Appendix E
Natural Environment

Terrestrial Habitat Existing Conditions & Impact Assessment Report (Final)

Class Environmental Assessment – Improvements to Barton Street and Fifty Road
The City of Hamilton
TPB166053

Prepared for:

The City of Hamilton

71 Main Street West, 6th Floor, Hamilton, Ontario, Canada, L8R 4Y5

April 2021

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Prepared for:

The City of Hamilton
71 Main Street West, 6th Floor, Hamilton, Ontario, Canada, L8R 4Y5

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Executive summary

The City of Hamilton is proposing to widen and improve approximately 5.0 kilometres (km) of Barton Street Road from Fruitland Road to Fifty Road and an additional 1.0 km of Fifty Road from South Service Road to Highway No. 8 as per the Hamilton Transportation Master Plan (TMP). Additional works will include replacement or extension of the existing crossing structures on site to accommodate the widening of the roadway, changes to drainage (ditches), and provision of multi-use pathways on both sides of the roadway. These roadway improvements were identified as a Schedule 'C' Project. The TMP satisfied Phases 1 and 2 of the Municipal Class EA process.

Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood) (formerly Amec Foster Wheeler) has been retained by the City of Hamilton to undertake the required Schedule 'C' Municipal Class EA for the proposed improvements to the sections of Barton Street and Fifty Road under study. This Terrestrial Habitat Existing Conditions and Impact Assessment Report will inform the preparation of an Environmental Study Report (ESR) for the project and aid in the completion of the Municipal Class EA Process.

An review of secondary source information and field investigations were completed for the Project to identify the presence and absence of components of the City's Natural Heritage System inclusive of species at risk. This report provides a summary of terrestrial existing conditions from both secondary source information and field investigations undertaken between 2016 and 2019. Field investigations were undertaken from the existing road right-of-way ROW and on the properties where permission to enter (PTEs) had been granted. More specifically the Project study area encompasses a 120 m buffer from Barton Road and Fifty Road ROW as summarized herein.

A summary of key findings include:

- Confirmation of three (3) avian SAR species: Barn Swallow, Bank Swallow and Eastern Meadowlark. Although Bobolink were not observed during the field investigations, it was documented within the Block 2 Secondary Plan prepared by Aquafor Beech Ltd. 2018, and therefore should be considered moving forward into future planning phases.
- Although a number of SAR and locally rare species were noted during the secondary source review of the Project study area, no rare mammals, reptiles, amphibians or vegetative species were observed/documented during field investigations.
- Three (3) significant woodlands are present within the Project study area as identified through both the Urban and Rural City of Hamilton Official Plans, along with other Core Areas (i.e., wetlands, linkages, ESAs etc.).
- No significant wildlife habitat was observed during the field investigations based on either species occurrence observations, or habitat which meets size and function criteria.
- As the entire Project study area was not exhaustively searched due to access restrictions there is a possibility for SAR or significant wildlife habitat to occur, however, these occurrences (with the exception of those noted above) are not within the area proposed for Project impact based on the Alternative 3(ROW widened north by maintain property line) for Barton Street and Alternative 3 (ROW widened to the east) of Fifty Road.
- With the application of the appropriate mitigation and restoration measures, the potential impacts of the proposed road widening to the surrounding natural environment are anticipated to be minimal and temporary in nature.

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1.0 Introduction

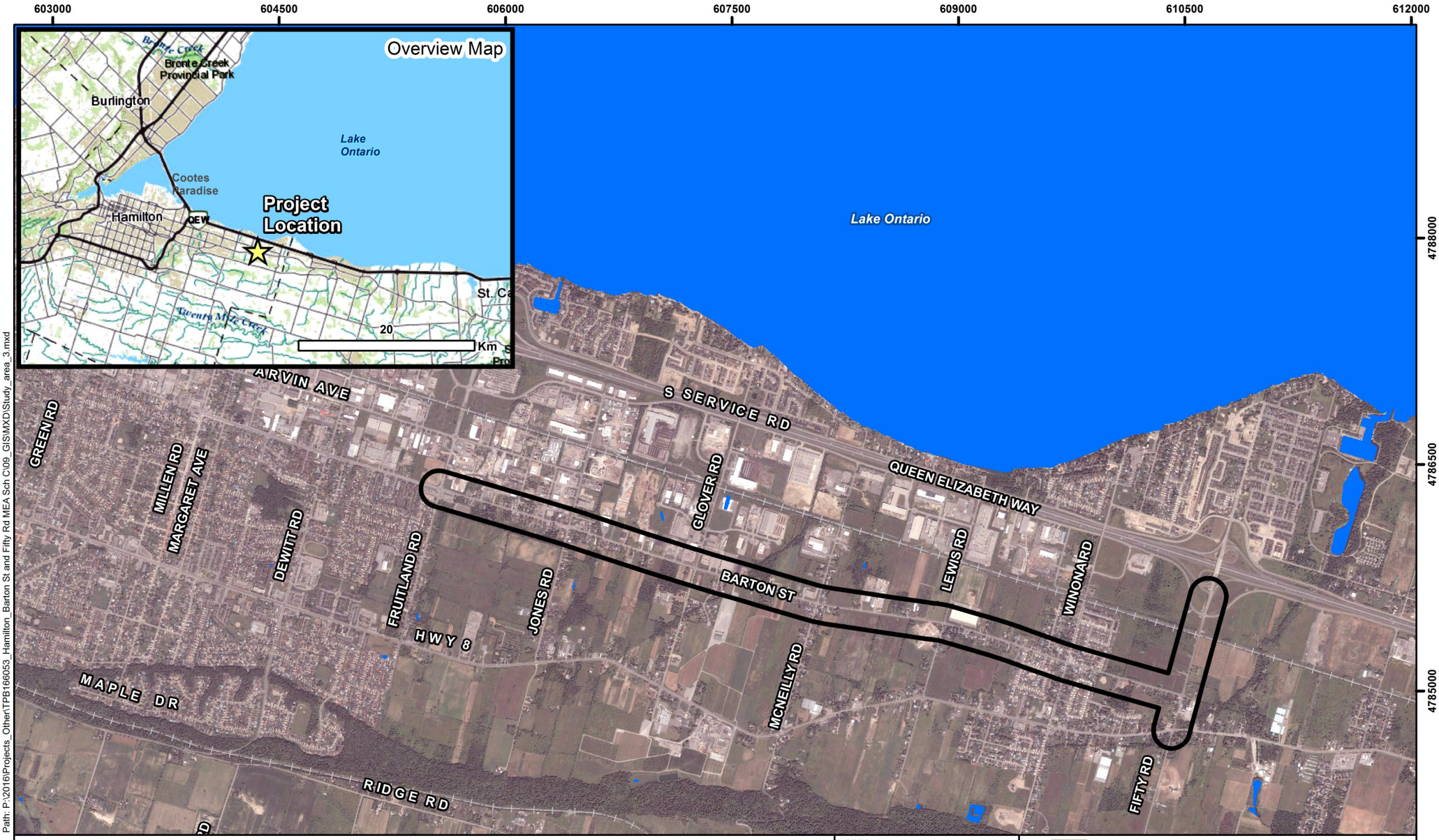
Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood) (formerly Amec Foster Wheeler) has been retained by the City of Hamilton to undertake the required Schedule 'C' Municipal Class EA for the proposed improvements to the sections of Barton Street and Fifty Road. As part of this Schedule 'C' Class EA, a Terrestrial Habitat Existing Conditions and Impact Assessment Report has been prepared to help inform the preparation of an Environmental Study Report (ESR) for the project and aid in the completion of the Municipal Class EA Process.

Proposed improvements associated with Barton Street and Fifty Road include the widening of roadway approximately 5.0 kilometres (km) of Barton Street Road from Fruitland Road to Fifty Road and an additional 1.0 km of Fifty Road from South Service Road to Highway No. 8 (hereafter referred to as 'the Project'). Widening and improvements to these road corridors follows those outlined in the City of Hamilton Transportation Master Plan (TMP). More specifically, the roadway requires improvements due to existing and projected structural deficiencies, intersection and road capacity deficiencies and changes in surrounding land use. Additional works will include replacement or extension of the existing crossing structures on site to accommodate the widening of the roadway, changes to drainage (ditches), and provision of multi-use pathways on both sides of the roadway.

1.1 Study Area

Barton Street is an east-west arterial corridor under the jurisdiction of the City of Hamilton. As noted herein, the project encompasses approximately 5.0 km of Barton Street Road from Fruitland Road to Fifty Road and an additional 1.0 km of Fifty Road from South Service Road to Highway No. 8. A 120 metre (m) buffer was applied to the existing roadways in order to assist with assessing natural heritage features in proximity to the road corridor. This 120 m buffer represents the study area that was reviewed as part of this Report (herein after referred to as the Project study area). The representation of this Project study area is illustrated on Figure 1-1.

The Project study area is under the regulatory jurisdiction of the Hamilton Conservation Authority (HCA) and the Guelph District Ministry of Natural Resources and Forestry (MNRF). As of April 1, 2019, the Ministry of Environment Conservation and Parks (MECP) has resumed responsibility of the Ontario *Endangered Species Act, 2007* (as amended) (ESA). All future correspondence as part of detailed design and requirements related to the ESA shall be directed to MECP. For the purposes of this Report, references are still made to MNRF for species-at-risk (SAR).



Path: P:\2016\Projects_Other\TPB166053_Hamilton_Barton St and Fifty Rd MEA Sch C\09_GIS\MXD\Study_area_3.mxd

LEGEND

- Approximate Study Area
- Railway
- Waterbody

NOTES:
- Background imagery from ESRI.
- Topographic features extracted from LIO, MNRF.

Hamilton

amec foster wheeler

BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Project Location and Study Area

Datum & Projection: NAD 1983 UTM Zone 17N

N W E S

0 1 2 3 4 Kilometres

PROJECT N°: TPB166053 | **FIGURE: 1-1**

SCALE: 1:35,000 | DATE: November 2017

2.0 Methodology

Wood undertook a secondary source data review of the Project study area and undertook biophysical inventories (field investigations) within sections of the Project study area where permissions to enter (PTE) were granted. The purpose of the secondary source review and field investigations was to characterize and evaluate the existing biophysical environment to provide baseline data to support the ESR, and future design and approval process for the Project. Secondary source information and data from field investigations were used to characterize terrestrial existing conditions of the Project study area, including classification and mapping of vegetation communities, inventories of plant and wildlife species, identify SAR presence, and determine the probability of suitable habitat.

