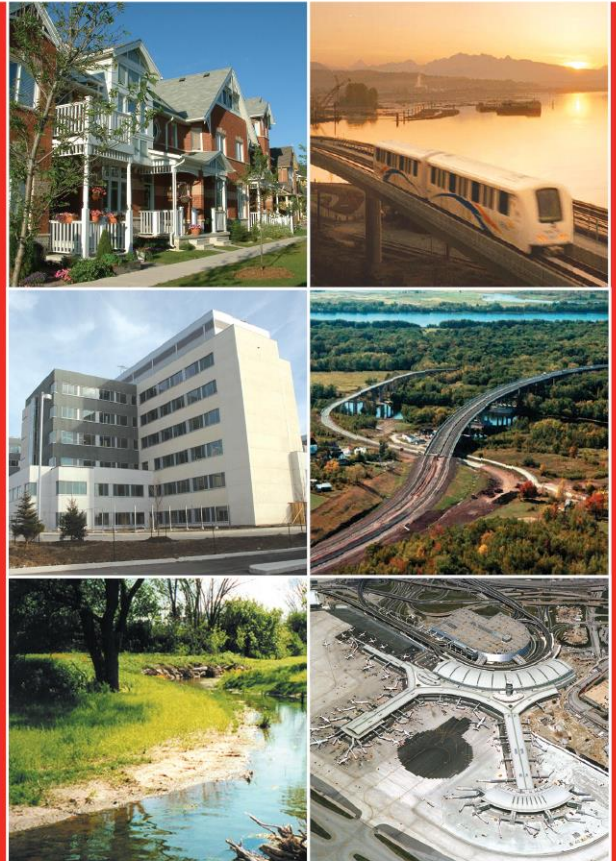


MMM Group Limited



York Trunk Sewer & Paisley-Clythe Feedermain - Environmental Report

Prepared for: Grand River Conservation Authority

COMMUNITIES
TRANSPORTATION
BUILDINGS
INFRASTRUCTURE



January 2014

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January 17, 2014

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Re: Permit Application, Application for a Development, Interference with Wetlands and Alterations to Shorelines and Watercourses – Ontario Regulation 150/06, York Trunk Sewer & Paisley Clyde Feedermain, City of Guelph

MMM Group Limited (MMM) has been retained by the City of Guelph to complete the Preliminary and Detail Design of the York Trunk Sewer and Paisley-Clythe Feedermain in the City of Guelph. The 1200 mm diameter trunk sanitary sewer and the 600 mm diameter watermain will extend from the east side of the Hanlon Parkway to York Road Park along a route through Silvercreek Park, across Edinburgh Road, through Royal City Park, across Gordon Street, and across the Speed River. The majority of the watermain and sanitary sewer will be installed using open-cut construction, including at crossings of Howitt Creek, Pond Creek and one crossing of the Speed River. The one exception is through Royal City Park where services will be installed using trenchless techniques to minimize adverse effects to mature trees in the park. A key plan is shown in Figure 1 (Appendix A) with further details provided on Figure 2: Plates 1 through 4 (Appendix A), and in the Contract Documents appended.

This letter has been prepared in support of the application for a permit under Ontario Regulation 150/06: *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses* and documents the natural environmental component of this project. Specifically, this letter includes:

- a description of the natural environmental conditions (updated from the Class Environmental Assessment [Class EA] study (GENVIAR 2009);
- a description of the potential direct and indirect impacts associated with the installation of the proposed watermain and sanitary sewer on the natural features; and,
- detailed mitigation measures recommended to address the potential impacts.

Included within the package are the following:

- One copy of the completed and signed Application Form for a *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses* Regulation 150/06 permit;

- Three copies of the Construction Drawings, including Erosion and Sediment Control Details
- Permit Application Processing Fee; and,
- Supporting documentation (Figures, species lists, SAR Screening table and agency communication).

1.0 APPROACH

1.1 Background Information and Agency Consultation

A variety of background information sources were reviewed and agencies were contacted to update the information database and prepare for field investigations. The primary sources of information are listed below:

- Topographic mapping, Land Information Ontario (LIO), Natural Resources and Values Information System (NRVIS) database, and air photo mosaic;
- Ministry of Natural Resources (MNR) Natural Heritage Information Centre (NHIC) Biodiversity Explorer database and direct communication with the MNR Guelph District office (Marriott pers. comm. 2013) for significant species and designated natural features within, adjacent to or in the vicinity of the project;
- Communication with the Guelph District MNR biologist, Art Timmerman and the Species-At-Risk (SAR) Biologist, Graham Buck, to identify and discuss the fish community assemblage and presence of potentially sensitive aquatic species and functions in the project area;
- DFO's Aquatic SAR mapping;
- *York Trunk Sewer and Paisley-Clythe Feedermain Schedule B Class Environmental Assessment Study* (GENIVAR 2009);
- The City of Guelph's Natural Heritage Strategy (Dogan and Associates 2009) and Amendment No 42 to the City of Guelph Official Plan: Natural Heritage System Amendment (OPA 42) (July 2010);
- Consultation with the Grand River Conservation Authority (GRCA) and City of Guelph Environmental Planning staff, including a site walk to review the Speed River Crossing (October 10th, 2013); and,
- Review of 90% Design Contract Drawings.

1.2 Field Surveys

Terrestrial field surveys were focused within the *project limits*, defined as the area within 10 m either side of the proposed construction zone. However, the field assessment also considered a *broader study area*, particularly for wildlife habitat potential which generally includes the area south of the *project limits* to the Speed River. Field surveys were conducted on December 11th, 2012, July 11th, September 10th and October 10th, 2013.

The terrestrial assessment involved:

- Breeding Bird Survey conducted on July 11th, 2013, including a targeted search for Barn Swallow (*Hirundo rustica*) nests within the *broader study area* and a SAR wildlife habitat assessment.
- Recording all direct wildlife observations and wildlife sign (including browse, track/trails, animal scat, bird nesting activity, tree cavities, burrows, excavated holes and vocalizations) and identifying potential wildlife usage and habitat functions associated with vegetation communities;
- Classifying and mapping vegetation communities according to the *Ecological Land Classification for Southern Ontario* (Lee et al. 1998), where appropriate;
- Evaluating the sensitivity and significance of vegetation and vegetation communities using the MNR's NHIC Biodiversity Explorer and SAR websites, and the Significant Plant List for Wellington County (Dougan and Associates 2009) for regional plant status; and,
- Noting general vegetation characteristics including age, general habitat features drainage conditions and levels of anthropogenic disturbance.

Fish and fish habitat preliminary site investigations were conducted on December 11th, 2012 with a second site reconnaissance conducted on October 10th, 2013, along the modified sewer alignment to verify and augment the findings of the Class EA investigations and identify any changes to site conditions since the original work was completed.

The aquatic assessment involved habitat mapping for 3 watercourse crossings which consisted of documenting physical habitat features, including channel morphology (percent pools, riffles, runs etc.), substrate composition, presence of barriers, percent canopy cover, riparian vegetation, and presence of aquatic vegetation. Crossing locations are shown on Figure 1: Plates 1, 3 and 4 (Appendix A). During the preliminary investigations transects were established to characterize the up and downstream reaches of the proposed impacted locations.

2.0 Existing Conditions

The following sections describe the existing conditions within the *project limits* and *broader study area* based on the background review and 2013 field investigations.

2.1 Designated Natural Areas and Significant Wildlife Habitat

2.1.1 Designated Areas

Based on information available in the NHIC, NRVIS and LIO databases, consultation with MNR Guelph District and review of the City of Guelph Official Plan Amendment 42: Natural Heritage System (City of Guelph 2010), the following designated natural areas and significant wildlife habitat occur in the *project limits* or *broader study area*. These areas are delineated on Figure 1, Appendix A.

Provincial Designations

Unevaluated Wetlands – located south of Eramosa River near its confluence with Speed River;

Waterfowl Winter Concentration Area - located in the Speed River (See Figure, Appendix A).

Grand River Conservation Authority Lands

- The *project limits* are contained within the regulatory floodplain - i.e. regulated under *Ontario Regulation 150/06: Development, Interference With Wetlands and Alterations to Shorelines and Watercourses*

City of Guelph Designations

- *Schedule 10: Natural Heritage Strategy* – shows *Significant Natural Area* along the Speed River. *Significant Natural Areas* identified in the Natural Heritage Strategy may include: *Areas of Natural and Scientific Interest (ANSI)*, *Significant Habitat for Provincially Endangered and Threatened Species*, *Significant Wetlands*, *Surface Water and Fish Habitat*, *Significant Woodlands*, *Significant Valleylands*, *Significant Landform*, *Significant Wildlife Habitat* (including *Ecological Linkages*), and *Restoration Areas* (City of Guelph 2010). In the *broader study area*, *Significant Natural Areas* are limited to the Speed River and Eramosa River waterways, in relation to *Surface Water and Fish Habitat* and *Significant Wildlife Habitat* in the form of waterfowl overwintering areas (Dougan and Associates 2009).

2.1.2 Significant Wildlife Habitat

Seasonal Concentration Areas

As noted above, there is a *Waterfowl Winter Concentration Area* identified and delineated by the MNR along the Speed and Eramosa Rivers in the vicinity of the project (Figure 1, Appendix A). This feature was also noted in the Class EA (GENIVAR 2009) and is mapped on Schedule 10E: Natural Heritage Strategy: Significant Wildlife Habitat (OPA 42). No other known *Seasonal Concentration Areas* have been identified in the *project limits* or *broader study area*.

Rare Vegetation Communities

No rare vegetation communities (e.g. alvar, prairie, savannah, rare forest types, cliff/talus, rock barrens, sand barrens, or rare ELC communities) are present in the *project limits* or *broader study area*.

Specialized Habitats for Wildlife

No specialized habitats for wildlife (e.g. amphibian woodland breeding habitat, amphibian wetland breeding habitat, turtle nesting habitat, old growth forest, mast areas, Bald Eagle nesting habitat, seeps and springs, etc.) have been identified within the *project limits* or *broader study area*. Some potential for turtle overwintering and waterfowl nesting may occur in the unevaluated wetlands (marsh) on the south side of the confluence of the Speed and Eramosa Rivers, beyond the *broader study area* limits.

Wildlife Movement Corridors

The Speed and Eramosa Rivers and their associated riparian habitats act as natural wildlife movement corridors throughout an otherwise urban context. No other wildlife movement corridors (i.e. deer movement corridors, amphibian movement corridors) have been identified within the *project limits* or *broader study area*.

Habitats of Species of Conservation Concern

There is very limited potential for species of conservation concern to occur within the *project limits*, however there is potential habitat for a select number of species within the *broader study area*. See Section 2.4 for further details.

2.2 Vegetation

2.2.1 Vegetation Communities

The *project limits* and *broader study area* are dominated by manicured parklands with mown grass and planted landscape trees. Natural areas are generally limited to the banks of the Speed and Eramosa Rivers and small patches of cultural meadow, cultural woodland and cultural thicket communities. Riparian communities at the 2 small watercourse crossings are very narrow and limited. Only 4 distinct vegetation community types were delineated within the *broader study area*: Mineral Cultural Woodland (CUW1), Mineral Thicket Swamp (SWT2), Mineral Cultural Thicket (CUT1) and Dry-Moist Old Field Meadow (CUM1-1). All of these communities are common in Ontario.

The alignment has been divided into 4 sectors. General vegetation community descriptions divided by each of the 4 sectors are provided below. Vegetation communities are delineated on Figure 2: plates 1 -4 (Appendix A) with representative photos provided in Appendix D.

Sector 1: Open Cut Section North of Wellington Street West

The majority of this sector is characterized by manicured lawn and planted trees associated with the adjacent apartment and condo buildings. The proposed watermain alignment will cross Howitt Creek in this sector then cross under Wellington Street West at the north limit of Sector 1. The riparian vegetation associated with this channelized, urban creek is limited to narrow strips and patches of wetland vegetation dominated by Reed Canary Grass (*Phalaris arundinacea*). Other species present include Narrow-leaved Cattail (*Typha angustifolia*), Broad-leaf Cattail (*Typha latifolia*), and Purple Loosestrife (*Lythrum salicaria*). A few trees are present along the channel, including Freeman's Maple (*Acer x freemanii*) and Common Apple (*Malus pumila*).

In the easterly portion of Sector 1, there are 2 small areas containing Old Field Meadow with scattered planted trees (Unit 1).

Unit 1 – Dry-Moist Old Field Meadow – Two narrow, semi-natural areas with planted trees adjacent to a busy traffic route (i.e. Wellington Street West). No significant features or species were recorded in this unit. This unit is dominated by common roadside and cultural meadow species including frequent bluegrass (*Poa sp.*) and Awnless Brome (*Bromus inermis ssp. inermis*) and occasional Creeping Wild Rye (*Elymus repens*), Canada Goldenrod (*Solidago canadensis*), Queen Anne's Lace (*Daucus carota*), Climbing Nightshade (*Solanum dulcamara*), Butter-and-eggs (*Linaria vulgaris*) and Reed Canary Grass. The young canopy includes planted White Spruce (*Picea glauca*), Box Elder (*Acer negundo*), Freeman's Maple, Red Pine (*Pinus resinosa*), Green Ash (*Fraxinus pennsylvanica*), Northern White Cedar (*Thuja occidentalis*), Black Locust (*Robinia pseudo-acacia*), and Butternut Hybrid (*Juglans sp.*). The understory is sparse, consisting of a few younger (planted) trees, including Green Ash and American Elm (*Ulmus americana*).

Sector 2: Open Cut Section South of Wellington Street West

West of Edinburgh Road, Sector 2 is characterized by manicured parkland (including mowed grass with planted landscape trees, a narrow 1-2 lane roadway, parking areas and beach volleyball courts) and a mosaic of Mineral Cultural Woodland and Dry-Moist Old Field Meadow communities (Unit 2) associated with the north bank of the Speed River. East of Edinburgh Road, this sector is also dominated by manicured parkland and includes riparian vegetation associated with the banks of Pond Creek as well as Dry-Moist Old Field Meadow (Unit 3), Mineral Cultural Thicket (Unit 4) and Mineral Cultural Woodland (Unit 5) areas. Each of these communities is described below and delineated on Figure 2: plates 1 through 4 (Appendix A).

Unit 2 –Mineral Cultural Woodland and Dry-Moist Old Field Meadow – Unit 2 consists of three culturally-influenced units (2A, 2B and 2C). These communities have been influenced by anthropogenic activities including the development of adjacent parklands and nearby roads. Some areas have been planted with conifers, while other areas are more remnant of a previously existing lowland deciduous forest. The canopy consists of frequent Green Ash, Box Elder, Norway Maple (*Acer platanoides*) and Black Walnut (*Juglans nigra*), with occasional American Basswood (*Tilia americana*), Littleleaf Linden (*Tilia cordata*), Paper Birch (*Betula papyrifera*), White Willow (*Salix alba*), American Larch (*Larix laricina*), White Spruce (planted), and Northern White Cedar. The understory is generally fairly sparse, with low species diversity, including frequent Riverbank Grape (*Vitis riparia*) and Buckthorn (*Rhamnus cathartica*).

Unit 2A is the relatively contiguous riparian vegetation present along the north bank of the Speed River extending eastward toward McCrae Boulevard. However, given the distance from the proposed alignment, the section from Edinburgh Road South to McCrae Boulevard was not surveyed in detail due to its greater distance south of the proposed alignment.

Unit 2B consists of a small treed area containing Paper Birch, Manitoba Maple and Norway Maple, along with Buckthorn and a fairly homogenous ground layer including common species such as Riverbank Grape, Canada Goldenrod and Yellow Avens (*Geum aleppicum*).

Unit 2C, adjacent to the Wellington Street West crossing location, includes frequent Staghorn Sumac (*Rhus typhina*) and one regionally rare species – Sand Dune Willow (*Salix cordata*) (further discussed in Section 2.4). The ground layer is dominated by common roadside and cultural meadow species including frequent bluegrass and Awnless Brome and occasional Canada Goldenrod, Queen Anne's Lace, St. John's-wort (*Hypericum perforatum*), Climbing Nightshade, and Garlic Mustard (*Alliaria petiolata*).

Unit 3 – Dry-Moist Old Field Meadow - This is a narrow, semi-natural cultural meadow area with planted landscape trees adjacent to a busy traffic route (i.e. Wellington Street West). No significant features or species were recorded in this unit. The ground layer is dominated by common roadside and cultural meadow grasses including abundant bluegrass, frequent Creeping Wild Rye, and occasional Awnless Brome and Reed Canary Grass. Other species present include Canada Goldenrod, Queen Anne's Lace, St. John's-wort, Climbing Nightshade, and Garlic Mustard. Mid-aged planted trees include Green Ash, Black Walnut, American Basswood, Box Elder, and Black Locust. The understory is limited to occasional Buckthorn.

Unit 4 – Mineral Cultural Thicket - This unit is characterized by young planted trees, which will eventually transition to a woodland state. This is a narrow, semi-natural area with planted landscape

trees adjacent to a busy traffic route (i.e. Wellington Street West). No significant features or species were recorded in this unit. The canopy/sub-canopy is fairly young, but includes Freeman's Maple, Box Elder, Green Ash, American Basswood, Black Walnut, American Larch, Butternut Hybrid, and White Oak (*Quercus alba*). The understory includes Green Alder (*Alnus viridis* spp. *crispa*), Buckthorn, and Common Elderberry (*Sambucus nigra* ssp. *canadensis*), as well as some regeneration of canopy/sub-canopy species. The ground layer is dominated by common roadside and cultural meadow species, including bluegrass, Canada Goldenrod, Queen Anne's Lace, St. John's-wort, Climbing Nightshade, and Garlic Mustard.

Unit 5 – Mineral Cultural Woodland - This area, adjacent to McCrae Boulevard, is characterized by young to mid-aged trees, most of which appear to have been planted during previous landscaping activities. This unit includes a number of exotic / invasive species and is adjacent to a busy traffic route (i.e. Wellington Street West). No significant features or species were recorded in this unit. The canopy includes frequent Black Walnut, with occasional White Spruce, Box Elder, Norway Maple, Freeman's Maple, Green Ash and Eastern Cottonwood (*Populus deltoides* ssp. *deltoides*). The understory includes scarce-occasional Common Juniper (*Juniperus communis*), Green Alder, Buckthorn, Guelder-rose Viburnum (*Viburnum opulus*) and Black Raspberry (*Rubus occidentalis*). The ground layer is dominated by common roadside and cultural meadow species such as Canada Goldenrod, Smooth Brome, Queen Anne's Lace, Reed Canary Grass, Calico Aster (*Symphyotrichum lateriflorum* var. *lateriflorum*), New England Aster (*Symphyotrichum novae-angliae*), and Tall Buttercup (*Ranunculus acris*).

The narrow, semi-natural riparian vegetation associated with Pond Creek is limited by the concrete-lined nature of the channel and is too small an area to delineate as a distinct vegetation community. However, this area is dominated by Red-osier Dogwood (*Cornus sericea*) with frequent Buckthorn and occasional Riverbank Grape. Tree species observed include occasional Green Ash, American Elm, and Box Elder. The ground layer is characterized by a mix of common wetland and cultural meadow species, including Canada Goldenrod, Climbing Nightshade, Queen Anne's Lace, Reed Canary Grass, and Purple Loosestrife. One provincially rare (S2) species – Cup-plant (*Silphium perfoliatum* var. *perfoliatum*) – was recorded in this area, over 50m south of the proposed alignment, and is discussed further in Section 2.4.

Sector 3: Tunnelled Section through Royal City Park

The Royal City Park area is dominated by manicured parkland, consisting mainly of mature planted trees and mowed grass. One semi-natural Mineral Cultural Woodland community (Unit 6) is located north of the proposed alignment and is described below.

Unit 6 – Mineral Cultural Woodland - This unit comprises a narrow semi-natural mid-aged to mature woodland bordered by manicured parkland to the south, and privately owned cultural thicket / cultural meadow lands to the north. No significant features or species were recorded in this unit. A mix of native and exotic species is found in the canopy, including abundant Norway Maple and occasional Box Elder, Green Ash and Freeman's Maple. The understory is limited, but includes occasional American Elm, young Freeman's Maple, Buckthorn and Common Lilac (*Syringia vulgaris*). The ground layer is characterized by abundant Garlic Mustard and Canada Goldenrod, frequent Lesser Burdock (*Arctium minus*) and Climbing Nightshade and occasional bluegrass, Awnless Brome, Pennsylvania Sedge (*Carex pensylvanica*), Greater Celandine (*Chelidonium majus*).

Sector 4: Open Cut Crossing of the Speed River

The banks of the Speed River in the vicinity of the proposed crossing are dominated by Mineral Cultural Woodland communities (Units 7 and 8), which are described in detail below. Both of these units are likely remnant of a lowland deciduous forest that once lined the Speed River floodplain. These areas have been impacted by anthropogenic disturbances including the construction of the pedestrian bridge and adjacent parklands and urban/suburban development.

Unit 7 – Mineral Cultural Woodland – This unit is located on the west bank of the Speed River in the vicinity of the proposed alignment. Exotic and invasive species are prevalent. The canopy includes abundant Norway Maple, frequent Box Elder, and occasional White Willow and Freeman’s Maple. The understory is characterized by a mix of native and exotic species including occasional Choke Cherry (*Prunus virginiana* var. *virginiana*), Buckthorn, and Riverbank Grape, Red-osier Dogwood, Glossy Buckthorn (*Frangula alnus*), Tartarian Honeysuckle (*Lonicera tatarica*) and Eastern Ninebark (*Physocarpus opulus*). The ground layer is fairly sparse, with occasional Ground Ivy (*Glechoma hederacea*), Canada Goldenrod (*Solidago canadensis*), Common Motherwort (*Leonurus cardiaca* ssp. *cardiaca*), Lesser Burdock, and Reed Canary Grass.

Unit 8 – Mineral Cultural Woodland – This unit is located along the east bank of the Speed River in the vicinity of the proposed alignment. A small Mineral Thicket Swamp inclusion is located along the water’s edge, immediately north of the pedestrian bridge. The woodland canopy is dominated by Black Walnut. Box Elder is also prevalent throughout the area, along with occasional Northern White Cedar, and Freeman’s Maple. The understory includes occasional-frequent Red-Osier Dogwood, Rough-leaved Dogwood (*Cornus drummondii*), Rambler Rose (*Rosa multiflora*), Guelder-rose Viburnum, and Riverbank Grape. The ground layer contains a relatively high diversity of native species, in comparison to other units along the alignment. Species recorded include bluegrass (*Poa* sp.), Wild Bergamot (*Monarda fistulosa*), Orange Jewelweed (*Impatiens capensis*), Virginia Stickseed (*Hackelia virginiana*) and Canada Goldenrod. Canada Clearweed (*Pilea pumila*), which is rare in Wellington County (Dougan and Associates 2009) was observed in low numbers in the Mineral Thicket Swamp inclusion.

