SE5		✓	✓			✓
*	Hieracium aurantiacum L.	Orange Hawkweed	G?	SE5						✓
*	Chrysanthemum leucanthemum L.	Oxeye Daisy	G?	SE5		✓	✓			✓
*	Arctium minus (Hill) Bernh.	Common Burdock	G?	SE5		✓	✓			✓
*	Cirsium vulgare (Savi) Ten.	Bull Thistle	G5	SE5		✓			✓	
	Cyperaceae									
	Carex aurea Nutt.	Golden-fruited Sedge	G5	S5		✓				
	Carex granularis Muhlenb. ex Willd.	Meadow Sedge	G5	S5		✓				
	Poaceae									
*	Festuca arundinacea Schreb.	Kentucky Fescue	G?	SE5		✓				✓

	Scientific Name	Common Name	Rarity Status			Vegetation Community				
			G Rank	S Rank	Wellington	CUW1	CUP3-3	SWC3-1	SWD4-1	HDG
	Glyceria striata (Lam.) A. Hitchc.	Fowl Manna-grass	G5	S5			✓	✓		
	Poa pratensis L. ssp. pratensis	Kentucky Bluegrass	G5T5?	S5		✓	✓		✓	✓
*	Bromus inermis Leyss. ssp. inermis	Smooth Brome	G5T?	SE5		✓				✓
*	Dactylis glomerata L.	Orchard Grass	G?	SE5		✓	✓			✓
*	Phleum pratense L.	Meadow Timothy	G?	SE5		✓	✓			✓
	Orchidaceae									
*	Epipactis helleborine (L.) Crantz	Eastern Helleborine	G?	SE5			✓			✓

APPENDIX 2: FAUNA

Appendix 2. Fauna of the Valeriote Property. Taxonomy follows NHIC (2004). Provincial rarity status follows NHIC (2004). Rarity status for Wellington County follows Riley 1989. Communities correspond to the ELC categories (Section 3.5).

* indicates a non-native species

	Scientific Name	Common Name	Rarity Status			Community				
			G Rank	S Rank	Wellington	CUW1	CUP3-3	HDG	SWC3-1	SWD4-1
	Bird									
	Coccyzus americanus	Yellow-billed Cuckoo	G5	S4B,SZN	Rare		✓			
	Myiarchus crinitus	Great Crested Flycatcher	G5	S5B,SZN					✓	
	Vireo olivaceus	Red-eyed Vireo	G5	S5B,SZN		✓	✓			
	Cyanocitta cristata	Blue Jay	G5	S5		✓	✓			
	Corvus brachyrhynchos	American Crow	G5	S5B,SZN			✓			
	Tachycineta bicolor	Tree Swallow	G5	S5B,SZN			✓			
	Poecile atricapillus	Black-capped Chickadee	G5	S5		✓	✓		✓	✓
	Turdus migratorius	American Robin	G5	S5B,SZN		✓				
	Dumetella carolinensis	Gray Catbird	G5	S5B,SZN			✓			
*	Sturnus vulgaris	European Starling	G5	SE					✓	
	Bombycilla cedrorum	Cedar Waxwing	G5	S5B,SZN		✓				
	Setophaga ruticilla	American Redstart	G5	S5B,SZN	Rare		✓		✓	✓
	Spizella passerina	Chipping Sparrow	G5	S5B,SZN		✓		✓		
	Spizella pusilla	Field Sparrow	G5	S5B,SZN	Rare	✓				
	Melospiza melodia	Song Sparrow	G5	S5B,SZN		✓				✓
	Cardinalis cardinalis	Northern Cardinal	G5	S5		✓	✓			✓
	Passerina cyanea	Indigo Bunting	G5	S5B,SZN		✓	✓			
	Molothrus ater	Brown-headed Cowbird	G5	S5B,SZN		✓	✓			
	Icterus galbula	Baltimore Oriole	G5	S5B,SZN	Rare		✓			
	Carduelis tristis	American Goldfinch	G5	S5B,SZN		✓	✓			
	Mammal									
	Sylvilagus floridanus	Eastern Cottontail	G5	S5		✓				
	Marmota monax	Groundhog	G5	S5			✓			

APPENDIX 3: TREE INVENTORY DATA

Appendix 3. Evaluation of trees conducted at Cityview Ridge

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
1	Thuja occidentalis	eastern white cedar	No	21.1	st	1
2	Thuja occidentalis	eastern white cedar	No	10.2		1
3	Thuja occidentalis	eastern white cedar	No	10.6		1
4	Pinus sylvestris	Scots pine	Yes	11.3	dl	2
5	Thuja occidentalis	eastern white cedar	No	11.7		1
6	Thuja occidentalis	eastern white cedar	No	18.8	st	1
7	Thuja occidentalis	eastern white cedar	No	10.8		1
8	Thuja occidentalis	eastern white cedar	No	12.1		1
9	Thuja occidentalis	eastern white cedar	No	10.9		1
10	Thuja occidentalis	eastern white cedar	No	12.5		1
11	Thuja occidentalis	eastern white cedar	No	10		1
12	Thuja occidentalis	eastern white cedar	No	16.3	st	1
13	Thuja occidentalis	eastern white cedar	No	13.7		1
14	Thuja occidentalis	eastern white cedar	No	13.8		1
15	Thuja occidentalis	eastern white cedar	No	15.3		1
16	Thuja occidentalis	eastern white cedar	No	16.2		1
17	Thuja occidentalis	eastern white cedar	No	15.4	st	1
18	Thuja occidentalis	eastern white cedar	No	14.6	st	1
19	Thuja occidentalis	eastern white cedar	No	23.4	st	1
20	Pinus sylvestris	Scots pine	Yes	10		1
21	Pinus sylvestris	Scots pine	Yes	11.6		1
22	Pinus sylvestris	Scots pine	Yes	19.4		2
23	Pinus sylvestris	Scots pine	Yes	14.7		1
24	Pinus sylvestris	Scots pine	Yes	11.9		1
25	Picea glauca	white spruce	No	10.3		1
26	Thuja occidentalis	eastern white cedar	No	13.9		1
27	Rhamnus cathartica	European buckthorn	Yes	11.5	st, dl, bl	5
28	Malus sp.	crabapple species	Yes	107.3	st, dl, w, d, ib	5
29	Pinus sylvestris	Scots pine	Yes	11.5		1
30	Crataegus sp.	hawthorn sp.	No	12.8	st, dl	4

