EXISTING CONDITIONS

NATURAL ENVIRONMENT FEATURES

CARDINAL CREEK VILLAGE

A report prepared for Tamarack Homes

by Muncaster Environmental Planning Inc.

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TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 EXISTING CONDITIONS 3

2.1 Aquatic Habitat 3
2.1.1 Cardinal Creek 3
2.1.2 'North' East-West Cardinal Creek Tributary 3
2.1.3 'South' East-West Cardinal Creek Tributary 8

2.2 Terrestrial Habitat 12
2.2.1 On-Site Forests 13
2.2.2 Agricultural Fields and Cultural Lands 21
2.2.3 Petrie Island and Mainland Urban Natural Area 24
2.2.4 Cardinal Creek Valley Urban Natural Area 25

2.3 Species at Risk and Other Species of Interest 26

3.0 SUMMARY 27

4.0 REFERENCES 28

FIGURES

Figure 1: Study Area 2
Figure 2: Natural Environment Features 7

APPENDIX

A Ministry of Natural Resources Correspondence

1.0 INTRODUCTION

This report represents a summary of the natural environment features within the study area of the Cardinal Creek Village urban development. The site is a recent addition to the City of Ottawa urban area along the east edge of the urban area. Ottawa Road 174 and the Ottawa River are to the north of the site, with the Cardinal Creek corridor to the west and Frank Kenny Road and Ted Kelly Drive to the east (Figure 1). The objective of this report is to provide information on the natural environment features and the functions they represent for input into the development of concept plan alternatives for the Cardinal Creek Village development.

The majority of the study area is dominated by agricultural lands. Remnant forested parcels are to the south of Ottawa Road 174 and along the west and east edges of the site north of Old Montreal Road. The forested portions of Cardinal Creek Natural Area, identified as Natural Area 46 in the former Region's 1997 Natural Environment System Strategy (Brownell and Blaney, 1997), south of Old Montreal Road and to the east of the Cardinal Creek corridor are now removed with a remnant corridor remaining along an east-west tributary of Cardinal Creek approximately 500 meters south of Old Montreal Road and remnant hedgerows along the former forest edges. The major natural environment features in the general area are the Cardinal Creek corridor to the west and the Ottawa River corridor to the north. The closest provincially significant wetlands and Life Science Area of Natural and Scientific Interest (ANSI) are associated with Petrie Island, on the opposite side of Ottawa Road 174 to the northwest of the site. An Earth Science Area of Natural and Scientific Interest is along Cardinal Creek, with unique limestone cave structures (a karst formation) of earth science significance conveying the creek flow underground for a distance of approximately 250 metres. This feature is approximately 600 meters to the southwest of the southwest corner of the site.

This report summarizes field studies completed in 2009 - 2012, with additional studies to be completed in July and August of 2012. Background information on the natural heritage features is summarized from the Ministry of Natural Resources and Ontario Breeding Bird databases, as well as correspondence with the Ministry of Natural Resources and the Rideau Valley Conservation Authority and the Greater Cardinal Creek Subwatershed Study Existing Conditions Report (AECOM, 2009). The Cardinal Creek corridor to the west of the study area is well documented in the Subwatershed Study and the Urban Natural Areas Environmental Evaluation Study (Muncaster and Brunton, 2005).

Figure 1 – Study Area

2.0 EXISTING CONDITIONS

2.1 Aquatic Habitat

2.1.1 Cardinal Creek

Cardinal Creek flows north to south to the west of the site. The creek averages six metres in wetted width and meanders among the forested Urban Natural Area. Cardinal Creek supports a range of cool and warm water fish communities and provides an important connection with the Ottawa River about 1.5 kilometres to the north Old Montreal Road. AECOM (2009) noted that the most diverse fish habitat and fish communities occur at the confluence of Cardinal Creek and the Ottawa River. Fish communities in the upper portion of the Creek are isolated from communities in the lower portion by permanent fish barriers at an old mill site north of Old Montreal Road and by the karst feature at Watters Road. An on-line stormwater management pond upstream of Watters Road has impacted the habitat of the area through extensive ponding, elimination of almost all of the canopy cover for the fish habitat and associated increases in water temperature (AECOM (2009). Bank erosion is common to the south of Old Montreal Road, and some rock protection has been added to the base and lower slopes of the road shoulders. AECOM (2009) have recommended realignment of Cardinal Creek just upstream, south, of Old Montreal Road to address these erosion concerns. Canopy cover for the creek is generally very good. Clay is the dominant substrate. Beaver cuttings were common adjacent to the Creek.

NEA (1992) identified thirty-six fish species in Cardinal Creek. Twenty of these species were restricted to the area within the vicinity of the confluence with the Ottawa River. Several barriers to fish migration were reported by NEA (1992) along Cardinal Creek between the Ottawa River and Innes Road. Detailed aquatic inventories of Cardinal Creek are provided in NEA (1992). NEA (1992) noted that the benthic macroinvertebrate community in Cardinal Creek indicated moderate levels of impaired water quality.

2.1.2 'North' East-West Cardinal Creek Tributary

This tributary enters the site from the east approximately 300 metres north of Old Montreal Road and continues to the west along hedgerows. At Laporte's Nursery the channel is piped for approximately 150 metres in the west portion of the nursery with several culverts in the east portion. Downstream, west, of Laporte's Nursery the channel flows over a higher gradient before entering Cardinal Creek near an old railway bed approximately 200 metres southeast of Ottawa Road 174.

The north tributary was sampled in 2009 (west of Laporte's Nursery) and 2012 (east of the nursery). No fish were captured in three stations sampled upstream, east, of the driveway for 1291 Old Montreal Road (sampling stations marked as 'A' on Figure 2). Only two fish, both creek chub, were captured at a station between the driveway and Laporte's Nursery to the west (sampling station 'B' on Figure 2). Creek chub were netted at all four sampling stations between the nursery and Cardinal Creek, with the number of fish ranging between two and fifty-four

(sampling stations 'C' on Figure 2). The fork length of the creek chub ranged between 30 and 118 mm. Northern two-lined salamanders were also netted at the site closest to the confluence with Cardinal Creek. The portion of the north tributary downstream, west, of Laporte's Nursery is considered more sensitive due to a more natural channel form, greater number of fish caught, greater flow and a less disturbed riparian corridor. Closer to Cardinal Creek the north tributary had an average wetted width and depths of 1.9 m, and 7 cm, respectively. Runs and step cascade morphological units are present over a substrate of bedrock, boulder, and cobble (Photo 1). Further upstream run and riffle morphological units are present over a substrate of bedrock, boulder, and cobble (Photo 2), with shallow steps in a bedrock shelf and pool habitat. The maximum pool depth was 30 cm (Photo 3). Closer to Laporte's Nursery a glide habitat over a substrate of fines, pebble, gravel, and cobble is present.