2.1 Secondary Source Review

Secondary sources and databases were reviewed to ascertain species occurrence within the Project study area. Sources of information include material and correspondence provided by external agencies and publicly-available topographic data for assessment of Areas of Natural or Scientific Interest (ANSI), Environmentally Sensitive Areas (ESAs), Provincially Significant Wetlands (PSW), other natural heritage features and SAR located within the Project study area. Sources reviewed include:

- Correspondence with MNRF (Guelph District) (Appendix A);
- Correspondence with Hamilton Conservation Authority (HCA) (Appendix A);
- Fruitland – Winona Block 1 Servicing Strategy Natural Heritage System (Dougan & Associates 2016);
- SCUBE Block 2 – Draft Concept Plan (Aquafor Beech Limited 2016; Letter Report to City of Hamilton);
- Block 2 Servicing Strategy for the Fruitland – Winona Secondary Plan Lands – Final Report (Aquafor Beech Limited 2018);
- Winona Hills Subdivision Winona, Ontario – Final – Natural Heritage Features Constraints Report (More Than Engineering 2012a);
- Barton Street East Subdivision Stoney Creek, Ontario – Update - Natural Heritage Features Constraints Report (More Than Engineering 2012b);
- Environment Canada's Species at Risk Public Registry database (ECCC 2017);
- The MNRF Species at Risk in Ontario List (MNRF 2019a);
- MNRF's Natural Heritage Information Centre (NHIC; MNRF 2019b);
- The Ontario Reptiles and Amphibian Atlas (ORAA) (Ontario Nature 2016) 10 x 10 km survey squares 17PH08, 17PH18;
- The Atlas of the Mammals of Ontario (AMO) (Dobbyn 1994);
- Bat species profiles and range maps for the province of Ontario provided by Bat Conservation International, Inc. (BCI 2017);
- The Second Atlas (2001-2005) of Breeding Birds of Ontario (ABBO) 10 x 10 km survey squares 17PH08, 17PH18 within Region 15 (Cadman et al., 2007); and
- Topographic data extracted from Land Information Ontario (MNRF 2017c).

The MNRF NHIC database utilizes a 1 km x 1 km system. The Project study area overlaps with 11 NHIC atlas squares including 17PH0586, 17PH0686, 17PH0786, 17PH0585, 17PH0685, 17PH0785, 17PH0885, 17PH0985, 17PH1085, 17PH0984, 17PH1084.

The ABBO and ORAA use a 10 km x 10 km grid system to generate a list of species potentially present within a given 10 km2 area. The list of mammals was generated through extrapolation of inventory mapping provided within the atlas (Dobbyn 1994).

2.2 Species at Risk and Provincially Rare Species

In Ontario, SAR are listed for both flora and faunal species whose individuals or populations are considered Extirpated, Endangered, Threatened, or Special Concern, as determined by the provincial Committee on the Status of Species at Risk in Ontario (COSSARO) and the federal Committee on the Status of Endangered Wildlife in Canada (COSEWIC). SAR and their critical habitat are regulated by the provincial *ESA* and the federal *Species at Risk Act, 2002* (*SARA*).

In Ontario, if a species is listed under the *ESA* as Extirpated, Endangered or Threatened, Section 9 of the Act prohibits killing, harming, harassing, capturing, taking, possessing, collecting, buying, selling, leasing, trading or offering to buy, sell, lease or trade a member of the species. Some of these prohibitions also apply to body parts of a member of the species and to things derived from a member of the species. Similarly, if a species is listed under the *ESA* as Endangered or Threatened, Section 10 of the Act prohibits damaging or destroying the habitat of the species. Species listed as Special Concern are not afforded protection under Sections 9 and 10 of the *ESA*.

Provincially rare species are those with a provincial rank of S1, S2 or S3 and considered provincially vulnerable to provincially imperiled. Provincially rare species are tracked by the NHIC and are not necessarily protected under *ESA*, though some species are listed in both places. In accordance with the MNRF Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E, those locations where species identified as Special Concern and provincially rare (S1-S3, SH) have been identified (element occurrence) are considered Significant Wildlife Habitat: Habitat for Species of Conservation Concern (not including Endangered or Threatened Species).

The potential for SAR and rare species to occur with the Project study area was determined based on a review of background information, agency consultation and field verification based on suitable habitat. The background information included a review of the NHIC online database of significant floral and faunal species within the Project study area. The background information noted above (e.g., wildlife atlases, previous reports etc.) were also used to develop a complete list of SAR and rare species occurrences that may overlap the Project study area. For the purposes of this report, as only no federal land is within the Project study area, only the provincial ESA will be applicable with the exception of SAR fisheries which is managed by Fisheries and Oceans Canada (DFO).

2.3 Field Investigations

Field investigations were undertaken by qualified Wood terrestrial biologists on June 17, June 28 and July 7, 2016, July 20 and August 11, 2017 and April 8, May 6 and June 11, 2019 in areas within the Project study area where PTE access was granted. An illustration of where access was provided is provided within Appendix B: Site Access and Restrictions. As such, where access was restricted, the areas were visually assessed form the closest vantage point with use of binoculars, and further reviewed through the use of satellite imagery. Field investigations were completed for several targeted surveys which included vegetation and ecological land classification, breeding birds and anuran call surveys. Additional information collected during the field investigations included a review of wildlife habitat, review of natural features (e.g., wetlands and woodlands) and recordings of incidental observations of wildlife (e.g., mammals and reptiles).

2.3.1 Vegetation Communities and Botanical Inventories

Detailed vegetation community classification and mapping were conducted according to the Ecological Land Classifications (ELC) system for southern Ontario. The First Approximation of ELC (Lee et al. 1998) was applied for the determination of ecosite type. The 2008 catalogue of ecosite types (Lee, 2008) was applied where ecosites could not be determined through the 1998 field manual, or were there was a better classification provided in the updated catalogue. The occurrence of ELC communities were cross-referenced with vegetation communities as identified in the Significant Wildlife Habitat (SWH) Technical Guide and the Significant Wildlife Habitat Ecoregion 7E Criterion Schedule (MNR 2000, MNRF 2015) to determine whether areas within the Project study area could be considered candidate or confirmed SWH.

Botanical field investigations were conducted simultaneously with other field investigations with specific targeted investigations taking place on July 20 and August 11, 2017. Botanical species occurrences were cross-referenced with the NHIC database (MNRF 2019b) and additional secondary source material to confirm presence or absence of rare or SAR species.

2.3.2 Breeding Bird Surveys

Eleven (11) point count stations were surveyed on June 17, June 28 and July 7, 2016 by qualified avian biologists skilled in the identification of birds by sight and sound. Point count stations are illustrated and provided in Appendix C. Each station was surveyed on all three (3) survey events, with the second round of surveys completed in the reverse order (as best feasible) to account for temporal biases. Three (3) surveys were undertaken to ensure compliance with requirements under the *Endangered Species Act* (2007) due to known occurrences of Eastern Meadowlark and Bobolink in the Project study area, as documented in secondary source material.

Breeding bird surveys were conducted using the Ontario Breeding Bird Atlas Guide for Participants (2001). Qualified avian biologist completed a ten (10) minutes survey at each point count station and all birds heard or observed were recorded at intervals of 0 to 50 m, 50 to 100 m, >100 m and flyovers (birds seen flying overhead). In addition, birds were recorded at intervals of 0 to 3 minutes, 3 to 5 minutes and 5 to 10 minutes. Surveys were initiated no earlier than 30 minutes prior to sunrise and extended to five (5) hours after sunrise. Species were identified through their unique vocalisations and visual observations. Each bird was recorded once and mapped on the field data sheets to ensure no duplication of individual birds. All breeding bird surveys were undertaken in good weather with warm temperatures, no precipitation, and little or no wind in accordance with regulatory approved protocols.

2.3.3 Anuran Breeding Surveys

Twelve (12) point count stations were surveyed on April 8, May 6 and June 11, 2019 by a qualified biologist skilled in the identification of frogs and toads. Point count stations are illustrated and provided in Appendix C. Each of the point count stations was surveyed on all three (3) survey events. Surveys were undertaken following the Marsh Monitoring Program (MMP) protocol (2008). Surveys were completed during the respective months of April, May and June when night-time air temperatures were above 5°C for the first survey, 10ºC for the second survey and 17ºC for the third survey.

In accordance with the MMP Protocol each of the ten (1) point count stations was surveyed anywhere between three (3) minutes and five (5) minutes depending on level of traffic noise. Call levels for each species heard were categorized into three (3) levels as follows:

- Level 1 – calls not simultaneous, number of individuals can be accurately counted;
- Level 2 – some calls simultaneous, number of individuals can be reliably estimated;

- Level 3 – full chorus, calls continuous and overlapping, number of individuals cannot be readily estimated.

2.3.4 Wildlife Habitat

To determine the existence of SWH within the Natural Heritage System, MNRF has developed SWH Criterion Schedules for identifying ecosites and/or natural features suitable for wildlife to carry out critical life processes including:

- Seasonal Concentration Areas of Animals;
- Rare Vegetation Communities and Specialized Habitat for Wildlife;
- Habitat for Species of Conservation Concern (excluding Endangered or Threatened species); and
- Animal Movement Corridors.

The Project study area fall within ecoregion 7E (Lake Erie - Lake Ontario Ecoregion), accordingly, the SWH Criterion Schedules for Ecoregion 7E was applied to document the occurrence of candidate SWH within the Project study area.

All incidental sightings of wildlife and significant wildlife habitat were documented concurrent with all formal field investigations (i.e., breeding bird and botanical surveys etc.).

3.0 Results

3.1 Secondary Source Review and Agency Consultation

3.1.1 Physiography and Soils

The Project study area is located within the Iroquois physiographic region. This region, found primarily along the Lake Ontario coastline, is characterized by sandy beaches, clay bluffs and large river-mouth wetlands (ECCC 2015). Large areas of this region have been urbanized including the current Project study area (ECCC 2015).

3.1.2 Vegetation Communities and Habitat

The Project study area is within Ecoregion 7E Lake Erie – Lake Ontario Ecoregion. Land cover in this ecoregion is predominantly cropland and pasture with developed lands and fragmented deciduous and mixed wood forest remnants (Crins et al. 2009). The Project study area matches this description. Most of the natural communities show signs of extensive current or historic disturbance with a mixture of native and non-native species.

Several natural heritage features overlap the Project study area. Additionally, the fragments of several deciduous forest and woodland community types are found throughout the Project study area.

A botanical inventory was compiled based on the field investigations, and using information collected from secondary sources. Of the plant species documented, 16 are considered SAR or provincially rare. For the purposes of this Report, only common names have been identified. A full list of species, inclusive of scientific names, is provided within Appendix D.