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
31	Thuja occidentalis	eastern white cedar	No	16.2	st	1
32	Acer negundo	Manitoba maple	Yes	18.4	dl, bt, w	5
33	Rhamnus cathartica	European buckthorn	Yes	10.2	st, dl, bl	5
34	Picea pungens	blue spruce	Yes	25.4		1
35	Picea pungens	blue spruce	Yes	22.4		1
36	Pinus sylvestris	Scots pine	Yes	11.6	dl	3
37	Picea pungens	blue spruce	Yes	23.4		1
38	Pinus sylvestris	Scots pine	Yes	11.6	dl	3
39	Pinus sylvestris	Scots pine	Yes	11		1
40	Pinus sylvestris	Scots pine	Yes	10		1
41	Picea pungens	blue spruce	Yes	25.4		2
42	Picea pungens	blue spruce	Yes	27.4		1
43	Picea pungens	blue spruce	Yes	17.2		1
44	Picea pungens	blue spruce	Yes	20.4		1
45	Crataegus sp.	hawthorn sp.	No	10.7	st, dl, bl	5
46	Pinus sylvestris	Scots pine	Yes	15.5		2
47	Pinus sylvestris	Scots pine	Yes	13	bt	4
48	Pinus sylvestris	Scots pine	Yes	13.7		1
49	Pinus sylvestris	Scots pine	Yes	11.6		1
50	Pinus sylvestris	Scots pine	Yes	12		1
51	Fraxinus pennsylvanica	green ash	No	11.5		1
52	Fraxinus pennsylvanica	green ash	No	10.9	dl	2
53	Pinus sylvestris	Scots pine	Yes	19.1	st	2
54	Pinus sylvestris	Scots pine	Yes	14.9		2
55	Pinus sylvestris	Scots pine	Yes	25.5	dl	3
56	Pinus sylvestris	Scots pine	Yes	12.6		2
57	Pinus sylvestris	Scots pine	Yes	12.6		2
58	Picea pungens	blue spruce	Yes	12.1		1
59	Picea pungens	blue spruce	Yes	28.1	st	2
60	Picea pungens	blue spruce	Yes	29		2
61	Pinus sylvestris	Scots pine	Yes	11.1		1
62	Picea glauca	white spruce	No	23.5		2

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
63	Picea glauca	white spruce	No	19.1		2
64	Pinus sylvestris	Scots pine	Yes	10.7	dl	3
65	Picea pungens	blue spruce	Yes	21.9		1
66	Picea pungens	blue spruce	Yes	23	bl	3
67	Pinus sylvestris	Scots pine	Yes	12.9		1
68	Pinus sylvestris	Scots pine	Yes	11.9		1
69	Pinus sylvestris	Scots pine	Yes	10.2	ab	3
70	Picea glauca	white spruce	No	20.7	dl	3
71	Pinus sylvestris	Scots pine	Yes	10.8	cl	3
72	Picea glauca	white spruce	No	17.4	limbs on one side	3
73	Malus sp.	crabapple species	Yes	35.2	dl, bl, st, d	5
74	Crataegus sp.	hawthorn sp.	No	12.4	ib, st, bt, bl, dl	5
75	Picea glauca	white spruce	No	12.5	dl	3
76	Picea glauca	white spruce	No	22.8		2
77	Picea glauca	white spruce	No	20.6	dl	2
78	Picea glauca	white spruce	No	28.2	st, p	3
79	Picea glauca	white spruce	No	19.7		1
80	Picea glauca	white spruce	No	30.4	bt, ab	2
81	Pinus sylvestris	Scots pine	Yes	17.7	dl, bl	4
82	Pinus sylvestris	Scots pine	Yes	15.2	dl, bl	4
83	Pinus sylvestris	Scots pine	Yes	23.1	dl, bl	3
84	Pinus sylvestris	Scots pine	Yes	20.8	fc, dl, bl	4
85	Pinus sylvestris	Scots pine	Yes	20.5	dl, bl	4
86	Pinus sylvestris	Scots pine	Yes	16.8	dl, bl	4
87	Pinus sylvestris	Scots pine	Yes	17.9	dl, bl, fc	4
88	Pinus sylvestris	Scots pine	Yes	30.1	fc, dl, bl	5
89	Pinus sylvestris	Scots pine	Yes	11.8	fc, dl, bl	5
90	Pinus sylvestris	Scots pine	Yes	17.9	dl, bl	4
91	Pinus sylvestris	Scots pine	Yes	14.1	fc, dl, bl	5
92	Pinus sylvestris	Scots pine	Yes	22.5	fc, dl, bl	4
93	Pinus sylvestris	Scots pine	Yes	19.1	dl, bl	4