Upstream, east, of Laporte's Nursery the north tributary has a general typical trapezoid ditch cross-section, with wetted widths and depths up to 1.6m and 8cm, respectively (Photos 4 and 5). The channel definition is lost among reed canary grass upstream, east, of the driveway for 1291 Old Montreal Road. Additional fish habitat information on this reach will be collected in 2012.

Photo 1 – Reach of the north tributary closest to Cardinal Creek looking upstream (May 4th, 2009)

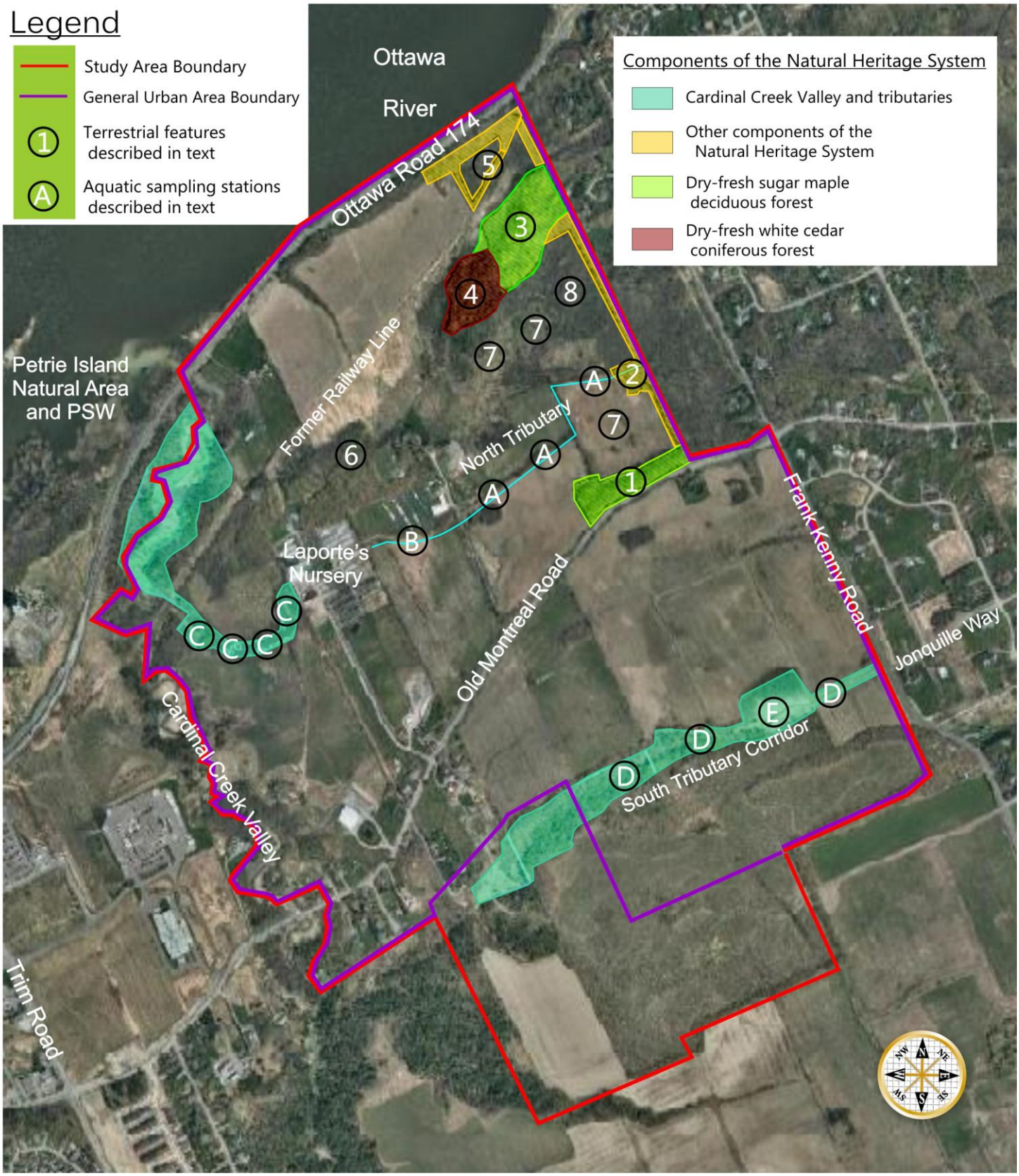
Photo 2 - Station 2 looking upstream from downstream (May 4th, 2009)

Photo 3 - Station 3 looking upstream from downstream (May 4th, 2009)

Photo 4 – North tributary as it enters the east portion of the site

Photo 5 – North tributary in central-east portion of the site

FIGURE 2 – NATURAL ENVIRONMENT FEATURES



2.1.3 'South' East-West Cardinal Creek Tributary

A second east-west tributary enters the site approximately 600 metres south of Old Montreal Road near the intersection of Frank Kenny Road and Jonquille Way. The tributary flows west to the confluence with Cardinal Creek approximately 520 metres west of the study area. Brook stickleback and creek chub were caught at all three sampling stations along the south tributary, with between 70 and 78 fish netted at each station (sampling stations 'D' on Figure 2). The fork length size range for the creek chub and brook stickleback were between 29 and 250 mm and 25 and 50 mm, respectively.

Typical wetted width and depths were 1.3 metres, and 9 cm, respectively. Glide, riffle and run morphological units over a substrate of cobble, gravel, boulder, hard packed clay, and broader clay particles are common, with pool habitat upstream of a partially breeched beaver dam 300 metres west of Frank Kenny Road (Photo 6). Bank erosion is extensive in many areas (Photo 7). Riparian cover is generally very good along the south tributary with deciduous and mixed forests on either side for most of the site. Closer to Frank Kenny Road there is no riparian cover as the south tributary is within an agricultural field (Photo 8). Just west of the site culverts in poor condition and debris associated with an access lane create a barrier to fish movement between Cardinal Creek and the site (Photo 9).