3.1.3 Wildlife

Inventories of wildlife were compiled from available literature and resources. Based on a review of background information, 123 species of birds, 39 species of mammals, 14 species of amphibians, and 15 species of reptiles are reported to occur within the one (1) to ten (10) km squares that encompass the Project study area. Similar to plant species, only common names are provided within the body of the report. A full list of species, inclusive of scientific names is provided within Appendix E.

3.1.3.1 Birds

Results of secondary source review revealed a total of 123 avian species to occur within the Project study area, of which 108 were recorded through the second addition of the ABBO (Cadman et al., 2007). Previous studies done by More Than Engineering (2012a, b) for other nearby projects identified 31 species as occurring within the Project study area, including the Provincially listed Barn Swallow (threatened). Correspondence with the MNRF as documented in Appendix A identified four SAR reported within the Project study area which include: Barn Owl, Barn Swallow, Bobolink and Chimney Swift.

It is important to note that the exact locations of species occurrences are not available from the atlas and are instead recorded from the eleven (11) 10 x 10 km squares encompassing the Project study area. Similarly, information provided by the City of Hamilton, MNRF, and through review of previous studies completed by More than Engineering did not provide exact location of species findings, therefore, Wood is not able to ascertain if these are within the Project study area or adjacent.

Of the 123 avian species identified to occur within the Project study area, 27 of the avian species are considered SAR or provincially rare species, with 27 identified as priority species on the Ontario Partners in Flight list (2008). A full review of secondary source material is provided within Appendix E.

3.1.3.2 Mammals

A review of secondary source material revealed a total of 39 species of mammals that have range maps that overlap the Project study area. Six (6) of the 39 species are considered SAR and/or identified as species of conservation concern. Information sourced from previous studies completed by More Than Engineering (2012a and 2012b), identified four (4) mammals within the Project study area which include: Raccoon, White-tailed Deer, Eastern Cottontail and Eastern Gray Squirrel. All those documented by More Than Engineering are considered common in the Province of Ontario, and typical for urbanized areas.

3.1.3.3 Amphibians and Reptiles

Review of the ORAA map and City of Hamilton SAR list identified 14 amphibian and 15 reptile species to occur within the one (1) to ten (10) km squares that encompass the Project study area (Ontario Nature 2016). It is important to note, that five (5) of these amphibians and five (5) of these reptiles have not been reported in over 20 years and may no longer occur in the Project study area. Again, similar to that of birds and mammals, exact locations of these species' records are not provided through the ORAA, therefore Wood is not able to ascertain if these are within the Project study area or adjacent.

Two (2) of the amphibian and nine (9) of the reptile species identified through secondary source material are identified as SAR or provincially rare.

Review of studies completed by other consultants that overlap the Project study area was undertaken. More Than Engineering (2012a and 2012b) identified Wood Frog and American Toad within the Project study area. Exact locations were not provided.

The Block 2 Servicing Plan had a call station (No.2) within the Project study area, just east of Watercourse 6.1. Western Chorus frog and Gray Treefrog were observed, however the number of calls and counts made would not constitute significant wildlife breeding habitat. The Block 1 Servicing Plan did not undertake amphibian call surveys, but relied on information supplied from the SCUBE West Subwatershed Study. No clear documentation of where amphibians were heard were noted in either Report, except that they were likely heard in wetland communities outside of the ROW.

3.1.3.4 Invertebrates

Three (3) species of invertebrates have been recorded within the Project study area during previous studies for other projects, which include: Cabbage White, Canadian Tiger Swallowtail and Monarch (More Than Engineering 2012a, and 2012b). Monarch is listed Provincially as a Special Concern species. Additional review of information identified a total of four (4) SAR and/or provincially rare invertebrates that may occur within the Project study area.

3.1.4 Species at Risk and Provincially Rare Species

Secondary source review and MNRF consultation (Appendix A) revealed the presence of 27 avian, six (6) mammalian, two (2) amphibian, nine (9) reptile, four (4) invertebrate and 16 plant SAR and provincially rare species documented within the vicinity of the Project study area (Dobbyn 1994, Cadman et al. 2007, Ontario Nature 2016, BCI 2017, MNRF 2019b, Correspondence 2017). It is important to note that the exact locations of these species are not available through the reviewed secondary sources. As a result, it is unknown if these species are present within the Project study area. A summary of SAR and provincially rare species documented through secondary source review are as follows:

- Extirpated species:
  - Timber Rattlesnake (*Crotalus horridus*)
- Endangered species:

  - King Rail (*Rallus elegans*)
  - Barn Owl (*Tyto alba*)
  - Acadian Flycatcher (*Empidonax virescens*)
  - Prothonotary Warbler (*Protonotaria citrea*)
  - Yellow-breasted Chat (*Icteria virens*)
  - Henslow's Sparrow (*Ammodramus henslowii*)
  - Eastern Small-footed Myotis (*Myotis leibii*)
  - Little Brown Myotis (*Myotis lucifugus*)
  - Northern Myotis (*Myotis septentrionalis*)
  - Tri-Colored Bat *(Perimyotis subflavus*)
  - American Badger (*Taxidea taxus*)
  - Jefferson Salamander (*Ambystoma jeffersonianun*)
  - Spiny Softshell (*Apalone spinifera*)
  - Mottled Duskywing (*Erynnis martialis*)
  - American Chestnut (*Castanea dentata*)
  - Spotted Wintergreen (*Chimaphila maculata*)
  - Eastern Flowering Dogwood (*Cornus florida*)
  - American Columbo (*Frasera caroliniensis*)
  - Butternut (*Juglans cinerea*)
  - Cucumber Tree (*Magnolia acuminata*)
  - Red Mulberry (*Morus rubra*)
  - American Ginseng (*Panax quinquefolius*)
  - Hoary Mountain-mint (*Pycnanthemum incanum*)
  - Few-flowered Club-rush (*Trichophorum planifolium*)
- Threatened species:
  - Least Bittern (*Ixobrychus exilis*)
  - Chimney Swift (*Chaetura pelagica*)
  - Eastern Whip-poor-will (*Caprimulugus vociferous*)
  - Bank Swallow (*Riparia riparia*)
  - Barn Swallow (*Hirundo rustica*)
  - Louisiana Waterthrush (*Parkesia motacilla*)
  - Cerulean Warbler (*Setophaga cerulea*)
  - Hooded Warbler (*Setophaga citrina,* listed federally only)

  - Bobolink (*Dolichonyx oryzivorus*)
  - Eastern Meadowlark (*Sturnella magna*)
  - Western Chorus Frog (*Pseudacris triseriata*, Great Lakes/St. Lawrence Population, listed federally only)
  - Blanding's Turtle (*Emydoidea blandingii*)
  - Eastern Hog-nosed Snake (*Hereodon platirhinos*)
  - White Wood Aster (*Eurybia divaricata*)
- Special Concern species
  - Peregrine Falcon (*Falco peregrinus*)
  - Bald Eagle (*Haliaeetus leucocephalus*)
  - Black Tern (*Chlidonias niger*)
  - Short-eared Owl (*Asio flammeus*)
  - Common Nighthawk (*Chordeiles minor*)
  - Red-headed Woodpecker (*Melanerpes erythrocephalus*)
  - Eastern Wood-Pewee *(Contopus virens*)
  - Wood Thrush (*Hylocichla mustelina*)
  - Golden-winged Warbler (*Vermivora chrysoptera*)
  - Canada Warbler (*Cardellina canadensis*)
  - Grasshopper Sparrow (*Ammodramus savannarum*)
  - Woodland Vole (*Microtus pinetorum*)
  - Snapping Turtle (*Chelydra serpentina*)
  - Northern Map Turtle (*Graptemys geographica*)
  - Eastern Musk Turtle (*Sternotherus odoratus*)
  - Milksnake (*Lampropeltis triangulum,* listed federally only)
  - Eastern Ribbonsnake, (*Thamnophis sauritus*)
  - Monarch (*Danaus plexippus*)
  - West Virginia White (*Pieris virginiensis*)
  - Green Dragon (*Arisaema dracontium*)
  - Broad Beech Fern (*Phegopteris hexagonoptera*)
- Provincially rare species
  - Arrow Clubtail (*Stylurus spiniceps*)
  - Lichen (*Bacidia trachona*)
  - Eastern Few-fruited Sedge (*Carex oligocarpa*)
  - Perfoliate Bellwort (*Uvularia perfoliata*)

3.1.5 Significant Natural Areas

A review of MNRF's NHIC database indicates that there are a number of natural heritage features recorded in and in close proximity to Project study area (Figure 3-1). The Fifty Creek Valley is located within the Project study area as well as portions of the Niagara Escarpment Plan (NEP) area (at Fifty Creek) and an area of Greenbelt Plan protected countryside which extends to Barton Street. The following features are located in the vicinity of the Project study area, but are not within the Project study area:

- Fifty Creek Valley (Environmentally Sensitive Area);
- Fifty Mile Creek Wetland Complex (evaluated non-Provincially Significant Wetland);
- Devil's Punchbowl Escarpment (Environmentally Sensitive Area);
- Fruitland Escarpment (ANSI);
- Vinemount Moraine (ANSI);
- Niagara Section Escarpment (ANSI);
- Vinemount Conservation Area; and
- Winona Conservation Area.

Review of the Urban Official Plan identified the following features within the Project study area:

- Core Areas, linkages, parks and general open space and streams;
- Two significant woodlands (Schedule B2)
  - One is east of Glover Road and another south of Barton just east of Jones Road.

Review of additional schedules within the Urban Official Plan identified no wetlands, ESAs or ANSIs within the Project study area.

In accordance with the Rural Official Plan, which covers the section of Fifty Road and Highway 8 intersection, the following has been identified:

- A Core Area (Schedule B – Natural Heritage System);
- A local ESA (on the southeast corner of Fifty Road and Hwy 8 – Schedule B6);
- A significant woodland (Schedule B2)
- A wetland (Key Hydrologic Feature) (Schedule B4).

3.2 Field Investigations

3.2.1 Vegetation Communities

The land within the Project study area includes residential, commercial, light industrial and agricultural areas, cultural vegetation habitats created by human disturbance, and natural communities. A total of 18 ELC community types / land uses were identified within the Project study area as documented in Table 3-1 and illustrated on Figure 3-2. The Project study area covers approximately 148.72 hectares (ha), with roughly 84.4% representing vegetation community types and/or land uses that are considered anthropogenic or cultural in origin (e.g., constructed/agricultural). Naturalized or semi naturalized habitats with cultural origins or ongoing disturbance represents 12.3% of the lands within the Project study area,

with the remaining 3.3% comprised of natural forest, swamp and woodland ecosites. All species noted are considered common to Ontario, and representative of urban and/or disturbed areas. A compiled plant list is provided in Appendix E, with photographs in Appendix G.