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
94	Fraxinus pennsylvanica	green ash	No	10.8	dl, bl, ab, d	5
95	Fraxinus pennsylvanica	green ash	No	10.5	dl, bl, ab, d	5
96	Fraxinus pennsylvanica	green ash	No	11.2	dl, bl, d	5
97	Fraxinus pennsylvanica	green ash	No	11.5	dl, bl, d	5
98	Fraxinus pennsylvanica	green ash	No	17.4	dl, bl, d	5
99	Fraxinus pennsylvanica	green ash	No	11.6	l, dl, bl, d	5
100	Fraxinus pennsylvanica	green ash	No	11.7	dl	3
101	Fraxinus pennsylvanica	green ash	No	10.2	dl, d, bl	5
102	Fraxinus pennsylvanica	green ash	No	10.1	dl, d, bl, ab	5
103	Fraxinus pennsylvanica	green ash	No	16.5	dl, bl	4
104	Fraxinus pennsylvanica	green ash	No	14.8	dl, d, bl	5
105	Fraxinus pennsylvanica	green ash	No	16	dl, bl, d	5
106	Fraxinus pennsylvanica	green ash	No	12.5	dl, d, bl	5
107	Juglans nigra	black walnut	No	20.5	dl	2
108	Populus tremuloides	tembling aspen	No	16.1	d, bl	5
109	Acer negundo	Manitoba maple	Yes	53.5	st, l, ab, dl, bl	4
110	Acer negundo	Manitoba maple	Yes	24.5	l, ab, dl, bl	4
111	Malus sp.	crabapple species	Yes	80.8	st, w, bl, dl	4
112	Acer negundo	Manitoba maple	Yes	51.1	st, dl, bl	4
113	Juglans nigra	black walnut	No	21.4	bt, ab, dl, bl	5
114	Juglans nigra	black walnut	No	25.8	st, ab, dl	4
115	Juglans nigra	black walnut	No	17.3	dl, bl	3
116	Juglans nigra	black walnut	No	14.9	dl, bl	3
117	Juglans nigra	black walnut	No	10.8	dl, bl	3
118	Juglans nigra	black walnut	No	20.1	dl	2
119	Juglans nigra	black walnut	No	16.8	dl	2
120	Juglans nigra	black walnut	No	10.6	l, dl, bl	5
121	Juglans nigra	black walnut	No	16.2	dl, bl	4
122	Juglans nigra	black walnut	No	11.4	dl, l, ab	5
123	Juglans nigra	black walnut	No	14.7	c, l, dl	4
124	Juglans nigra	black walnut	No	13.2	l, dl, ab	5
125	Fraxinus pennsylvanica	black walnut	No	21	dl, d	4

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
126	Populus tremuloides	tembling aspen	No	21.1	dl, d	4
127	Populus tremuloides	tembling aspen	No	20	dl, bt, d	4
128	Populus tremuloides	tembling aspen	No	22.5	d, dl	3
129	Juglans nigra	black walnut	No	17.4	c, dl	3
130	Fraxinus pennsylvanica	green ash	No	15.7	dl	3
131	Fraxinus pennsylvanica	green ash	No	12.3	dl, d, l	4
132	Fraxinus pennsylvanica	green ash	No	12.1	dl, d, l, c	5
133	Fraxinus pennsylvanica	green ash	No	18	dl, fn	4
134	Fraxinus pennsylvanica	green ash	No	16.5	dl	3
135	Malus sp.	crabapple species	Yes	53.2	dl, w, st, ab	3
136	Malus sp.	crabapple species	Yes	31.2	st, ab, ib, l	4
137	Malus sp.	crabapple species	Yes	74.8	st, ab, ib, w	3
138	Malus sp.	crabapple species	Yes	29.6	c, w, ab, bl	3
139	Malus sp.	crabapple species	Yes	40.1	ab, st, dl	3
140	Malus sp.	crabapple species	Yes	37.2	w, ab, dl	4
141	Malus sp.	crabapple species	Yes	24.8	ib, dl	3
142	Malus sp.	crabapple species	Yes	51.2	ib, dl	3
143	Malus sp.	crabapple species	Yes	28.4	ib, dl, ab	3
144	Malus sp.	crabapple species	Yes	55.2	st, dl, ab	3
145	Malus sp.	crabapple species	Yes	43.7	w, c, dl, d, ib	5
146	Populus tremuloides	tembling aspen	No	16.7	c, dl	5
147	Populus tremuloides	tembling aspen	No	22.3	dl	4
148	Acer saccharinum	silver maple	No	49.1	dl, w, st	3
149	Acer saccharinum	silver maple	No	19.6	dl	2
150	Acer saccharinum	silver maple	No	45.1	st, dl	2
151	Acer saccharinum	silver maple	No	30.4	st, dl	2
152	Acer saccharinum	silver maple	No	25.1	st, dl	3
153	Populus balsamifera	balsam poplar	No	28.6	dl	2
154	Fraxinus pennsylvanica	green ash	No	21.5	dl, d, st	5
155	Acer negundo	Manitoba maple	Yes	16.6	ab	3
156	Populus balsamifera	balsam poplar	No	67.5	dl	1
157	Acer negundo	Manitoba maple	Yes	31.1	st, dl	2