A meadow marsh is upstream of the partially breeched beaver dam along the south tributary corridor west of Frank Kenny Road (Photo 10, feature marked with an 'E' on Figure 2). Reed canary grass is dominant with Canada bluejoint, purple loosestrife, spotted jewelweed and joe-pye-weed also present.

Photo 6 - Looking upstream toward Frank Kenny Road from beaver dam (May 4th, 2009)

Photo 7 – Bank erosion along the south tributary in the middle of the site (May 4th, 2009)

Photo 8 – The south tributary looking upstream, east, to Frank Kenny Road (May 4th, 2009)

Photo 9 – Culverts and other debris impact the connectivity of the south tributary just downstream (west) of the site

Photo 10 – Meadow marsh along south tributary approximately 230 metres west of Frank Kenny Road. View looking east

Minor tributaries that flow into the south tributary from the south were sampled in the spring of 2012. No fish were captured or observed in these tributaries, with the intermittent nature of the channels and the steep gradients likely isolating these tributaries from the south tributary (Photo 11). Water depths were generally less than 5cm but increased to 85cm in isolated pools (Photo 12). No fish were captured in the pools or elsewhere along these tributaries. The riparian corridor along most of these tributaries has been highly impacted by tree removal (Photo 12).

Photo 11 – Tributary approaching the south tributary near the west edge of the site. View looking north (April 18th, 2012)

Photo 12 – Isolated pool along a tributary south of the south tributary in a large area of tree removal (April 18th, 2012)

Another tributary to Cardinal Creek is approximately 210 metres south of Old Montreal Road, west of Frank Kenny Road. This channel is poorly defined among cattails and has very limited flow. Only dip netting could be completed on April 18th, 2012 in limited areas. Most of the channel was dry. No fish were captured.

2.2 Terrestrial Habitat

Much of the south portion of the site is designated *Rural Natural Features Area* on Schedule A of the 2003 Official Plan. The main natural heritage feature in this area was the Cardinal Creek Natural Area, identified as Natural Area 46 in the former Region's 1997 Natural Environment System Strategy. In addition to the *Rural Natural Features* lands, the Natural Area extends to the west of the site along the Cardinal Creek corridor from Old Montreal Road to south of Watters Road. This Natural Area was rated moderate overall, scoring moderate for five of the eight evaluation criteria (landscape attributes, endangered, threatened and rare species, vegetation and species diversity, hydrological features and condition of natural). A high rating was assigned to the rare vegetation community criterion. Only the common vegetation community and seasonal wildlife concentration criteria scored less than moderate of the nine evaluation criteria. Note that the majority of forest has been removed and this area is no longer considered part of the Natural Heritage System on the City's draft Schedule L. The balance of the site is designated *General Rural Area* on Schedule A, but as indicated above the site is now part of the City's urban area.

Two Urban Natural Areas, Cardinal Creek Valley and Petrie Island and Mainland, are along the Cardinal Creek corridor adjacent to the west site boundary. These Urban Natural Areas are designated *Urban Natural Features* on Schedule B of the City of Ottawa's Official Plan (City of Ottawa, 2003). Schedule K of the City's Official Plan identified unstable slopes along the length of Cardinal Creek and the south tributary south of Old Montreal Road. In addition the Cardinal Creek corridor and the west portion of the south tributary corridor are identified as *Significant Valleylands* on Annex 14: Natural Heritage Systems of Official Plan Amendment 76, with many portions of the corridor also identified as *Significant Woodlands*. *Significant Woodlands* are also noted for the forests north of Old Montreal Road in the northeast portion of the site and the forests now removed south of the south tributary.

2.2.1 On-Site Forests

North of Old Montreal Road

This description begins north of Old Montreal Road along the east portion of the site.

A dry-fresh sugar maple deciduous forest is along the slope immediately north of Old Montreal Road in the east portion of the site (feature marked with a '1' on Figure 2). Sugar maple is the dominant tree species with a good representation of white elm and red ash. In addition to a good representation of maple regeneration (Photo 13), chokecherry, shadbush and common buckthorn are in the understorey. The ground flora has some disturbance from non-native and/or invasive species such as common dandelion and Canada goldenrod but white trillium, trout-lily, false Solomon's-seal and blue cohosh are common. This forest contains the only provincially rare vegetation community outside of the Cardinal Creek corridor identified in the Greater Cardinal Creek Subwatershed Study, a small linear representation of sugar maple carbonate treed talus just north of Old Montreal Road (AECOM, 2009) Wildlife observed in this deciduous forest included grey squirrel, red squirrel, red-eyed vireo, chestnut-sided warbler, black-capped chickadee, white-breasted nuthatch, song sparrow, American robin, common grackle, American crow, blue jay, common yellowthroat and yellow warbler.

A remnant deciduous forest is approximately 200 metres north of Old Montreal Road (feature '2' on Figure 2). Basswood is common in this area along with sugar maple and red ash. A few butternut stems are also present. Maple regeneration is good. Bluegrass, purple-flowering raspberry, bittersweet nightshade, common burdock and poison ivy indicate past disturbances in the forest but white trillium, large-leaved aster, sensitive fern, lady fern, white snakeroot and enchanter's nightshade are also present. Wildlife observed in this area included great-crested flycatcher, grey catbird, red-eyed vireo, American crow, song sparrow, white-throated sparrow, blue jay, American robin, American goldfinch and American woodcock.

Maple and cedar forests are along the slope that begins south of a hydro line and former railway line. In the dry-fresh sugar maple deciduous forest mature sugar maples up to 65cm dbh are present, along with a good representation of intermediate-aged and regenerating maple stems (Photo 15, feature '3' on Figure 2). American beech, red maple, white ash, white birch, basswood, white pine, white cedar and ironwood are also present. In addition to the mature

maples, there are mature American beech, white pine and basswood between 50 and 58cm dbh. Blue cohosh, white trillium, false Solomon's seal and trout-lily are common spring ground flora (Photo 14), with poison ivy and ostrich fern also present. Natural deadfall adds to the ecological functions of the area. Woodpecker use of cavities is common and the area appears to be used for wild turkey roosting based on observations in December and late March.