2.2.2 Vascular Plants

A total of 112 vascular plants were identified during the field surveys, 12 of which were only identified to genus level. Of the 100 identified to species 55 are native and 45 are non-native or hybrids (ranked SNA). The majority of the species recorded are common in the City of Guelph and throughout Ontario (ranked S4 or S5). One provincially rare species – Cup-plant (S2) – was recorded and 2 regionally rare species – Canada Clearweed (R-A) and Sand Dune Willow (R-C) – were recorded, as discussed in Section 2.4.

All vascular plants recorded are listed in Appendix B.

2.3 Wildlife and Wildlife Habitat

Wildlife resources were evaluated using a review of background material and field surveys. A breeding bird survey was conducted on July 11th, 2013 within the *broader study area*. Wildlife observations were also recorded during botanical and fisheries field work conducted on December 11th 2012, September 10th and October 10th, 2013. The *broader study area* provides habitat for grassland, riparian, forest and forest edge associated species. All wildlife species recorded are listed in Appendix C.

2.3.1 Mammals

One mammal species was recorded during field visits: Gray Squirrel (*Sciurus carolinensis*). However, the general area likely supports a range of mammals often found in similar habitats, including: Eastern Cottontail (*Sylvilagus floridanus*), Eastern Chipmunk (*Tamias striatus*), Raccoon (*Procyon lotor*), Groundhog (*Marmota monax*), Striped Skunk (*Mephitis mephitis*), Mink (*Mutela vison*), Muskrat (*Ondatra zibethicus*), Coyote (*Canis latrans*), Red Fox (*Vulpes vulpes*), White-tailed Deer (*Odocoileus virginianus*), and a number of small mammals that often go undetected (for example shrews, voles, mice, bats).

2.3.2 Herpetofauna

One herpetofauna species was observed during the field surveys: American Toad (*Anaxyrus americanus*). However, the general area likely supports a range of amphibian and reptile species often found in similar habitats, including: Dekay's Brownsnake (*Storeria dekayi*), Eastern Gartersnake (*Thamnophis sirtalis*), Green Frog (*Lithobates clamitans*), Midland Painted Turtle (*Chrysemys picta marginata*) and Northern Leopard Frog (*Lithobates pipiens*).

MMM did not observe evidence of turtle nesting (e.g. past nest predation) in the vicinity of the Speed River crossing or anywhere within the *project limits* or *broader study area*. Ideal nest sites for turtles tend to face south or west with little overhead cover, have gravelly, sandy or loamy soil, and are within a few metres of water (Brooks 2007). Based on this definition, no 'ideal' turtle nesting habitat occurs within the *project limits* or *broader study area*. The shorelines of the Speed River are mostly developed parkland with no natural breeding habitat (sand or gravel beaches and shoals). The eastern section of the Speed River across from York Road Park supports an unevaluated wetland that may support foraging or overwintering Snapping Turtles (*Chelydra serpentina*) that prefer emergent vegetation marshes with soft muddy substrate and slow currents, however this wetland is beyond the *project limits* and *broader study area*.

No suitable turtle nesting habitat or turtle basking habitat occurs within the *project limits* (i.e. 10 m either side of the proposed alignment). There are some limited turtle basking opportunities within the Speed River within the *broader study area*. The eastern section of Speed River where the Eramosa River joins contains suitable basking habitat with shallow water with emergent cobble/boulder substrate. No observable basking opportunities (stationary emergent tree branches, logs or rocks) were observed within the western section of the Speed River (west of the first water control structure west of McCrae Boulevard).

Similarly, no reptile hibernacula or potential hibernacula sites were noted within the *project limits* or *broader study area*.

2.3.3 Birds

Twenty-nine bird species were recorded during the July 11th, 2013 field survey (refer to Appendix C for the complete list of species). The avifauna observed are expected for site conditions and found throughout the Southern Ontario area (Bird Studies Canada et al. 2006).

Two of the observed avifauna are designated At Risk by COSEWIC and COSSARO: Barn Swallow (Threatened) and Chimney Swift (*Chaetura pelagica* - Threatened). Barn Swallow and Chimney Swift were observed foraging along the Speed River and environs at the west end of the alignment but no nest sites were located. The pedestrian bridge just south of the proposed Speed River Crossing was specifically reviewed for avian nests. No nests were observed on this structure or in the Howitt Creek

or Pond Creek culverts. The *broader study area* provides some opportunity for “Area Sensitive” birds, including two species recorded during field work: Common Merganser (*Mergus merganser*) and White-breasted Nuthatch (*Sitta carolinensis*)

Five Cliff Swallow (*Petrochelidon pyrrhonota*) nests were observed under the Highway 7 –Wellington Street West exit-ramp bridge, southwest of the *project limits*.

2.4 Terrestrial Species of Conservation Concern

In this report, the term Species of Conservation Concern (SCC) includes: Species at Risk (SAR) (i.e., species that are “designated” by the Committee on the Status of Endangered Wildlife in Canada [COSEWIC] and/or listed under the Species at Risk Act [SARA] and species “designated” by the Committee on the Status of Species at Risk in Ontario [COSSARO], including those [Endangered and Threatened] species listed and regulated under Ontario's Endangered Species Act [ESA 2007]); provincially rare species (NHIC S-rank of S1 to S3); and regionally rare species listed in the *Significant Plant List for Wellington County* (Dougan and Associates 2009) and *Significant Wildlife List for Wellington County* (Dougan and Associates 2009).

Through a background review, 23 terrestrial SCC were identified as having potential to occur in the vicinity of the project, including:

- 5 SAR confirmed by the Guelph MNR to be recorded in the vicinity of the project: Butternut (Endangered) Barn Swallow (Threatened), Snapping Turtle (Special Concern), Eastern Ribbonsnake (Special Concern), and Milksnake (Special Concern) (see Appendix E for agency correspondence);
- 21 SAR identified by the Guelph MNR as being present in the City of Guelph (including the 5 species confirmed by MNR to be recorded within the vicinity of the project); and
- 4 SCC identified by the MNR NHIC database as having potential to exist in the vicinity of the project (including 3 SAR and 1 provincially rare [S1-S3] species).

Of the 23 SCC, 2 are vascular plant species and 21 are wildlife species. Potential habitat for these SCC was examined during field review and a full assessment of habitat suitability and potential for presence in the *broader study area* is included in Appendix F: SAR Screening Table.

Field surveys by MMM Group in December 2012, July and September 2013 confirmed the presence of 11 SCC (3 vascular plants and 8 wildlife species), which are discussed in more detail below.

2.4.1 Vascular Plant SCC

Three vascular plant SCC were confirmed by MMM biologists during field work: one provincially rare plant and two regionally rare plants listed in the *Significant Plant List for Wellington County* (Dougan and Associates 2009). These species are:

- Cup-plant – provincially rare (ranked as S2 by NHIC), was observed along Pond Creek, more than 50m south of the proposed crossing (i.e. within the *broader study area*, not within the *project limits*). However, according to the *Rare Vascular Plants of Ontario: Fourth Edition* (Oldham and Brinker 2009), Cup-plant “appears to be native in floodplain woods along the Thames River; populations elsewhere in the province may be garden escapes”. This occurrence is assumed to be a garden escape.

- Canada Clearweed – ranked “R-A” (i.e. occurrence at between 1 and 10 natural sites in Wellington County) – was observed on the east bank of the Speed River south of the proposed crossing location (i.e. within the *broader study area*, not within the *project limits*) (Unit 8, Mineral Thicket Swamp inclusion); and
- Sand Dune Willow – ranked “R-C” (i.e. added based on records provided by Mike Oldham [NHIC]) – was observed just west of the proposed Wellington Street West crossing (Unit 2C, Mineral Cultural Woodland). This location is within the *project limits*, but contained within the area protected by tree preservation fencing as outlined in Section 4.4.

Several trees examined during field surveys were suspected to be Butternut (*Juglans cinerea*) – a species that is designated as Endangered by COSEWIC and COSSARO, and listed under Schedule 1 of SARA and protected under the ESA (2007). However, all of these trees were later determined to be Butternut Hybrid (*Juglans sp.*) by a certified Butternut assessor, and agreement on this issue was reached with the MNR (See Appendix E for correspondence). These trees are therefore not considered to be SCC for the purposes of this review. However, suitable habitat for Butternut is present in the *broader study area*, along the Speed River.

No suitable habitat is present for Carey's Sedge (*Carex careyana* – S2) within the *project limits* or *broader study area*. The NHIC record for this species is from 1905.

2.4.2 Wildlife SCC

Eight wildlife SCC were observed in the field by MMM staff. Two of these are SAR, one of which is also listed as regionally significant (Dougan and Associates 2009). An additional six are also regionally significant. Species observed include:

- Barn Swallow - Threatened - COSEWIC, COSSARO; species currently receives protection under the ESA, 2007. Barn Swallow was recorded foraging over the *project limits* at the west end of the proposed alignment.
- Chimney Swift - Threatened - COSEWIC, COSSARO; species currently receives protection under the ESA, 2007. Chimney Swift was recorded in the *broader study area*, southwest of the *project limits*.
- Belted Kingfisher (*Ceryle alcyon*), regionally significant.
- Cliff Swallow, regionally significant.
- Common Merganser (*Mergus merganser*), regionally significant.
- Great Blue Heron (*Ardea herodias*), regionally significant.
- Northern Flicker (*Colaptes auratus*), regionally significant.
- Ring-billed Gull (*Larus delawarensis*), regionally significant.

For the additional 19 wildlife SCC identified through the background review, suitable habitat for 5 species occurs in the *project limits*:

- Snapping Turtle - suitable habitat within the Speed River, primarily beyond the *project limits*;

- Eastern Ribbonsnake - low quality suitable habitat within riparian zone of the Speed River; though species prefers slow moving water and wetlands;
- Milksnake - suitable habitat present within the *project limits* and *broader study area*. Milksnake is a habitat generalist so it is difficult to rule out potential for this species based on habitat alone, however there are no occurrences of this species known from the general project area;
- Monarch (*Danaus plexippus*) – suitable habitat along roadsides and in small cultural meadow communities within the *project limits* and *broader study area* where milkweed plants and other wildflowers occur; and
- Rusty-patched Bumblebee (*Bombus affinis*) – limited habitat for this species is present (lightly wooded and urban areas) though the likelihood of this species occurring is extremely limited. The last record of this species occurring in the Guelph area was prior to 2002. The only occurrence of this species in Canada from 2002 to 2010 was in Pinery Provincial Park (Colla and Taylor-Pindar 2011) despite thorough survey work throughout Ontario.

Potential habitat for an additional 3 species is present in the *broader study area*. These include:

- Little Brown Bat (*Myotis lucifugus*);
- Bald Eagle (*Haliaeetus leucocephalus*);
- Blanding's Turtle (*Emydoidea blandingii*); and

For further details regarding habitat availability for SCC within the *broader study area*, see the SAR screening table found in Appendix F.

2.5 Aquatic Ecology

The project located within the Speed River Subwatershed. The proposed watermain and trunk sanitary sewer alignment crosses three watercourses:

- **Howitt and Pond Creeks:** Howitt Creek and Pond Creek are municipal drains that generally flow in a west to east direction through the *broader study area* and *project limits*. These drains discharge into the Speed River in Silvercreek Park. The proposed crossing of Howitt Creek is immediately north of Wellington Street West. Only the proposed watermain will cross Howitt Creek. The proposed crossing of Pond Creek is immediately south of Wellington Street West. Both the proposed watermain and sanitary sewer will cross Pond Creek.
- **Speed River:** The Speed River generally flows south through the town of Guelph and more specifically southeast through the project area prior to its confluence with the Eramosa River. The Speed River then continues to flow southwest, parallel to Wellington Street West. The proposed crossing of Speed River is just north of its confluence with the Eramosa River. Both the watermain and sanitary sewer will cross the Speed River.

2.5.1 Fish Habitat

Howitt Creek Crossing

Howitt Creek in the vicinity of the proposed works has been modified through channel straightening and lining of the banks with stone and concrete (refer to site photos, Appendix D). Through the *broader study area* (downstream of the proposed crossing) this creek consists of an open stone and concrete lined channel. Howitt Creek discharges into the Speed River approximately 48 m downstream from the concrete box culvert under Wellington Street West. Channel characteristics of the drain through the *broader study area* and *project limits* are fairly consistent therefore one reach was characterized.

Through this reach, sediment has been deposited within the concrete lined channel resulting in a slight meandering flow path that ranges from 1.5 to 2.5 m wetted width with a mean depth of 0.15 m. Habitat through this reach is composed primarily of riffles and flats with substrates dominated by sand, gravel and cobble. Riparian vegetation along the concrete channel (on top of bank) in the vicinity of the proposed works is a manicured lawn. In-stream cover is provided by cobble with in-stream emergent vegetation consisting of Reed Canary Grass with some Narrow-leaved Cattail, Broad-leaved Cattail and Purple Loosestrife.

Approximately 2.5 m downstream of the Wellington Street West culvert (and downstream of the proposed crossing location), an existing gravity sewer is exposed and fully elevated above the channel. A berm approximately 0.7 m in height extending from the channel bed has been constructed to support the sewer. Flow is conveyed through the berm and under the gravity sewer via two pipes. This current scenario may function as a barrier to fish movement upstream as the inlet to these pipes was not observed clearly.

Pond Creek Crossing

Pond Creek appears to be a piped feature upstream of Wellington Street West and as such originates as an open channel as it flows from the concrete box culvert with slab under this road. The concrete lined channel discharges into the Speed River approximately 126 m downstream from Wellington Street West. The proposed crossing of Pond Creek is immediately downstream of the culvert outlet (refer to site photos, Appendix D). Channel characteristics through this reach and upstream are fairly consistent therefore one reach was characterized.

The flow through the culvert is laminar. The concrete lined channel averages 2 m high with a wetted width of 2.5 m and a mean depth of 0.3 m. Habitat through this reach is composed primarily of riffles, pools, and flats with substrates dominated by sand, scattered boulders and broken concrete rubble. Riparian vegetation along the concrete channel (on top of bank) was dominated by shrubs including Red-osier Dogwood and Buckthorn. A few young trees and typical roadside cultural meadow species are also present. In-stream cover is provided by mainly boulders and broken concrete rubble with minor woody debris. In-stream vegetation was limited to spotted coverage of submerged algae on the coarse substrates with small patches of emergent vegetation including Reed Canary Grass and Purple Loosestrife.

There is a drop measuring 0.7 m located approximately 5 m downstream from the culvert opening in the vicinity of the proposed crossing. This drop appears to be a barrier to fish movement under low flow conditions; however with the drain completely piped upstream there is limited fish habitat upstream of this seasonal barrier. There is also an existing gravity sewer that is exposed within the channel approximately 77 m downstream of the culvert outlet and downstream of the proposed crossing. The

exposed gravity sewer has limited clearance above the channel bed and as a result minor scouring has occurred as flow is forced beneath it, thereby creating pooling downstream. Although baitfish were observed upstream of this exposed gravity sewer during the December 11th site visit, the limited clearance may prevent passage of larger fish.

Speed River Crossing

The Speed River is a relatively large watercourse that is controlled by a series of dams and weirs to help dissipate energy and reduce erosion. The proposed crossing is located approximately 90 m upstream from the confluence point between the Speed and Eramosa Rivers (refer to site photos, Appendix D). Channel characteristics through this reach and upstream are fairly consistent therefore one reach was characterized (refer to Figure 2, plate 4 [Appendix A]).

During the December 11th site visit, the defined channel flows straight with a mean wetted width of 25 m and a mean depth of 0.25 m. Bankfull widths measured 38.45 m with a bankfull depth of 0.53 m. Habitat through this reach is composed primarily of riffles, and substrates dominated by gravel, cobble, sand and scattered boulders. Evidence of minor bank erosion was observed along the west bank with bank heights ranging from 1 to 2 m high. Riparian vegetation is dominated by Norway Maple and frequent Box Elder along the west bank and Black Walnut, Red-osier Dogwood and Rough-leaved Dogwood along the east bank. Ground cover is limited on the east bank, but includes a mix of cultural meadow and native wetland species on the east bank. Cobble / sand bars were exposed along both banks during time of field investigations, representing low flow conditions. In-stream cover is provided by mainly cobble with minor woody debris and boulders. In-stream vegetation was limited to spotted coverage of algae on the coarse substrates and small patches of Reed Canary Grass along the west bank.

A covered pedestrian bridge is located approximately 50 m downstream of the proposed crossing location and ~ 38 m upstream of the convergence point with Eramosa River. During field investigations, the water abutted the west pier with 5.9 m clearance from the east pier. Substrates along the banks were dominated by sand with some gravel and cobble.

2.5.2 Fish Community

Howitt Creek

There is good connection between Howitt Creek and the Speed River and it is assumed that fish species within the Speed River are able to utilize Howitt Creek as potential foraging / refuge habitat up to the existing exposed gravity sewer which may function as a barrier to fish movement further upstream. During the December 11th site visit, baitfish were observed utilizing the reach downstream of this potential barrier.

Pond Creek

There is good connection between Pond Creek and the Speed River therefore it is assumed that fish species within Speed River are able to utilize this watercourse as potential foraging / refuge habitat. However as noted above, the 0.7 m perch downstream of the Wellington Street West culvert outlet may provide a seasonal barrier to fish movement (though there is limited habitat upstream of this perch). During the December 11th site visit, baitfish were observed utilizing the pools at the culvert outlet (in the vicinity of the proposed works) and pools downstream of the exposed gravity sewer. The limited clearance of the exposed gravity sewer above the channel bed may prevent passage of larger fish.

Speed River

The MNR manages Speed River at this location as a coolwater watercourse; with some warmwater fish species such as Smallmouth Bass (*Micropterus dolomieu*), Largemouth Bass (*Micropterus salmoides*), Common Carp (*Cyprinus carpio*), and Common Shiner (*Luxilus cornutus*). This reach also contains Mottled Sculpin (*Cottus bairdii*), which is a coldwater species. Fish community data (fish dot records) were provided by Art Timmerman, Management Biologist at the Guelph District MNR (Timmerman pers. comm. 2013). The closest occurrence of fish dot records in the Speed River is immediately upstream of the proposed crossing location and is from 2009 (refer to Figure 2, Plate 4 [Appendix A]). Since this record is less than 10 years old, it satisfies the condition set out by GRCA at the October 10th site walk and fish community sampling was therefore not required for this project.

The MNR indicated that the coolwater timing window would apply to all works within the water (i.e. work permitted between July 1st to March 15th).

2.5.3 Aquatic Species of Conservation Concern

Consistent with findings from GENIVAR's background data collection, no aquatic species of concern were identified by the local MNR and none were observed by MMM during field investigations. Communication with the MNR SAR Biologist, Graham Buck (Buck pers comm 2013) indicated that there were no SAR mussels within the proposed impacted area of the Speed River. According to the MNR, the nearest occurrence of SAR mussels within Speed River occurs approximately 21 km downstream of the proposed crossing location (Buck pers. comm. 2013). This is also consistent with DFO SAR mapping which does not delineate any aquatic SAR habitat within the *broader study area* or vicinity.

3.0 Proposed Works - Trunk Sewer and Feedermain Installation

The York Trunk Sewer is a proposed 1200mm diameter sanitary trunk sewer that will run east-west through the City of Guelph parallel to the Speed and Eramosa Rivers. The current Phase (Phase 1) of the York Trunk Sewer is a length of approximately 1700 metres from west of Edinburgh Road in Silvercreek Park to east of the Speed River in York Road Park. The Paisley-Clythe Watermain is a proposed 600mm diameter watermain that will run east-west through the City parallel to the new York Trunk Sewer. Phase 1 of the Paisley-Clythe Watermain is a length of approximately 2200 metres from the Wellington Street West / Waterloo Avenue intersection to east of the Speed River.

The majority of the sewer and watermain alignment will be installed using open-cut techniques, including the crossings of all three watercourses. The one exception is through Royal City Park where services will be installed using trenchless techniques. The proposed works are further described below. The anticipated impacts and associated mitigation measures are described in the following sections (Sections 4.0 and 5.0).

3.1 Howitt Creek and Pond Creek Crossings

The construction of the pipes will include open cut crossings of Howitt Creek, Pond Creek, and the Speed River. Prior to trench construction, coffer dams will be constructed within Howitt Creek/Pond Creek on either side of the proposed trench. A steel culvert pipe will be temporarily placed inside the drainage channel to bypass flows around the coffer dams and the work zone. After construction, Howitt Creek and Pond Creek will be restored to match existing with a minimum of 300 mm of riverstone

placed in the channel bottom. The stone and concrete lined banks will be reinstated following construction.

Only the Paisley-Clythe Watermain will cross Howitt Creek. The watermain will cross Howitt Creek within the north boulevard of Wellington Street West. The trench across Howitt Creek will be approximately 1.8 metres wide and 1.8 metres deep. Unshrinkable fill will be used to backfill the trench.

Both the Paisley-Clythe Watermain and York Trunk Sewer will cross Pond Creek. The pipes will cross Pond Creek just south of Wellington Street West. The watermain and the sanitary sewer will cross Pond Creek in separate trenches. The sanitary sewer trench across Pond Creek will be approximately 3 metres wide and 2.2 metres deep. Concrete encasement will be placed around the sanitary sewer. The watermain trench across Pond Creek will be approximately 1.8 metres wide and 3 metres deep.

3.2 Speed River Crossing

The new York Trunk Sewer is being designed to twin the existing York Trunk Sewer. As such the new York Trunk Sewer must be constructed at the same elevation as the existing sewer, and must match the invert of the existing trunk sewer at either end of the project. These conditions severely constrict the vertical alignment of the sewer, as the vertical alignment of the sewer is essentially set. As a result, there is only about 1 metre of vertical cover over the trunk sewer at the Speed River crossing. MMM consulted with geotechnical engineers and microtunneling contractors who concluded that there is not enough cover at this location to do a trenchless crossing. Therefore, it was determined that the sanitary sewer crossing of the Speed River must be completed using open cut construction techniques along with the watermain in a common trench with a pipe separation of 600 mm.

Construction within the Speed River will be restricted to the low flow season between December 1st and February 28th. The watermain and sanitary sewer will be constructed across the Speed River in two phases, one phase for construction within the west half of the river (60%) and the second phase for construction within the east half of the river (40%). During each phase of construction, a coffer dam will be built around the work zone and the Speed River flows will be maintained within the opposite side of the river. The width of the construction work area within the river during each phase of construction is currently set at 15 m.