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
158	Fraxinus pennsylvanica	green ash	No	11		1
159	Fraxinus pennsylvanica	green ash	No	22.4	dl, c, st	4
160	Fraxinus pennsylvanica	green ash	No	11.5		1
161	Fraxinus pennsylvanica	green ash	No	11.1		1
162	Fraxinus pennsylvanica	green ash	No	10	w, dl	3
163	Fraxinus pennsylvanica	green ash	No	10.7	dl	2
164	Fraxinus pennsylvanica	green ash	No	10.8	dl	2
165	Fraxinus pennsylvanica	green ash	No	16.4	dl, ib	2
166	Fraxinus pennsylvanica	green ash	No	10.9		1
167	Fraxinus pennsylvanica	green ash	No	12.5	dl, fn, w	4
168	Fraxinus pennsylvanica	green ash	No	27.2	st, dl,	3
169	Fraxinus pennsylvanica	green ash	No	25.8	st, dl	3
170	Fraxinus pennsylvanica	green ash	No	23.3	st, dl	2
171	Betula papyrifera	white birch	No	25.8	st, fn, dl	3
172	Fraxinus pennsylvanica	green ash	No	11.9	dl, w	2
173	Ulmus americana	American elm	No	11.7	dl, id	3
174	Fraxinus pennsylvanica	green ash	No	10.1	fn, dl	2
175	Fraxinus pennsylvanica	green ash	No	10.1	dl, fn	3
176	Ulmus americana	American elm	No	13.1	w, ab	3
177	Ulmus americana	American elm	No	22.8	st	2
178	Fraxinus pennsylvanica	green ash	No	24.8	st	2
179	Ulmus americana	American elm	No	10.6	dl, id	3
180	Ulmus americana	American elm	No	16.9	id, dl	4
181	Ulmus americana	American elm	No	13.2	id, dl	2
182	Fraxinus pennsylvanica	green ash	No	11.1	w	2
183	Fraxinus pennsylvanica	green ash	No	15.1	fc, dl, bl	2
184	Ulmus americana	American elm	No	12.5	ab, id	2
185	Fraxinus pennsylvanica	green ash	No	16.9		1
186	Fraxinus pennsylvanica	green ash	No	12.4		1
187	Fraxinus pennsylvanica	green ash	No	11.3		1
188	Fraxinus pennsylvanica	green ash	No	10.4		1
189	Fraxinus pennsylvanica	green ash	No	10.5		1

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
190	Ulmus americana	American elm	No	13.9		3
191	Fraxinus pennsylvanica	green ash	No	11.1		1
192	Populus tremuloides	tembling aspen	No	17.2	w	2
193	Populus tremuloides	tembling aspen	No	15.9	w, dl	3
194	Populus tremuloides	tembling aspen	No	34.8	st, w, bl	3
195	Populus tremuloides	tembling aspen	No	15.3		1
196	Fraxinus pennsylvanica	green ash	No	15.1		1
197	Populus tremuloides	tembling aspen	No	23.8	w	2
198	Betula pumila	dwarft birch	Yes	11.9	fn, ab	4
199	Betula pumila	dwarft birch	Yes	20.9	fn, ab	3
200	Picea glauca	white spruce	No	19.7		2
201	Fraxinus pennsylvanica	green ash	No	21.8	st	2
202	Picea glauca	white spruce	No	12.2		2
203	Fraxinus pennsylvanica	green ash	No	12.8	dl, ab	3
204	Fraxinus pennsylvanica	green ash	No	11	ab	2
205	Fraxinus pennsylvanica	green ash	No	75	st	2
206	Ulmus americana	American elm	No	36	st, id	3
207	Larix decidua	European larch	Yes	23.3	dl	3
208	Picea abies	Norway spruce	Yes	45.9	p, w	3
209	Acer saccharum	sugar maple	No	31.2	id	2
210	Pinus sylvestris	Scots pine	Yes	45.5	dl, bl	3
211	Pinus sylvestris	Scots pine	Yes	25.8	p, dl, bl	3
212	Picea abies	Norway spruce	Yes	39.2	p, dl	3
213	Picea abies	Norway spruce	Yes	37.1	p, dl	3
214	Picea abies	Norway spruce	Yes	31.5	p, dl	3
215	Picea abies	Norway spruce	Yes	10	p, dl	3
216	Picea abies	Norway spruce	Yes	23.4	p, dl	3
217	Picea abies	Norway spruce	Yes	28.4	p, dl	3
218	Picea abies	Norway spruce	Yes	28.6	p, dl	3
219	Picea abies	Norway spruce	Yes	26.7	p, dl	3
220	Picea abies	Norway spruce	Yes	10.4	p, dl	3
221	Picea abies	Norway spruce	Yes	38.1	p, dl	3

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
222	Picea abies	Norway spruce	Yes	38	p, dl	3
223	Malus sp.	crabapple species	Yes	36.2	fc, dl, bl	3
224	Populus tremuloides	tembling aspen	No	10.8	dl	2
225	Populus tremuloides	tembling aspen	No	14.1	dl	2
226	Populus tremuloides	tembling aspen	No	11.8	dl, w	3
227	Populus tremuloides	tembling aspen	No	12	dl, bl	3
228	Populus tremuloides	tembling aspen	No	24.4	st, dl	3
229	Populus tremuloides	tembling aspen	No	15.5	dl	3
230	Populus tremuloides	tembling aspen	No	11.5	dl, bl	3
231	Populus tremuloides	tembling aspen	No	13	dl, bl	3
232	Populus tremuloides	tembling aspen	No	17.4	dl, bl	3
233	Populus tremuloides	tembling aspen	No	11.6	dl, bl	3
234	Populus tremuloides	tembling aspen	No	12.7	dl, bl	3
235	Populus tremuloides	tembling aspen	No	17.5	dl	3
236	Populus tremuloides	tembling aspen	No	18.5	dl	3
237	Populus tremuloides	tembling aspen	No	16	dl	2
238	Populus tremuloides	tembling aspen	No	16	dl, bl	3
239	Populus tremuloides	tembling aspen	No	15.3	dl, bl	3
240	Populus tremuloides	tembling aspen	No	11.5	dl, bl	2
241	Populus tremuloides	tembling aspen	No	30.9	st, dl, bl	3
242	Populus tremuloides	tembling aspen	No	11.1	d, bl	4
243	Populus tremuloides	tembling aspen	No	11.5	dl, bl	3
244	Populus tremuloides	tembling aspen	No	14	dl, bl	3
245	Populus tremuloides	tembling aspen	No	20.5	st, dl	3
246	Populus tremuloides	tembling aspen	No	15.4	dl	2
247	Populus tremuloides	tembling aspen	No	13.3	dl	3
248	Populus tremuloides	tembling aspen	No	12.9	dl	3
249	Populus tremuloides	tembling aspen	No	11.4	dl	3
250	Populus tremuloides	tembling aspen	No	10.5	dl	3
251	Populus tremuloides	tembling aspen	No	10.3		2
252	Populus tremuloides	tembling aspen	No	13.9		1
253	Populus tremuloides	tembling aspen	No	12.9		2