Many portions of the dry-fresh white cedar coniferous forest (feature '4' on Figure 2) have a high density of cedar stems, limited understorey and ground flora. In other areas the density is lower and common buckthorn, staghorn sumac, black currant and red elderberry shrubs and ground flora such as Canada mayflower, wild grape, yellow violet, blue violet, blue cohosh, trout-lily, lady fern, sensitive fern, ostrich fern, bittersweet nightshade, purple flowering raspberry, enchanter's nightshade, poison ivy and common burdock are present. Wind throw is extensive in the cedar forest. Rock is at the surface in many areas of the cedar forest. An old laneway runs through the forest and sheds are present along the laneway.

The fresh-moist ash deciduous north forest of the hydro line and former rail line is younger than the forests described above to the south along the slope and has minimal sugar maple representation (Photo 16, feature '5' on Figure 2). The larger trees are poplars (large-toothed aspen and eastern cottonwood) and white ash up to 35cm dbh, with the vast majority of tree stems less than 20cm dbh. In addition to the poplars and ash, basswood, bur oak, white elm and sugar maple are present. Wind throw is common in this forest. Common and glossy buckthorn are thick in the understorey in many areas with black currant and ash regeneration also present. The ground flora is more disturbed than the forests to the south along the north slope with field horsetail, moneywort, poison ivy, yellow wood sorrel, elecampagne, yellow avens, white avens, Canada goldenrod, Philadelphia fleabane, common dandelion, Pennsylvania sedge, hog peanut and common strawberry well established. However, representation of trout-lily, Canada mayflower, yellow violet, false Solomon's-seal and blue violet is also present in this forest. A hedgerow of bur oaks up to 50cm dbh is along the west side of this forest in the northeast corner of the site (Photo 17).

Wildlife observed in the northeast forests included Baltimore oriole, yellow warbler, American goldfinch, black-capped chickadee, white-breasted nuthatch, rose-breasted grosbeak, American robin, blue jay, mourning dove, common yellowthroat, chestnut-sided warbler, yellow warbler, red-eyed vireo, alder flycatcher, eastern wood pewee, great-crested flycatcher, ovenbird, wood thrush, veery, common grackle, red-winged blackbird, northern flicker, song sparrow, chipping sparrow, American crow, white-tailed deer, grey squirrel and red squirrel. Road noise from Ottawa Road 174 is heard through the northeast forests.

Another representation of a dry-fresh sugar maple deciduous forest is in the northwest portion of the site, northeast of Laporte's Nursery (feature '6' on Figure 2). Mature sugar maples up to 63cm dbh are scattered in the forest, with a good regeneration of maple stems (Photo 18). Bur oak, ironwood, red maple and white ash are common species in the deciduous forest, with butternut also present. The understorey is generally open, indicating former pasture activity. Some blue cohosh was observed but the extent of spring ephemerals is much less than other on-site forests. Selective logging in the forest appears to have retained a good age diversity of trees.

Exposed rock is common but no snakes were observed during April and early May surveys. Pileated woodpecker activity was observed in a couple of well-used snags. Least flycatcher, American crow, American woodcock, white-breasted nuthatch, northern cardinal, American robin (including immatures), chestnut-sided warbler, red-eyed vireo, blue jay, black-capped chickadee, red-winged blackbird, grey squirrel and eastern chipmunk are other wildlife observed in this maple forest.

Photo 13 – Maple regeneration is very good in the dry-fresh deciduous forest just north of Old Montreal Road in central-east portion of the site

Photo 14 – Dominance of blue cohosh in portions of maple forest along north slope

Photo 15 –Maple regeneration is also very good in the dry-fresh maple deciduous forest along the north slope in the northeast portion of the site

Photo 16 – Younger deciduous forest in the northeast corner of the site

Photo 17 - Row of bur oaks along west edge of northeast deciduous forest

Photo 18 – Dry-fresh sugar maple forest in northwest portion of the site

South of Old Montreal Road

Most of the forest in the south portion of the site, south of Old Montreal Road and the south tributary, that was part of the Cardinal Creek Natural Area, is no longer present. Remnant deciduous hedgerow remains along the south edge of the former forest and the corridor of the south tributary remains well-treed. Sugar maple, red ash and basswood are the common species in the deciduous hedgerows.

Sugar maple, bur oak, white ash, American beech, eastern hemlock, basswood, white cedar, large-toothed aspen and red maple are common in the forests along the slopes of the south tributary corridor, with white birch, white spruce, black cherry, red ash and ironwood also present (Photos 19 and 20). Yellow birch is found near the base of the slopes in the vicinity of the south tributary channel. There are several mature bur oak, sugar maple, American beech and eastern hemlock trees. The coniferous representation increases further east of Frank Kenny Road and this portion of the forest is considered a dry-fresh mixed forest (Photo 21). Regenerating maple, beech, white pine, ash, balsam fir, bur oak and basswood stems are common in the understorey along with hawthorn, red raspberry, white elderberry, prickly ash, black currant and American yew shrubs. The ground flora communities show some disturbance with thicket creeper, common dandelion, reed canary grass, garlic mustard, wild grape, poison ivy, white avens, helleborine, flowering dogbane and purple-flowering raspberry however the extent of spring ephemerals is higher on the north (south facing) slope than the south slope and include high densities of white trillium and trout-lily, along with large-flowered bellwort, bloodroot, sharped-lobed hepatica, wild ginger, blue cohosh, red trillium, Canada mayflower

and false Solomon's-seal. Christmas fern, oak fern, lady fern, red baneberry, enchanter's nightshade, foamflower, large-leaved aster and hog peanut are other components of the ground flora. The mixed forest in the west portion of the south tributary corridor has the least disturbance in the ground flora community.

Wildlife observed along the south corridor included northern flicker, song sparrow, chipping sparrow, Canada goose, blue jay, ring-billed gull, grey catbird, red-winged blackbird, American woodcock, American robin, common yellowthroat, black-capped chickadee, ovenbird, great-crested flycatcher, red-eyed vireo, pileated woodpecker, white-throated sparrow, American goldfinch, cedar waxwing, American crow, woodchuck and red squirrel.