Each phase of the work will commence with the installation of appropriate erosion and sediment controls around the work area. The next step will be the construction of the coffer dam to isolate the work area. Surface coffer dams will first be constructed to cut off the flow of water over the ground surface. Once the surface coffer dam is in place, a deep coffer dam will be excavated to the surface of the bedrock, a depth of approximately 1.5 metres. The purpose of the deep coffer dam is to prevent inflow to the trench from the native sand/gravel overburden. Once the deep coffer dam has been installed, the common trench will be excavated. The common trench will have a width of approximately 4.0 metres and a depth of approximately 3 metres from the existing ground surface. Any water encountered in the work area will be pumped out through an Envirotank or filter bags / straw bale areas a minimum of 30 m from the adjacent watercourse or sensitive environmental feature. The trench will be encased in concrete up to the top of bedrock elevation. The trench will be backfilled with native material.

3.3 Storm Box Culvert Outfall to Speed River

As part of the works, the City requested that the study include a new storm box culvert outfall will be constructed to the Speed River in Silvercreek Park (see Figure 2, plate 3, Appendix A). Work will

include the installation of 340 m of an 1800x900 mm storm box culvert, of which approximately 240 m will be constructed in a common trench with the 1200 mm sanitary sewer on Wellington Street, and 100 m will be constructed on its own alignment in the park between Wellington Street and the Speed River. Work will also include a new outfall for the new box culvert at the Speed River, a 1050 mm storm sewer crossing of Wellington Street West and an Oil-Grit Separator on the new box culvert.

The location of the storm box outlet to the Speed River is slightly east of where an existing storm box outlet occurs. The existing storm sewer will be decommissioned with the installation of the new storm sewer. The modified location was selected in part to avoid impacting existing trees within the riparian zone. The Speed River bank in this location is a constructed wall that will be reinstated following construction (See drawing D7).

Erosion and sediment control measures will be installed prior to commencing the work. A coffer dam will be constructed around the work area for the proposed outfall. Armourstone will be placed flush with the riverbed at the outfall location, in order to prevent erosion. Flagstone will be used to reinstate the disturbed slope after construction.

4.0 Impact Assessment

The proposed works along the majority of the alignment will be temporary in nature with all areas disturbed for the installation of services to be restored following construction. The greatest areas of potential impact will be at the Speed River crossing, the crossings of Howitt and Pond Creeks and at the storm box culvert outfall to the Speed River. There is limited vegetation at the Howitt and Pond Creek crossings and at the storm box culvert outfall locations and these work areas will be isolated during construction thereby limiting potential to impact fish and aquatic habitat, as further outlined below. The Speed River crossing location was selected based on a variety of criteria including the location of existing underground infrastructure, adjacent property restrictions, presence and quality of riparian vegetation and the angle of the crossing (i.e. with the goal of crossing as close as feasible to perpendicular). Input to the crossing location was received from the City of Guelph and GRCA staff during the October 10th, 2013 site walk. Nevertheless, disturbance of the riparian vegetation communities on both sides of the river for equipment access and disturbance of the channel bed for the trench excavation and installation of services was unavoidable.

4.1 Impacts to Designated Areas

There will be no direct impacts to the Unevaluated Wetlands south of Eramosa River near its confluence with the Speed River. Mitigation measures will be in place to ensure no sediment release to the Speed River and downstream resources.

The Speed River crossing will occur within a very small portion of the mapped *Waterfowl Winter Concentration Area* that extends throughout the Speed and Eramosa Rivers in the project vicinity. It is anticipated that any waterfowl utilizing the Speed River in the vicinity of the open cut crossing will move away from the disturbance for the period of construction activity and there are no anticipated post-construction effects, once the channel bed has been reinstated and the riparian community restored. The MNR did not provide any timing restrictions relating to this SWH feature.

The Speed River crossing will occur within a very small portion of the mapped City of Guelph *Significant Natural Areas*, where these areas overlap with the Speed River, including *Surface Water and Fish Habitat* and *Significant Wildlife Habitat* (waterfowl overwintering area). Section 6.1.5.4.3 and

Section 6.1.5.8.3 of OPA 42 state that certain uses are permitted within these policy areas including “essential public and private *linear infrastructure* lines and their *normal maintenance*, provided no feasible alternative exists”. The current project would fall under this exemption.

4.2 Impacts to Vegetation Resources

As noted above, most of the impacts to vegetation resources will be temporary in nature with all disturbed areas restored following construction. Although efforts have been made to minimize impacts to trees, the selected alignment will require some tree removals. Tree removals have been determined for trees with diameter at breast height [DBH] greater than 10 cm (see Appendix H: Arborist Report). The required removals are outlined below for each Sector of the alignment.

- Sector 1 – Vegetation impacts in Sector 1 include the removal of 23 trees, and temporary disturbance of tolerant cultural meadow and manicured lawn along the Wellington Street West right-of-way (ROW). A limited amount of riparian vegetation associated with Howitt Creek will also be disturbed for equipment access at the open cut crossing of the creek.
- Sector 2 – Vegetation impacts in Sector 2 include the removal of 27 trees, and temporary disturbance of manicured lawn and tolerant cultural meadow, cultural thicket, and cultural woodland communities. A limited amount of riparian vegetation associated with Pond Creek will also be disturbed for equipment access at the open cut crossing of the creek.
- Sector 3 – Services within Sector 3 will be installed using trenchless technology (tunnelling) thereby limiting the disturbance of vegetation resources through this sector.
- Sector 4 - The open cut crossing of the Speed River requires removal of riparian vegetation for construction access. At the Speed River, 19 trees will be removed (13 on the west side, 6 on the east side). Trees removed include a mix of native and non-native species (e.g. Manitoba Maple, Norway Maple, Black Walnut, Eastern Red Cedar, etc.) ranging in size from 10 cm DBH to 26 cm DBH. Tree removals are detailed on the Landscape Drawings. Given the distance to the proposed crossing location, no disturbance to the thicket swamp inclusion is anticipated.

All of the vegetation communities that will be impacted by the proposed works are common, and have been impacted by previous anthropogenic disturbance. See below (Section 4.4) for a discussion of impacts to Species of Conservation Concern.

Impacts to mature trees in Royal City Park are being avoided by tunneling through this section of the alignment. The Speed River Crossing location was also selected to avoid impacts to mature willow trees along the west bank. Overall, the vegetation removals that will be required are anticipated to be nominal, and limited to areas already impacted to some degree by road and parkland maintenance activities. Tree removals will be replaced at a ratio greater than 3:1 (i.e., for the total of 69 trees removed, 220 native trees will be planted. An additional 244 native shrubs will be planted in the vicinity of the Speed River and 2 creek crossings). Following re-grading and seeding, similar vegetation is expected to regenerate naturally in other areas temporarily disturbed for construction.

4.3 Impacts to Wildlife and Wildlife Habitat

Impacts to wildlife are expected to be negligible given that habitat removals will be temporary and no critical habitats will be affected. The majority of the species observed to be utilizing the affected areas

are common, tolerant species. The mitigation measures outlined in Section 5.0 will ensure that habitat will be restored and that wildlife is not disturbed during critical nesting times. Furthermore, as outlined in Section 5.2, all efforts will be made to ensure that any wildlife incidentally encountered during construction will be protected from harm.

4.4 Impacts to Species of Conservation Concern

Vascular Plant SCC

None of the provincially rare (Cup-plant) or regionally rare (Canada Clearweed and Sand Dune Willow) vegetation species are anticipated to be impacted by the proposed works – they are all located beyond the proposed construction zone for the watermain and sewer alignments:

- Cup-plant – located over 50 m south of the proposed alignment;
- Canada Clearweed – located approximately 20 m south of the proposed alignment; and
- Sand Dune Willow – located beyond the proposed tree preservation fencing.

Wildlife SCC

Impacts to the habitats of Barn Swallow, Chimney Swift and Monarch are not anticipated given that areas of cultural meadows, roadside vegetation and riparian vegetation communities will only be temporarily disturbed and will be restored to a similar or improved condition (i.e. restoration with a greater diversity of native vegetation) following construction. Breeding habitat for Barn Swallow and Chimney Swift will not be affected by the proposed works.

Similarly, the temporary disturbances within the *project limits* will not affect any critical habitat features for the 6 regionally significant bird species recorded (Belted Kingfisher, Cliff Swallow, Common Merganser, Great Blue Heron, Northern Flicker and Ring-billed Gull).

With the implementation of the recommended mitigation measures including procedures for incidental encounters, there are no anticipated effects to Snapping Turtle, Eastern Ribbonsnake or Milksnake or any critical habitat features.

4.5 Impacts to Fish and Fish Habitat

Impacts to fish and fish habitat are considered to be minimal and generally confined to impacts associated with construction activity. Construction activities for the installation of the watermain and sanitary sewer have the potential to result in impacts to fish and fish habitat within and downstream of the alignment including but not limited to:

- transport of deleterious substances to the watercourse (e.g. sediment, fuel, lubricants, etc.);
- alteration of riparian vegetation;
- increased erosion potential;
- changes in primary productivity and nutrient inputs;
- flow alteration; and

- channel scouring.

In addition, potential impacts of in-water work include the direct injury or mortality of fish through dewatering activities. For a complete list of potential impacts relating to the proposed works, refer to Appendix G: Aquatic Effects Assessment Summary Table.

Impacts to fish and fish habitat resulting from in-water work are expected to be minimal and mitigable. The MNR sets restrictive timing windows for in-water work that are based on fish community assemblage and the MNR region in order to avoid potential impacts to downstream fish communities during sensitive spawning periods (MNR 2013). In the impacted area of the Speed River, Largemouth and Smallmouth Bass and Northern Pike are present, making the combined restrictive in-water timing window March 15th to July 15th. Work is expected to occur between December 1st and February 28th, outside the species-restricted timing window and also during the low flow season, minimizing impacts resulting from altered flow paths. Additionally, mitigation measures will be in place to minimize the potential injury / mortality of fish as a result of dewatering activities. All recommended mitigation measures are discussed further below in Section 5.0.

It is anticipated that the implementation of standard Erosion and Sediment Control (ESC) measures will be sufficient to prevent the transport of sediments from the work area downstream. The removal of riparian vegetation along the banks will be minimized and cleared vegetation will be re-planted following the completion of in-water work (See Section 5.1 and Appendix H: Arborist Report and Landscape Plans).

5.0 Mitigation Measures

5.1 Vegetation

The following mitigation measures are recommended to minimize effects to the local vegetation communities and their associated habitat functions:

- Install erosion and sediment control measures prior to vegetation clearing, and maintain throughout construction and until all disturbed ground has been permanently stabilized.
- Clearly delineate vegetation clearing zones and vegetation retention zones (i.e. Tree Preservation Fence and siltation control fencing as shown on contract documents) on both the construction drawings and in the field with the contractor prior to clearing and grading. Equipment, materials and other construction activities will not be permitted in vegetation retention zones.
- Routinely inspect sediment and erosion control structures, including after storms, and repair as required.
- Re-stabilize and re-vegetate exposed surfaces as soon as possible, using native seed mixes and native plant material, following the Landscape Plans found in Appendix H.
- The Environmental Inspector should be notified in the event the Contractor needs to clear additional vegetation beyond the identified limits (to be reviewed in the field).
- In the vicinity of the Speed River, Pond and Howitt Creeks, trees and shrubs to be felled away from the watercourses, to avoid unnecessary disturbance to aquatic areas.

- Dispose of cut and grubbed material through chipping.
- Avoid all unnecessary traffic, dumping and storage of materials over tree root zones adjacent to natural areas
- In dust-sensitive areas, control dust using water and not chemical suppressants.
 - o Conduct vehicle maintenance and fuelling at the designated and properly contained maintenance areas in the works yards or at commercial garages.
 - o Remove and dispose of all construction-related debris following construction in appropriately designated areas.
- Implement environmental inspection during construction to ensure that protection measures are implemented, maintained and repaired and remedial measures are initiated where warranted.
- Ensure equipment and materials storage through the construction period is located in designated and properly contained areas located well away from the river banks and outside of retained vegetation areas.

5.2 Wildlife and Wildlife Habitat

The mitigation measures outlined above to minimize effects to vegetation and protect adjacent natural areas will also protect the associated wildlife habitat. However, it is also necessary to ensure the protection of nesting migratory birds as well as all wildlife that may utilize the area where construction is proposed.

To protect nesting migratory birds, no work is permitted to proceed that would result in the destruction of active nests (nests with eggs or young birds), or the wounding or killing of bird species protected under the *Migratory Birds Convention Act* (MBCA 1994) and / or Regulations under that Act. In order to protect nesting migratory birds, in accordance with the MBCA, the contractor will:

- Ensure that timing constraints are applied to avoid vegetation clearing (including grubbing) during the breeding bird season (Approximately May 1st to August 8th). Occasionally bird species will precede (e.g. mid-April nesting) or exceed (e.g. September) the approximate breeding bird season window. It is the contractor's responsibility to ensure that active nests of migratory species are not disturbed during construction.
- The Contractor shall not destroy active nests (nests with eggs or young birds) of protected migratory birds, including SAR protected under the ESA (2007). When these nests are encountered, the Contractor Administrator must be contacted.
- If a nesting migratory bird is identified within or adjacent to the construction site and the construction activities are such that continuing construction in that area would result in a contravention of the MBCA or ESA (2007), **all activities will stop and MNR and Environment Canada will be contacted to discuss mitigation options**, and/or to obtain a LOA from MNR to follow for species listed under the ESA (2007);
- Additional/modified measures may be required for any SAR and will be determined on a case-by-case basis through consultation with MNR.

The following measures are recommended for the protection of wildlife in general:

- Under no circumstances will any animal (e.g., bird, turtle, snake, mammal) be knowingly harmed, harassed or otherwise disturbed. If an animal is encountered, it will be allowed to move away on its own. In the event that wildlife encountered does not move from the construction zone, the Contract Administrator will be notified. Small wildlife (e.g. turtles, amphibians) stranded within a contained construction zone will be captured and released by a suitably qualified individual (e.g. Environmental Inspector).
- In the event that a SAR or possible SAR is found in the construction area, all construction that could potentially harm the animal will cease immediately and the Contract Administrator will be notified. The Contract Administrator will then contact the MNR SAR Biologist for direction, as these animals are protected under the ESA (2007).

5.3 Fish and Fish Habitat

On June 29th, 2012, amendments to the *Fisheries Act* received Royal Assent. The changes, which came into effect on November 25th, 2013, have re-focused the *Act* on protecting the productivity of recreational, commercial and Aboriginal fisheries by focusing protection rules on real and significant threats to the fisheries and the habitat that supports them, while setting clear standards and guidelines for routine projects. As part of these changes, certain project activities will no longer require DFO review, provided that they meet certain criteria. Projects are still required to avoid causing *serious harm to fish* (in compliance with the *Fisheries Act*) by following best practices such as those described in the *measures to avoid harm*, which have replaced all previous DFO Operational Statements.

MMM biologists have reviewed the changes to the *Fisheries Act* and conclude that works associated with the installation of the sanitary sewer and watermain will not require DFO review as the following project criteria have been met, as further outlined in Table 1. Many of the mitigation measures outlined in the table are repeated in the complete list of mitigation measures following.

- There will be no increase in fill placed below the High Water Mark;
- Channel realignment is not required and channel will not be narrowed;
- Fish passage will not be completely obstructed during a restricted timing window;
- Work will be completed in isolation of flowing water;
- Measures will be taken to avoid killing fish during site isolation; and
- Site will be restored back to existing condition.

Table 1. Fish and Fish Habitat Review Criteria

Criteria / Objective	Mitigation	Is Objective Met?
There will be no increase in fill placed below the High Water Mark.	• Reinstatement of all channel beds at all 3 watercourse crossings (Howitt Creek, Pond Creek and Speed River) will occur in such a way as to match existing conditions, using native material, or as otherwise directed by the CA. An increase in fill material from pre-existing conditions will not be permitted. See drawings D3, D4 and D5 for design details. • No fill will be placed in the Speed River at the storm box outlet.	Yes
Channel realignment is not required and channel will not be narrowed.	• For both the Howitt Creek and Pond Creek crossings flow will be maintained during construction using a steel culvert pipe temporarily placed inside the drainage channel to bypass flows around the coffer dams and the work zone therefor no temporary realignment is required. Following construction both channels will be reinstated to match existing conditions using native material, or as otherwise directed by the CA; not channel narrowing will occur. • The Speed River crossing will be constructed using a 60/40 design whereby flow will be maintained through part of the river while the other part is isolated from flow in order to dig the trench and install the services. The channel will be reinstated to match existing conditions following construction. No narrowing of the channel will occur and an increase in fill material from pre-existing conditions will not be permitted. Refer to drawing D5 and associated contractor notes. • The storm box outlet at the Speed River will not require any narrowing of the Speed River at this location	Yes
Fish passage will not be completely obstructed during a restricted timing window.	• In-water works will occur during winter months (December 1st through February 28th) (i.e. the low flow period) and outside of the fisheries timing window restriction (March 15th to July 15th). • As noted above, and illustrated on drawings D4 and D5, flow will be maintained during construction at all 3 watercourse crossings.	Yes

Criteria / Objective	Mitigation	Is Objective Met?
Work will be completed in isolation of flowing water.	• Cofferdams will be utilized at all three watercourse crossings and at the storm box outlet in order to isolate the work zones. The contractor will be responsible for ensuring the continued functioning of the coffer dams throughout construction. • Any damage caused to the work zone due to flooding or watercourse flows shall be repaired and cofferdams reinstated. Each time the work area is flooded a fish rescue will be performed to ensure that fish are not stranded within the work area upon dewatering.	Yes
Measures will be taken to avoid killing fish during site isolation.	• Prior to dewatering, pumps will be screened to prevent entrainment or impingement of fish. Screens should be located a minimum of 12 inches above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms. • Any trapped fish (including mussel species) within the isolated work area will be removed by a qualified fisheries biologist under permit from the MNR and relocated in a suitable area downstream of the work area. • Each time the work area is flooded a fish rescue will be performed to ensure that fish are not stranded within the work area upon dewatering.	Yes
Site will be restored back to existing condition.	• The open-cut watercourse crossings will be back-filled with native material, or as otherwise directed by the CA. The surface of the concrete encasement will be rough-raked to minimize the potential for the future erosion / scouring of the back-filled material. An increase in fill material from pre-existing conditions will not be permitted. • All exposed surfaces around watercourses will be stabilized and vegetated as soon as possible following construction, using native seed mixes and native plant material, following the Landscape Plans found in Appendix H.	Yes

Given the proper implementation of the proposed mitigation measures (below), MMM biologists have determined that the proposed works will not result in *serious harm to fish* and therefore will not contravene the *Fisheries Act*. However, it should be noted that changes to the implementation of the *Fisheries Act* (in effect November 2013) is an ongoing process and these changes may affect the proposed works in the near future. As a result it is recommended that the project impacts be reviewed once again prior to construction in order to ensure compliance with the Act and its implementation.

As previously mentioned, all in-water works will be completed during the low flow season between December 1st and February 28th and outside of the MNR restrictive fisheries timing window of March 15th to July 15th. It is anticipated that potential adverse effects associated with construction not addressed by construction timing can be mitigated through standard construction Best Management Practices (BMPs) and the restoration of any disturbed areas, as outlined in Appendix G. An ESC Plan will be prepared by the Contractor for the proposed installation of watermain and sanitary sewer with the objective that zero sediment enters the watercourse during or after construction. To minimize residual effects to fish and fish habitat, BMPs and an ESC plan should include, but not be limited to, the following:

- All machinery shall arrive on site in a clean condition and be maintained free of fluid leaks, invasive species and noxious weeds.
- Construction within the cofferdam area shall occur in the dry. All water pumped from the work area shall be directed through Envirotanks or filter bags / straw bale areas at a minimum of 30 m from the adjacent watercourse or sensitive environmental feature.
- Prior to dewatering, pumps will be screened to prevent entrainment or impingement of fish. Screens should be located a minimum of 12 inches above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms.
- Any trapped fish (including mussel species) within the isolated work area will be removed by a qualified fisheries biologist under permit from the MNR and relocated in a suitable area downstream of the work area.
- Any damage caused to the work zone due to flooding or watercourse flows shall be repaired and cofferdams reinstated. Each time the work area is flooded a fish rescue will be performed to ensure that fish are not stranded within the work area upon dewatering.
- Cofferdams shall be placed immediately prior to construction in the watercourse areas and shall be removed immediately after the engineer approves the watercourse and wall reinstatement (Howitt Creek). Should the cofferdam begin to leak, the contractor shall immediately fix the leak.
- The Contractor shall maintain an adequate supply of suitable material (e.g. pea gravel filled sandbags, concrete barriers, poly sheets, etc.) for coffer dam construction, maintenance and modification.
- Energy from flow bypass around Howitt and Pond Creek work areas will be dissipated using a riverstone splash pad prior to re-entering the watercourse downstream of the cofferdam.

- All in-water works shall be completed during the low flow season between December 1st and February 28th and outside the restrictive fisheries timing window of March 15th to July 15th. Duration of in-water work should be minimized as much as possible.
- Equipment shall not be permitted in the watercourse outside the cofferdam area, unless otherwise permitted by the MNR.
- Prior to the removal of vegetation, site specific ESC measures must be in place and will be maintained until all disturbed ground has been permanently stabilized (see Contract Documents). Grubbing activities will be delayed until immediately prior to construction. Silt fencing will be installed to isolate the work area and reduce the potential for the transport of sediments from stockpiled material into the identified watercourses and natural features adjacent to the work area.
- Protect retained vegetation with Tree Preservation Fencing and stabilize exposed soils with vegetation where possible.
- Materials removed or stockpiled during construction must be deposited and contained in a manner to ensure sediment does not enter a watercourse and be appropriately stored in an area at least 30 m away from the watercourse.
- All exposed mineral soil shall be treated as quickly as possible to prevent erosion and sediment from entering the watercourse.
- The area within the silt fencing around Howitt Creek, Pond Creek and the Speed River is to be monitored regularly and if erosion problems develop, immediate action is to be taken. Any accumulated sediment within the work area (e.g. abutting silt fencing or within trench) will be removed regularly.
- Avoid / minimize work during wet weather conditions (monitor forecast conditions).
- The open-cut watercourse crossings will be back-filled with native material, or as otherwise directed by the CA. The surface of the concrete encasement will be rough-raked to minimize the potential for the future erosion / scouring of the back-filled material. An increase in fill material from pre-existing conditions will not be permitted.
- The Contractor will adaptively manage the site in a manner that the objectives of the mitigation plan are met. In the event that unforeseen events (e.g. heavy rainfall) cause the strategies set out in the plan to be insufficient or inappropriate, the Contractor will respond in a timely manner with all reasonable measures consistent with safety to prevent, counteract or remedy any effects on fish or fish habitat that may result.
- Spill reporting procedures shall be used to report any unexpected discharge, silt, sediment or other deleterious substance within the watercourse to the relevant regulatory agencies.
- The Contractor is responsible for ensuring that an appropriate contingency / response plan is in place in the event of a spill / breach and have all necessary materials on site. The contingency plan equipment that shall be onsite throughout the duration of the construction period shall include at a minimum:
 - o Erosion control screen and stakes;
 - o Fuel spill equipment/Emergency spill kit;
 - o Spare pump and fuel; and,
 - o Clean gravel fill

In addition to the above mitigation measures, it is recommended that, prior to construction activities, an on-site meeting take place with project contractors, engineers and biologists to ensure all mitigation measures are in place and functional.