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
254	Populus tremuloides	tembling aspen	No	15.7		2
255	Populus tremuloides	tembling aspen	No	11.6		2
256	Populus tremuloides	tembling aspen	No	16.7		2
257	Populus tremuloides	tembling aspen	No	14.7		2
258	Populus tremuloides	tembling aspen	No	13.7		2
259	Populus tremuloides	tembling aspen	No	15.9		2
260	Tilia americana	basswood	No	29.3	st	2
261	Populus tremuloides	tembling aspen	No	14.3		2
262	Populus tremuloides	tembling aspen	No	12.2		2
263	Fraxinus pennsylvanica	green ash	No	10.8		2
264	Acer saccharum	sugar maple	No	56.5	st	2
265	Acer saccharum	sugar maple	No	13.2	dl	2
266	Acer saccharum	sugar maple	No	33.2	dl	2
267	Acer saccharum	sugar maple	No	13.8		1
268	Acer saccharum	sugar maple	No	26.2		1
269	Acer saccharum	sugar maple	No	29.4		1
270	Acer saccharum	sugar maple	No	14.4		1
271	Acer negundo	Manitoba maple	Yes	28.2	d, w, l	5
272	Acer saccharum	sugar maple	No	34.8		1
273	Acer saccharum	sugar maple	No	12	ab	2
274	Acer saccharum	sugar maple	No	38.1		1
275	Populus tremuloides	tembling aspen	No	48.3	st	3
276	Populus tremuloides	tembling aspen	No	29.7	st, w, bl	3
277	Acer saccharum	sugar maple	No	35.7	st	2
278	Acer saccharum	sugar maple	No	10.6		2
279	Acer saccharum	sugar maple	No	30.5		1
280	Picea glauca	white spruce	No	25.8	dl	2
281	Acer negundo	Manitoba maple	Yes	55.3	d, bl, ab	5
282	Acer negundo	Manitoba maple	Yes	21.4	ab, st	3
283	Populus tremuloides	tembling aspen	No	52	dl	2
284	Acer negundo	Manitoba maple	Yes	23.8	dl, bl, w	4
285	Acer negundo	Manitoba maple	Yes	28.3	dl, bl	4

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
286	Populus tremuloides	tembling aspen	No	81.6	dl	2
287	Tilia americana	basswood	No	56.8	st	3
288	Acer saccharum	sugar maple	No	68.9	w, dl, p	4
289	Acer negundo	Manitoba maple	Yes	55.3	d, bl, ab	5
290	Acer saccharum	sugar maple	No	198.2	st, dl	4
291	Malus sp.	crabapple species	Yes	28.8	ab, dl, bl	5
292	Malus sp.	crabapple species	Yes	36.3	d	5
293a	Fraxinus pennsylvanica	green ash	No	56.6	dl, bl	3
293b	Acer negundo	Manitoba maple	Yes	40.4	dl, bl, ab	4
294	Acer negundo	Manitoba maple	Yes	43.4	st, dl, bl	4
295	Acer negundo	Manitoba maple	Yes	22.5	dl, bl	4
296	Acer negundo	Manitoba maple	Yes	20.5	ab, dl, bl	4
297	Acer negundo	Manitoba maple	Yes	62.7	st, d, bl	5
298	Acer negundo	Manitoba maple	Yes	38.8	dl, bl	3
299	Acer negundo	Manitoba maple	Yes	11	dl, bl	4
300	Acer negundo	Manitoba maple	Yes	12	dl, bl	4
301	Fraxinus pennsylvanica	green ash	No	36.4	dl, bl	4
302	Fraxinus pennsylvanica	green ash	No	27.6	d, bl	5
303	Acer negundo	Manitoba maple	Yes	69.7	d, bl, st	5
304	Malus sp.	crabapple species	Yes	54.3	st, ab	2
305	Populus tremuloides	tembling aspen	No	56.6	dl	2
306	Fraxinus pennsylvanica	green ash	No	39.2	d, bl	4
307	Salix fragilis	crack willow	Yes	26.5	l, ab	3
308	Populus tremuloides	tembling aspen	No	54.3	dl	2
309	Acer negundo	Manitoba maple	Yes	95.2	st, dl, bl	4
310	Populus tremuloides	tembling aspen	No	68.5		3
311	Acer negundo	Manitoba maple	Yes	115.7	st, dl, l	3
312	Populus tremuloides	tembling aspen	No	40.9	dl	2
313	Populus tremuloides	tembling aspen	No	23.5	dl	3
314	Acer negundo	Manitoba maple	Yes	42	l, dl	3
315	Acer saccharinum	silver maple	No	46.3	dl	2
316	Acer negundo	Manitoba maple	Yes	53.5	st, dl	3