Photo 19 – South side of deciduous forest along south tributary corridor

Photo 20 – Deciduous forest on north slope of south tributary corridor

Photo 21 - Mixed forest along the north slope of south tributary corridor

2.2.2 Agricultural Fields and Cultural Lands

Agricultural fields dominate much of the site. The majority of these fields are planted in corn (Photo 22) or soybeans (Photo 23). Cultural meadow vegetation is adjacent to the agricultural fields and hedgerows. These areas support principally non-native and/or invasive ground flora such as brome grass, blue grass, green foxtail, pineapple weed, reed canary grass, tiger lily, common dandelion, common plantain, tufted vetch, alfalfa, bird's-foot trefoil, common milkweed, bladder campion, Canada goldenrod, tall goldenrod, oxeye daisy, red clover, white-sweet clover, lamb's-quarter, common yarrow, white bedstraw, black-eyed susan, flowering dogbane, wormseed mustard, field sow-thistle, wild carrot, black medic, rough-fruited cinquefoil, heal-all, lower hop clover, chicory, Canada thistle, hedge bindweed, common mugwort, common ragweed, purple loosestrife, wild parsnip, common burdock, daisy fleabane and white clover.

Cultural woodlands (feature '7' on Figure 2) and thickets (feature '8') on former agricultural land are common in the east portion of the site in the tablelands between the deciduous forest described above and the forested slope to the north. The largest trees in good condition in these areas are up to 24cm dbh but the vast majority are less than 15cm dbh with a typical tree size of 10cm dbh. Apple trees are common along with young sugar maple, bur oak, white ash, basswood, white elm, red ash and trembling aspen are present. Ash regeneration is extensive in the fields north of Old Montreal Road in the central-east portion of the site (Photos 24 and 25). Many of the trees have fungal growth while vine coverage is common on others. A couple of larger maples are in senescence with broken major limbs and trunk decay. Common buckthorn, glossy buckthorn, red-osier dogwood, red raspberry, staghorn sumac, crabapple, highbush cranberry and hawthorn shrubs are well represented. Canada goldenrod, thicket creeper, tall buttercup, common dandelion, white avens, common milkweed, enchanter's nightshade, common strawberry, white bedstraw, wild grape and wild parsnip are typical ground flora.

Deciduous hedgerows are common between the agricultural fields and along the long driveway of 1291 Old Montreal Road north of Old Montreal Road. Sugar maples up to 70cm dbh are along the driveway, along with smaller bur oak, red maple and white ash.

Rock pigeon, turkey vulture, wild turkey, double-crested cormorant, red-tailed hawk, American crow, common raven, house wren, American goldfinch, American robin, northern flicker, spotted sandpiper, indigo bunting, European starling, Canada goose, wild turkey, barn swallow, black-capped chickadee, yellow warbler, red-eyed vireo, gray catbird, cedar waxwing, common yellowthroat, mourning dove, song sparrow, chipping sparrow, tree sparrow, Baltimore oriole, blue jay, killdeer, red-winged blackbird, common grackle, brown-headed cowbird, northern leopard frog, eastern cottontail, woodchuck, grey squirrel and white-tailed deer were observed on and adjacent to the agricultural fields and cultural habitats. The barn swallows, a Species at Risk as discussed below, were observed flying over the cultivated fields between Old Montreal Road and the south tributary.

Photo 22 – Cultivated field in the north-central portion of the site. View looking north

Photo 23 – Cultivated field in the south-central portion of the site. View looking north

Photo 24 - Ash regeneration is very common in the former agricultural fields north of Old Montreal Road in the central-east portion of the site

Photo 25 – Typical cultural habitat in the north-central portion of the site to the south of the forests along the north slope

2.2.3 Petrie Island and Mainland Urban Natural Area

The Petrie Island and Mainland Urban Natural Area is an important complex of alluvial islands, riparian deciduous swamp forests and mainland deciduous and mixed upland forests along the Ottawa River corridor. This 288 hectare Urban Natural Area extends south of Ottawa Road 174 along the Cardinal Creek corridor. Petrie Island is also the closest Life Science Provincially Significant Area of Natural and Scientific Interest and the only Provincially Significant Wetland in this portion of the City (Brunton, 1995).

The Petrie Island and Mainland Urban Natural Area was assigned a high overall environmental rating in the Urban Natural Areas Environmental Evaluation Study (Muncaster and Brunton, 2005). The Urban Natural Area scored above average for all nine eight evaluation criteria except an average score for the absence of disturbance criteria. The site summary for the Petrie Island and Mainland Urban Natural Area concludes that the natural area represents a provincially important natural area containing some of the best remaining representatives of Ottawa Valley shore and nearshore habitats as well as an exceptional array of rare features such as Blanding's turtle, least bittern and hackberry savannah habitat. The Natural Area supports a very high native flora co-efficient of conservation rating, with 63 high-rated Coefficient of Conservation species. Well to the north of the study area there is now a major recreational park in a former sand extraction site at the east end of the island. The impact of invasive vegetation such as glossy buckthorn, common buckthorn, tartarian honeysuckle, Manitoba maple, crack willow, purple loosestrife, reed canary grass, flowering rush and garlic mustard was considered moderate to severe.

A red and silver maple swamp is along the Cardinal Creek corridor just south of Ottawa Road 174. Green frog and northern leopard frog are common in the swamp and adjacent marshes. The marsh habitat continues to the north on the north side of Ottawa Road 174. Further from Cardinal Creek itself upland deciduous forest replaces the swamp habitat, with trembling aspen, basswood, bur oak, red ash, sugar maple and white spruce well represented on both sides of Ottawa Road 174.

The Natural Environment Evaluation Strategy (Brownell and Blaney, 1997) undertaken by the former Region of Ottawa-Carleton considered the Petrie Island Natural Area to be of high significance due to several criterion including rare vegetation communities, landscape attributes, endangered, threatened or rare species, seasonal wildlife concentrations and hydrological features. The majority of the attributes of interest are associated with Petrie Island proper and the Ottawa River shoreline and do not occur adjacent to the site. Important attributes of the Petrie Island Natural Area include the native wetlands, deciduous swamps, upland hackberry, mature upland mixed maple and hemlock forests, and sand-bar communities, foraging and spawning fish habitat at the confluence of Cardinal Creek and the Ottawa River, the open limestone talus vegetation community, mooneye and lake sturgeon fish species, breeding marsh wrens, colonial bird habitat, interior forest habitat and low habitat fragmentation. There are none of these attributes in proximity to the site.