6.0 Conclusions

With the implementation of all recommended mitigation measures, the installation of the sanitary sewer and watermain within the *project limits* is not anticipated to result in adverse effects to vegetation, wildlife, wildlife habitat, SCC or fish and fish habitat. Construction of the 3 open-cut watercourse crossings will be restricted to the winter months (between December 1st and February 28th) in order to comply with the fisheries timing window for cool water systems.

As the City of Guelph is planning to tender the project by the end of January, we would appreciate your timely review and issuance of the permit. If you require additional information or clarification regarding this information, please contact the undersigned at drosth@mmm.ca or (519)-741-1464 ext. 2240.

Sincerely,
MMM Group Limited



Heather Drost, B.Sc.
Project Ecologist - Botanist
Ecology Department

cc: Adele Labbé (City of Guelph)
Majde Qaqish (City of Guelph)
Mani Ruprai (MMM)

Enclosed: Permit Application Form
Permit Application Fee Payment (*cheque*)

Appendix A: *Figure 1: Key Map*
Figure 2: Plates (1-4): Terrestrial and Aquatic Features
Appendix B: Plant Species List
Appendix C: Wildlife Species List
Appendix D: Site Photos
Appendix E: Correspondence
Appendix F: SAR Screening Table
Appendix G: Aquatic Effects Assessment Summary Table
Appendix H: Arborist Report and Landscape Plans

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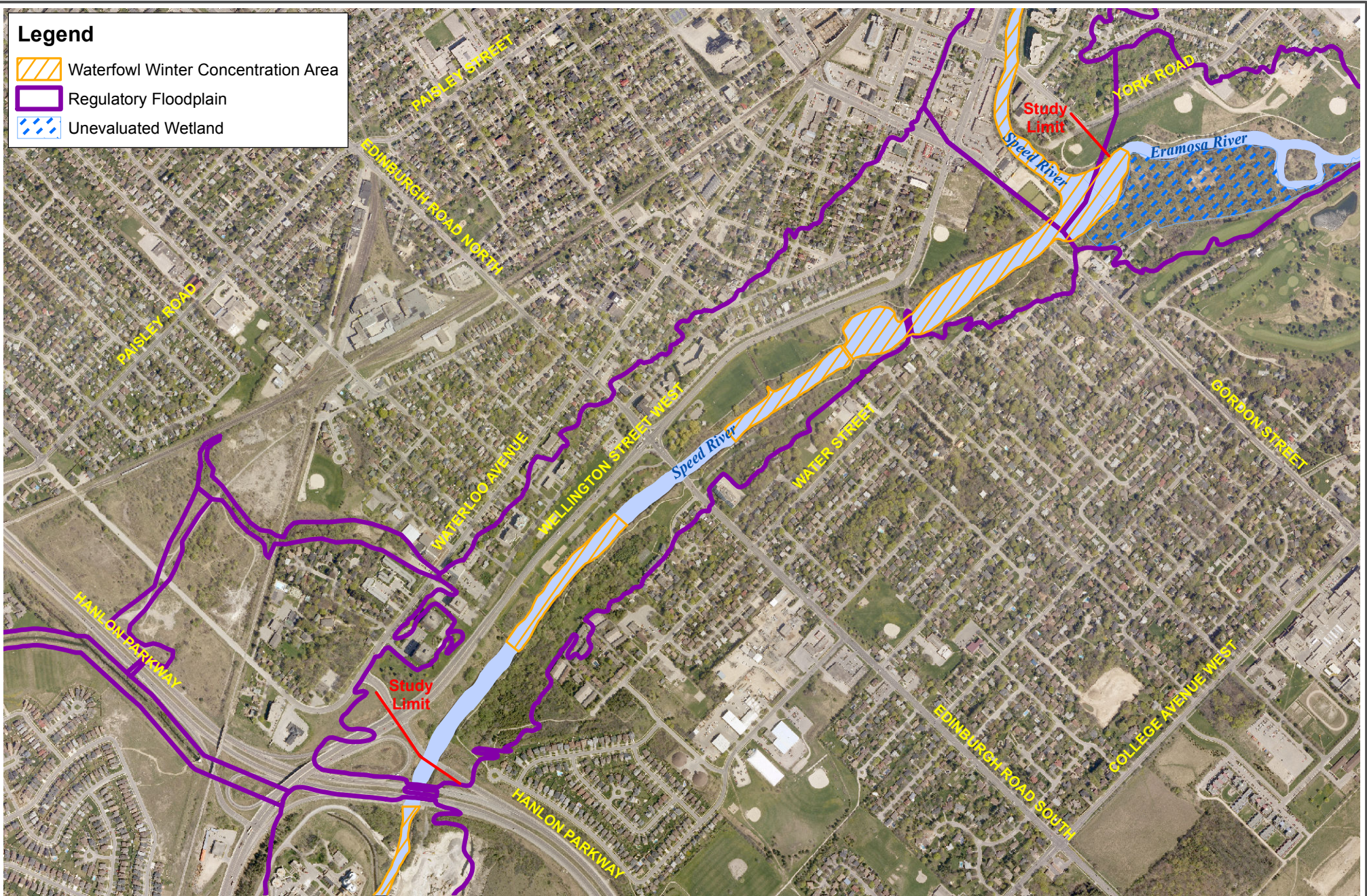
References

- Bird Studies Canada, Environment Canada's Canadian Wildlife Service, Ontario Nature, Ontario Field Ornithologists and Ontario Ministry of Natural Resources. 2006. Ontario Breeding Bird Atlas Website. <http://www.birdsontario.org/atlas/index.jsp>
- Brooks, R. J. 2007. The biology, status and conservation of Canadian freshwater turtles. *Herpetological Conservation* 2: 57-84.
- Buck, G. 2013. Personal Communication with Graham Buck, Guelph District MNR SAR Biologist. Email dated October 29, 2013.
- City of Guelph. 2010. Official Plan Amendment Number 42: Natural Heritage System. [<http://guelph.ca/wp-content/uploads/OfficialPlanAmendment42.pdf>].
- Colla, S. R. and A. Taylor-Pindar. 2011. Recovery Strategy for the Rusty-patched Bumble Bee (*Bombus affinis*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. vi + 21 pp.
- COSEWIC. 2013. Canadian Species at Risk. Committee on the Status of Endangered Wildlife in Canada. [http://www.cosewic.gc.ca/eng/sct5/index_e.cfm].
- Dougan and Associates 2009. City of Guelph's Natural Heritage Strategy. Guelph, Ontario.
- GENVIAR 2009. York Trunk Sewer and Paisley-Clythe Feedermain Municipal Class Environmental Assessment. City of Guelph. Guelph, Ontario.
- Forest Gene Conservation Association (FGCA). 2011. About Butternut. [http://fgca.net/conservation/sar/butternut_about.aspx].
- Lee, H. T, W.D. Bakowsky, J. L. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray, 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southcentral Region, Science Development and Transfer Branch. Technical Manual ELC-005.
- MacCulloch, R.D. 2002. The ROM Field Guide to Amphibians and Reptiles of Ontario. Royal Ontario Museum. Toronto, Ontario.
- Marriott. D. 2013. Personal Communication with Dave Marriott, Guelph MNR District Planner. Email dated January 13, 2013.
- Michigan Flora Online. A. A. Reznicek, E. G. Voss, & B. S. Walters. February 2011. University of Michigan. Web. January 16, 2014. <http://michiganflora.net/species.aspx?id=927>.

- Ministry of Natural Resources. 2013. Species at Risk in Ontario (SARO) List.
[http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_CSSR_SARO_LST_EN.html].
- Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section. Science Development and Transfer Branch, Southcentral Science Section. 151pp. + appendices.
- Natural Heritage Information Centre. 2013. Natural Heritage Information Centre Website.
[<http://nhic.mnr.gov.on.ca/nhic.cfm>].
- NatureServe. 2011. NatureServe Explorer. [<http://www.natureserve.org/explorer/>].
- Newmaster, S. G., A. Lehela, P.W.C. Uhlig, S.McMurray and M.J. Oldham. 1998. Ontario Plant List. Ontario Ministry of Natural Resources, Ontario Forest Research Institute, Sault Ste. Marie, Ontario, Forest Research Information Paper No. 123, 550 pp. + appendices
- Oldham, M. J. and S. R. Brinker. 2009. Rare Vascular Plants of Ontario. Fourth Edition. Natural Heritage Information Centre, Ministry of Natural Resources. Peterborough, Ontario.
- Oldham, M. J., W. D. Bakowsky and D. A. Sutherland. 1995. Floristic Quality Assessment System for Southern Ontario. Natural Heritage Information Centre, Ministry of Natural Resources. Peterborough, Ontario.
- Reitsma, L., Goodnow, M., Hallworth, M. T., and C. J. Conway. 2010. Canada Warbler (*Cardellina canadensis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online. [<http://bna.birds.cornell.edu/bna/species/421>].
- Timmerman, A. 2013. Personal Communication with Art Timmerman, Guelph District MNR Biologist. Email dated October 22, 2013

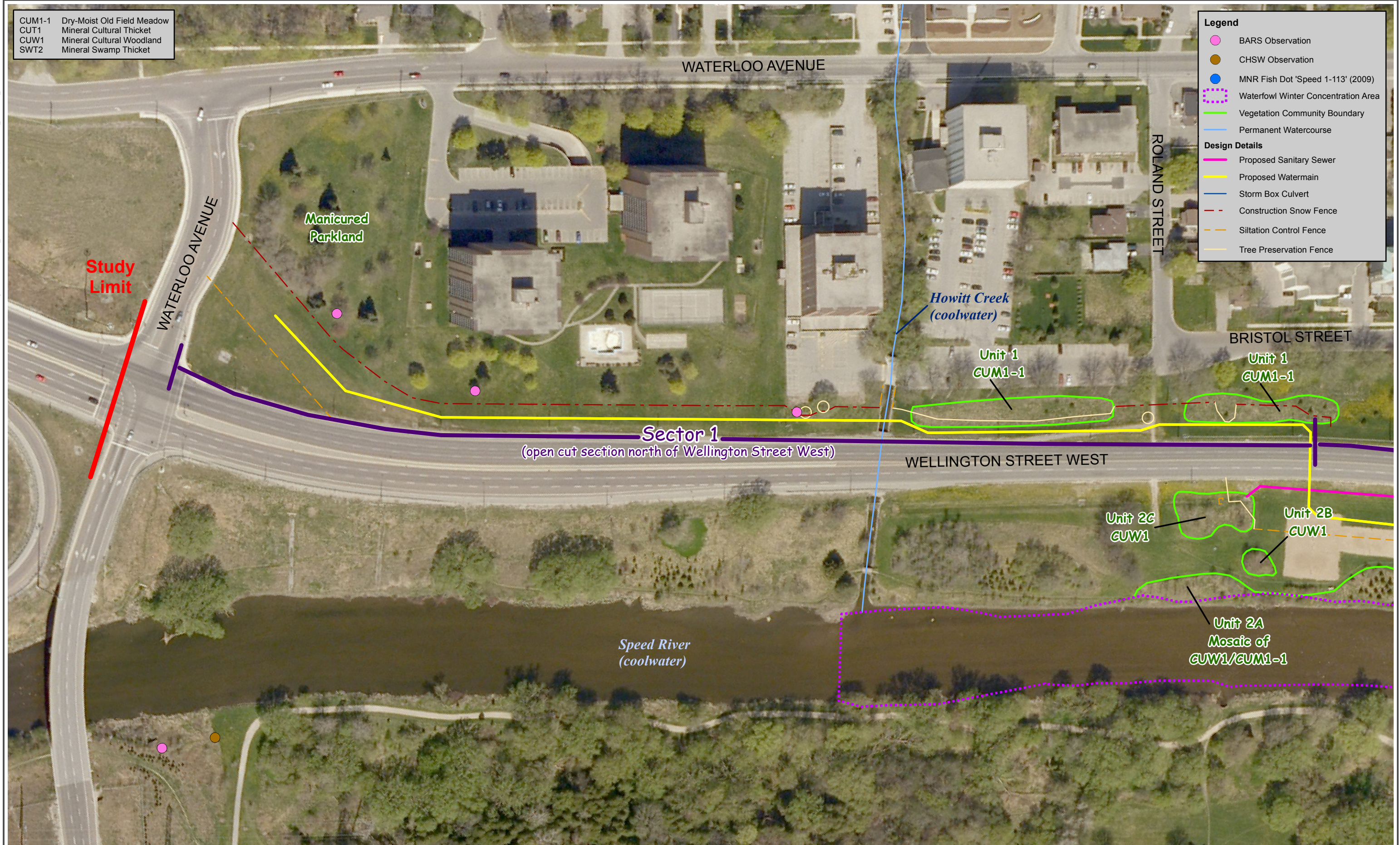
APPENDIX A

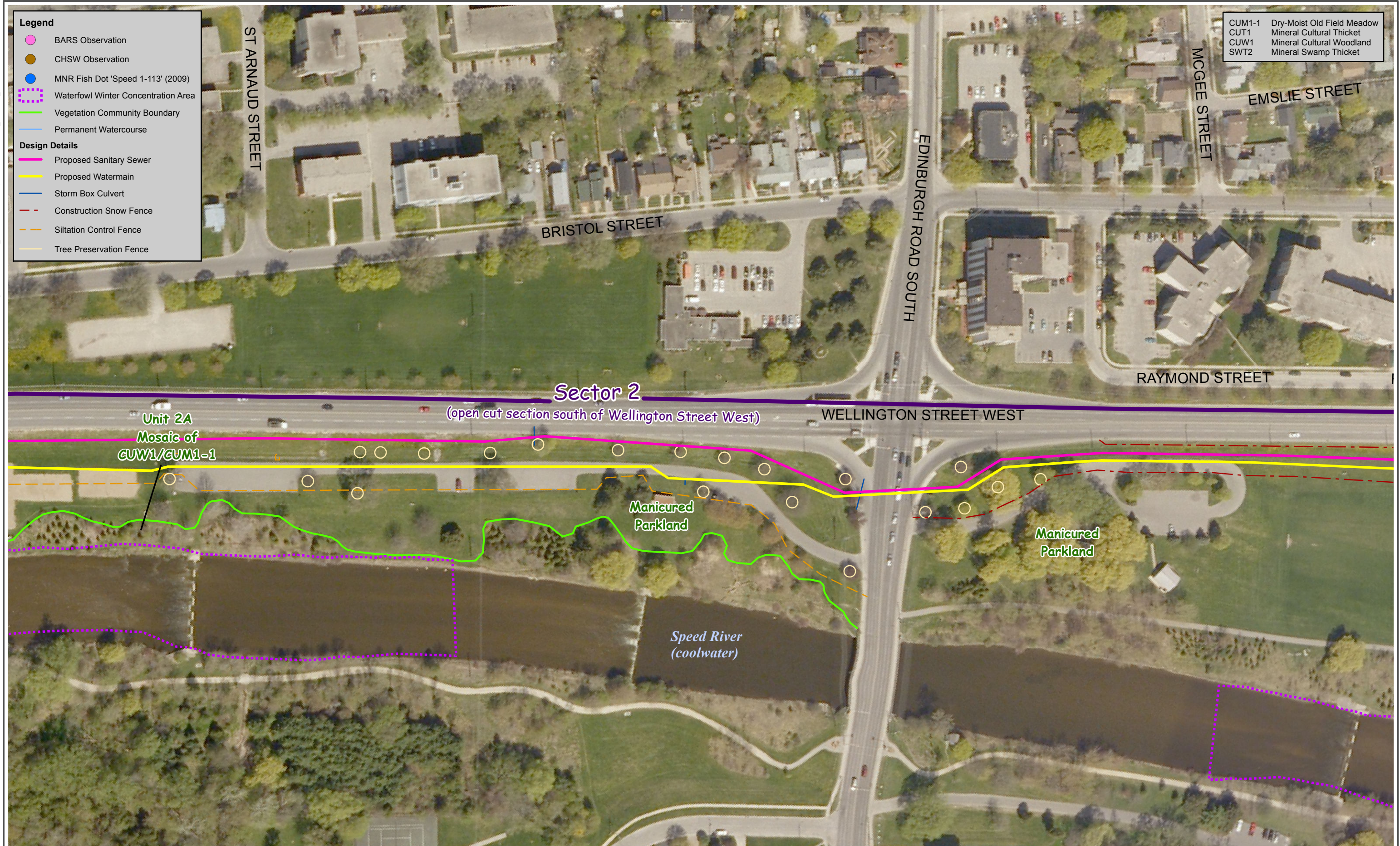
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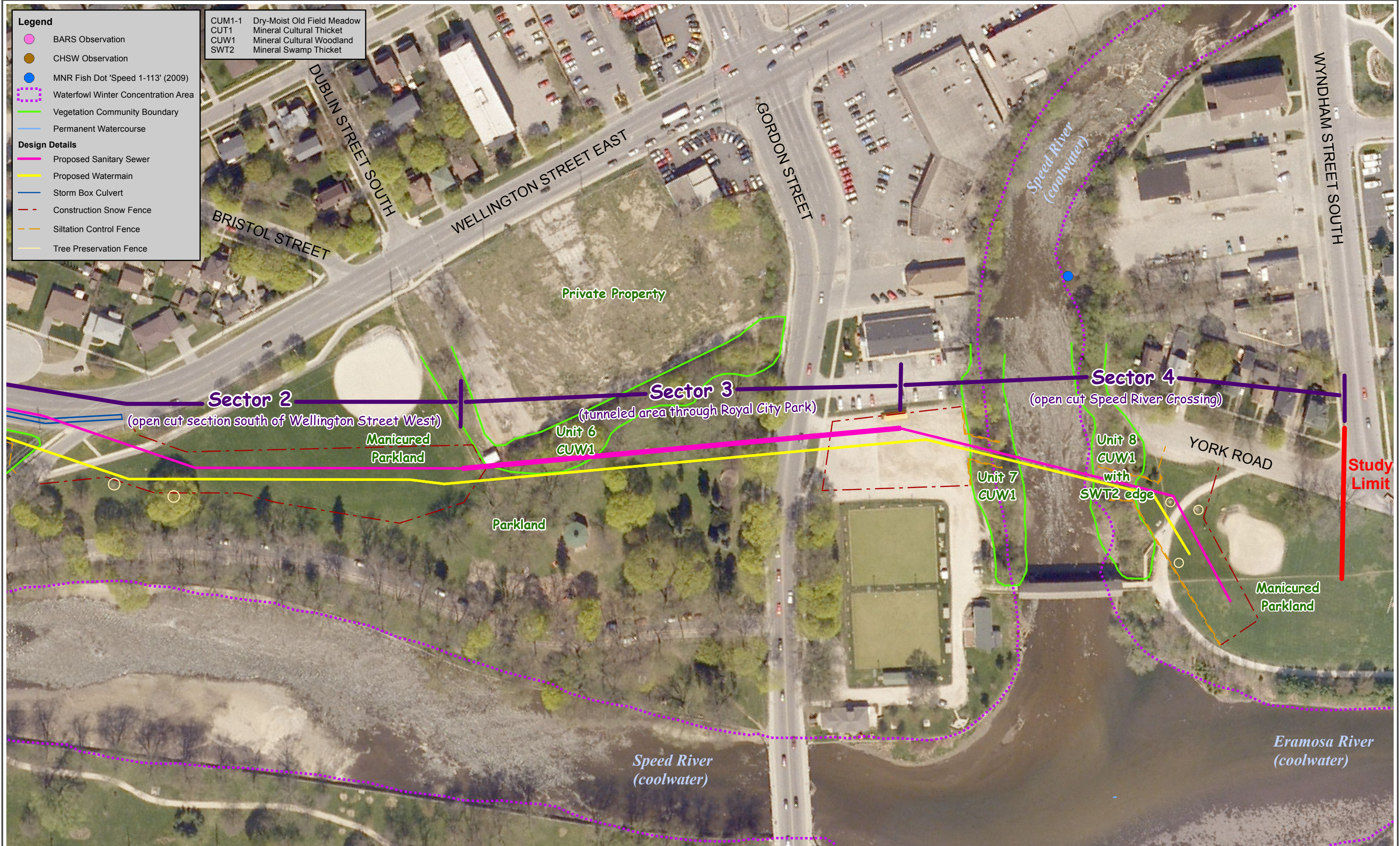
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-  Waterfowl Winter Concentration Area
-  Regulatory Floodplain
-  Unevaluated Wetland