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
317	Juglans nigra	black walnut	No	14.7	dl, d	3
318	Acer negundo	Manitoba maple	Yes	14.7	dl, d	4
319	Acer negundo	Manitoba maple	Yes	26.6	dl, l, ab	3
320	Acer negundo	Manitoba maple	Yes	18.4	dl, l, w	3
321	Acer negundo	Manitoba maple	Yes	21.8	st, dl, ab	3
322	Acer negundo	Manitoba maple	Yes	29.1	st, dl	3
323	Acer negundo	Manitoba maple	Yes	14.6	st, dl	3
324	Acer negundo	Manitoba maple	Yes	19.5	dl, d	3
325	Acer negundo	Manitoba maple	Yes	27.2	dl, ab, st, l	4
326	Acer negundo	Manitoba maple	Yes	26.8	dl, d, ab, l	4
327	Populus tremuloides	tembling aspen	No	97.2	dl	2
328	Acer negundo	Manitoba maple	Yes	42.8	dl, bl	2
329	Populus tremuloides	tembling aspen	No	44.3	dl	2
330	Quercus rubra	red oak	No	18.2	dl	2
331	Quercus rubra	red oak	No	49.7	s, st, dl	3
332	Tilia americana	basswood	No	128.3	st, fn, w, dl, d	4
333	Tilia americana	basswood	No	108.7	fn, dl, st	3
334	Tilia americana	basswood	No	62.4	dl, w, ab	3
335	Tilia americana	basswood	No	76.7	st, dl	2
336	Fraxinus pennsylvanica	green ash	No	10.8	dl	2
337	Quercus rubra	red oak	No	19.9	dl	2
338	Acer negundo	Manitoba maple	Yes	72.5	st, dl, ab	3
339	Acer negundo	Manitoba maple	Yes	74.6	st, ab, dl	3
340	Acer negundo	Manitoba maple	Yes	41.2	dl, d	2
341	Robinia pseudo-acacia	black locust	Yes	37.2	st, dl	2
342	Robinia pseudo-acacia	black locust	Yes	10.7	dl, d	3
343	Robinia pseudo-acacia	black locust	Yes	10.1	dl, d, ab	4
344	Robinia pseudo-acacia	black locust	Yes	36.1	st, dl	3
345	Robinia pseudo-acacia	black locust	Yes	21	st, dl, c, d	4
346	Robinia pseudo-acacia	black locust	Yes	27.2	dl	2
347	Robinia pseudo-acacia	black locust	Yes	31.4	st, w, b, dl	4
348	Robinia pseudo-acacia	black locust	Yes	16.3	dl, d	3

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
349	Robinia pseudo-acacia	black locust	Yes	20.5	st, dl, b	4
350	Fraxinus pennsylvanica	green ash	No	12.5	nearly dead	5
351	Robinia pseudo-acacia	black locust	Yes	10	dl	2
352	Robinia pseudo-acacia	black locust	Yes	28.2	st, dl	3
353	Robinia pseudo-acacia	black locust	Yes	24.1	st, dl, d	3
354	Robinia pseudo-acacia	black locust	Yes	36.9	st, dl, s	3
355	Robinia pseudo-acacia	black locust	Yes	43	st, dl, d, ab	4
356	Robinia pseudo-acacia	black locust	Yes	18.5	dl, d	4
357	Robinia pseudo-acacia	black locust	Yes	15.4	dl, d	3
358	Robinia pseudo-acacia	black locust	Yes	15.6	dl, d, ab, d	4
359	Robinia pseudo-acacia	black locust	Yes	38.7	dl, ab	3
360	Acer negundo	Manitoba maple	Yes	24.3	dl, d, fn	5
361	Acer negundo	Manitoba maple	Yes	15.4	l, dl	3
362	Robinia pseudo-acacia	black locust	Yes	24.5	dl, d, w	5
363	Robinia pseudo-acacia	black locust	Yes	33.9	st, dl, d	5
364	Robinia pseudo-acacia	black locust	Yes	21.7	dl	3
365	Robinia pseudo-acacia	black locust	Yes	24.5	s, dl, d	3
366	Robinia pseudo-acacia	black locust	Yes	13.3	dl	2
367	Fraxinus pennsylvanica	green ash	No	10.5	dl, d	4
368	Juglans nigra	black walnut	No	15.8	bl	2
369	Juglans nigra	black walnut	No	12.3	dl	1
370	Fraxinus pennsylvanica	green ash	No	10.8	dl, bl	3
371	Fraxinus pennsylvanica	green ash	No	10.1	dl, d, bl, w	4
372	Juglans nigra	black walnut	No	13.2	dl	2
373	Juglans nigra	black walnut	No	23	dl, bl	2
374	Juglans nigra	black walnut	No	13.3	dl	2
375	Juglans nigra	black walnut	No	23.4	dl	2
376	Juglans nigra	black walnut	No	26.6	dl	3
377	Juglans nigra	black walnut	No	14.9	dl, d	3
378	Juglans nigra	black walnut	No	21.1	dl	2
379	Robinia pseudo-acacia	black locust	Yes	15.1	dl, d, st	5
380	Fraxinus pennsylvanica	green ash	No	17.3	dl, fn, d	4

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
381	Robinia pseudo-acacia	black locust	Yes	11.7	ab, dl, d	4
382	Robinia pseudo-acacia	black locust	Yes	26.2	dl, d, st, w	4
383	Robinia pseudo-acacia	black locust	Yes	13	dl, d, w	4
384	Robinia pseudo-acacia	black locust	Yes	10.5	dl, d, ib	4
385	Robinia pseudo-acacia	black locust	Yes	11.9	dl, d, ab, id	5
386	Robinia pseudo-acacia	black locust	Yes	10.8	dl, d	4
387	Juglans nigra	black walnut	No	13.2	dl, bt	3
388	Juglans nigra	black walnut	No	16.5	dl, d	2
389	Juglans nigra	black walnut	No	10.7	dl, l	2
390	Juglans nigra	black walnut	No	23	w, dl	3
391	Juglans nigra	black walnut	No	23.4	w, dl, d, ab	4
392	Juglans nigra	black walnut	No	16.8	c, dl	3
393	Juglans nigra	black walnut	No	15.7	w, dl	3
394	Juglans nigra	black walnut	No	18.8	dl	2
395	Juglans nigra	black walnut	No	15.3	w, dl, d	3
396	Juglans nigra	black walnut	No	33.7	dl, w	2
397	Juglans nigra	black walnut	No	29.9	dl	2
398	Juglans nigra	black walnut	No	10.2	w, dl, d	3
399	Juglans nigra	black walnut	No	29	dl, d, w	3
400	Juglans nigra	black walnut	No	13.7	dl, d	3
401	Juglans nigra	black walnut	No	12.8	dl	2
402	Juglans nigra	black walnut	No	13.5	dl	2
403	Populus tremuloides	tembling aspen	No	54.9	dl, w	2
404	Populus tremuloides	tembling aspen	No	29.6	dl	2
405	Populus tremuloides	tembling aspen	No	17.6	dl	2
406	Malus sp.	crabapple species	Yes	37.3	dl, d	3
407	Juglans nigra	black walnut	No	10.6		1
408	Fraxinus pennsylvanica	green ash	No	10.6	dl, u, fn	4
409	Malus sp.	crabapple species	Yes	89.2	st, ab, d, dl	3
410	Juglans nigra	black walnut	No	29.2	dl	2
411	Juglans nigra	black walnut	No	35.7	w, dl	3
412	Juglans nigra	black walnut	No	29.3	dl, w	3