- **Table 3-1: ELC Vegetation Communities and Land Uses**

ELC Type	Community Description
Vegetated / Natural Communities	
SAGM1 Vineyard Total Area: 0.90 ha (0.6%)	Two polygons consisting of Vineyards exist at the western end of the study area. These areas consist of rows of planted grape vines.
SAGM2 Orchard Total Area: 0.79 ha (0.53%)	Two polygons of Orchards exist at the eastern end of the study area. These areas consist of rows of planted fruit trees.
CUM1 Mineral Cultural Meadow Ecosite Total Area: 1.22 ha (0.82%)	One cultural meadow community was present at the south-east side of the intersection of Barton Street and Glover Road. This area is dominated by grasses and weedy species such as goldenrods, thistle and Common Burdock. Note, correspondence with the City of Hamilton's Natural Heritage Planner Melissa Kiddie noted the property on the southeast side of Glover Road and Barton Street is planned to undergo future development.,.
CUM1-1 Dry – Moist Old Field Meadow Type Total Area: 15.32 ha (10.3%)	The Dry – Moist Old Field Meadow Type communities are fallow agricultural fields and the areas around the QEW and Fifty Road ramps. This community is very diverse with no dominant species, goldenrods, grasses, Chicory and Wild Carrot were abundant with sparse occurrences of Bur Oak, Staghorn Sumac and Back Locust in the tree and shrub layers.
THDM2-6 Buckthorn Deciduous Shrub Thicket Type Total Area: 0.10 ha (0.07%)	Two small polygons of Buckthorn Deciduous Shrub Thicket Type are located at the west end of the study area on the edges of forest fragments. This community type is dominated by European Buckthorn with a few White Ash in the upper canopy. The ground layer is sparse with Early Goldenrod and Summer Grape uncommon.
WODM5 Fresh – Moist Deciduous Woodland Ecosite Total Area: 0.50 ha (0.33%)	Two polygons of Fresh – Moist Deciduous Woodland Ecosite are present at the west end of the study area. This community is a mix of species along a watercourse including Willows, Manitoba Maple and dying Ash trees with European Buckthorn and hawthorns in the understory. The ground layer consists of grasses, Garlic Mustard and Spotted Touch-me-not.

ELC Type	Community Description
FOD7-2 Fresh – Moist Green Ash – Hardwood Lowland Deciduous Forest Type Total Area: 2.21 ha (1.49%)	Five polygons of Fresh – Moist Green Ash – Hardwood Lowland Deciduous Forest Type are present within the Project study area. This community is currently dominated by Red Ash though many of the trees are unhealthy and dying or already dead. This community will succeed into willow dominated lowland forest or buckthorn thicket. Willow species and Manitoba Maple are common understorey species joined by European Buckthorn and various forbs in the ground layer.
FOD7-3 Fresh – Moist Willow Lowland Deciduous Forest Type Total Area: 1.24 ha (0.84%)	Three polygons of Fresh – Moist Willow Lowland Deciduous Forest Type are present within the Project study area. This community is dominated by Willow species joined by occasional American Elm, Manitoba Maple and Black Walnut. Siberian Elm and Staghorn Sumac join in the subcanopy and shrub layers. The ground layer is dominated by grasses, Common Burdock and Tall Goldenrod.
FOD9-4 Fresh – Moist Shagbark Hickory Deciduous Forest Type Total Area: 0.50 ha (0.3%)	Two polygons of Fresh – Moist Shagbark Hickory Deciduous Forest Type are present within the Project study area. This community is dominated by Shagbark Hickory. The subcanopy and shrub layers are dominated by European Buckthorn and the ground layer contains Poison Ivy and Canada Thistle.
FODM9-6 Fresh – Moist Oak – Hardwood Deciduous Forest Type Total Area: 0.36 ha (0.24%)	Two polygons of Fresh – Moist Oak – Hardwood Deciduous Forest Type are present within the western end of the Project study area. This community was observed from a distance due to a lack of Permission to Enter. The community canopy consisted of Oak species, Ash species, Manitoba Maple and Silver Maple.
SWD1-1 Swamp White Oak Mineral Deciduous Swamp Type Total Area: 0.06 ha (0.04%)	One small polygon of Swamp White Oak Mineral Deciduous Swamp Type is located at the west end of the Project study area within a deciduous woodlot. The canopy of this community is composed of abundant Swamp White Oak joined by American Elm and Freeman's Maple. Shagbark Hickory joins in the subcanopy with European Buckthorn and Gray Dogwood in the shrub layer. The dense groundlayer is dominated by sedges, grasses and Elecampane.
Constructed Areas	
AG Agriculture Total Area: 15.86 ha (10.67%)	The agricultural fields within the Project study area were growing mainly corn and soybeans and when field investigations were completed.

ELC Type	Community Description
CGL_2 Parkland Total Area: 4.00 ha (2.69%)	The two areas of parkland were manicured lawn with planted vegetation and associated infrastructures including parking facilities, baseball diamonds etc.
CVC_1 Business Sector Total Area: 28.83 ha (19.39%)	The business sector areas were buildings with associated infrastructure such as parking lots, manicured lawns and some planted trees and gardens.
CVC_2 Light Industry Total Area: 2.41 ha (1.62%)	One area of light industry was present at the eastern end of the Project study area. This area was one building and associated infrastructure such as parking.
CVI_1 Transportation Total Area: 12.94 ha (8.70%)	The transportation land use includes Barton Street, Fifty Road as well as cross streets.
CVR Residential Total Area: 57.05 ha (38.36%)	Residential areas within the Project study area consist of detached houses with adjacent lawns and gardens.
CVS_1 Education Total Area: 4.42 ha (2.97%)	The education areas included two Elementary schools and their adjacent manicured lawns and infrastructure.

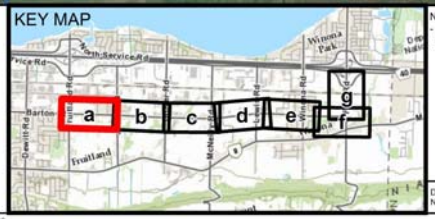
LEGEND

Vegetation Communities

- CUM1-1, Dry - Moist Old Field Meadow Type
- CVC_1, Business Sector
- CVI_1, Transportation
- CVR, Residential
- FOD7-2, Fresh - Moist Green Ash - Hardwood Lowland Deciduous Forest Type
- FOD9-4, Fresh - Moist Shagbark Hickory Deciduous Forest Type
- FODM9-6, Fresh - Moist Oak - Hardwood Deciduous Forest Type
- SWD1-1, Swamp White Oak Mineral Deciduous Swamp Type
- THDM2-6, Buckthorn Deciduous Shrub Thicket Type
- WODM5, Fresh - Moist Deciduous Woodland Ecosite

0 100 200 300 400 500 Metres

KEY MAP



NOTES:
- Background extracted from Google Earth.

Datum & Projection: NAD 1983 UTM Zone 17N

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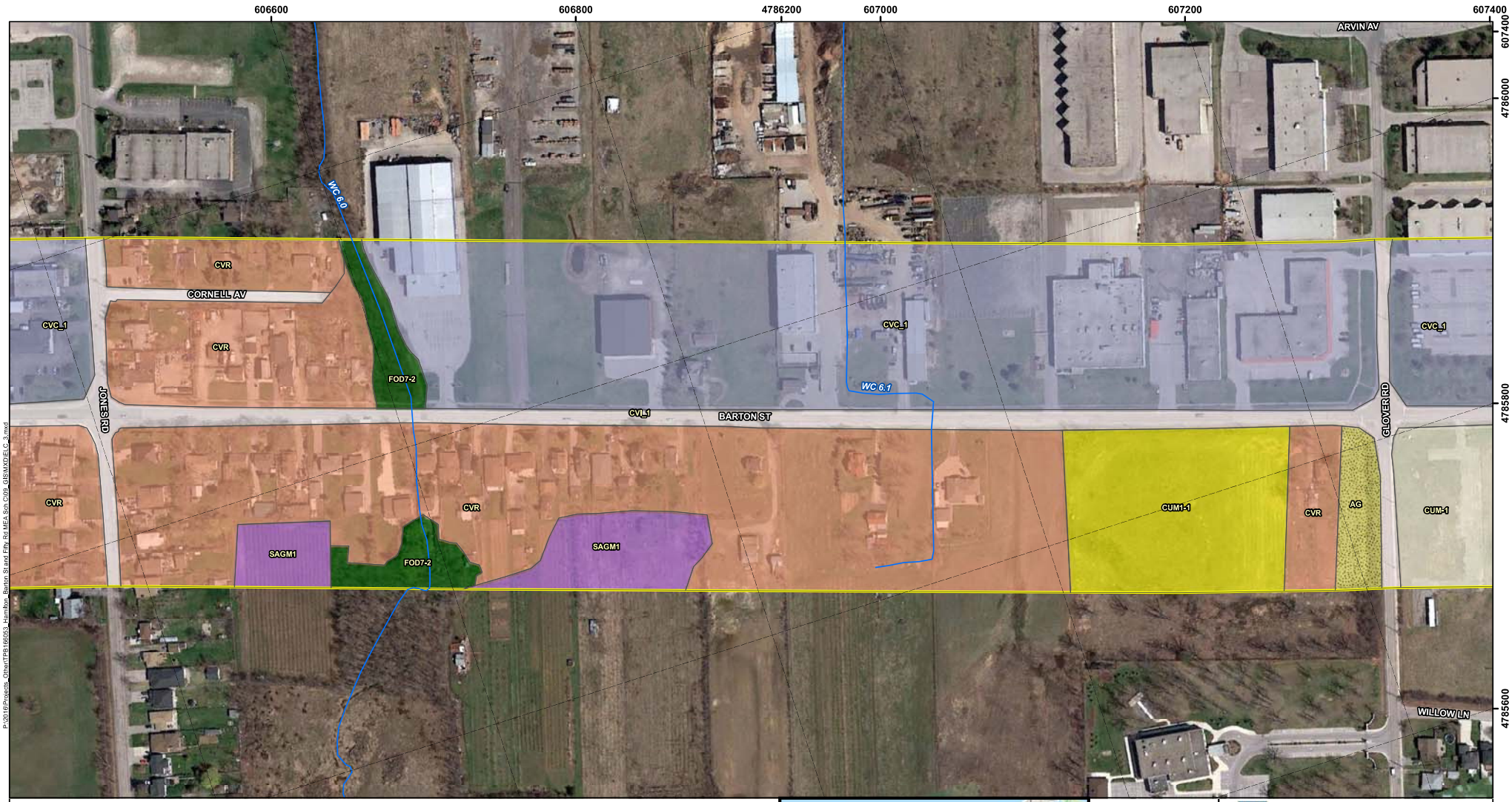
BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Ecological Land Classification

PROJECT N°: TPB166053 | **FIGURE: 3-1a**

SCALE: 1:2,500 | DATE: November 2017



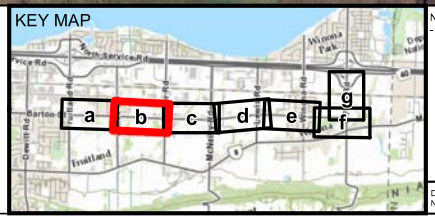
LEGEND

Vegetation Communities

- AG, Agriculture
- CUM-1, Mineral Cultural Meadow Ecosite
- CUM1-1, Dry - Moist Old Field Meadow Type
- CVC_1, Business Sector
- CVI_1, Transportation
- CVR, Residential
- FOD7-2, Fresh - Moist Green Ash - Hardwood Lowland Deciduous Forest Type
- SAGM1, Vineyard

0 100 200 300 400 500 Metres

KEY MAP



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- Background extracted from Google Earth.