2.2.4 Cardinal Creek Valley Urban Natural Area

The Cardinal Creek Valley Urban Natural Area is intermittent, with the north edge stopping on the south side of Old Montreal Road. The south edge of the Petrie Island Urban Natural Area is approximately 400 metres north of Old Montreal Road, connecting to the Ottawa River corridor across Regional Road 174.

The Cardinal Creek Valley Urban Natural Area was assigned a moderate overall environmental rating in the Urban Natural Areas Environmental Evaluation Study (Muncaster and Brunton, 2005). The Urban Natural Area is large (42.2 hectares) but the features and condition of the Urban Natural Area were a disappointment (Dan Brunton, pers. comm.). Other than the size and shape criteria, the Urban Natural Area scored average or below for the other eight evaluation criteria. Five of the criteria scored average with the lower scores assigned for the significant flora and fauna, wildlife habitat and absence of disturbance criteria. The site summary for the Cardinal Creek Valley Urban Natural Area concludes that the natural area represents a formerly rich riparian clay ravine forest severely degraded by logging, fragmentation and destruction of adjacent natural vegetation with limited restoration potential. Features of the Urban Natural Area are a moderate level of native biodiversity, faunal representation of common urban breeding birds and mammals and a regionally rare karst earth science feature along the Cardinal Creek Valley. The latter is identified as a landform feature on Schedule K of the City's Official Plan and is a Provincially Significant Earth Science ANSI. The Karst feature is approximately 250 metres long and provides an underground channel for Cardinal Creek under Watters Road (AECOM, 2009).

Disturbances noted within the Urban Natural Area include edge effect influence throughout the natural area, minor informal pathways on steep slopes, with associated soil erosion, significant litter dumping in some areas, especially north of Watters Street, severe disturbance to woodlands by selective logging and substantial course alterations and channelization of Cardinal Creek at Watters Street. The impact of invasive vegetation such as glossy buckthorn, Manitoba maple, purple loosestrife and reed canary grass was considered minor on upland vegetation, with a significant impact on disturbed wetland habitat along the base of the creek corridor.

In the former Region of Ottawa-Carleton's Natural Environment System Strategy (Brownell and Blaney, 1997), the Cardinal (Leonard) Creek Natural Area was rated moderate overall, with one criterion, rare vegetation community/landform type, scoring high and five other criteria (landscape attributes, endangered, threatened and rare species, vegetation community/landform and species diversity, hydrological features and condition of natural area) scoring moderate. Brownell and Blaney (1997) summarized the Natural Area as primarily sugar maple, poplar and white birch dominated upland forest on marine clay plain. The impact of alien species was considered low. The fragmentation and linear shape of the Natural Area resulted in a moderate amount of interior habitat. Brownell and Blaney (1997) assessed the vegetation community condition as fair. Seeps were reported along the Cardinal Creek valley. The rare vegetation community/landforms reported by Brownell and Blaney (1997) for the Cardinal Creek Natural Area included dry-fresh white birch deciduous forests, maple deciduous mineral swamps, dry-fresh white cedar coniferous forests and fresh sugar maple deciduous forests.

2.3 Species at Risk and other Species of Interest

The Ontario Ministry of Natural Resources's new biodiversity explorer website was reviewed (http://www.biodiversityexplorer.mnr.gov.on.ca/nhicWEB/main.jsp). This site allows for a search of threatened and endangered species covered by the 2008 *Endangered Species Act*, as well as other species of interest. A search conducted on the 10 km square including the study area and adjacent lands (18VR63) identified sixteen species of interest including two Species at Risk, lake sturgeon and Henslow's sparrow. The threatened lake sturgeon is reported from the Ottawa River, to the north of the site. The Henslow's sparrow utilizes unmaintained tall weedy fields (Ehrlich et al., 1988). This bird was not reported for the 10 km square that includes the study area in the two Ontario Breeding Bird Atlas result periods. Milksnake, a Species of Concern reported from the overall 10 km square including the study area, is found in a variety of habitats where mice and other prey are, including farms, rocky slopes and the edges of forests.

The other potential species of interest are provincially rare and are predominantly found in aquatic and/or wetland habitats, including four dragonflies and damselflies (horned clubtail, forcipate emerald, arrowhead spiketail and green-striped darner), northern long sedge, cattail sedge, American waterwort, Greene's rush, twin-stemmed bladderwort, southern twayblade and lurking leskea, a moss. Southern twayblade and Greene's rush are known from Mer Bleue, about six kilometres to the southwest of the site. Woodland pinedrops is found in upland habitats and is known from the Green's Creek Conservation Area, well to the west of the study area. The large purple fringed-orchid is found in wetter portions of the deciduous forests where sugar maple and American beech dominate.

The Breeding Bird Atlas results for the 10 km square 18VR63 were reviewed, with the threatened bobolink, eastern meadowlark, barn swallow and chimney swift reported for the overall 10km square, as well as three species of special concern, short-eared owl, black tern and Canada warbler. Bobolink, barn swallow and eastern meadowlark utilize large grassland areas including hay fields, while chimney swift nests predominantly in open chimneys and sometimes in tree hollows. Short-eared owl requires open habitats such as pastures and marshes. Black tern is known from the larges marshes along the Québec side of the Ottawa River while Canada warbler utilizes wet forests with dense understory.

Other than barn swallows flying over the cultivated fields south of Old Montreal Road none of these bird species were observed on the site during breeding bird surveys conducted on June 6th and July 1st, 2012. The agricultural fields are cultivated, principally in corn and soybeans and no bobolink or meadowlark were observed in the fields. The Greater Cardinal Creek Subwatershed Study Existing Conditions Report did not identify any habitat for grassland bird species on the site (AECOM, 2009). A survey for whip-poor-will was completed on June 30, 2012 between 21:55 and 22:25. Conditions were ideal for hearing whip-poor-will with 95 percent of the moon face showing, calm winds and an air temperature of 22° C. No whip-poor-wills were heard calling on or adjacent to the site. It is anticipated that the remaining forests on the site are too narrow for whip-poor-will. No on-site forests are greater than 200 metres in width. Barns at 1291 Old Montreal Road were investigated for potential barn swallow nesting with no activity observed.