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
413	Juglans nigra	black walnut	No	27.9	dl, fc	2
414	Juglans nigra	black walnut	No	41	w, dl, d	3
415	Juglans nigra	black walnut	No	22.6	dl, d, p	4
416	Juglans nigra	black walnut	No	26	p, dl, d	3
417	Juglans nigra	black walnut	No	29.5	dl, p	2
418	Juglans nigra	black walnut	No	15.2	dl, p, d	3
419	Juglans nigra	black walnut	No	27	p, dl, d	2
420	Juglans nigra	black walnut	No	14.6	d, dl	3
421	Juglans nigra	black walnut	No	25.4	dl	2
422	Juglans nigra	black walnut	No	17	dl	2
423	Juglans nigra	black walnut	No	19	dl, c, p	3
424	Juglans nigra	black walnut	No	18.5	dl	2
425	Juglans nigra	black walnut	No	15.6	dl	2
426	Juglans nigra	black walnut	No	26.5	dl, w, d	3
427	Fraxinus pennsylvanica	green ash	No	13.9	dl, d	4
428	Crataegus sp.	hawthorn sp.	No	17	ab, dl, d	3
429	Juglans nigra	black walnut	No	18	dl	1
430	Juglans nigra	black walnut	No	10.2	dl	2
431	Juglans nigra	black walnut	No	26	w, dl	3
432	Fraxinus pennsylvanica	green ash	No	14	dl, d, w	4
433	Fraxinus pennsylvanica	green ash	No	19.5	dl, w	2
434	Populus tremuloides	tembling aspen	No	12.2	ab	1
435	Populus tremuloides	tembling aspen	No	34.4	st, w, ab	3
436	Acer saccharum	sugar maple	No	74.6	dl	2
437	Acer saccharum	sugar maple	No	59	dl	1
438	Acer saccharum	sugar maple	No	57.2		1
439	Acer saccharum	sugar maple	No	110	st	1
440	Acer negundo	Manitoba maple	Yes	82.4	ab, st, dl	3
441	Acer negundo	Manitoba maple	Yes	52.9	ab, st, dl	3
442	Acer negundo	Manitoba maple	Yes	93.2	st, ab, dl, w, d	4
443	Acer negundo	Manitoba maple	Yes	26.5	ab, w, d	4
444	Acer negundo	Manitoba maple	Yes	83	st, ab, dl	3

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
445	Acer platanoides	Norway maple	Yes	79.1	st, p, dl	2
446	Acer saccharum	sugar maple	No	46.3	sl	1
447	Acer platanoides	Norway maple	Yes	61.9		1
448	Acer negundo	Manitoba maple	Yes	18	ab, dl, l	4
449	Acer saccharum	sugar maple	No	82.1	d, bt	4
450	Acer saccharum	sugar maple	No	74		1
451	Acer saccharum	sugar maple	No	55.1	d, bt, w	4
452	Acer platanoides	Norway maple	Yes	20.7	p	1
453	Acer saccharum	sugar maple	No	50.2		1
454	Picea glauca	white spruce	No	26.1	p	2
455	Acer saccharum	sugar maple	No	79.1		1
456	Picea glauca	white spruce	No	37.9	p	2
457	Picea glauca	white spruce	No	32.5	p	2
458	Acer saccharum	sugar maple	No	110	w, dl	3
459	Acer platanoides	Norway maple	Yes	22.8	p, w	2
460	Acer platanoides	Norway maple	Yes	34.6	p	2
461	Acer platanoides	Norway maple	Yes	20.1	w, p	3
462	Acer saccharum	sugar maple	No	55.6	w, p	2
463	Acer negundo	Manitoba maple	Yes	42.9	st, ab	3
464	Acer negundo	Manitoba maple	Yes	48.7	dl, d, ab	4
465	Acer negundo	Manitoba maple	Yes	165.9	st, ab, dl	4
466	Thuja occidentalis	eastern white cedar	No	19.2	st	1
467	Thuja occidentalis	eastern white cedar	No	32.4	st	1
468	Morus alba	white mulberry	Yes	30.3	p, ab, w	2
469	Morus alba	white mulberry	Yes	22.6	l, w, p	3
470	Acer negundo	Manitoba maple	Yes	43.7	p	1
471	Populus balsamifera	balsam poplar	No	13.1	w, d, bt	4
472	Populus balsamifera	balsam poplar	No	13	w, p	2
473	Populus balsamifera	balsam poplar	No	21.2	p, dl	2
Trees surveyed in the conifer plantation extension						
	Fraxinus pennsylvanica	green ash	No	14		3
	Fraxinus pennsylvanica	green ash	No	15		3