Datum & Projection: NAD 1983 UTM Zone 17N

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BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Ecological Land Classification

PROJECT N°: TPB166053	**FIGURE: 3-1b**
SCALE: 1:2,500	DATE: November 2017

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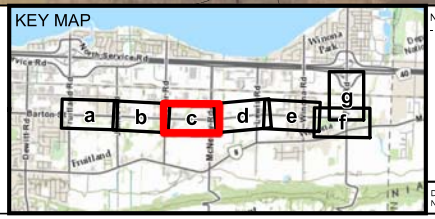
LEGEND

Vegetation Communities

- AG, Agriculture
- CGL_2, Parkland
- CUM-1, Mineral Cultural Meadow Ecosite
- CUM1-1, Dry - Moist Old Field Meadow Type
- CVC_1, Business Sector
- CVI_1, Transportation
- CVR, Residential
- FOD7-2, Fresh - Moist Green Ash - Hardwood Lowland Deciduous Forest Type

0 100 200 300 400 500 Metres

KEY MAP



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- Background extracted from Google Earth.

Datum & Projection: NAD 1983 UTM Zone 17N

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BARTON STREET, HAMILTON
ENVIRONMENTAL ASSESSMENT

Ecological Land Classification

PROJECT N°: TPB166053	**FIGURE: 3-1c**
SCALE: 1:2,500	DATE: November 2017

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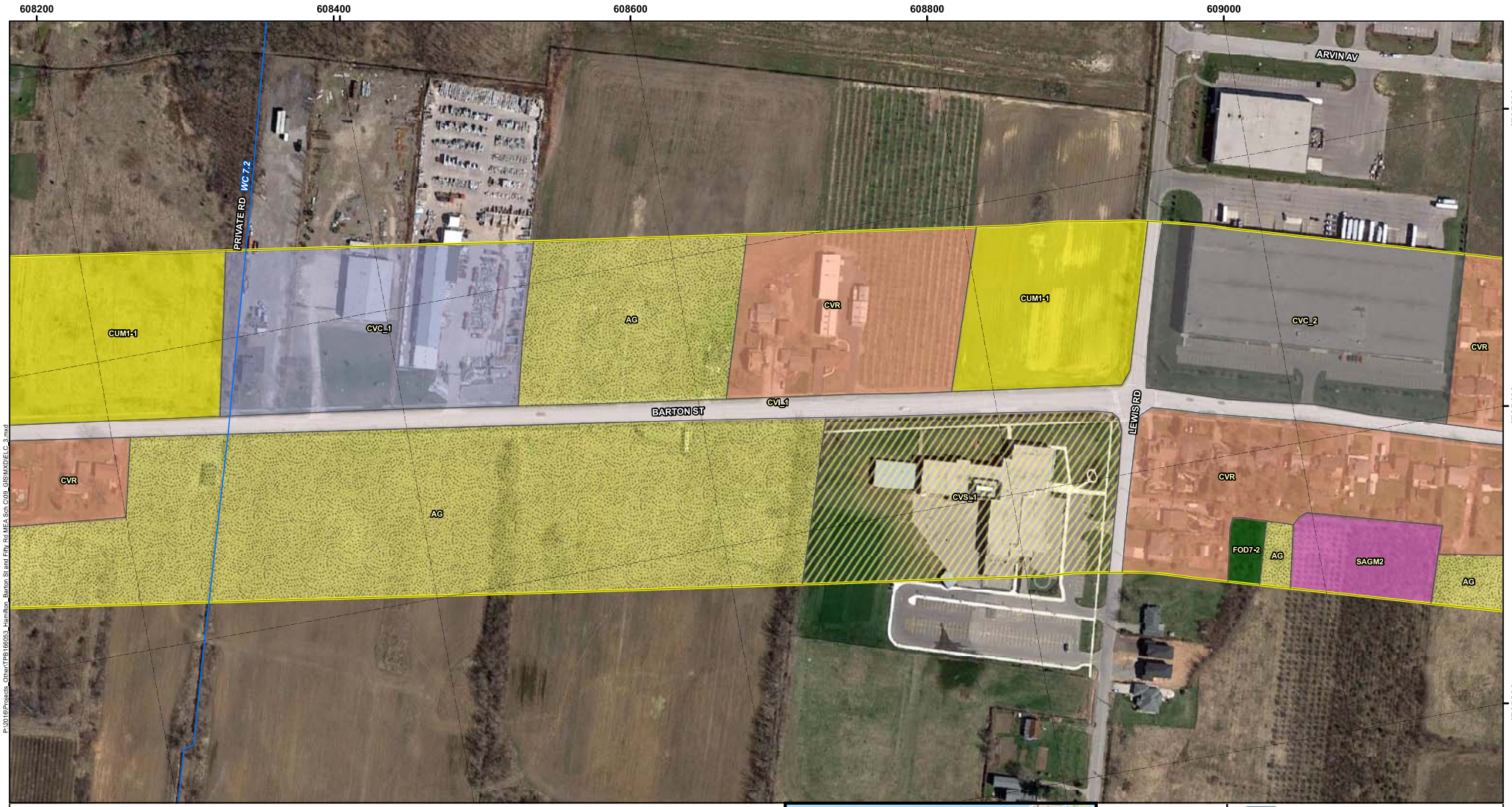

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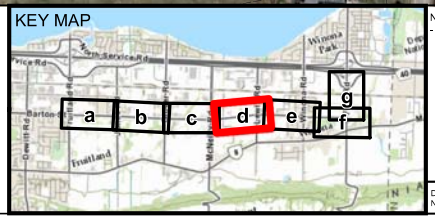
LEGEND

Vegetation Communities

- AG, Agriculture
- CUM1-1, Dry - Moist Old Field Meadow Type
- CVC_1, Business Sector
- CVC_2, Light Industry
- CVI_1, Transportation
- CVR, Residential
- CVS_1, Education
- FOD7-2, Fresh - Moist Green Ash - Hardwood Lowland Deciduous Forest Type
- SAGM2, Orchard

0 100 200 300 400 500 Metres

KEY MAP



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ENVIRONMENTAL ASSESSMENT

Ecological Land Classification

PROJECT N°: TPB166053 | **FIGURE: 3-1d**

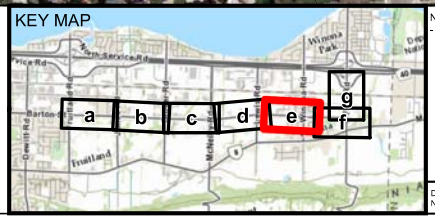
SCALE: 1:2,500 | DATE: November 2017

LEGEND

Vegetation Communities

- AG, Agriculture
- CGL_2, Parkland
- CVC_2, Light Industry
- CVL_1, Transportation
- CVR, Residential
- SAGM2, Orchard

KEY MAP



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Ecological Land Classification

PROJECT N°: TPB166053 | **FIGURE: 3-1e**

SCALE: 1:2,500 | DATE: November 2017

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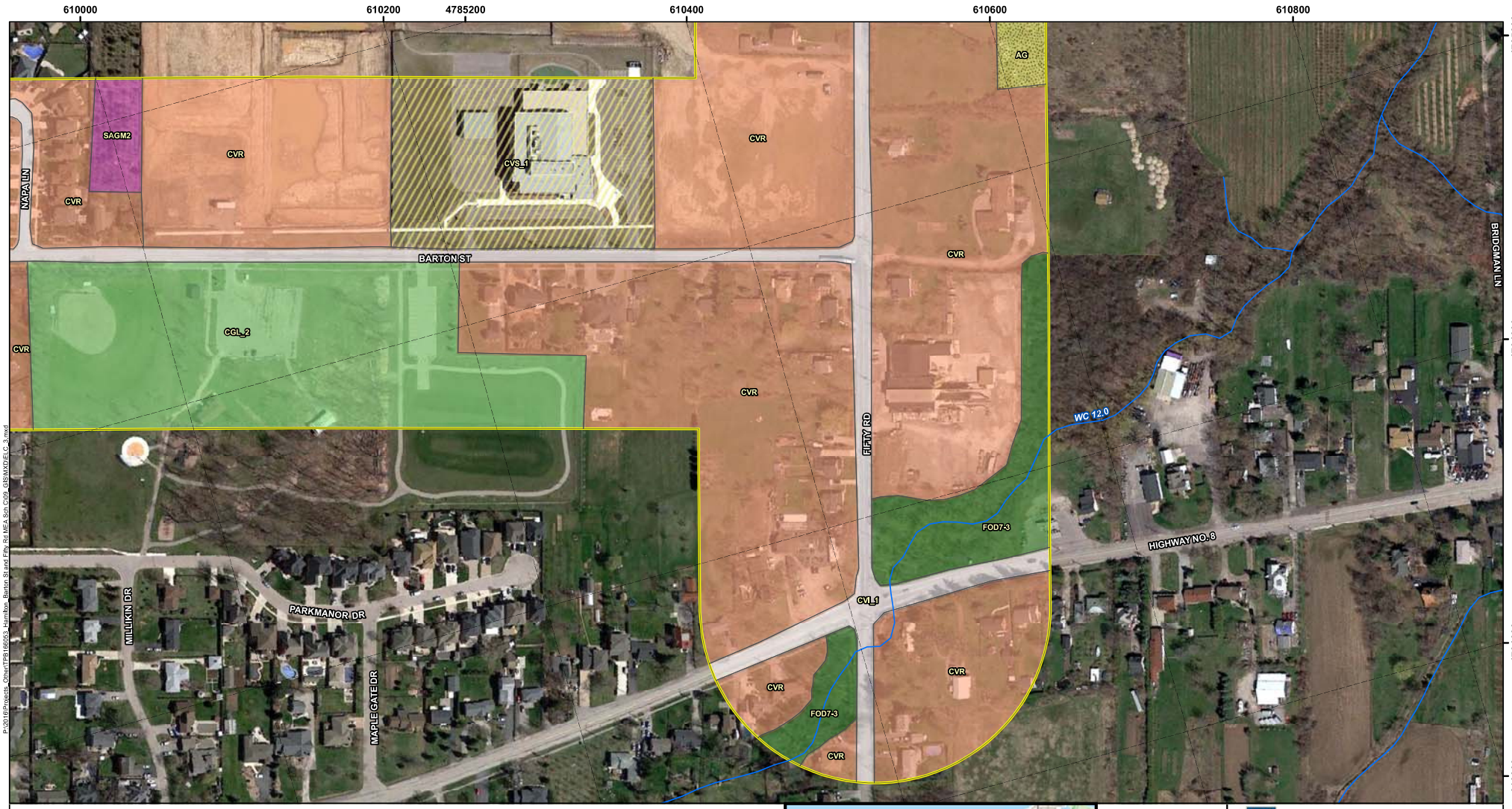
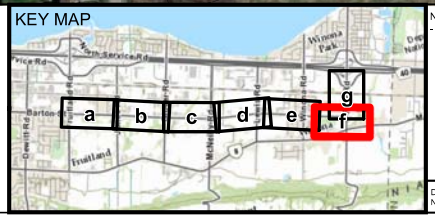