APPENDIX B

Plant List

Appendix B: Plant List

COMMON NAME	SCIENTIFIC NAME	cc ¹	cw ¹	Grank ²	Srank ³	COSEWIC ⁴	MNR ⁵	SARA Status ⁶	Schedule ⁶	Wellington Region ⁷
Box Elder	<i>Acer negundo</i>	0	-2	G5	S5					
Norway Maple	<i>Acer platanoides</i>	*	5	GNR	SNA					
Freeman's Maple	<i>Acer X freemanii</i>			GNA	SNR					
Garlic Mustard	<i>Alliaria petiolata</i>	*	0	GNR	SNA					
Green Alder	<i>Alnus viridis spp. crispa</i>			G5TNR	S5					
Annual Ragweed	<i>Ambrosia artemisiifolia</i>	0	3	G5	S5					
Serviceberry Species	<i>Amelanchier sp</i>									
Lesser Burdock	<i>Arctium minus</i>	*	5	GNR	SNA					
Kansas Milkweed	<i>Asclepias syriaca</i>	0	5	G5	S5					
Paper Birch	<i>Betula papyrifera</i>	2	2	G5	S5					
Devil's Beggar's Ticks	<i>Bidens frondosa</i>	3	-3	G5	S5					
Awnless Brome	<i>Bromus inermis ssp inermis</i>	*	5	GNR	SNA					
Pennsylvania Sedge	<i>Carex pensylvanica</i>	5	5	G5	S5					
Sedge Species	<i>Carex sp</i>									
Brown Starthistle	<i>Centaurea jacea</i>	*	5	G?	SNA					
Common Mouse-ear Chickweed	<i>Cerastium fontanum</i>	*	3	GNR	SNA					
Greater Celadine	<i>Chelidonium majus</i>	*	5	GNR	SNA					
Chicory	<i>Cichorium intybus</i>	*	5	GNR	SNA					
Enchanter's Nightshade	<i>Circaea lutetiana ssp canadensis</i>	3	3	G5T5	S5					
Creeping Thistle	<i>Cirsium arvense</i>	*	3	GNR	SNA					
Bull Thistle	<i>Cirsium vulgare</i>	*	4	GNR	SNA					
Rough-leaved Dogwood	<i>Cornus drummondii</i>	4	0	G5	S4					
Red-osier Dogwood	<i>Cornus sericea</i>	2	-3	G5	S5					
Crown-vetch	<i>Coronilla varia</i>	*	5	GNR	SNA					
Queen Anne's Lace	<i>Daucus carota</i>	*	5	GNR	SNA					
Fuller's Teasel	<i>Dipsacus fullonum</i>	*	5	GNR	SNA					
Creeping Wild Rye	<i>Elymus repens</i>	*	3	GNR	SNA					
Wild-rye Species	<i>Elymus sp</i>									
Small-flower Willow-herb	<i>Epilobium parviflorum</i>	*	3	GNR	SNA					
Eastern Helleborine	<i>Epipactis helleborine</i>	*	5	GNRS	SNA					
White-top Fleabane	<i>Erigeron annuus</i>	0	1	G5	S5					
Philadelphia Fleabane	<i>Erigeron philadelphicus var. philadelphicus</i>	1	-3	G5T5	S5					
Glossy Buckthorn	<i>Frangula alnus</i>	*	-1	GNR	SNA					
Green Ash	<i>Fraxinus pennsylvanica</i>	3	-3	G5	S5					
Marsh Bedstraw	<i>Galium palustre</i>	5	-5	G5	S5					
Yellow Avens	<i>Geum aleppicum</i>	2	-1	G5	S5					
Avens Species	<i>Geum sp</i>									

COMMON NAME	SCIENTIFIC NAME	cc ¹	cw ¹	Grank ²	Srank ³	COSEWIC ⁴	MNR ⁵	SARA Status ⁶	Schedule ⁶	Wellington Region ⁷
Ground Ivy	<i>Glechoma hederacea</i>	*	3	GNR	SNA					
Grass Species	<i>Grass sp</i>									
Virginia Stickseed	<i>Hackelia virginiana</i>	5	1	G5	S5					
Dame's Rocket	<i>Hesperis matronalis</i>	*	5	G4G5	SNA					
St. John's-wort	<i>Hypericum perforatum</i>	*	5	GNR	SNA					
Orange Jewelweed	<i>Impatiens capensis</i>	4	-3	G5	S5					
Iris Species	<i>Iris sp</i>									
Black Walnut	<i>Juglans nigra</i>	5	3	G5	S4					
Butternut Hybrid	<i>Juglans sp</i>									
Ground Juniper	<i>Juniperus communis</i>	4	3	G5	S5					
American Larch	<i>Larix laricina</i>	7	-3	G5	S5					
Cutgrass Species	<i>Leersia sp</i>									
Common Motherwort	<i>Leonurus cardiaca ssp. cardiaca</i>	*	5	GNRTNR	SNA					
Butter-and-eggs	<i>Linaria vulgaris</i>	*	5	GNR	SNA					
Tartarian Honeysuckle	<i>Lonicera tatarica</i>	*	3	GNR	SNA					
Purple Loosestrife	<i>Lythrum salicaria</i>	*	-5	G5	SNA					
Common Apple	<i>Malus pumila</i>	*	5	G5	SNA					
Black Medic	<i>Medicago lupulina</i>	*	1	GNR	SNA					
Wild Bergamot	<i>Monarda fistulosa</i>	6	3	G5	S5					
Dillen's Wood Sorrel	<i>Oxalis dillenii</i>	0	3	G5	S5?					
Thicket Creeper	<i>Parthenocissus vitacea</i>			G5	S5					
Reed Canary Grass	<i>Phalaris arundinacea</i>	0	-4	G5	S5					
Meadow Timothy	<i>Phleum pratense</i>	*	3	GNR	SNA					
Common Reed	<i>Phragmites australis</i>	0	-4	G5	S4?					
Eastern Ninebark	<i>Physocarpus opulifolius</i>	5	-2	G5	S5					
White Spruce	<i>Picea glauca</i>	6	3	G5	S5					
Spruce Species	<i>Picea sp</i>									
Canada Clearweed	<i>Pilea pumila</i>	5	-3	G5	S5					R-A
Red Pine	<i>Pinus resinosa</i>	8	3	G5	S5					
English Plantain	<i>Plantago lanceolata</i>	*	0	G5	SNA					
Bluegrass Species	<i>Poa sp</i>									
Eastern Cottonwood	<i>Populus deltoides ssp. deltoides</i>	4	-1	G5T5	SU					
Quaking Aspen	<i>Populus tremuloides</i>	2	0	G5	S5					
Sweet Cherry	<i>Prunus avium</i>	*	5	GNR	SNA					
Choke Cherry	<i>Prunus virginiana var. virginiana</i>	2	1	G5T5	S5					
White Oak	<i>Quercus alba</i>	6	3	G5	S5					
Bur Oak	<i>Quercus macrocarpa</i>	5	1	G5	S5					
Northern Red Oak	<i>Quercus rubra</i>	6	3	G5	S5					

COMMON NAME	SCIENTIFIC NAME	cc ¹	cw ¹	Grank ²	Srank ³	COSEWIC ⁴	MNR ⁵	SARA Status ⁶	Schedule ⁶	Wellington Region ⁷
Tall Buttercup	<i>Ranunculus acris</i>	*	-2	G5	SNA					
Buckthorn	<i>Rhamnus cathartica</i>	*	3	GNR	SNA					
Staghorn Sumac	<i>Rhus typhina</i>	1	5	G5	S5					
Wild Black Currant	<i>Ribes americanum</i>	4	-3	G5	S5					
Black Locust	<i>Robinia pseudoacacia</i>	*	4	G5	SNA					
Rambler Rose	<i>Rosa multiflora</i>	*	3	GNR	SNA					
Black Raspberry	<i>Rubus occidentalis</i>	2	5	G5	S5					
Curly Dock	<i>Rumex crispus</i>	*	-1	GNR	SNA					
White Willow	<i>Salix alba</i>	*	-3	G5	SNA					
Sand Dune Willow	<i>Salix cordata</i>	9	-1	G4	S4S4					R-C
Common Elderberry	<i>Sambucus nigra ssp. canadensis</i>	5	-2	G5	S5					
Stonecrop Species	<i>Sedum sp</i>									
Cup-plant	<i>Silphium perfoliatum var perfoliatum</i>	9	-2	G5T5?	S2					
Climbing Nightshade	<i>Solanum dulcamara</i>	*	0	GNR	SNA					
Tall Goldenrod	<i>Solidago altissima</i>	1	3	G5	S5					
Canada Goldenrod	<i>Solidago canadensis</i>	1	3	G5	SNR					
Field Sowthistle	<i>Sonchus arvensis ssp arvensis</i>	*		GNRTNR	SNA					
Panicked Aster	<i>Symphyotrichum lanceolatum ssp. lanceolatum</i>			G5T5	S5					
Calico Aster	<i>Symphyotrichum lateriflorum var. lateriflorum</i>	3	-2	G5T5	SNR					
New England Aster	<i>Symphyotrichum novae-angliae</i>	2	-3	G5	S5					
White Heath Aster	<i>Symphyotrichum pilosum var. pilosum</i>	4	2	G5T5	S5					
Purple-stemmed Aster	<i>Symphyotrichum puniceum var. puniceum</i>	6	-5	G5T5	S5					
Common Lilac	<i>Syringa vulgaris</i>	*	5	GNR	SNA					
Common Dandelion	<i>Taraxacum officinale</i>	*	3	G5	SNA					
Northern White Cedar	<i>Thuja occidentalis</i>	4	-3	G5	S5					
American Basswood	<i>Tilia americana</i>	4	3	G5	S5					
Littleleaf Linden	<i>Tilia cordata</i>			GNR	SNA					
Goat's-beard Species	<i>Tragopogon sp</i>									
Narrow-leaved Cattail	<i>Typha angustifolia</i>	3	-5	G5	SNA					
Broad-leaf Cattail	<i>Typha latifolia</i>	3	-5	G5	S5					
American Elm	<i>Ulmus americana</i>	3	-2	G5?	S5					
Siberian Elm	<i>Ulmus pumila</i>	*	5	GNR	SNA					
Common Mullein	<i>Verbascum thapsus</i>	*	5	GNR	SNA					
Maple-leaf Viburnum	<i>Viburnum acerifolium</i>	6	5	G5	S5					
Nannyberry	<i>Viburnum lentago</i>	4	-1	G5	S5					
Guelder-rose Viburnum	<i>Viburnum opulus</i>	*	0	G5	SNA					
Riverbank Grape	<i>Vitis riparia</i>	0	-2	G5	S5					

Legend

Accepted Name and Author

Accepted Name and Author were updated primarily using NatureServe Explorer (Updated August 2010), in combination with the Integrated Taxonomic Information System (ITIS), United States Department of Agriculture (USDA) Plants Database, and the New York Flora Atlas.

United States Department of Agriculture Plants Database,

NatureServe Explorer: <http://www.natureserve.org/explorer/index.htm>

ITIS: <http://www.itis.gov/>

USDA Plants: <http://plants.usda.gov/java/>

New York Flora Atlas: <http://newyork.plantatlas.usf.edu/Default.aspx>

¹Coefficient of Conservatism and Coefficient of Wetness

CC = Coefficient of Conservatism. Rank of 0 to 10 based on plants degree of fidelity to a range of synecological parameters: (0-3) Taxa found in a variety of plant communities; (4-6) Taxa typically associated with a specific plant community but tolerate moderate disturbance; (7-8) Taxa associated with a plant community in an advanced successional stage that has undergone minor disturbance; (9-10) Taxa with a high fidelity to a narrow range of synecological parameters.

CW = Coefficient of Wetness. -Value between 5 and -5. A value of -5 is assigned to Obligate Wetland (OBL) and 5 to Obligate Upland (UPL), with intermediate values assigned to the remaining categories.

Oldham, M. J., W. D. Bakowsky and D. A. Sutherland. 1995. *Floristic Quality Assessment System for Southern Ontario*. Natural Heritage Information Centre, Ministry of Natural Resources. Peterborough, Ontario.

²G-Rank (global)

Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

(Global Status from MNR Biodiversity Explorer September 2012)

Global (G) Conservation Status Ranks

G1 Extremely rare—usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G2 Very rare—usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.

G3 Rare to uncommon—usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.

G4 Common—usually more than 100 occurrences; usually not susceptible to immediate threats.

G5 Very common—demonstrably secure under present conditions.

Variant Ranks

G#G# - Range Rank – A numeric range rank (e.g., G2G3, G1G3) is used to indicate the range of uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g., GU should be used rather than G1G4).

GU – Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible (when the range of uncertainty is three

consecutive ranks or less), a range rank (e.g., G2G3) should be used to delineate the limits (range) of uncertainty.

GNR – Unranked – Global rank not yet assessed

GNA – Not Applicable – A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

Rank Qualifiers

? - Inexact Numeric Rank—Denotes inexact numeric rank; this should not be used with any of the Variant Global Conservation Status Ranks or GX or GH.

Q - Questionable taxonomy that may reduce conservation priority—Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The “Q” modifier is only used at a global level and not at a national or subnational level.

C - Captive or Cultivated Only—Taxon or ecosystem at present is presumed or possibly extinct or eliminated in the wild across their entire native range but is extant in cultivation, in captivity, as a naturalized population (or populations) outside their native range, or as a reintroduced population or ecosystem restoration, not yet established. The “C” modifier is only used at a global level and not at a national or subnational level. Possible ranks are GXC or GHC. This is equivalent to “Extinct” in the Wild (EW) in IUCN’s Red List terminology (IUCN 2001).

³S-Ranks (provincial)

Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

(Provincial Status from MNR Biodiversity Explorer September 2012)

S1 Critically Imperiled—Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled—Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure—Common, widespread, and abundant in the nation or state/province.

S#S# Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

SX Presumed Extirpated - Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.

SH Possibly Extirpated (Historical) - Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for

which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.

SNR Unranked – Nation of state/province conservation status not yet assessed.

SU Unrankable – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

SNA Not Applicable – A conservation status rank is not applicable because the species is not a suitable target for conservation activities.¹

⁴COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

(federal status from COSEWIC November 2012)

EXT Extinct - A species that no longer exists.

EXP Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.

END Endangered - A species facing imminent extirpation or extinction.

THR Threatened - A species likely to become endangered if limiting factors are not reversed.

SC Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

NAR Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.

DD Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

⁵OMNR (Ontario Ministry of Natural Resources)

(provincial status from MNR January 13, 2012)

The provincial review process is implemented by the MNR's Committee on the Status of Species at Risk in Ontario (COSSARO).

EXT Extinct—A species that no longer exists anywhere.

EXP Extirpated—A species that no longer exists in the wild in Ontario but still occurs elsewhere.

END Endangered - A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's Endangered Species Act (ESA).

THR Threatened—A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.

SC Special Concern (formerly Vulnerable) —A species with characteristics that make it sensitive to human activities or natural events.

NAR Not at Risk—A species that has been evaluated and found to be not at risk.

DD Data Deficient (formerly Indeterminate) —A species for which there is insufficient information for a provincial status recommendation.

⁶ SARA (Species at Risk Act) Status and Schedule

The Act establishes Schedule 1, as the official list of species at risk. It classifies those species as being either Extirpated, Endangered, Threatened, or a Special Concern. Once listed, the measures to protect and recover a listed species are implemented.

EXT Extinct - A species that no longer exists.

EXP Extirpated - A species that no longer exists in the wild in Canada, but exists elsewhere in the wild.

END Endangered - A species that is facing imminent extirpation or extinction.

THR Threatened - A species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

SC Special Concern - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

¹ Added on June 4, 2013 from <http://nhic.mnr.gov.on.ca/glossary/srank.cfm>

Schedule 1: is the official list of species that are classified as extirpated, endangered, threatened, and of special concern.

Schedule 2: species listed in Schedule 2 are species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

Schedule 3: species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

The Act establishes Schedule 1 as the official list of species at risk. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern.

Species that were designated at risk by COSEWIC prior to October 1999 (Schedule 2 & 3) must be reassessed using revised criteria before they can be considered for addition to Schedule 1 of SARA. After they have been assessed, the Governor in Council may on the recommendation of the Minister, decide on whether or not they should be added to the List of Species at Risk.

Government of Canada. Species at Risk Public Registry. Website:
[http://www.sararegistry.gc.ca/default_e.cfm September 27, 2012]

Glossary: http://www.sararegistry.gc.ca/about/glossary/default_e.cfm#e

Species Index A-Z: http://www.sararegistry.gc.ca/sar/index/default_e.cfm

Species Listing by Schedule: http://www.sararegistry.gc.ca/sar/listing/default_e.cfm

⁷ Regional Status –

Significant Plant List for Wellington County

- R-A: Included based on “rare” status (i.e. occurrence at between 1 and 10 natural sites in the County) in the Flora of Wellington County (Anderson and Frank 2004, unpublished) and subsequent revisions by A. Anderson over 2005-2008).
- R-B: Added as a plant record from post-1990 environmental studies within Guelph with global and /or provincial significance.
- R-C: Added based on records provided by Mike Oldham (NHIC) for Wellington County in 2005, verification of records in OAC herbarium (Jan.-Feb. 2008) and supplementary review by Mike Oldham Dec. 2007 - Feb. 2008.
- R-D: New record for Wellington County (observed during field work conducted by Dougan & Associates 2005-2006).

Dougan & Associates 2009. Significant Plant List for Wellington County. City of Guelph Natural Heritage Study, Appendix A.

APPENDIX C

Wildlife List

Appendix C: Wildlife List

Avian Observations

COMMON NAME	SCIENTIFIC NAME	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	SARA STATUS ₅	SCHEDULE ₆	WELLINGTON COUNTY ⁷	MNR AREA SENSITIVE ⁸	BREEDING EVIDENCE ₉	ABUNDANCE	HIGHEST BREEDING STATUS ¹⁰	FIELD NOTES
American Crow	<i>Corvus brachyrhynchos</i>	G5	S5B,SZN						N	SM/H	1	Possible	
American Goldfinch	<i>Carduelis tristis</i>	G5	S5B,SZN						N	SM/H	5	Possible	
American Robin	<i>Turdus migratorius</i>	G5	S5B,SZN						N	SM/H	5	Possible	
Barn Swallow	<i>Hirundo rustica</i>	G5	S5B,SZN	THR	THR	THR			N	V/CF	6	Probable	Adults carrying food and disappearing around the apartment buildings at Waterloo Ave and Wellington St W.
Belted Kingfisher	<i>Ceryle alcyon</i>	G5	S5B,SZN					Y	N	SM/H	1	Possible	
Black-capped Chickadee	<i>Poecile atricapillus</i>	G5	S5						N	SM/H	3	Possible	
Blue Jay	<i>Cyanocitta cristata</i>	G5	S5						N	SM/H	2	Possible	
Canada Goose	<i>Branta canadensis</i>	G5	S5						N	SM/H	1	Possible	
Cedar Waxwing	<i>Bombycilla cedrorum</i>	G5	S5B,SZN						N	SM/H	6	Possible	
Chimney Swift	<i>Chaetura pelagica</i>	G5	S5B,SZN	THR	THR	THR	1	Y	N	D	2	Probable	Likely nesting in nearby residential/commercial chimney
Chipping Sparrow	<i>Spizella passerina</i>	G5	S5B,SZN						N	SM/H	1	Possible	
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	G5	S5B,SZN					Y	N	AE	5	Confirmed	5 nests under Wellington Exit -Hanlon Pkwy
Common Grackle	<i>Quiscalus quiscula</i>	G5	S5B,SZN						N	SM/H	2	Possible	
Common Merganser	<i>Mergus merganser</i>	G5	S5B,SZN					Y	Y	FY	8	Confirmed	1 adult and 7 fledged young swimming down the Speed River
European Starling	<i>Sturnus vulgaris</i>	G5	SE						N	SM/H	7	Possible	
Great Blue Heron	<i>Ardea herodias</i>	G5	S5B,SZN					Y	N	X	1	Observed	
House Finch	<i>Carpodacus mexicanus</i>	G5	SE						N	SM/H	2	Possible	
House Sparrow	<i>Passer domesticus</i>	G5	SE						N	SM/H	5	Possible	
Mallard	<i>Anas platyrhynchos</i>	G5	S5B,SZN						N	SM/H	17	Possible	
Northern Cardinal	<i>Cardinalis cardinalis</i>	G5	S5						N	SM/H	1	Possible	
Northern Flicker	<i>Colaptes auratus</i>	G5	S5B,SZN					Y	N	SM/H	3	Possible	

Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	G5	S5B,SZN						N	X	1	Observed	
Red-eyed Vireo	<i>Vireo olivaceus</i>	G5	S5B						N	SM/H	1	Possible	
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	G5	S5B,SZN						N	A	18	Probable	
Ring-billed Gull	<i>Larus delawarensis</i>	G5	S5B,SZN					Y	N	X	1	Observed	Flying-over
Song Sparrow	<i>Melospiza melodia</i>	G5	S5B,SZN						N	SM/H	6	Possible	
Spotted Sandpiper	<i>Actitis macularia</i>	G5	S5B,SZN						N	SM/H	1	Possible	
Warbling Vireo	<i>Vireo gilvus</i>	G5	S5B,SZN						N	SM/H	2	Possible	
White-breasted Nuthatch	<i>Sitta carolinensis</i>	G5	S5						Y	SM/H	2	Possible	

*Total = 29 species

Insect Observation

COMMON NAME	SCIENTIFIC NAME	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	SARA STATUS ₅	SCHEDULE ₆	WELLINGTON COUNTY ⁷	MNR AREA SENSITIVE ⁸	BREEDING EVIDENCE ₉	ABUNDANCE	HIGHEST BREEDING STATUS ¹⁰	FIELD NOTES
Ebony Jewelwing	<i>Calopteryx maculata</i>	G5	S5						N	X	1	X	

*Total = 1 species

Mammal Observation

COMMON NAME	SCIENTIFIC NAME	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	SARA STATUS ₅	SCHEDULE ₆	WELLINGTON COUNTY ⁷	MNR AREA SENSITIVE ⁸	BREEDING EVIDENCE ₉	ABUNDANCE	HIGHEST BREEDING STATUS ¹⁰	FIELD NOTES
Gray Squirrel	<i>Sciurus carolinensis</i>	G5	S5						N	X	1	X	

*Total = 1 species

Herpetofauna Observation

COMMON NAME	SCIENTIFIC NAME	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	SARA STATUS ₅	SCHEDULE ₆	WELLINGTON COUNTY ⁷	MNR AREA SENSITIVE ⁸	BREEDING EVIDENCE ₉	ABUNDANCE	HIGHEST BREEDING STATUS ¹⁰	FIELD NOTES
American Toad	<i>Anaxyrus americanus</i>	G5	S5						N	X	1	X	

*Total = 1 species

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Appendix C: Wildlife List

Legend

¹G-Rank (global)

Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety. (*Global Status from MNR Biodiversity Explorer September 2012*) Global (G) Conservation Status Ranks

G1 Extremely rare—usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G2 Very rare—usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.

G3 Rare to uncommon—usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.

G4 Common—usually more than 100 occurrences; usually not susceptible to immediate threats.

G5 Very common—demonstrably secure under present conditions.

Variant Ranks

G#G# - Range Rank – A numeric range rank (e.g., G2G3, G1G3) is used to indicate the range of uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g., GU should be used rather than G1G4).

GU – Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible (when the range of uncertainty is three consecutive ranks or less), a range rank (e.g., G2G3) should be used to delineate the limits (range) of uncertainty.

GNR – Unranked – Global rank not yet assessed

GNA – Not Applicable – A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

Rank Qualifiers

? - Inexact Numeric Rank—Denotes inexact numeric rank; this should not be used with any of the Variant Global Conservation Status Ranks or GX or GH.