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
	Pinus sylvestris	Scots pine – 100 trees	Yes	15-22	dl, bl	3
	Ulmus americana	American elm	No	23		3
Trees surveyed in the conifer plantation adjacent to Watson Parkway (note: this represents a sample of 10% of the conifer plantation where the commercial development is being proposed)						
	Fraxinus pennsylvanica	green ash	No	13.2	dl	2
	Fraxinus pennsylvanica	green ash	No	10.9		2
	Picea glauca	white spruce	No	30.8	s	2
	Picea glauca	white spruce	No	10.1	dl	2
	Picea glauca	white spruce	No	22.3	dl	2
	Picea glauca	white spruce	No	14.3	st, bl, dl	3
	Picea glauca	white spruce	No	23.7	dl	3
	Picea glauca	white spruce	No	17.5	st, bl, dl	3
	Picea glauca	white spruce	No	21.1	st, bl, dl	3
	Pinus sylvestris	Scots pine	Yes	23.2	dl, bl	2
	Pinus sylvestris	Scots pine	Yes	19.9	dl, bl	2
	Pinus sylvestris	Scots pine	Yes	22.3	dl, bl	2
	Pinus sylvestris	Scots pine	Yes	20.1	dl	2
	Pinus sylvestris	Scots pine	Yes	14.5	d, dl, st	2
	Pinus sylvestris	Scots pine	Yes	14.6	dl, bl	2
	Pinus sylvestris	Scots pine	Yes	22.9	dl	2
	Pinus sylvestris	Scots pine	Yes	21.7	dl, bl	2
	Pinus sylvestris	Scots pine	Yes	26.1	dl	2
	Pinus sylvestris	Scots pine	Yes	22.5	dl	2
	Pinus sylvestris	Scots pine	Yes	15.4	dl, bl	2
	Pinus sylvestris	Scots pine	Yes	18.8	dl, bl	2
	Pinus sylvestris	Scots pine	Yes	37	dl	2
	Pinus sylvestris	Scots pine	Yes	30	dl	2
	Pinus sylvestris	Scots pine	Yes	26.3	dl	2
	Pinus sylvestris	Scots pine	Yes	14.5	dl, bt	2
	Pinus sylvestris	Scots pine	Yes	15.2	dl	2
	Pinus sylvestris	Scots pine	Yes	13.1	dl, bl	3
	Pinus sylvestris	Scots pine	Yes	15	dl, bl, b	3

Tree #	Scientific Name	Common Name	Introduced	DBH (cm)	Tree Condition	Class
	Pinus sylvestris	Scots pine	Yes	19	dl	3
	Pinus sylvestris	Scots pine	Yes	15.8	dl	3
	Pinus sylvestris	Scots pine	Yes	14.8	dl	3
	Pinus sylvestris	Scots pine	Yes	17.2	dl, d	3
	Pinus sylvestris	Scots pine	Yes	16.9	dl, bl	3
	Pinus sylvestris	Scots pine	Yes	15.1	dl, bl	3
	Pinus sylvestris	Scots pine	Yes	14	dl	3
	Pinus sylvestris	Scots pine	Yes	24.5	dl, bl	3
	Pinus sylvestris	Scots pine	Yes	17.3	dl, bl	3
	Pinus sylvestris	Scots pine	Yes	11	d, dl	4
	Pinus sylvestris	Scots pine	Yes	11.3	dl, bl	4
	Pinus sylvestris	Scots pine	Yes	15.5	dl, bl, bt	4
	Pinus sylvestris	Scots pine	Yes	10.4	dl, bl	4
	Populus tremuloides	trembling aspen	No	20		2
	Populus tremuloides	trembling aspen	No	22		2
	Populus tremuloides	trembling aspen	No	20		2

Tree Size:
Diameter (cm) at breast height (DBH)

Trunk Integrity:
r root damage or decay
st split stem/weak crotch
br butt rot
l excessive lean (*e.g.* 30° to 45°)
h upper stem holes/decay
w wound (bark damage, large pruning cuts)
f fungus (conks)
ib insect borers
b burl
wh woodpecker holes
s seam or cracks
c cankers

Crown Structure:
bt broken top
bl broken or severed primary limbs
p pollarded (severe and improper pruning)
ab adventitious branching (clusters of new shoots on main trunk)

Crown Vigour:
dl moderate dead wood (*e.g.* 11 to 35% secondary branches mostly)
d significant crown dieback (*e.g.* >35% dead wood in primary limbs)
u undersized leaves
fc foliar chlorosis/yellowing
fn foliar necrosis/browning
id insect defoliators (species if known)
di disease (species if known)

Tree Vigour Classes:

Class 1 Excellent Condition, No Risk Trees

Sound, thrifty, full crowned trees of natural shape with no dead limbs in the top of the crown and no significant evidence of decline.

Class 2 Good Condition, Low Risk Trees

Full to medium crowned trees of natural shape with a live crown ratio ≥40% that exhibit no more than minor dead wood (*e.g.* up to 10% secondary branches only and mainly in the lower crown) and no more than one moderate trunk defect or indicator of decline.

Class 3 Fair Condition, Medium Risk Trees

Full to small crowned trees with a live crown ratio ≥25% that exhibit no more than moderate dead wood (*e.g.* 11 to 35% secondary branches mostly) and no more than two moderate trunk defects or indicators of decline.

Class 4 Poor Condition, High Risk Trees

Medium to very small crowned trees (*e.g.* live crown ratio < 25%) that exhibit one or more of the following conditions.

a) Trees with significant foliage of poor colour and less than normal size.
b) Trees with significant crown dieback (*e.g.* > 35% dead wood in primary limbs).
c) Trees with major trunk defects or decay (*e.g.* one extensive problem, or 3 or more distinct but moderate decline indicators).

Class 5 Very Poor Condition, Very High Risk Trees

Dying trees with very little live crown.