LEGEND

Vegetation Communities

- AG, Agriculture
- CGL_2, Parkland
- CVI_1, Transportation
- CVR, Residential
- CVS_1, Education
- FOD7-3, Fresh - Moist Willow Lowland Deciduous Forest Type
- SAGM2, Orchard

KEY MAP



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BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Ecological Land Classification

PROJECT N°: TPB166053 | **FIGURE: 3-1f**

SCALE: 1:2,500 | DATE: November 2017

Path: P:\2016\Projects_Other\TPB166053_Hamilton_Barton St and Fifty Rd MEA Sch C\09_GIS\MXD\ELC_portrait_2.mxd 05 September 2017

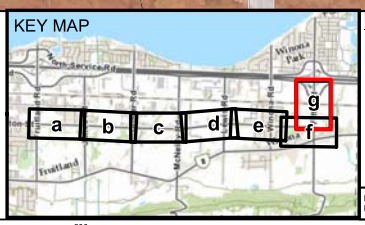
LEGEND

Vegetation Communities

- AG, Agriculture
- CGL_2, Parkland
- CUM1-1, Dry - Moist Old Field Meadow Type
- CVI_1, Transportation
- CVR, Residential
- CVS_1, Education
- FOD7-3, Fresh - Moist Willow Lowland Deciduous Forest Type

0 25 50 100 150 200 Metres

KEY MAP



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Projection: UTM Zone 17N

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BARTON STREET, HAMILTON
ENVIRONMENTAL ASSESSMENT

Ecological Land Classification

PROJECT N°: TPB166053 | **FIGURE: 3-1g**

SCALE: 1:2,500 | DATE: September 2017

3.2.2 Wildlife

3.2.2.1 Birds

Of the 123 avian species reported to occur within the Project study area through secondary source review, only 44 avian species were recorded during breeding bird surveys, with an additional four (4) species observed as incidentals during other field investigations. A summary of the breeding bird findings is provided in Appendix F.

A total of three (3) SAR (Barn Swallow, Bank Swallow and Eastern Meadowlark) and two (2) provincially rare species (S3) (Semipalmated Sandpiper and Caspian Tern) were observed either through breeding evidence or through flyovers or foraging displays.

The observations of Caspian Tern, Cliff Swallow, Double-crested Cormorant, Semipalmated Sandpiper and Lesser Yellowlegs were only noted as flyovers and/or foraging as no breeding evidence was documented.

Nine (9) of the avian species documented are considered Uncommon or Rare in the City of Hamilton according to the Hamilton Natural Areas Inventory (NAI) (2014). Those species include:

- Sharp-shinned Hawk (Rare breeder);
- Green Heron (Uncommon breeder);
- American Kestrel (Uncommon breeder);
- Purple Martin (Uncommon breeder);
- Bank Swallow (Uncommon breeder);
- Cliff Swallow (Uncommon breeder);
- Northern Mockingbird (Uncommon breeder);
- Eastern Meadowlark (Uncommon breeder); and
- Orchard Oriole (Uncommon breeder).

All of these species are considered apparently secure to secure provincially (S4/S5) with the exception of Bank Swallow and Eastern Meadowlark, which are both considered threatened species within the province and protected under the ESA.

Commonly recorded birds during the field investigations included House Sparrow (74), European Starling (64), American Robin (53), Red-winged Blackbird (50) and Rock Pigeon (41). Together, these species represented 47.5% of all birds recorded. These species are typical of agricultural and anthropogenically influenced natural areas.

As noted in the secondary source review, a total of 27 avian species are considered priority species on the Ontario Partners in Flight list (2008). Of the 27 avian species, only nine (9) of those were documented during the breeding bird field investigations. Documentation of those findings is provided in Appendix E.

3.2.2.2 Mammals

A total of 39 species of mammals had range maps that overlapped the Project study area according to secondary source material. Evidence of two (2) mammals were observed during the field investigations completed by Wood staff which include: urban tolerant Eastern Gray Squirrel and White-tailed Deer. While

other mammal species may exist within the Project study area, the majority of species are likely considered common to urbanized areas with secretive and/or nocturnal behaviours; making observations using standard non-invasive methods difficult.

3.2.2.3 Amphibians and Reptiles

Anuran breeding surveys were completed using the MMP Protocol (2008). Species were identified during a series of three surveys over the course of April, May and June 2019. Surveys were completed beginning 30 minutes after sunset and completed before midnight. Three to five minute survey counts were completed for all three dates. A summary of the anuran call surveys is provided in Appendix F.

No reptiles were incidentally observed during field investigations, and limited anurans (frogs and toads) were observed during the field surveys completed. Based on all the information collected, it can be assumed that there is no suitable habitat for turtles within the areas immediate to the ROW. Similarly, limited observations of anurans were made, most of which were noted 50 m or greater from the existing ROW.

3.2.2.4 Invertebrates

Monarch Butterfly, a species listed provincially and federally as Special Concern was incidentally observed within the Project study area during the field investigation. This species is likely to use the Common Milkweed and other wildflower species for egg-laying and foraging, respectively.

3.2.3 Species at Risk (Endangered and Threatened)

Three (3) SAR were recorded during field investigations, including Barn Swallow, Bank Swallow and Eastern Meadowlark.

Species identified through secondary source review and from field investigations were synthesized in Table 3-2 for identifying potential/confirmed occurrence of endangered and threatened SAR within the Project study area. Other SAR which may occur in the region or have occurred historically, but do not have suitable habitat within the Project study area are not included in Table 3-2. The probabilities of occurrence for each SAR are based on an assessment of each species' habitat preferences/needs in conjunction with existing conditions observed during the field investigations and those collected through secondary source material. It is important to note that additional SAR may come into the area or species already occurring in the area may be up-listed at any time. For this reason, ongoing communication with the MNRF (now MECP) is strongly recommended to ensure compliance with the *ESA*. The probabilities of occurrence are defined as 'Confirmed Present', 'High', 'Moderate', 'Low', and 'None' and are based on the following definitions:

- **Confirmed Present**: Those species recorded directly within the Project study area during current or previous field investigations.
- **High**: Those species recorded near the Project (typically within 10 km and recorded in the past 20 years) and whose preferred habitat is abundant within the Project study area. Species with high probability of occurrence would be expected to breed within or frequently use the habitats available within the Project study area and would be known to have a high relative abundance within the region (e.g., compared to other regions in Ontario).
- **Moderate**: Those species near the Project, but have limited suitable habitat within the Project study area. Species with moderate probabilities of occurrence may not occur within the Project study area

frequently, but may intermittently use it for foraging, migration or movement to other parts of their home-range.

- **Low**: Those species recorded near the Project study area, but whose preferred habitat does not occur or is extremely limited within the Project study area. These species may intermittently move through the Project study area, but are unlikely to become permanent residents.
- **None**: Those species whose preferred habitat is completely absent from the Project study and may only migrate intermittently through the Project study area.

Table 3-2: Records of Endangered and Threatened Species at Risk within the Project study area and Probability of Occurrence

Species Name, Status (*SARA*, *ESA*, S-Rank)[1,2,3], and Data Source	Preferred Habitat	Potential SAR Habitat/Occurrence within the Project study area
SAR Birds		
Barn Owl (*Tyto alba*) *ESA*: Endangered *SARA*: Endangered Record Source: MNRF Correspondence	Barn Owl primarily use old agricultural fields, pasture, hayfields, grassy roadsides and grassy marshes for foraging. This species uses a wide variety of nest sites including tree cavities, chimneys, platforms and ledges in barns and other buildings, bridges, attics and nest boxes (COSEWIC 2010a).	**Low –** Reported near the Project study area by MNRF. No observations of this species during the breeding bird surveys or other field investigations completed. This species is found in extremely low numbers in Ontario. The only suitable foraging habitat observed are the cultural meadows which only make up 10% of the Project study area and are considered fragmented and scattered. The forested areas are small polygons and extremely fragmented by residential and commercial land use areas. There is very limited foraging and nesting habitats within the Project study area and therefore is considered to have a low probability of occurring.
Chimney Swift (*Chaetura pelagica*) *ESA*: Threatened *SARA*: Threatened Record Source: ABBO, MNRF Correspondence, HCA	Due to the land clearing associated with colonization, Chimney Swifts have increasingly moved into building chimneys. Today, the species is mainly associated with areas where the birds can find buildings to use as nesting and resting sites, however a small portion of the population continues to use hollow trees. (COSEWIC 2007a).	**Low –** Reported near the Project study area by MNRF and HCA. No observations of this species during the breeding bird surveys or other field investigations completed. Chimney Swifts have limited/no access to potential chimneys of suitable size to permit nesting. This species may use the Project study area for foraging, but is considered to have a low probability of occurring.