The potential Species at Risk in the City of Ottawa were also reviewed, with an emphasis on the endangered and threatened species historically reported in the overall City, including butternut, American ginseng, eastern prairie fringed-orchid, flooded jellyskin, wood turtle, spiny softshell, Blanding's turtle, snapping turtle, musk turtle, Henslow's sparrow, loggerhead shrike, bald eagle, golden eagle, least bittern, eastern meadowlark, bobolink, barn swallow, whip-poor-will, chimney swift, peregrine falcon, eastern cougar, common gray fox and American eel. The habitat requirements of these species along with those listed as special concern were reviewed. Butternut is relatively common in portions of Ottawa in a variety of habitats and is present in the forests north of Old Montreal Road. Prior to any work in the vicinity of trees, it must be determined that butternut is not in or within 25 metres of proposed areas of disturbance. Potential Species at Risk that may occur in the adjacent Cardinal Creek and Petrie Island and Mainland Urban Natural Areas include eastern ribbonsnake, western chorus frog and snapping turtle in the floodplain of the valley adjacent to Cardinal Creek, with black tern, lake sturgeon, American eel, spiny softshell and river redhorse to the north of the study area in the Ottawa River corridor. These corridors are not anticipated to be impacted by development of the site.

In correspondence dated March 20th, 2012 (Appendix A) the Ministry of Natural Resources butternut, lake sturgeon, Blanding's turtle, bobolink, whip-poor-will, chimney swift, loggerhead shrike, eastern meadowlark and barn swallow as potential Species at Risk that may utilize the site and adjacent lands. These species are discussed above.

AECOM (2009) noted that no aquatic Species at Risk have been documented at any of the sampling sites along Cardinal Creek for which information was provided.

3.0 SUMMARY

The study area is dominated by cultivated lands but does contain some natural heritage features. The recommended natural heritage system for the site is shown on Figure 2. The system includes the Cardinal Creek Valley and the south tributary, as well as the west, downstream, portion of the north tributary. The upper or east portion of the north tributary is not included due to a lack of fish caught (only two fish of one species caught in total across four sampling stations) and lack of features within the channel (a typical agricultural trapezoid cross-section) and the adjacent riparian corridor. As an alternative to retention of this portion of the north tributary as part of an urban development it is suggested that enhancement and rehabilitation measures be completed on Cardinal Creek and the south tributary including increasing the connectivity along the south tributary and addressing areas of erosion.

The remnant wooded areas of the valleylands of Cardinal Creek and the south tributary will be retained as well as the older wooded areas along the north slope south of the old railway line in the northeast portion of the site. These forests are relatively narrow less than 200 metres in width, and thus utilization by area sensitive and forest interior breeding birds is low. There was a minimal representation of these species in the forests along the north slope, including lands to the east of the site, with ovenbird, wood thrush and veery heard. The west portion of the wooded north slope contains more disturbance and a lower diversity of ecological features. The natural

heritage system also includes deciduous forests along the east side of the site. This corridor will assist in providing a linage to the Ottawa River corridor to the north, although this connection must still cross Ottawa Road 174 to the north of the site. The fresh-moist ash deciduous north forest in the northeast corner of the site is younger than the forests along the north slope but a representation of this forest is also included in the recommended natural heritage system.

Development of the site should consider retention of natural environment features on the site not specifically identified as part of the natural heritage system. Examples include the double hedgerow of deciduous trees along the driveway to 1291 Old Montreal Road and portions of the deciduous forest to the northeast of Laporte's Nursery.

The natural heritage system proposed on Figure 2 is generally consistent with the draft Natural Heritage System identified for the Cardinal Creek Subwatershed Study. Some additional lands are shown on the subwatershed study draft south of the south tributary corridor. These areas have a greater level of disturbance and the woody vegetation cover is highly fragmented. The draft Natural Heritage System in the Cardinal Creek Subwatershed Study also includes some of the cultural thicket and cultural woodland habitat in the east portion of the site north of Old Montreal Road and south of the forested north slope. Based on the field surveys these areas appeared too disturbed to be included in the natural heritage system although the east portion is recommended for retention as part of the corridor along the east side of the site.

Important mitigation measures are required to protect the components of the natural heritage system and other natural environment features to be retained. These measures include buffer setbacks with no disturbances to protect the adjacent retained feature, construction timing for in-water work outside of the more sensitive March 15th to June 30th period, proper sediment and erosion control and protection for retained adjacent trees and forest edges. To protect breeding birds, no tree or shrub removal should occur between April 15th and July 30th, unless a nesting survey conducted within five days of the woody vegetation removal identifies no breeding activity. Surveys for butternut should be conducted well in advance of in areas of proposed tree removal. No site disturbances that may harm the butternuts are to occur within a radius of 25 metres of the tree until butternut health assessments are completed and as required mitigation or compensations plans are developed and approved by the Ministry of Natural Resources.

4.0 REFERENCES

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Rideau Valley Conservation Authority. 2006. City Stream Watch 2006 Annual Report. 57 pp. & append

APPENDIX A

MINISTRY of NATURAL RESOURCES CORRESPONDENCE

Ontario

Ministry of Natural Resources

Kemtpville District
P.O. Box 2002
10 Campus Drive
Kemtpvile, ON K0G 1J0

Tel.: (613) 258-8470
Fax.: (613) 258-3920

Ministère des Richesses naturelles

District de Kemptville
CP 2002
10 Campus Drive
Kemptville, ON K0G 1J0

Tél.: (613) 258-8470
Téléc.: (613) 258-3920

20 March 2012

Muncaster Environmental Planning
491 Buchanan Crescent
Ottawa, ON K1J 7V2

Attention: Bernie Muncaster

Subject: Information Request – Proposed Urban Residential Development in the Geographic Township of Cumberland

Our File No. 2012_CUM-1731

The Ministry of Natural Resources (MNR) Kemptville District has carried out a preliminary review in order to identify any potential natural resource and natural heritage values in the area.