Q - Questionable taxonomy that may reduce conservation priority—Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The “Q” modifier is only used at a global level and not at a national or subnational level.

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²S-Ranks (provincial)

Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario. (*Provincial Status from MNR Biodiversity Explorer September 2012*)

S1 Critically Imperiled—Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled—Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

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Appendix C: Wildlife List

S4 Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure—Common, widespread, and abundant in the nation or state/province.

S#S# Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

SX Presumed Extirpated - Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.

SH Possibly Extirpated (Historical) - Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.

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(provincial status from MNR January 13, 2012)

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The Act establishes Schedule 1, as the official list of species at risk. It classifies those species as being either Extirpated, Endangered, Threatened, or a Special Concern. Once listed, the measures to protect and recover a listed species are implemented.

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THR Threatened - A species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

SC Special Concern - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

1 Added on June 4, 2013 from <http://nhic.mnr.gov.on.ca/glossary/srank.cfm>

⁶**Schedule 1:** is the official list of species that are classified as extirpated, endangered, threatened, and of special concern.

Schedule 2: species listed in Schedule 2 are species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

Schedule 3: species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1. The Act establishes Schedule 1 as the official list of species at risk. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern. Species that were designated at risk by COSEWIC prior to October 1999 (Schedule 2 & 3) must be reassessed using revised criteria before they can be considered for addition to Schedule 1 of SARA. After they have been assessed, the Governor in Council may on the recommendation of the Minister, decide on whether or not they should be added to the List of Species at Risk.

Government of Canada. Species at Risk Public Registry. Website:

[http://www.sararegistry.gc.ca/default_e.cfm September 27, 2012]

Glossary: http://www.sararegistry.gc.ca/about/glossary/default_e.cfm#e

Species Index A-Z: http://www.sararegistry.gc.ca/sar/index/default_e.cfm

Species Listing by Schedule: http://www.sararegistry.gc.ca/sar/listing/default_e.cfm

⁷**Regional Status – Significant Plant List for Wellington County**

R-A: Included based on “rare” status (i.e. occurrence at between 1 and 10 natural sites in the County) in the Flora of Wellington County (Anderson and Frank 2004, unpublished) and subsequent revisions by A. Anderson over 2005-2008).

R-B: Added as a plant record from post-1990 environmental studies within Guelph with global and /or provincial significance.

R-C: Added based on records provided by Mike Oldham (NHIC) for Wellington County in 2005, verification of records in OAC herbarium (Jan.-Feb. 2008) and supplementary review by Mike Oldham Dec. 2007 - Feb. 2008.

R-D: New record for Wellington County (observed during field work conducted by Dougan & Associates 2005-2006).

Dougan & Associates 2009. Significant Plant List for Wellington County. City of Guelph Natural Heritage Study, Appendix A.

⁸**Ontario Ministry of Natural Resource –Area Sensitive Species**

N-No the species is not listed as area sensitive

Y-Yes the species is listed as area sensitive

Refer to section “5.4.2.1 Habitat for area-sensitive species” of the Ministry of Natural Resources – Significant Wildlife Habitat Technical Guide for fauna list and description of this significant wildlife criteria.

Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section. Science Development and Transfer Branch, Southcentral Science Section. 151pp. + appendices.

^{9,10}**ONTARIO BREEDING BIRD ATLAS CODES**

¹⁰**Breeding Evidence**

Strongest evidence of breeding for as many species as possible.

There are four levels of evidence:

1. Species observed in breeding season (no indication of breeding).

York Trunk Sewer and Paisley-Clythe Feedermain

January 2014

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2. Possible breeding.
3. Probable breeding.
4. Confirmed breeding.

⁹**Below are the kinds of evidence required for each of these levels:**

Observed

X - Species observed in its breeding season (no evidence of breeding). Presumed migrants should not be recorded.

Possible Breeding

H - Species observed in its breeding season in suitable nesting habitat.

S - Singing male present or breeding calls heard, in its breeding season in suitable nesting habitat.

Probable Breeding

P - Pair observed in their breeding season in suitable nesting habitat.

T - Permanent territory presumed through registration of territorial song on at least 2 days, a week or more apart, at the same place.

D - Courtship or display between a male and a female or 2 males, including courtship feeding or copulation.

V - Visiting probable nest site.

A - Agitated behaviour or anxiety calls of an adult.

B - Brood patch on adult female or cloacal protuberance on adult male.

N - Nest-building or excavation of nest hole.

Confirmed Breeding

DD - Distraction display or injury feigning.

NU - Used nest or egg shell found (occupied or laid within the period of the study).

FY - Recently fledged young or downy young, including young incapable of sustained flight.

AE - Adults leaving or entering nest site in circumstances indicating occupied nest.

FS - Adult carrying faecal sac.

CF - Adult carrying food for young.

NE - Nest containing eggs.

NY - Nest with young seen or heard

http://www.birdsontario.org/download/atlas_feb03.pdf

Ontario Breeding Bird Atlas

C/o University of Guelph

Blackwood Hall, Room 211

Guelph, Ontario, N1G 2W1

Tel: 519-826-2092

Fax: 519-826-2113

Email: atlas@uoguelph.ca

Webpage: www.birdsontario.org

Coordinator: Mike Cadman

APPENDIX D

Site Photos

Sector 1: Open Cut Section North of Wellington Street West



Photo 1: Manicured parkland and Howitt Creek riparian vegetation (September 2013).



Photo 2: Old Field Meadow with young planted trees (Unit 1) with mowed edge adjacent to Wellington Street West (September 2013).

Sector 2: Open Cut Section South of Wellington Street West



Photo 3: Manicured parkland adjacent to Wellington Street West in vicinity of proposed alignment (September 2013).



Photo 4: Cultural Woodland (Unit 2) along the north bank of the Speed River (September 2013).

Sector 2: Open Cut Section South of Wellington Street West

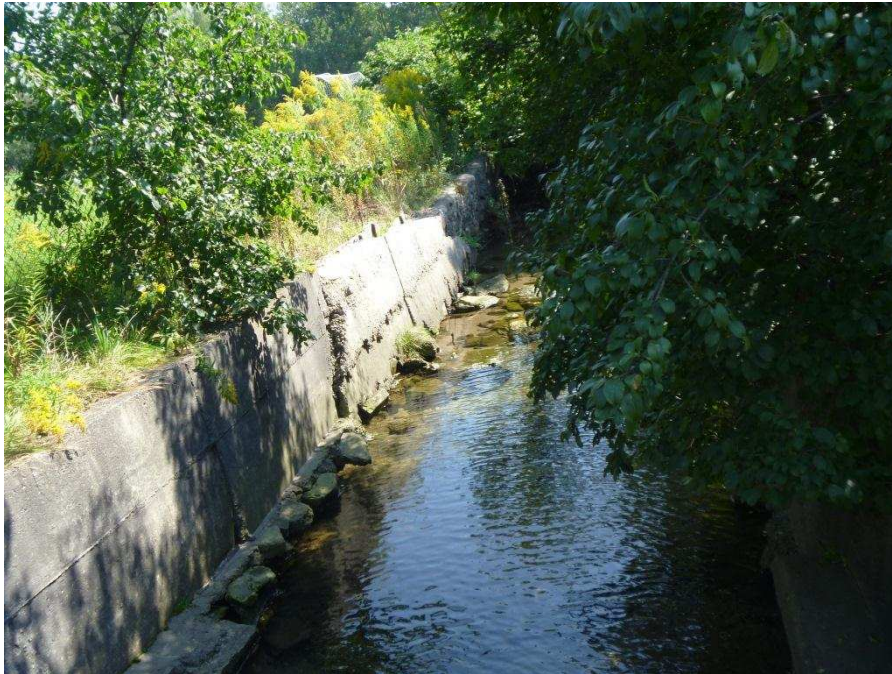


Photo 5: Riparian vegetation along Pond Creek (September 2013).



Photo 6: Old Field Meadow (Unit 3) west of McCrae Blvd (September 2013).

Sector 2: Open Cut Section South of Wellington Street West



Photo 7: Mineral Cultural Thicket (Unit 4) east of McCrae Blvd (September 2013).



Photo 8: Mineral Cultural Woodland (Unit 5) east of McCrae Blvd (September 2013).

Sector 3: Tunneled Section through Royal City Park



Photo 9: Narrow Cultural Woodland (Unit 6) along north edge of park (September 2013).



Photo 10: Manicured parkland with mature tree component (September 2013).

Sector 4: Open Cut Crossing of the Speed River - West Bank

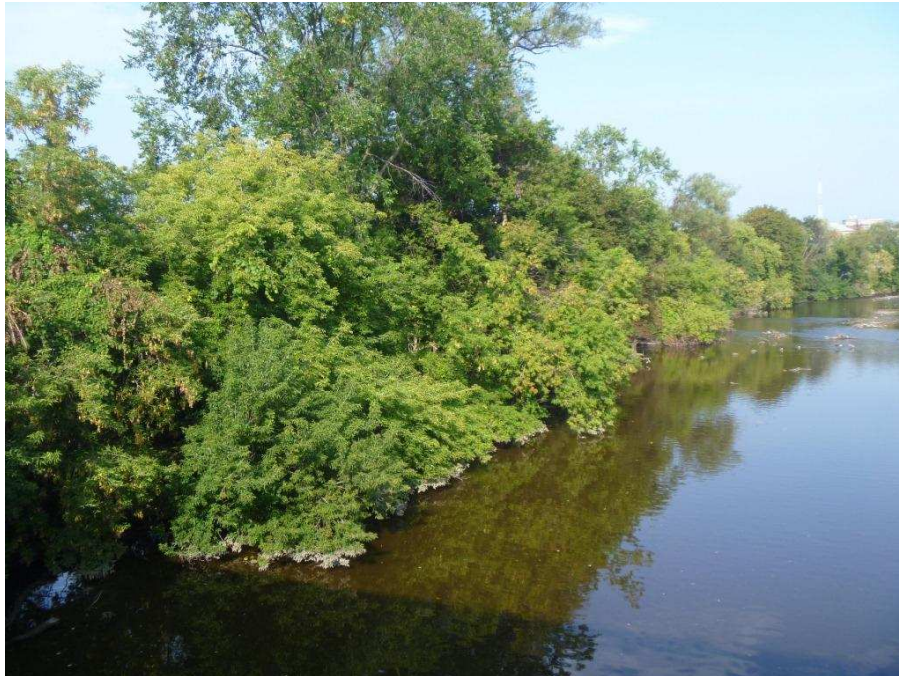


Photo 11: Cultural Woodland (Unit 7) along the west bank near the proposed crossing location (September 2013).



Photo 12: Riparian vegetation along west bank near the proposed crossing location (September 2013).

Sector 4: Open Cut Crossing of the Speed River - East Bank



Photo 13: Cultural Woodland (Unit 8) along the east bank near the proposed crossing location (September 2013).



Photo 14: riparian vegetation along the east bank near the proposed crossing location (September 2013).

Speed River – Crossing Location



Photo 15: Upstream from the proposed Speed River crossing location (December 2012).



Photo 16: Downstream from the proposed Speed River crossing location (December 2012).

Pond Creek – Crossing Location



Photo 17: Upstream from the proposed crossing location (December 2012).



Photo 18: Downstream from the proposed crossing location (December 2012).

Howitt Creek – Crossing Location



Photo 19: Upstream from the proposed crossing location (December 2012).



Photo 20: Downstream from the proposed crossing location (December 2012).

APPENDIX E
Correspondence

Kristina Domsic

From: Holly Anderson
Sent: Monday, January 14, 2013 8:20 AM
To: Heather Drost; Geoffrey Gartshore
Subject: FW: Natural Heritage Information Request - York Trunk Sewer
Attachments: Guelph District - City of Guelph SAR List.xls

Follow Up Flag: Follow up
Flag Status: Flagged

FYI see below.

Holly

Holly Anderson, B.Sc.

Biologist
Infrastructure and Environment

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Please consider the environment before printing this e-mail and/or its attachments.

From: Marriott, David (MNR) [mailto:David.Marriott@ontario.ca]
Sent: January-13-13 5:02 PM
To: Holly Anderson
Cc: Buck, Graham (MNR); Timmerman, Art (MNR)
Subject: RE: Natural Heritage Information Request - York Trunk Sewer

Hi Holly,

The Ministry of Natural Resources (MNR) is in receipt of the York Trunk Sewer and Paisley-Clythe Feedermain request for information. It is understood that MMM Group and Ecoplans have been retained to undertake the Preliminary and Detail Design for the construction of the project. The approximate study area for the project was provided in the attachment to the request.

MNR staff have had an opportunity to review the natural heritage information and records at the Guelph District Office for the study area, and can offer the following comments for consideration.

Fisheries

The Speed River at this location is a coolwater watercourse; however, some of the species are not coolwater fish species. This includes the following warmwater species: smallmouth bass, largemouth bass, common carp, and common shiner. This reach of the Speed River also contains mottled sculpins, which are coldwater species.

The Eramosa River is also a coolwater watercourse, but it does not contain brook trout at this location.

The request for information indicates that a crossing of the Speed River will be required. Please note that the open timing window for fish would be July 1 to March 15 of the following year.

Species at Risk

It is understood that the NHIC Biodiversity Explorer was reviewed to determine what species at risk records may be available for the study area. Please be advised however that because the province has not been surveyed comprehensively for the presence of listed species, the absence of records is not an indicator for the absence of species at risk from an area. Consequently, the presence of an element occurrence (EO) is useful to flag the presence of the species in the area, but is not an appropriate tool to determine whether a species is absent from the area, or whether it should be surveyed for or not in a particular area.

MNR staff provides the following advice for determining the presence of species at risk.

I. Habitat Inventory

Ministry staff recommends undertaking a comprehensive botanical inventory of the entire area that may be subject to direct and indirect impacts from the proposed activity. The vegetation communities should be classified as per the "Ecological Land Classification (ELC) for Southern Ontario" system, to either the "Ecosite" or "Vegetation Type" level. With respect to aquatic habitats in the study area, we recommend you collect data on the physical characteristics of the waterbodies and inventory the riparian zone vegetation, so that these habitats can be classified as per the Aquatic Ecosites described in the ELC manual.

II. Potential Species at Risk within the Study Area

A list of species at risk that have the potential to occur in the area can be produced by cross-referencing the ecosites described during the habitat inventory with the habitat descriptions of species at risk known to occur within the planning area. The list of species at risk known for the City of Guelph is attached. Please be aware that sometime before early March Little Brown Bat and Northern Long-eared Bat will be added to the Species at Risk in Ontario List (SARO) as endangered, and the City of Guelph occurs within the range of both of these species. The species-specific COSEWIC status reports (www.cosewic.gc.ca) are a good source of information on species at risk habitat needs and will be helpful in determining the suitability of the study areas ecosites for a given species.

Please note that the SARO list is a living document and is amended periodically as a result of species assessment and re-assessments conducted by the Committee on the Status of Species at Risk in Ontario (COSSARO). The SARO list can be accessed on the webpage <http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/276722.html>.

COSSARO also maintains a list of species to be assessed in the future. It is recommended to take COSSARO's list of anticipated assessments into consideration, especially when the proposed start date of the activity is more than 6 months away, or the project will be undertaken over a period greater than 6 months. The list can be viewed by going to <http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/244543.html> and clicking on the link Priority List of Species to be Assessed and Classified by COSSARO.

Species at risk habitat prescribed under regulation can be accessed on the Environmental Registry and searching for postings related to Ontario Regulation 242/08 under the *Endangered Species Act*.

III. Species at Risk Surveys

Ministry staff are of the opinion that each species at risk identified under Step II should be surveyed for, regardless of whether or not the species has been previously recorded in the area. The survey report should describe how each species at risk was surveyed for, and provide a rationale for why, if any, certain species appearing on the attached list were not afforded a survey (e.g. habitat within the study area is not suitable for a specific species at risk). Some species at risk surveys require an authorization under the *Endangered Species Act* (permit) and/or a Scientific Collector's Permit. Please contact Graham Buck (MNR Species at Risk Biologist) at 519-826-4505, for a copy of a permit application or for further information on the implications on the legislation.

The Ministry can confirm that the following species have been observed/recorded in the area:

- Barn Swallow (threatened) has been observed foraging above the sport fields within the Eramosa River Park near Waterworks Place. Currently the location of the nest(s) has not been identified, but the species may be associated with the Owens-Corning factory;
- The City of Guelph has identified a Butternut tree (threatened) near the band shell in Royal City Park.
- Snapping Turtle (special concern) has been observed in the Eramosa River, as well as nesting in the Eramosa River Park; and
- There are also records of Eastern Ribbonsnake (special concern) and Milksnake (special concern) near the study area.

Other Information

Unevaluated wetlands have been identified adjacent to the study area. Digital mapping for wetlands can be obtained from Land Information Ontario (LIO). The dataset of interest is called 'Wetland Unit' within LIO. MNR staff notes that there may be an unmapped unevaluated wetland in the southern portion of the study area as well (air-photo interpretation). In addition, the study area is a known waterfowl winter concentration area.

The Ministry additionally recommends contacting the municipal planning approval authority and the conservation authority to determine if they have any additional information or records of interest for the study area.

Please contact me if further comment or clarification is required.

Thanks

Dave

Dave Marriott

District Planner
Ministry of Natural Resources, Guelph District
1 Stone Road West
Guelph ON, N1G 4Y2
(P) 519-826-4926
(F) 519-826-6849
email: david.marriott@ontario.ca

From: Holly Anderson [<mailto:HAnderson@ecoplans.com>]
Sent: November 23, 2012 9:21 AM
To: Stone, Mike (MNR)
Cc: Heather Drost; Geoffrey Gartshore
Subject: Natural Heritage Information Request - York Trunk Sewer

Dear Mike,

I am writing to request natural heritage data for the **York Trunk Sewer and Paisley-Clythe Feedermain Preliminary and Detail Design**. Please see the attached formal letter of request and key plan for further details.

Sincerely,

Holly Anderson

Holly Anderson, B.Sc.

Biologist

Infrastructure and Environment

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Please consider the environment before printing this e-mail and/or its attachments.

Kristina Domsic

From: Adele.Labbe@guelph.ca
Sent: Wednesday, October 30, 2013 3:53 PM
To: Majde.Qaqish@guelph.ca; Heather Drost
Subject: FW: York Trunk Sewer & Paisley-Clythe Watermain - Butternut Assessment

Heather, Majde,

The MNR concurs with the Butternut assessment. One more thing checked off the list ☺.

Adèle

From: Buck, Graham (MNR) [<mailto:Graham.Buck@ontario.ca>]
Sent: October 29, 2013 2:05 PM
To: Adele Labbe
Subject: RE: York Trunk Sewer & Paisley-Clythe Watermain - Butternut Assessment

Hi Adele,

In my opinion the methods used by the consultant to determine whether the trees are pure Butternut or not are in keeping with what MNR would expect. Therefore I do not have any reason to believe the conclusions reached, that all trees are hybrids or Japanese Walnut is incorrect.

Graham

*Graham Buck
Species at Risk Biologist
Ministry of Natural Resources
1 Stone Road West
Guelph ON
N1G 4Y2
519 826 4505
graham.buck@ontario.ca*

From: Adele.Labbe@guelph.ca [<mailto:Adele.Labbe@guelph.ca>]
Sent: October-07-13 3:29 PM
To: Buck, Graham (MNR)
Subject: FW: York Trunk Sewer & Paisley-Clythe Watermain - Butternut Assessment

FYI

From: Heather Drost [<mailto:HDrost@ecoplans.com>]
Sent: October 4, 2013 10:31 AM
To: Adele Labbe; Buck, Graham (MNR) (Graham.Buck@ontario.ca)
Cc: Geoffrey Gartshore; Mani Ruprai; Alex Green; Ben Tymchyshyn; Bill Draper
Subject: York Trunk Sewer & Paisley-Clythe Watermain - Butternut Assessment

Adele and Graham,

Please find attached a summary of our review of the *suspected* Butternut trees along the project limits of the York Trunk Sewer project. Our review has found all 5 'stems' to be hybrids or Japanese Walnuts, not subject to Ontario Regulation 242/08, as amended by Ontario Regulation 178/13, made under the ESA 2007.

Please call or email if you have further questions.

Regards,
Heather.

Heather Drost, B.Sc.

Biologist / Botanist
Ecology Department

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Kristina Domsic

From: Nathan Garland <ngarland@grandriver.ca>
Sent: Tuesday, August 27, 2013 4:23 PM
To: Heather Drost
Subject: RE: Natural Heritage Information Request

Follow Up Flag: Follow up
Flag Status: Flagged

Heather,

I've heard back from our Biologist's and they do not have site specific detailed information for that portion of the Speed in Guelph other than the information included below.

"The Speed River is currently mapped as warm water habitat but supports a mix of warm and cool water species, including top predators, most notably northern pike. The entire system is regarded as mixed water in the Fish Plan. There is pike spawning habitat in the Eramosa proper, upstream of its confluence with the Speed. The presence of darters in the study reach also suggests relatively good water quality."

I'm am attaching a copy of the link to the GRCA Fish Management Plan along with a link to the City of Guelph River Systems Management Plan.

<http://guelph.ca/wp-content/uploads/RiverSystemsManagementStudy.pdf>

<http://guelph.ca/wp-content/uploads/RiverSystemsManagementStudy.pdf>

Should you have any further questions or comments please feel free to call or email.

Regards,

Nathan Garland
Resource Planner
Grand River Conservation Authority
(519) 621-2763 EXT. 2236

From: Heather Drost [mailto:HDrost@ecoplans.com]
Sent: August-21-13 1:41 PM
To: Nathan Garland
Subject: RE: Natural Heritage Information Request

Thanks Nathan.

I'll await your response.

Regards,
Heather

Heather Drost, B.Sc.
Biologist / Botanist

From: Nathan Garland [<mailto:ngarland@grandriver.ca>]
Sent: August-21-13 1:31 PM
To: Heather Drost
Subject: RE: Natural Heritage Information Request

Hi Heather,

Yes, I received the mapping, thank-you for forwarding.

We do have some survey/community classification work which was completed for some of the properties that GRCA own's in the area as it shows up on our internal mapping.

I've forwarded your request to our Biologist to see what information they can provide and what survey works were completed, or if it was more a mapping exercise. I will follow up with you once I have heard back.

Regards,

Nathan Garland
Resource Planner
Grand River Conservation Authority
(519) 621-2763 EXT. 2236

From: Heather Drost [<mailto:HDrost@ecoplans.com>]
Sent: August-21-13 11:21 AM
To: Nathan Garland
Subject: RE: Natural Heritage Information Request

Nathan,

I trust you received the map that I forwarded? Have you had a chance review the data request?