Species Name, Status (*SARA*, *ESA*, S-Rank)[1,2,3], and Data Source	Preferred Habitat	Potential SAR Habitat/Occurrence within the Project study area
Eastern Whip-poor-will (*Caprimulugus vociferous*) *ESA*: Threatened *SARA*: Threatened Record Source: MNRF SAR list for City of Hamilton	Whip-poor-will breeding habitat is dependent upon forest structure. The species avoids both wide-open spaces and closed-canopy forests. Semi-open forests or patchy forests with clearings, such as barrens or forests that are regenerating following major disturbances, are preferred as nesting habitat. Additionally, habitats with sparse ground cover are preferred (COSEWIC 2009b).	**Low –** Reported by the MNRF to occur within the City of Hamilton (Appendix A). No observations of this species during the breeding bird surveys or other field investigations completed. There is very limited suitable habitat available for this species. Two small areas of Deciduous Woodland exist however the there is no interior habitat, as such this species is considered to have a low probability of occurring.
Bank Swallow (*Riparia riparia*) *ESA*: Threatened *SARA*: Threatend Record Source: MNRF SAR list for City of Hamilton, HCA, ABBO	The Bank Swallow breeds in a wide variety of natural and human-made sites with vertical faces in silt and sand deposits, including riverbanks, aggregate pits and stock piles of soil. Breeding sites are often situated near open terrestrial habitat used for aerial foraging (e.g., grasslands, meadows, pastures, and agricultural cropland) (COSEWIC, 2013a).	**Confirmed Present** – Reported by the MNRF as present within the City of Hamilton and near the Project study area. It was also documented by HCA and the ABBO. This species was observed within the Project study area during Wood field investigations. There is limited nesting habitat in the Project study area but much of the Project study area is suitable foraging habitat.
Barn Swallow (*Hirundo rustica*) *ESA*: Threatened *SARA*: Threatened Record Source: MNRF Correspondence, ABBO	Barn Swallow has become closely associated with human settlements, nesting in and on artificial structures, including buildings, bridges and road culverts, and prefer various open habitats for foraging including grassy fields, pastures, agricultural crops and over open water (COSEWIC 2011b).	**Confirmed Present –** Reported by the MNRF as present within the City of Hamilton and near the Project study area. It was also documented by the ABBO. This species was observed within the Project study area during the breeding bird surveys. Large portions of the Project study area are appropriate habitat with open areas for foraging and have suitable structures for nesting (e.g., buildings or barns).

Species Name, Status (*SARA*, *ESA*, S-Rank)[1,2,3], and Data Source	Preferred Habitat	Potential SAR Habitat/Occurrence within the Project study area
Yellow-breasted Chat (*Icteria virens*) *ESA*: Endangered *SARA*: Special Concern Record Source: MNRF SAR list for City of Hamilton	Yellow-breasted Chat breed in dense thickets and scrub such as riparian thickets, forest clearings and other regenerating areas (COSEWIC 2011c, Cornell Ornithology 2015).	**Low –** Reported by the MNRF as present within the City of Hamilton. No observations of this species during the breeding bird surveys or other field investigations completed. There is very limited suitable breeding habitat for this species within the Project study area as only one small area of Buckthorn Shrub Thicket habitat is present. There is a low probability of this species using this small area to carry out its life processes.
Bobolink (*Dolichonyx oryzivorus*) *ESA*: Threatened *SARA*: Threatened Record Source: MNRF Correspondence, ABBO, NHIC	Bobolink nest primarily in forage crops, hayfields and associated pastures. Bobolink also occur in wet prairie, graminoid peatlands and abandoned fields dominated by tall grasses, no-till cropland, small-grain fields, reed beds and irrigated fields in arid regions. The species does not generally occupy fields of row crops such as corn, soybean and wheat, pastures in valleys with high shrub density or intensively grazed pastures (COSEWIC 2010d).	**Low – Moderate –** Reported near the Project study area by MNRF. It was also reported by NHIC and ABBO. No Bobolink were observed during the breeding bird surveys or other field investigations completed. There are some areas of cultural meadow within the Project study area that may be suitable habitat for Bobolink, inclusive of agricultural fields supporting what appears to be a corn/hay crop rotation. Based on these observations, combined with the lack of observations during the breeding bird investigations, this species is considered to have a low to moderate possibility of occurring.

Species Name, Status (*SARA*, *ESA*, S-Rank)[1,2,3], and Data Source	Preferred Habitat	Potential SAR Habitat/Occurrence within the Project study area
Eastern Meadowlark (*Sturnella magna*) *ESA*: Threatened *SARA*: Threatened Record Source: MNRF species list for City of Hamilton	As a ground nesting grassland specialist, the Eastern Meadowlark inhabits grassland habitats, native prairies and savannahs, as well as non-native pastures, hayfields, weedy meadows, herbaceous fencerows and airfields (COSEWIC 2011d).	**Confirmed Present –** Reported by the MNRF as present within the City of Hamilton. This species was observed during the breeding bird surveys. Suitable nesting habitat for Eastern Meadowlark was noted as there are several agricultural fields in the Project study. As such, it is assumed this species uses the habitats available within the Project study area to carry out their life processes.
Henslow's Sparrow (*Ammodramus henslowii*) *ESA*: Endangered *SARA*: Endangered Record Source: MNRF SAR list for City of Hamilton	Henslow's Sparrow are an area sensitive grassland species which prefer natural areas but will nest in cultural meadows, pastures and wet meadows. Areas that have been grazed, burned or which contain too many species are generally avoided Tracts of grassland > 30 ha, and preferably > 100 ha are preferred and likely required to establish and maintain a colony (COSEWIC 2011e, MNRF 2017a).	**Low –** Reported by the MNRF as present within the City of Hamilton. No observations of this species during the breeding bird surveys or other field investigations completed. There are some areas of cultural meadow across the study area which could be suitable habitat for Henslow's Sparrow and there are several agricultural fields in the study area that could provide suitable habitat when used for hay. These patches are quite small (<15 ha cultural meadow total). As such, there is a low probability of this species using the habitats available for breeding.
SAR Mammals		
Eastern Small-footed Myotis (*Myotis leibii*) *ESA*: Endangered *SARA*: No Status Record Source: MNRF species list for City of Hamilton	The Eastern Small-footed Bat is one of the less common species found to hibernate in Ontario. Caves and mines serve as significant hibernacula while streams and ponds serve as foraging areas. Maternity colonies and roosts are associated with woodlands with large diameter trees (MNR 2017a).	**Low –** Reported by the MNRF as present within the City of Hamilton. There are no known caves and mines within the Project study area. Woodlands within the Project study area were considered limited. Therefore the probability of this species using the Project study area for part of its life cycle is considered low.

Species Name, Status (*SARA*, *ESA*, S-Rank)[1,2,3], and Data Source	Preferred Habitat	Potential SAR Habitat/Occurrence within the Project study area
Little Brown Myotis (*Myotis lucifugus*) *ESA*: Endangered *SARA*: Endangered Record Source: MNRF species list for City of Hamilton	The Little Brown Bat is wide-spread throughout the southern half of Canada and is especially associated with humans, often forming nursery colonies in buildings, attics, and other man-made structures. Little Brown Bats forage over water where their diet consists of aquatic insects, mainly midges, mosquitoes, mayflies, and caddisflies. They also feed over forest trails, cliff faces, meadows, and farmland where they consume a wide variety of insects, from moths and beetles to crane flies (COSEWIC 2013b, BCI 2017).	**Low - Moderate –** Reported by the MNRF as present within the City of Hamilton. Although limited woodland and wetland habitats are present in the Project study area, the presence of farm buildings and residential areas may provide suitable maternal roost habitat for this species. As such, the probability of this species to occur within the Project study area is considered low to moderate.
Northern Myotis (*Myotis septentrionalis*) *ESA*: Endangered *SARA*: Endangered Record Source: MNRF species list for City of Hamilton	The Northern Long-eared Bat is one of the less common species found to hibernate in Ontario. This species is closely associated with woodlands and use trees as maternity sites (COSEWIC 2013b, MNR 2017a).	**Low –** Reported by the MNRF as present within the City of Hamilton. Woodlands within the Project study area were considered limited. Therefore the probability of this species using the Project study area for part of its life cycle is considered low.
Tricoloured Bat (*Perimyotis subflavus*) *ESA*: Endangered *SARA*: Endangered Record Source: MNRF species list for City of Hamilton	Within treed habitats, Tri-colored Bat primarily roosts in tree foliage (mainly within oak leaves). Leaf roosts are shaped like umbrellas with a "roof" and a hollow core where bats rest. Studies have shown that oak leaves are a preferred roost site. Maple leaves are also selected, although less commonly. It is thought that Tri-colored Bat may prefer roost trees in more open woodlands, as opposed to deep woods. Roosts in tree cavity are used less frequently than Myotis species (COSEWIC 2013b, BCI, 2017).	**Low** – Reported by the MNRF as present within the City of Hamilton. Woodlands within the Project study area were considered limited. Therefore the probability of this species using the Project study area for part of its life cycle is considered low.

Species Name, Status (*SARA*, *ESA*, S-Rank)[1,2,3], and Data Source	Preferred Habitat	Potential SAR Habitat/Occurrence within the Project study area
American Badger (*Taxidea taxus*) *ESA*: Endangered *SARA*: Endangered Record Source: MNRF species list for City of Hamilton	American Badger prefer grass or shrubland habitats. Forested areas and cultivated fields are generally avoided. Agricultural areas can be suitable if there are adequate hedgerows, fencerows and field edges (COSEWIC 2012b).	**Low –** Reported by the MNRF as present within the City of Hamilton. Cultivated fields and residential areas make up the majority of the Project study area. No hedgerows were identified during field investigations, and those patches of vegetation between agricultural fields is limited.
SAR Amphibians		
Jefferson Salamander (*Ambystoma jeffersonianum*) *ESA*: Endangered *SARA*: Endangered Record Source: ORAA, MNRF species list for City of Hamilton	Throughout their range, Jefferson Salamanders are found within deciduous or mixed upland forests containing, or adjacent to, suitable breeding ponds. Breeding ponds are normally ephemeral, or vernal woodland pools that dry in late summer. Terrestrial habitat is mature woodlands with burrows or rock formations which allow adults underground below the frost line (COSEWIC 2010e).	**Low** – Reported by the MNRF as present within the City of Hamilton. It was also reported by ORAA. No suitable ponds or pools were observed during the field investigations. Although records of Jefferson/Blue-spotted Salamander have been recorded near the Project study area, there is a low probability for their occurrence in relation to the Project.
SAR Reptiles		
Eastern Hog-nosed Snake (*Hereodon platirhinos*) *ESA*: Threatened *SARA*: Threatened Record Source: MNRF species list for City of Hamilton	Eastern Hog-nosed Snake preferred habitats include open woodlands, brushland or forest edges often in proximity to water (COSEWIC 2007c).	**Low** – Reported by the MNRF as present within the City of Hamilton. No observations of this species was noted during the field investigations, and none were recorded in the ORAA. There is limited suitable habitat for this species in the few isolated forest communities within the Project study area. Based on these observations, this species is considered to have a low probability of occurring.