Following a review of natural heritage values and data, there are no Provincially Significant Wetland (PSWs) on site but the there is a Provincially Significant Earth Science Areas of Natural and Scientific Interest (ANSI) adjacent to the site(s). The site(s) also contain a permanent watercourse, swamps and woodlands. Watercourses, swamps and woodlands provide habitat for a diversity of species, including species at risk.

If there is to be work in water and/or disturbance of the river bed or shoreline, additional and more detailed plans are requested by the MNR for review. A work permit from the Ministry of Natural Resources may be required pending further details regarding the proposed works. Furthermore, the local Conservation Authority should be contacted regarding possible permitting required for these particular works at the site in question.

With the new Endangered Species Act (ESA, 2007) in effect, it is important to understand which species and habitats exist in the area and the implications of the legislation. A review of the Natural Heritage Information Centre (NHIC) and internal records indicate that there is a potential for Butternut (Endangered-END) where trees are present, Lake Sturgeon (THR) and Blanding's turtle (THR) and other at risk turtle species on the site. Aerial photographs also suggest the presence of potential habitat for Bobolink (Threatened-THR), Whip-poor-will (THR), Chimney Swift (THR), Loggerhead Shrike (END), Easter Meadowlark (THR) and Barn Swallow (THR) on or near the site. If a proposed activity is known to have an impact on the species mentioned above or any other species at risk (SAR), an ESA permit is required.

Bobolink, Whip-poor-will, Chimney Swift, Eastern Meadowlark, Barn Swallow, Loggerhead Shrike and Lake Sturgeon receive general habitat protection, the Loggerhead Shrike is also protected under the Migratory Birds Convention Act and thus any potential works should consider disturbance of possible important habitat. None of the other species listed above currently receive habitat protection, however the listed Endangered and Threatened species all receive species protection under Section 9 of the Endangered Species Act, 2007 (ESA).

If any of these or any other species at risk are discovered throughout the course of the work, and/or should any species at risk or their habitat be potentially impacted by on site activities, MNR should be contacted immediately and operations be modified to avoid any negative impacts to species at risk or their habitat until further direction is provided by MNR.

Species listed as Special Concern on the SARO list are not protected under the Endangered Species Act, 2007. However, please note that some of these species may be protected under the Fish and Wildlife Conservation Act. Please consider the following Special Concern species prior to any activities being carried out:

- Milksnake
- Eastern Ribbonsnake
- Snapping turtle

Suggested search and avoidance measures for the aforementioned species are listed below:

Turtles: A thorough sweep of the aquatic area should take place before any in water work occurs. A sweep of the area will encourage any turtles possibly utilizing the site to move away before any equipment or work which could impact the species occurs. Furthermore, extra care and precaution should be taken during the snapping turtle species nesting season in June and early July. Turtles may utilize the embankment to come up and nest during this time. If the proposed work will occur during this timeline, Ministry of Natural Resources (MNR) recommends fencing off the site in early spring to prevent the turtles from nesting there and to visually inspect the embankment and surrounding area to ensure that no turtles are present before proceeding with any work. In addition, caution should be taken from October 16th to March 15th as turtles could be hibernating. Turtles could use the area to burrow in for the winter. If the proposed work will occur during this timeline, Ministry of Natural Resources (MNR) recommends fencing off the site in early fall to prevent the turtles from hibernating there.

Snakes: A thorough search of the area should take place before terrestrial activity and work is being conducted. Temperature and weather conditions will drive their behaviour and they are much more visible on warm summer days when basking or moving more frequently. Extra precaution should be taken in spring emergence conditions when snakes are in concentrated areas. Vegetation at this time is undeveloped increasing visibility, and outside of spring they are more active. Snakes may use open areas to bask, but avoid these areas when it is too hot. Searches could include trees, logs, ground, stumps, rock outcrops and ledges. Skin sheds can be a good indication of presence. Oviposition sites of egg laying snakes may be identified by young snakes in the fall and are usually in old trees, stumps, logs, manure piles or other decaying materials. If hibernacula and oviposition sites are suspected or known they must not be

destroyed if encountered and MNR recommends fencing off the areas before proceeding with any work.

Butternut: If any of the proposed work will require harming or killing of Butternut trees, a Butternut Health Assessor will have to be contacted to assess the health of the tree before proceeding with potential permit application (prior to proposed activity). If a Butternut tree will be impacted during the work proposed, please contact your local MNR office to enquire further about the process dealing with Butternut trees.

Fish: Proper mitigation and care should be taken to mitigate impact on water quality and fish habitat, including the installation of sediment and erosion control measures, avoiding removal, alteration or covering of substrates used for fish spawning, feeding, over-wintering or nursery areas including selecting locations with sand, silt or clay substrates and where aquatic vegetation is scarce or absent.

Although no other threatened or endangered species or their habitat have been documented in the area, these features may be present and this list should not be considered complete.

Please note: The advice in this letter is valid until **20 March 2013** and may become invalid if:

1. The Committee on the Status of Species at Risk in Ontario (COSSARO) re-assesses the status of the above-named species OR adds a species to the SARO List such that the section 9 and/or 10 protection provisions apply to those species.
2. Additional occurrences of species are discovered.
3. Habitat protection comes into force for one of the above-mentioned species through the creation of a habitat regulation.

This letter has been prepared to provide preliminary information to support compliance with the ESA 2007 and does not address other requirements under other federal or provincial laws and regulations.

Although this data represents the MNR's best current available information, it is important to note that a lack of occurrence at a site does not mean that there are no SAR at the location. The MNR continues to encourage ecological site assessments to determine the potential for other SAR occurrences. When a SAR does occur on a proposed site, it is recommended that the proponent contact the MNR for technical advice and to discuss what activities can occur without contravention of the Act. If an activity is proposed that will contravene the Act (such as Section 9 or 10), the proponent must contact the MNR to discuss the potential for application of certain permits (Section 17) or agreement (Regulation 242/08). For specific questions regarding the Endangered Species Act (2007) or species at risk, please contact a district Species at Risk Biologist at sar.kemptville@ontario.ca.

Sincerely,

Laura McL