We would appreciate a response at your earliest convenience.

Regards,
Heather.

Heather Drost, B.Sc.
Biologist / Botanist

From: Nathan Garland [<mailto:ngarland@grandriver.ca>]
Sent: August-12-13 4:31 PM
To: Heather Drost
Subject: RE: Natural Heritage Information Request

Heather,

Do you have a map of the area you can provide?

Regards,

Nathan Garland

Resource Planner

Grand River Conservation Authority

(519) 621-2763 EXT. 2236

From: Heather Drost [<mailto:HDrost@ecoplans.com>]

Sent: August-12-13 12:02 PM

To: Beth Brown; Nathan Garland

Subject: RE: Natural Heritage Information Request

Thanks. I was beginning to wonder if that might be the case.

Thanks for forwarding. Yes, study area is in the City of Guelph.

Regards,

Heather.

Heather Drost, B.Sc.

Biologist / Botanist

Ecoplans | A member of **MMM Group**

t: 519.741.8850 x2240 | f: 519.741.8884

From: Beth Brown [<mailto:bbrown@grandriver.ca>]

Sent: August-12-13 12:00 PM

To: Heather Drost; Nathan Garland

Subject: RE: Natural Heritage Information Request

Heather:

Jamie and Liz no longer work at the GRCA. I assume this project is within the City of Guelph and have forwarded it to Nathan Garland for follow-up.

Sincerely,

Beth

From: Heather Drost [<mailto:HDrost@ecoplans.com>]

Sent: August-12-13 11:52 AM

To: lyerex@grandriver.ca; jferguson@grandriver.ca

Cc: Beth Brown

Subject: FW: Natural Heritage Information Request

Importance: High

Good morning,

I am following up again on the data request below. The original data request was sent in November 2012 with a follow-up in May 2013. To my knowledge, we have not received a reply. If a reply was sent to Holly Anderson, please forward to my attention as Holly is no longer working at Ecoplans.

If a response has not been provided, please review and respond at your earliest convenience.

Regards,
Heather.

Heather Drost, B.Sc.
Biologist / Botanist

Ecoplans | A member of **MMM Group**
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From: Heather Drost
Sent: May-13-13 3:12 PM
To: lyerex@grandriver.ca; jferguson@grandriver.ca
Subject: FW: Natural Heritage Information Request

Good afternoon Liz and Jamie,

I am following up on this data request sent back in November 2012 (see below and attached). Could you please review your files and confirm whether a response was sent to this request? If it was, please forward your response to me as Holly Anderson is no longer working at Ecoplans and so any response sent to her is not currently accessible.

If a response has not been provided, please review and respond at your earliest convenience.

Thank you for your understanding.

Regards,
Heather.

Heather Drost, B.Sc.
Biologist / Botanist

Ecoplans | A member of **MMM Group**
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From: Holly Anderson
Sent: November-23-12 9:18 AM
To: lyerex@grandriver.ca; jferguson@grandriver.ca
Cc: Heather Drost; Geoffrey Gartshore
Subject: Natural Heritage Information Request

Dear Liz and Jamie,

I am writing to request natural heritage data for the **York Trunk Sewer and Paisley-Clythe Feedermain Preliminary and Detail Design**. Please see the attached formal letter of request and key plan for further details.

Sincerely,

Holly Anderson

Holly Anderson, B.Sc.
Biologist
Infrastructure and Environment

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Please consider the environment before printing this e-mail and/or its attachments.

Kristina Domsic

From: Alex Green
Sent: Wednesday, October 09, 2013 10:10 AM
To: Ben Tymchyshyn; Heather Drost
Subject: York Trunk Sewer - Environmental Comments
Attachments: York Trunk Sewer and Paisley Clyde Feedermain Enviro Comments_June 29th, 2013.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Ben/Heather,

I am not sure if I ever had sent you these comments from Adèle back in June. Most of these comments generally relate to design, but there are a few comments that may relate to your work as well.

Regards,

Alex Green

Designer - E.I.T.
Infrastructure

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INTERNAL MEMO



DATE June 29, 2013

TO **Majde Qaqish, Project Engineer**

FROM Adèle Labbé, Environmental Planner

DIVISION Planning

DEPARTMENT Planning & Building, Engineering and Environment

SUBJECT York Trunk Sewer and Paisley-Clythe Feedermain Municipal Class EA 30 % Detailed Design Drawings – Environmental Review

Materials Reviewed:

- 30 % Drawings dated May/13 by MMM Group
- Draft Arborist Report dated February 20th, 2013 by MMM Group
- Reconnaissance Site Visit taken June 11, 2013

Comments

Trees and the Urban Forest

1. Overall, staff are encouraged as the alignment as well as techniques proposed provide the ability to avoid the majority of trees and tree damage. Refinement of the total number of trees to be impacted is required at the next design stage.
2. The presence of a mature butternut (*Juglans cinerea L.*) was confirmed within Royal City Park. The specimen has been assessed and was confirmed to be a retainable tree by a qualified Butternut Health Assessor. A meeting with the Ministry of Natural Resources was held in 2011, at which time mitigation measures for protection of the tree were identified to include tree protection fencing, and all construction related works, should remain outside of the dripline + 5-8m. Ensure the next set of drawings illustrates how this is being met through illustrating the dripline of the tree and distance separation between the dripline and the entry or exit shaft for HDD and/or microtunneling, as well as the watermain and sanitary pipe lines themselves.
3. Identify all Butternut within proximity to the alignment on the drawings and highlight the distance separation between them and proposed works.
4. Identify the feasibility of spading and relocating trees within the impacted areas.
5. Inventories of trees to be removed accompanied by proposed number of compensation trees will need to be outlined further within the more detailed design phase of the process. Note that compensation should be calculated using a 3:1 replacement ratio.
6. Refine the details of riparian vegetation on the banks of the Speed River within the areas of potential impact. Include it in the Arborist Report and on the drawings.
7. Note that the Private Tree Protection Bylaw does not regulate public lands.
8. Include tree protection zones on drawings. Ensure the City standard for Tree Protection is utilized. SD-90a and Sd-90c can be found online at:

http://guelph.ca/wp-content/uploads/PartB_Standard_Contract_Specifications_2013.pdf

Aquatic Habitat

1. Discussion and drawings have indicated the crossing of the Speed River to be by Open Cut. Please explore in detail the technical feasibility of crossing the Speed River using trenchless technology.
2. Both pipes will cross two tributaries to the Speed River, Pond Creek and Howitt Creek. Include detailed information (including cross-sections) within this area. Discuss the feasibility of using trenchless technologies in these areas.
3. The Pond Creek currently has an exposed sanitary sewer crossing it, the new sewer should be designed to lie below the invert of the creek bed.
4. Integrate information from Wellington St project re: future culvert under Wellington Road at Pond Creek in order to assess option of placing the sanitary sewer closer to the road, where the bed of Pond Creek is higher in elevation.

Species-at-Risk and Significant Wildlife Habitat

9. Identify if there are any recommended mitigation measures to minimize any potential impacts to Species-at-Risk including Butternut (*Juglans cinerea L.*) and Snapping Turtle (*Chelydra serpentina*).
10. Also identify any proposed mitigation measures for minimizing potential impacts to waterfowl overwintering habitat and fish habitat.

Process

11. Once the 60% Drawings are complete, the project should be taken to the River System's Advisory Committee for comments.
12. Ensure both the sanitary sewer and the watermain are included in the cross-section at the next phase of design.

INTERNAL MEMO



DATE January 10, 2013

TO **Majde Qaqish, Project Engineer**

FROM Adèle Labbé, Environmental Planner

DIVISION Planning

DEPARTMENT Planning & Building, Engineering and Environment

SUBJECT York Trunk Sewer and Paisley-Clythe Feedermain Municipal Class EA 90 % Detailed Design Drawings – Environmental Review

Materials Reviewed:

- 90 % Drawings dated Dec 13/13 by MMM Group
- Arborist Report dated October 25, 2013 by MMM Group
- Email from Majde Qaqish dated January 9, 2014; Subject: York Trunk Watermain

Comments

Trees and the Urban Forest

1. Staff continue to be encouraged with the alignment as well as techniques proposed as there has been obvious effort to avoid the trees and tree damage and to undertake best solutions for the river system.
2. The Butternut trees within the subject area have been identified as hybrid trees and as such a permit from the MNR is not required. MNR's concurrence with the hybrid status was confirmed by email on October 29, 2013.

There is an error of page 6 of the report as it states that Butternut Health Assessment is required in spring of 2013, and the report is dated October 2013. Correct the report. Clarify in the report the status of the trees. Include in appendices the email received by MNR indicating that they concur with the methodology used to determine the Butternuts are hybrids.

3. In the "Impacts" sections of the report (pages 5 and 6) indicate that: "Impacts to vegetation will be determined upon the preparation of Tree Management Plans". However the report also notes that approximately +/-542 trees over 10 cm DBH will be removed. This is ambiguous. Please clarify the number of trees lost under the "Impacts" section for the Silvercreek Park / Speed River Crossing area, the Royal City Park area and in total.

Also, refine the details of impacts to trees and riparian vegetation on the banks of the Speed River as a result of the open cut proposal. Drawings P10 and L11.

This is consistent with staff comments discussed in our meeting on December 12th where it was noted that the Tree Drawings need to be updated to the 90% drawings. We also asked that the full size construction drawings include the tree inventory table and tree numbers, to inform contractors. MMM will have the information to provide the requested clarifications in the Arborist Report.

4. Identify the feasibility of spading and relocating trees within the impacted areas, in consultation with Parks and Forestry staff. Trees to be relocated should not be counted as trees to be removed. Trees that will be relocated do not need to be compensated for. For ease of implementation, it would be best if the trees to be

relocated were identified as such in the Tree Inventory table. Please indicate in the Tree Inventory table which trees are to be relocated based on the input received from Randy Drewery.

5. Note that the Private Tree Protection Bylaw does not regulate trees on public lands. This should be adjusted on page 3 of the report.
6. The City standard for Tree Protection SD-90a was included in the drawing details however the detail for the signage is missing. Add SD-90c to the drawing details. It can be found online at: http://guelph.ca/wp-content/uploads/PartB_Standard_Contract_Specifications_2013.pdf
7. As indicated in my memorandum dated June 29, 2013 (comment #5). The total number of trees to be removed should be accompanied by the total number of trees planned to be planted as replacement trees. Environmental Planning recommends a 3:1 replacement ratio for all tree removed over 10 cm DBH and that are in excellent to fair condition. However, in this case, shrubs should also be considered for planting in areas where ecological function would be enhanced (i.e., creek and river banks, riparian zone). Please include a list of native shrubs that could be utilized on page 7.
8. The large Hybrid Butternut tree in Royal City Park should also be recognized as Significant on pages 5/6 of the report.

Restoration / Landscaping

9. The Speed River crossing is being done by open cut. The restoration of the Speed River banks, post-construction, should include dense tree and/or shrub plantings. The lack of dense plantings in this area will invite colonization of invasive species as well as leave the area open to continued disturbance by people and pets. Species selection should include hardy, native species that will have a chance to compete with Buckthorn. Suggest willow species also be considered in this area.
10. Compensation vegetation would be beneficial along the lengths of the Pond and Howitt Creeks (i.e., shading and detritus/organic inputs).
11. Indicate the total number of trees and shrubs proposed for purposes of understanding compensation.

Process

12. The project should be taken to the River Systems Advisory Committee as soon as possible. The next meeting is February 19, 2014.
13. Environmental Planning suggests that Tree Removal Notification letters be sent out to residents within 120 m of where tree removals will occur, in advance of removals being undertaken. I also suggest this same letter be sent to EAC, RSAC and the Guelph Urban Forest Friends (GUFF) and that the information be posted on the website. Please consider this and let me know if I can be of assistance at the appropriate time.

Jenny Enoae

From: Buck, Graham (MNR) <Graham.Buck@ontario.ca>
Sent: October-29-13 9:06 AM
To: Jenny Enoae
Cc: Timmerman, Art (MNR)
Subject: RE: Natural Heritage Information Request - York Trunk Sewer

Hi Jenny,

The nearest occurrence of SAR mussels in the Speed River is at the Hwy 401 bridge.

Graham Buck
Species at Risk Biologist

From: Timmerman, Art (MNR)
Sent: October-29-13 8:56 AM
To: Buck, Graham (MNR)
Subject: FW: Natural Heritage Information Request - York Trunk Sewer

Graham, could you respond?

Thanks

Art

From: Jenny Enoae [<mailto:EnoaeJ@mmm.ca>]
Sent: Tuesday, October 29, 2013 7:26 AM
To: Timmerman, Art (MNR)
Subject: RE: Natural Heritage Information Request - York Trunk Sewer

Hi Art,

As a follow-up re: fish community in this reach of the Speed, I checked the DFO SAR Mapping (2013) for SAR mussels that might be within this reach. Results suggest that they are not present. Is there any other information regarding mussels within the Speed that the MNR may have?

Thanks,

Jenny

Jenny Enoae, B.Sc., M.Sc.

Aquatic Biologist
Ecology Department

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From: Timmerman, Art (MNR) [<mailto:art.timmerman@ontario.ca>]
Sent: October-22-13 10:14
To: Jenny Enoae
Subject: FW: Natural Heritage Information Request - York Trunk Sewer
Importance: High

Jenny, see the attached figures which show the file numbers and years of data collection in the study area.

Art

From: Marriott, David (MNR)
Sent: Wednesday, October 16, 2013 4:01 PM
To: Timmerman, Art (MNR); Whalen, Rose (MNR)
Subject: FW: Natural Heritage Information Request - York Trunk Sewer
Importance: High

Hi Art and Rose,

Can you please look at the consultant's questions below regarding the York Trunk Sewer work below?

This includes some clarification on the fisheries info we previously provided, and the applicability of the PLA. Our original email for the info request is attached.

Thanks

Dave

Dave Marriott
District Planner
Ministry of Natural Resources, Guelph District
1 Stone Road West
Guelph ON, N1G 4Y2
(P) 519-826-4926
(F) 519-826-6849
email: david.marriott@ontario.ca

From: Heather Drost [<mailto:HDrost@ecoplans.com>]
Sent: October 16, 2013 2:54 PM
To: Marriott, David (MNR)
Cc: Jenny Enoae
Subject: RE: Natural Heritage Information Request - York Trunk Sewer
Importance: High

Good afternoon David,

Further to Jenny's email below, we have a few additional questions about the proposed open-cut crossing of the Speed River in Guelph.

As I understand it, the bed of most rivers is considered public land, under control and management of the MNR. As such, a work permit may be required for the open-cut crossing of the Speed River. I've reviewed the Crown Land Management section of the Ministry's website, specifically the page titled "when is a work permit required" but the installation of a sanitary sewer across a river is not explicitly mentioned.

Could you please confirm if a work permit is required for this work (in addition to the Permit that we will be obtaining from the GRCA) **and the turn-around time to obtain such a permit?**

Finally, we are aware that there is a **waterfowl winter concentration area** within the study area. Are there timing restrictions associated with working in the river that relate to this feature?

This project is advancing quickly; a timely response to this and to Jenny's email would be very much appreciated.

Thank you in advance,
Heather.

Heather Drost, B.Sc.
Biologist / Botanist

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From: Jenny Enoae
Sent: October-10-13 3:21 PM
To: David.Marriott@ontario.ca
Cc: Heather Drost
Subject: Natural Heritage Information Request - York Trunk Sewer
Importance: High

Hi David,

Earlier this year my colleague, Holly Anderson, sent you a request for Natural Heritage Information with regards to the **York Trunk Sewer and Paisley-Clythe Feedermain Preliminary and Detail Design** project currently being undertaken by MMM Group Ltd. and Ecoplans, a member of MMM Group Ltd (please refer to the initial email request sent on behalf of Ecoplans and your response below).

With regards to the fish community information that you provided:

Fisheries

The Speed River at this location is a coolwater watercourse; however, some of the species are not coolwater fish species. This includes the following warmwater species: smallmouth bass, largemouth bass, common carp, and common shiner. This reach of the Speed River also contains mottled sculpins, which are coldwater species.

Would you be able to tell me when this information was collected? Do you have specific fish dot collection records for this reach or in the near vicinity? Do you have specific information for spawning activity for small and largemouth bass within the Speed?

On another note, I checked the **DFO SAR Mapping (2013)** for SAR mussels that might be within this reach. Results suggest that they are not present. Is there any other information regarding mussels within the Speed that the MNR may have?

Please feel free to call me if that is easier or an email reply back is suitable as well. I'm trying to get a sense as to whether or not I need to collect fish community inventory as now the project is going through with an open-cut crossing of the Speed for the proposed new sewer. As we are nearing our submission to the GRCA – a timely response would be greatly appreciated.

Regards,

Jenny

APPENDIX F

SAR Screening Table

Common Name	Scientific Name	Source	S-Rank	COSEWIC ³	MNR ⁴	MNR Recovery Strategy?	MNR Habitat Regulation?	SARA Status ⁵	Schedule ⁵	Federal Recovery Strategy?	Detailed Habitat Description	Potential to occur based on habitat suitability	Survey Approach	Results
Vascular Plants														
Butternut	<i>Juglans cinerea</i>	MNR Correspondence	S3?	END	END	No	No	END	1	Yes	Grows best in rich, moist, and well-drained soils often found along streams and well-drained gravel sites, especially those made up of limestone and seldom found on dry, rocky and sterile soils (COSEWIC Species Assessment Report). Butternut is a shade intolerant species, which prefers rich, moist and well-drained soils, and is often found along the edges of streams and rivers. It can grow alone or in small groups in deciduous forests. Young seedlings and saplings can tolerate up to 60% crown closure. Common associates include basswood, black cherry, beech, black walnut, elm, hickory, oak, red maple, sugar maple, white ash and yellow birch (FGCA 2011).	Suitable habitat is present throughout the broader study area, in parklands and in natural communities along the banks of the Speed River and Eramosa River.	A detailed botanical inventory of natural areas was undertaken in September 2013. All trees in the project limits were documented through a tree inventory. Potential Butternut trees were evaluated by a certified Butternut Health Assessor with results submitted to and reviewed by the MNR.	All potential Butternut trees within the project limits were confirmed to be hybrids and are therefore not considered to be a species of concern. Impacts to the mature tree in Royal City Park will be avoided for cultural heritage reasons.
Carey's Sedge	<i>Carex careyana</i>	NHIC (record dated 1905)	S2								Rich deciduous forests; rather local (Michigan Flora Online 2011).	No suitable habitat present in the project limits or broader study area.	A detailed botanical inventory of natural areas was undertaken in September 2013.	Not Observed
Mammals														
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	MNR Correspondence	S3	END	END	No	No	END	No schedule	No	Northern long-eared bats are associated with forests, choosing to roost under loose bark and in the cavities of trees. These bats hibernate from October or November to March or April, most often in caves or abandoned mines (MNR 2013).	Very low potential for this species to occur within the project limits and broader study area. Low quality woodland(s) with snags for maternity roosts. Low quality foraging habitat over parkland and river surface.	General wildlife and wildlife habitat survey was undertaken within the broader study area on July 11, 2013	Not Observed
Little Brown Bat	<i>Myotis lucifugus</i>	MNR Correspondence	S4	END	END	No	No	END	No schedule	No	Bats are nocturnal. During the day they roost in trees and buildings. They often select attics, abandoned buildings and barns for summer colonies where they can raise their young. Bats can squeeze through very tiny spaces (as small as six millimetres across) and this is how they access many roosting areas. Little brown bats hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing (MNR 2013).	Potential for this species to occur within the broader study area. The project limits are surrounded by buildings (urban and commercial) that provide potential maternity colony habitat. Open parkland and river surface provide low quality foraging habitat.	General wildlife and wildlife habitat survey was undertaken within the broader study area on July 11, 2013	Not Observed
Avifauna														
Bald Eagle	<i>Haliaeetus leucocephalus</i>	MNR Correspondence	S4B,SZN	NAR	SC	No	No			No	Require large continuous area of deciduous or mixed woods around large lakes, rivers; require area of 255 ha for nesting, shelter, feeding, roosting; prefer open woods with 30 to 50% canopy cover; nest in tall trees 50 to 200 m from shore; require tall, dead, partially dead trees within 400 m of nest for perching; sensitive to toxic chemicals. Bald Eagles nest in a variety of habitats and forest types, almost always near a major lake or river where they do most of their hunting. While fish are their main source of food, Bald Eagles can easily catch prey up to the size of ducks, and frequently feed on dead animals, including White-tailed Deer. They usually nest in large trees such as pine and poplar. During the winter, Bald Eagles sometimes congregate near open water such as the St. Lawrence River, or in places with a high deer population where carcasses might be found (MNR 2013).	Very low potential for this species to occur within the project limits and broader study area. The broader study area does not provide large enough continuous woodland habitat with mature trees with dead partial crowns for the species to nest upon. The Speed River provides low quality foraging habitat area.	Breeding bird survey and habitat assessment was completed within the broader study area on July 11, 2013.	Not Observed. The City of Guelph has noted that Bald Eagles have been observed foraging over the Speed River in Winter months (Labbe pers comm. 2013)

Common Name	Scientific Name	Source	S-Rank	COSEWIC ³	MNR ⁴	MNR Recovery Strategy?	MNR Habitat Regulation?	SARA Status ⁵	Schedule ⁵	Federal Recovery Strategy?	Detailed Habitat Description	Potential to occur based on habitat suitability	Survey Approach	Results
Barn Swallow	<i>Hirundo rustica</i>	MNR Correspondence	S4B	THR	THR	No	No	No Status	No schedule	No	Ability to adapt to nesting in a variety of artificial structures (barns, bridges, etc.) and able to exploit foraging opportunities in open, human-modified, rural landscapes such as cliffs, caves, rock niche (MNR 2013).	High potential for this species to occur within the project limits and broader study area, nests on artificial structures (including bridges and buildings) and exploits foraging opportunities in open rural landscapes (farm fields) and emergent insects over open water (rivers and wetlands).	Targeted surveys for Barn Swallows was undertaken on July 11, 2013. Surveyed buildings and culverts along Wellington Street South as well undersides of bridges that span the Speed River for nesting evidence .	Observed foraging over the eastern cultural meadows of the broader study area, no nests located.
Bobolink	<i>Dolichonyx oryzivorus</i>	MNR Correspondence	S4B	THR	THR	No	No	No Status	No schedule	No	Grassland, hayfields, and lightly grazed pasture, and has adapted to nesting in winter wheat fields. Favours fields with high percentage of grass cover and moderate percent of forb cover and is not attracted to fields with woody vegetation. This species does not nest in woodland or shrubby thicket. Ideal habitat size varies widely and is likely affected by available habitat in a region. Individual territory size can range from 0.45-2.0 ha ³ and may vary widely in different regions. Populations may require approximately 10-30 ha (Herkert 1991). Breeds in open grasslands, old fields, lightly-moderately grazed pastures, no-till cropland, hayfields, small grain fields, wet meadows and planted cover. In migration and in winter uses freshwater marshes, grasslands, rice and sorghum fields (NatureServe 2011).	No suitable habitat within the project limits. Very low potential for this species to occur within the broader study area. The open meadows are small and narrow and are not suitable as bobolink nesting habitat.	Breeding bird survey and habitat assessment was completed within the broader study area on July 11, 2013.	Not Observed
Canada Warbler	<i>Cardellina canadensis</i>	MNR Correspondence	S4B	THR	SC	No	No	THR	1	No	Found in a variety of forest types, but it is most abundant in wet, mixed deciduous-coniferous forest with a well-developed shrub layer. It is also found in riparian shrub forests on slopes and in ravines and in old-growth forests with canopy openings and a high density of shrubs, as well as in stands regenerating after natural disturbances, such as forest fires, or anthropogenic disturbances, such as logging (Reitsma <i>et al.</i> 2010)	No suitable habitat within the project limits. Very low potential for this species to occur within the broader study area. The mixed wet deciduous-coniferous forest with a well-developed shrub layer that species needs for breeding does not occur.	Breeding bird survey and habitat assessment was completed within the broader study area on July 11, 2013.	Not Observed
Chimney Swift	<i>Chaetura pelagica</i>	MNR Correspondence	S4B,S4N	THR	THR	No	No	THR	1	No	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water. Before European settlement Chimney Swifts mainly nested on cave walls and in hollow trees or tree cavities in old growth forests. Today, they are more likely to be found in and around urban settlements where they nest and roost (rest or sleep) in chimneys and other manmade structures. They also tend to stay close to water as this is where the flying insects they eat congregate. Chimney Swifts are aerial foragers, often concentrating near water where insects are abundant. Inhabits rural and urban environments with suitable nesting/roosting sites principally in chimneys. Natural nest sites include the interior of hollow tree trunks and branches. (NatureServe 2011).	No suitable habitat within the project limits. High potential for this species to occur in the broader study area. Nests in artificial structures (including industrial and residential buildings and chimneys) and exploits foraging opportunities in open landscapes (meadows) and emergent insects over open water (rivers and wetlands).	Breeding bird survey and habitat assessment was completed within the broader study area on July 11, 2013.	Observed foraging over the eastern cultural meadows of the broader study area, no nests located
Common Nighthawk	<i>Chordeiles minor</i>	MNR Correspondence	S4B	THR	SC	No	No	THR	1	No	Open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs. Traditional Common Nighthawk habitat consists of open areas with little to no ground vegetation, such as logged or burned-over areas, forest clearings, rock barrens, peat bogs, lakeshores, mine tailings. Although the species also nests in cultivated fields, orchards, urban parks, mine tailings and along gravel roads and railways, they tend to occupy natural sites (MNR 2013).	No suitable habitat within the project limits. Very low potential for the species to occur broader study area. Nests on open ground of gravel pits or urban parks and gravel roof tops. The ground cover of the open meadows was too dense for the species to nest within.	Breeding bird survey and habitat assessment was completed within the broader study area on July 11, 2013.	Not Observed

Common Name	Scientific Name	Source	S-Rank	COSEWIC ³	MNR ⁴	MNR Recovery Strategy?	MNR Habitat Regulation?	SARA Status ⁵	Schedule ⁵	Federal Recovery Strategy?	Detailed Habitat Description	Potential to occur based on habitat suitability	Survey Approach	Results
Eastern Meadowlark	<i>Sturnella magna</i>	MNR Correspondence	S4B	THR	THR	No	No	No Status	No schedule	No	Eastern Meadowlarks prefer grassland habitats, including native prairies and savannahs, as well as non-native pastures, hayfields, weedy meadows, herbaceous fencerows, young orchards, golf courses, grassy roadside verges, young oak plantations, grain fields and grassy airfields with elevated singing perches. The minimum area required is estimated at 5 ha (MNR 2013).	No suitable habitat within the project limits. Very low potential for this species to occur within the broader study area. The open meadows are small and narrow and are not suitable as meadowlark nesting habitat.	Breeding bird survey and habitat assessment was completed within the broader study area on July 11, 2013.	Not Observed
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	MNR Correspondence	S4B	THR	SC	No	No	THR	1	No	In their breeding areas, Golden-winged Warblers seem to be fond of regeneration zones where young shrubs grow, surrounded by mature forest, and characterized by plant succession of 10 to 30 years. The warblers frequent clusters of herbaceous plants and low bushes (where they place their nests, which are built on the ground). They favour environments where the trees are spread out, as well as the forest edge, and use this setting for perching, singing and looking for food. Golden-winged Warblers are found in dry uplands, swamp forests and marshes. This warbler shows a preference for public utility (hydro-electric) rights-of-way, the edges of fields, areas where logging has recently occurred, beaver ponds and burned-out or intermittently cultivated areas (MNR 2013).	No suitable habitat within the project limits. Very low potential for this species to occur within the broader study area. The cultural meadow does not meet species habitat breeding requirements (late transitioning meadow surrounded by mature forest with shrub cover). The cultural meadow provides low quality foraging habitat for the species.	Breeding bird survey and habitat assessment was completed within the broader study area on July 11, 2013.	Not Observed
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	MNR Correspondence	S4B	THR	SC	No	No	THR	1	No	Open, deciduous forest with little understory; fields or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees; feeds on insects and stores nuts or acorns for winter; requires cavity trees with at least 40 cm dbh; requires about 4 ha for a territory (MNR 2013).	Very low potential for this species to occur within the project limits and broader study area. The woodlands do not meet species breeding habitat requirements; open, deciduous forest with little understory; fields or pasture lands with scattered large trees. The woodlands provide low quality foraging habitat for the species.	Breeding bird survey and habitat assessment was completed within the broader study area on July 11, 2013.	Not Observed
Yellow-breasted Chat	<i>Icteria virens</i>	MNR Correspondence	S2B	END	SC	No	No	SC	1	No	Scrubby, early successional habitats, utilizing regenerating old field, forest edges, railway and hydro rights-of-way, young coniferous reforestations and, occasionally wet willow-ash-elm thickets bordering wetlands; nests above ground in bush, vines, etc. (MNR 2013).	Very low potential for this species to occur within the project limits and broader study area. The open meadow does not meet the species breeding habitat requirements (early successional meadow with woodland edges). The cultural meadow provides low quality foraging habitat for the species.	Breeding bird survey and habitat assessment was completed within the broader study area on July 11, 2013.	Not Observed
Herpetofauna														
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	MNR Correspondence	S2	END	END	Yes	Yes	THR	1	No	Damp shady deciduous forest, swamps, moist pasture, lakeshores; temporary woodland pools for breeding; hides under leaf litter, stones or in decomposing logs. Prefers forests with wetland, pond or vernal or other temporary pool that provide breeding habitat. Adults live on the forest floor; in the soil or in leaf litter. In early spring, they move to woodland ponds to breed. Movement and breeding occurs only at night, and most often on rainy nights (MacCulloch 2002)	No suitable breeding habitat within the project limits or broader study area. Very low potential for this species to forage within the broader study area. There are no forests with wetlands, vernal pools or other temporary ponds to provide breeding habitat. The woodlands provide low quality foraging habitat for the species.	Herpetofaunal surveys (amphibian breeding habitat assessment and reptile breeding habitat assessment) was completed within the broader study area on July 11, 2013.	Not Observed

Common Name	Scientific Name	Source	S-Rank	COSEWIC ³	MNR ⁴	MNR Recovery Strategy?	MNR Habitat Regulation?	SARA Status ⁵	Schedule ⁵	Federal Recovery Strategy?	Detailed Habitat Description	Potential to occur based on habitat suitability	Survey Approach	Results
Blanding's Turtle	<i>Emydoidea blandingii</i>	MNR Correspondence; NHIC (record dated 1989)	S3	THR	THR	No	No	THR	1	Yes	The Blanding's Turtle is a primarily aquatic species. In the summer, it is found in lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. In general, the species prefers shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, whereas juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. The Blanding's Turtle also needs terrestrial environments; it can travel over long distances, between different aquatic environments, in order to find suitable sites for basking in the sun and nesting. The species usually nests in dry conifer or mixed hardwood forests, up to 410 m from any body of water. Females also like partially vegetated sites such as fields or roadways and dig nests in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams. Blanding's Turtle inhabits shallow water, usually in large marshes, shallow lakes, and similar bodies of water. They are poor swimmers, and often move about by walking on the bottom. They usually do not travel far from water except to nest, and overwinter at the bottom of water bodies (MacCulloch 2002). They hibernate in the mud at the bottom of permanent water bodies from late October until the end of April (MNR 2013).	Very low potential for this species to occur within the project limits but may occur up stream or down stream in adjacent wetland habitats of the broader study area.	Herpetofauna surveys (amphibian breeding habitat assessment and reptile breeding habitat assessment) was completed within the broader study area on July 11, 2013.	Not Observed
Northern Map Turtle	<i>Graptemys geographica</i>	NHIC (record dated 1924)	S3	SC	SC	No	No	SC	1	No	large bodies of water with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges, will bask in groups; uses soft soil or clean dry sand for nest sites; may nest at some distance from water; home range size is larger females (about 70 ha) than males (about 30 ha) and includes hibernation, basking, nesting and feeding areas; aquatic corridors (e.g. stream) are required for movement (MacCulloch 2002).	Very low potential to occur within the project limits and broader study area. General habitat for this species is present (large bodies of water with soft bottoms, and aquatic vegetation, basks on logs or rocks), however MNR does not consider this species to be present within the City of Guelph and the NHIC record is from 1924.	Herpetofauna surveys (amphibian breeding habitat assessment and reptile breeding habitat assessment) was completed within the broader study area on July 11, 2013.	Not Observed
Snapping Turtle	<i>Chelydra serpentina</i>	MNR Correspondence	S3	SC	SC	No	No	SC	1	No	Permanent, semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water; home range size ~28 ha in area. Snapping Turtle are usually found in large bodies of water, and sometimes in small ponds as well. It can travel extensively to deposit eggs, but otherwise leave the water infrequently (MacCulloch 2002). Snapping Turtle often use gravel shoulders along roads for nest sites (MNR factsheet).	Very low potential for this species to occur within the project limits but may occur up stream or down stream in adjacent wetland habitats of the broader study area.	Herpetofauna surveys (amphibian breeding habitat assessment and reptile breeding habitat assessment) was completed within the broader study area on July 11, 2013.	Not Observed

Common Name	Scientific Name	Source	S-Rank	COSEWIC ³	MNR ⁴	MNR Recovery Strategy?	MNR Habitat Regulation?	SARA Status ⁵	Schedule ⁵	Federal Recovery Strategy?	Detailed Habitat Description	Potential to occur based on habitat suitability	Survey Approach	Results
Eastern Ribbonsnake (aka. Northern Ribbonsnake)	<i>Thamnophis sauritus septentrionalis</i>	MNR Correspondence; NHIC (record from 1990)	S3	SC	SC	No	No	SC	1	Yes	Sunny grassy areas with low dense vegetation near bodies of shallow permanent quiet water; wet meadows, grassy marshes or sphagnum bogs; borders of ponds, lakes or streams; hibernates in groups. The Northern Ribbonsnake is semi-aquatic and most frequently found along wetland edges. Quiet, shallow water with low surrounding cover is preferred, although areas with good exposure to sunlight are also required. Gravid females may move away from water before nesting, as females and juveniles are occasionally found in upland areas. Eastern Ribbonsnake prefers meadows or forest edges, and they are often found near the edges of permanent bodies of water such as marshes, ponds, lakes, and rivers. They often bask on offshore rocks or logs, and feed in water, capturing frogs, fish and invertebrates (MacCulloch 2002).	Some potential for this species to occur within the project limits but may occur up stream or down stream in adjacent marsh habitats of the broader study area.	Herpetofauna surveys (amphibian breeding habitat assessment and reptile breeding habitat assessment) was completed within the broader study area on July 11, 2013.	Not Observed
Milksnake	<i>Lampropeltis triangulum</i>	MNR Correspondence	S3	SC	SC	No	No	SC	1	No	Farmlands, meadows, hardwood or aspen stands; pine forest with brushy or woody cover; river bottoms or bog woods; hides under logs, stones, or boards or in outbuildings; often uses communal nest sites. It is most frequently reported in and around buildings, especially old structures. However, it is found in a wide variety of habitats, from prairies, pastures, and hayfields, to rocky hillsides and a wide variety of forest types. Two other important features of good Milksnake habitat are proximity to water, and suitable locations for basking and egg-laying. Milksnake prefers open forest, forest edges, meadows, and cultivated areas. It's often found in barns and buildings, and overwinters underground in rocks (MacCulloch 2002).	Some potential to occur within the project limits and broader study area. Habitat for this species is present in human structures, rocky outcrops, rocky hillsides near water and small meadows for foraging.	Herpetofauna surveys (amphibian breeding habitat assessment and reptile breeding habitat assessment) was completed within the broader study area on July 11, 2013.	Not Observed
Insects														
Monarch	<i>Danaus plexippus</i>	MNR Correspondence	S2N,S4B	SC	SC	No	No	SC	1	No	Monarchs in Canada exist primarily wherever milkweed (Asclepius) and wildflowers (such as Goldenrod, asters, and Purple Loosestrife) exist. This includes abandoned farmland, along roadsides, and other open spaces where these plants grow. Monarch wintering habitats include Eucalyptus trees along the Californian coast, and the Oyamel Fir forest in central Mexico (MNR 2013).	Potential for the species to occur within the project limits and broader study area. Habitat for this species is present along roadsides and cultural meadows containing milkweed and wildflowers.	General wildlife and wildlife habitat survey was undertaken within the broader study area on July 11, 2013	Not Observed
Rusty-patched Bumble Bee	<i>Bombus affinis</i>	MNR Correspondence	S1	END	END	Yes	No	END	1	No	Generalist species that can be found in open habitat such as mixed farmland, savannah, sand dune, urban and lightly wooded areas, favouring oak savannah habitat. Usually nests in old rodent burrows, hollow tree stumps and fallen dead wood. Foraging habitat typically contains an abundance of wild flowers in the forest understory or in open fields (MNR 2013).	Potential for this species to occur within the project limits and in adjacent habitats of the broader study area. Limited habitat for this species is present (lightly wooded and urban areas).	General wildlife and wildlife habitat survey was undertaken within the broader study area on July 11, 2013	Not Observed
West Virginia White	<i>Pieris virginiensis</i>	MNR Correspondence	S3		SC	No	No			No	Inhabits moist, deciduous woodlands, and the larvae feed only on the leaves of toothwort (Dentaria diphylla; Dentaria X maxima), which is a small, spring-blooming plant of the forest floor (MNR 2013).	Very low potential for this species to occur within the project limits and broader study area. The project limits lack the specific habitat the species requires (moist, deciduous woodlands, and the larvae feed only on the leaves of toothwort)	General wildlife and wildlife habitat survey was undertaken within the broader study area on July 11, 2013	Not Observed

APPENDIX G

Aquatic Effects Assessment Summary Table

Appendix G. Aquatic Effects Assessment Summary Table

Waterbody	Pathway of Effect (s)	Stressor (Potential Impact)	Cause and Effect Relationship	Mitigation Measures	Residual Effects
Speed River; Pond Creek; Howitt Creek	Vegetation Clearing	Use of industrial equipment Alteration of riparian vegetation Addition or removal of instream organic structure Bank Stability and exposed soils Change in shade Allochthonous inputs Increased erosion potential	An increase in nutrients/contaminants into the watercourse may lead to a variety of effects on fish and other aquatic wildlife Removal of undercut banks and overhanging woody material used as cover/structure for fish Removal of woody material from the stream channel may result in loss of cover/structure Loss of vegetation can lead to bank instability and exposed soils The alteration of riparian vegetation may result in the loss of shade Potential reduction in allochthonous inputs such as leaf matter and terrestrial insects Exposed soils can lead to erosion and sediment entering the water. Loss of root material could lead to bank slumping	Minimize riparian vegetation removal Use proper clearing techniques Protect retained vegetation Rehabilitation of riparian vegetation plantings to rehabilitate exposed soils Management of erosion and sediment controls	No residual effects: all areas cleared of vegetation will be replanted post-construction ESC measures will contain/isolate construction zone and remain in place until plantings have become established Retained vegetation will be protected using tree preservation fencing
	Excavation	Creation of pond, pit or trench Dewatering of pit or trench Bank stability and exposed soils Change in slope and drainage Removal of topsoil Exposed soils Increased erosion potential Soil/material stockpiles	Creation of pond, pit or trench can lead to bank instability and exposed soils, change in slope or drainage. The pit or trench may also require dewatering Dewatering discharge may affect bank stability and increase erosion potential Loss of vegetation and topsoil during construction can lead to bank instability and exposed soils Should groundwater enter the pit or trench, water temperature may be impacted due to the difference in groundwater temperature Removal of topsoil will result in exposed soils Exposed soils can lead to erosion and sediment entering the water Soil piles may runoff and increase sediment concentration in the watercourse	Management erosion and sediment controls Management of dewatering discharge Management of excess materials	No residual effect: effective ESC measures will be in place to prevent sediment transport into the waterbody. All dewatering discharge (if required) will be directed through approved filtering devices (filter bag; Envirotank and discharged 30 m away from watercourse or sensitive area) All material removed or stockpiled will be contained in a manner to ensure sediment does not enter waterbody
	Use of Industrial Equipment	Bank stability and exposed soils Increased erosion potential Re-suspension and entrainment of sediment Oil, grease and fuel leaks from equipment	Use of mobile industrial equipment within a water body can lead to the mortality of fish, eggs and/or ova should they be present in the work area during construction Industrial equipment can expose soils through the loss of vegetation within the working area Exposed soils can lead to erosion and sediment entering the water. Loss of root material could lead to bank slumping Oil, grease and fuel are deleterious substances that can harm or kill fish.	Operational constraint for access Management of erosion and sediment controls Management of equipment and spills Management of temporary flow Management of dewatering discharge Management of fish transfer Operational timing constraint	No residual effects: Industrial equipment will utilize designated access routes and work areas and arrive onsite in good condition Work will take place during the specified cool-water timing window Filter bags will be used for dewatering work areas ESC measures will contain/isolate construction area Cofferdams will be properly installed to isolate in-water work zones

Waterbody	Pathway of Effect (s)	Stressor (Potential Impact)	Cause and Effect Relationship	Mitigation Measures	Residual Effects
	Riparian Planting	Site preparation Bank stability and exposed soils Increased erosion potential Increase in riparian and bank vegetation Improved canopy Increased shade Change in vegetation species composition	Site preparation can result in exposed soils that can lead to instable banks, exposed soils and increased erosion potential Loss of vegetation can lead to bank instability and exposed soils Exposed soils can lead to erosion and sediment entering the water. Loss of root material could lead to bank slumping Improved canopy cover to a watercourse may increase nutrient concentrations and shade cover Increased shade cover may alter water temperatures by buffering the impacts of sun exposure	Management of erosion and sediment controls Rehabilitation of riparian vegetation Rehabilitation of bank Rehabilitation of exposed soils	No residual effects: riparian vegetation will be replanted with suitable species
	Dredging	Change in aquatic macrophytes Resuspension and entrainment of sediment	Dredging the trench for the sewer and water main could lead to a change in food supply, nutrient concentrations or habitat structure and cover through the removal of aquatic macrophytes A change in sediment and/or contaminant concentrations may result from the re-suspension and entrainment of sediment	Management of temporary flow Rehabilitation of in-stream cover	No residual effects: all in-stream works are proposed to take place in the dry by effectively isolating in-water zones from the watercourse. Flow will not be affected in the Speed River. Flows will be temporarily diverted around the in-water work zone in Howitt and Pond Creek
	Fish Passage Issues	Obstruction (downstream and upstream fish passage) Alteration of migration patterns Flow alteration Diversion channels Attraction flows/flow barriers	Dams or other structures placed in the water may impede fish passage through the work area Reduction in flow may not provide appropriate cues to migrating fish and therefore fish may not migrate into spawning grounds. Dammed water may slow down and warm, altering thermal regimes Increases to flow may result in alteration of gas pressure or create velocity/low flow barriers to fish migration Inappropriately designed diversion channels may not be suitable to allow for fish passage. Diversion to other watercourses may result in inter-basin transfer of species.	Operational constraints for timing of in-water works Management of fish screens or equivalent Management of temporary flows	No residual effect: fish passage and flow will be maintained during and after construction. Water-tight cofferdams will be used to minimize the potential for fish to enter dry work zones. In-water works will occur during low-flow period between Dec 1 st and Feb 28 th .
	Water Extraction	Placement of materials in water Reduced flow Entrainment in pumps/machinery	Extraction of water may result in the loss of fish habitat and migration routes within the work area and downstream Equipment required to extract water (pumps, hoses, intakes, etc) from the watercourse will be placed in the water and may result in injuring fish and/or the introduction of deleterious substances to the watercourse Fish may be entrained in the pump during dewatering of the work area or while pumping water around the work area	Management of dewatering discharge Management of temporary flow Management of fish transfer Management of fish screens	No residual effects: areas to be dewatered will be isolated from the rest of the watercourse and a fish removal to be conducted prior to the pumping of water. A mesh screen will be placed over the pump intake to minimize the potential for fish entrainment.
	Flow Management	Dewatering Bank erosion Scouring of channel bed Change in substrate composition	Dams or other structures placed in the water may impede fish passage through the work area Flow redirection may alter the thermal regime of the watercourse and create unsuitable conditions for migrating fish species sensitive to temperature Reduction in flow may not provide appropriate cues to migrating fish and therefore fish may not migrate into spawning grounds. Dammed water may slow down and warm, altering thermal regimes Changes in flow may result in alteration of gas pressure or create velocity/low flow barriers to fish migration Inappropriately designed diversion channels may not be suitable to allow for fish passage. Diversion to other watercourses may result in inter-basin transfer of species	Management of dewatering discharge Management of work-site containment Operational constraints for management of in-water work	No residual effects: flow and fish passage will be maintained during and after construction. Energy from flows diverted through temporary culvert in Howitt and Pond Creeks will be dissipated using riverstone splash pad prior to re-entering the watercourse thereby preventing bank erosion or bed scouring