Species Name, Status (*SARA*, *ESA*, S-Rank)[1,2,3], and Data Source	Preferred Habitat	Potential SAR Habitat/Occurrence within the Project study area
SAR Plants		
American Chestnut (*Castanea dentata*) *ESA*: Endangered *SARA*: Endangered Record Source: MNRF species list for City of Hamilton	American Chestnut habitat is typically upland deciduous forests with sandy acidic soils. This species occurs with Red Oak, Black Cherry, Sugar Maple and Beech (COSEWIC 2004, MNRF 2017a).	Low – Reported by the MNRF as present within the City of Hamilton. No observations of American Chestnut were made during the botanical inventory field investigations. No forest communities with the associated deciduous species was observed (where accessible) within the Project study area. As no specific element occurrences of this species was noted during secondary source review, and the entire forest communities within the entire Project study area were not exhaustively searched, the probability of this species to occur is considered low.
Eastern Flowering Dogwood (*Cornus florida*) *ESA*: Endangered *SARA*: Endangered Record Source: MNRF species list for City of Hamilton	Eastern Flowering Dogwood is a small tree which typically inhabits open mid-age to mature deciduous or mixed forests (COSEWIC 2007d). Preferred habitat includes floodplains, slopes and ravines and can sometimes be found along roadsides or fencerows (MNRF 2017a).	Low – Reported by the MNRF as present within the City of Hamilton. No observations of Eastern Flowering Dogwood were made during the botanical inventory field investigations. No forest communities with the associated deciduous species was observed (where accessible) within the Project study area. As no specific element occurrences of this species was noted during secondary source review, and the entire forest communities within the entire Project study area were not exhaustively searched, the probability of this species to occur is considered low.

Species Name, Status (*SARA*, *ESA*, S-Rank)[1,2,3], and Data Source	Preferred Habitat	Potential SAR Habitat/Occurrence within the Project study area
American Columbo (Frasera caroliniensis) *ESA*: Endangered *SARA*: Endangered Record Source: MNRF species list for City of Hamilton	American Columbo habitat is typically open deciduous forest, forest edges, clearings and shrub thickets (COSEWIC 2006a, MNRF 2017a). It can also utilise grasslands, moist woods and swamp habitats (MNRF 2017a).	Low – Reported by the MNRF as present within the City of Hamilton. No observations of American Columbo were made during the botanical inventory field investigations. No forest communities with the associated deciduous species was observed (where accessible) within the Project study area. As no specific element occurrences of this species was noted during secondary source review, and the entire forest communities within the entire Project study area were not exhaustively searched, the probability of this species to occur is considered low.
Butternut (*Juglans cinerea*) *ESA*: Endangered *SARA*: Endangered Record Source: MNRF species list for City of Hamilton, HCA	Butternut is widespread and relatively common in southern Ontario (more than 100 occurrences). Butternut often grows alone or in small groups in deciduous woodlots and riparian areas. This species prefers moist, well drained soils or well drained gravel substrates (COSEWIC 2003, MNRF 2017a). Populations of this species are being devastated throughout its natural range by a fungal disease known as Butternut Canker (MNR 2017a).	Low - Moderate – Reported by the MNRF as present within the City of Hamilton and specimens have been recorded within the Fifty Creek Valley ESA by the Hamilton Conservation Authority. No observations of Butternut were made during the botanical inventory field investigations. As the entire Project study area was not exhaustively searched there is still a low - moderate possibility this species does exist somewhere in the Project study area, but not within the areas searched as part of the field investigations.

Species Name, Status (*SARA*, *ESA*, S-Rank)[1,2,3], and Data Source	Preferred Habitat	Potential SAR Habitat/Occurrence within the Project study area
White Wood Aster (*Eurybia divaricata*) *ESA*: Threatened *SARA*: Threatened Record Source: MNRF species list for City of Hamilton	White Wood Aster is found in deciduous woodlands with well drained soils and open canopies (COSEWIC 2002a, MNRF 2017a).	Low – Reported by the MNRF as present within the City of Hamilton. No observations of White Wood Aster were made during the botanical inventory field investigations. No forest communities with the associated deciduous species was observed (where accessible) within the Project study area. As no specific element occurrences of this species was noted during secondary source review, and the entire forest communities within the entire Project study area were not exhaustively searched, the probability of this species to occur is considered low.
SAR Invertebrates		
Monarch (*Danaus plexippus*) *ESA:* Special Concern *SARA:* Special Concern	Found primarily wherever milkweed and wildflowers exist; abandoned farm fields, along roadsides and ditches, open spaces and fallow fields.	Confirmed – Monarch was observed during the field investigations. It is believed the species was utilizing the milkweed observed within the Project study area.
Mottled Duskywing (*Erynnis martialis*) *ESA:* Endangered *SARA:* No status	Tends to inhabit a range of grassland, shrubland and savanna habitats that contain well drained soil. It prefers areas with specialized host plants that include New Jersey Tea and Prairie Redroot.	Low – Reported by the MNRF as present within the City of Hamilton. No observations of Mottled Duskywing or habitats that support New Jersey Tea or Prairie Redroot were made during the field investigations. Based on an overview of the area, and the fact the entire Project study area was not exhaustively searched, the probability of this species to occur is within the Project study area is considered low, with the understanding no habitat was noted along the road ROW.

Species Name, Status (*SARA*, *ESA*, S-Rank)[1,2,3], and Data Source	Preferred Habitat	Potential SAR Habitat/Occurrence within the Project study area
West Virginia White (*Pieris virginiensis*) *ESA:* Special Concern *SARA:* No status	Generally prefer moist deciduous woodlands and is often associated with Two-leaved Toothwort – a plant in which the larvae feed from.	Low – Reported by the MNRF as present within the City of Hamilton. No observations of West Virginia White or habitats that support Two-leaved Toothwort were made during the field investigations. Based on an overview of the area, and the fact the entire Project study area was not exhaustively searched, the probability of this species to occur is within the Project study area is considered low, with the understanding no habitat was noted along the road ROW.

3.2.3.1 Plants

An NHIC database record and MNRF correspondence indicated the potential for plant SAR to occur within the Project study area, and/or within the City of Hamilton proper. Six (6) plant SAR were determined to have no probability of occurring within the Project study area due to no suitable habitat being present. These included Spotted Wintergreen, Cucumber Tree, Red Mulberry, American Ginseng, Hoary Mountain-mint and Few-flowered Clubrush.

A review of the remaining vegetative SAR is provided in Table 3-2. More specifically, no vegetative SAR were observed during the field investigations to be within the existing ROW and in those areas where permissions to enter were provided. The HCA did note the presence of Butternut within the Fifty Creek ESA, which overlaps the south east end of the Project study area, however, this ESA extends outside the Project study area and no exact locations of Butternut were provided. As such, it cannot be confirmed as to where the occurrence of this species is located.

The Hamilton Conservation Authority confirmed the presence of Butternut in the Fifty Creek Environmentally Sensitive Area which overlaps the eastern end of the Project study area. It should be noted that the exact locations not provided for the Butternut, as such, therefore it cannot be determined whether these records are within the Project study area or outside. Either or, no Butternut were observed. As the entire Project study area was not exhaustively searched there is still a low - moderate possibility this species does exist somewhere in the Project study area, but not within the areas searched as part of the field investigations.

3.2.3.2 Birds

Three (3) avian SAR were reported during the field investigations, Barn Swallow, Bank Swallow, and Eastern Meadowlark. All three (3) of these species are designated Threatened under the *ESA*, and are also considered threatened and identified on Schedule 1 under *SARA*.

<u>Bank Swallow</u>

The Bank Swallow breeds in a wide variety of natural and artificial sites with vertical banks in sand and silt deposits, including riverbanks, lake bluffs, aggregate pits and stock piles of soil. Breeding sites are often situated near open terrestrial habitat used for aerial foraging (e.g., grasslands, meadows, pastures, and agricultural cropland) (COSEWIC 2013a).

During field investigations, 14 Bank Swallow observations were recorded at five (5) breeding bird point count survey locations (BBS2, BBS6, BBS7 BBS10 and BBS11). Observations of this species were only flyovers. No evidence of breeding was noted, as no critical habitat (e.g., breeding habitat) for this species is along the ROW. It is expected that based on the flyover observations, these Swallows may have been using the open fields for foraging.

<u>Barn Swallow</u>

Although Barn Swallows continue to nest in traditional natural habitats, they are now most closely associated with human structures in rural areas. Such nesting sites include a variety of artificial structures that provide either a horizontal nesting surface (e.g., a ledge) or a vertical face, often with some sort of overhang that provides shelter (COSWEIC 2011b). Nests are most commonly located in and around open barns, garages, sheds, boat houses, bridges and road culverts, and are situated on such surfaces as beams and posts, light fixtures, and ledges over windows and doors (COSEWIC 2011b). Because Barn Swallow nests are constructed of mud pellets, Barn Swallows require nest sites that have a source of nearby mud,

which makes bridges and large culverts ideal sites for nesting (COSEWIC 2011a). Barn Swallows typically select foraging sites close to open habitats such as farmlands of various descriptions, wetlands, road rights-of-way and large forest clearings (COSEWIC 2011b).

During field investigations, 44 Barn Swallow observations were recorded at six (6) breeding bird point count survey locations (BBS1, BBS2, BBS3, BBS5, BBS6 and BBS10). Observations of this species were only flyovers. The Project study area does provide nesting and foraging habitat for Barn Swallow, however only foraging observations were made during the field investigations, and no nesting sites were noted along the ROW. It is likely the nesting structures may be associated with barns, or out buildings that occur within the Project study area. In the event buildings will be removed as part of the Project, it is recommended they be searched for Barn Swallow nests prior to demolition.

Eastern Meadowlark

Eastern Meadowlarks prefer grassland habitats, including native prairies and savannahs, as well as non-native pastures, hayfields, weedy meadows, herbaceous fencerows and airfields (COSEWIC 2011d). In hayfields, Eastern Meadowlarks prefer older sites due to the availability of moderately tall (25 to 50 cm) grass with abundant litter cover, a high proportion of grass, moderate to high forb density, low shrub and woody vegetation cover and low percent cover of bare ground (COSEWIC 2011d). As such, perpetual hayfields are preferred over hayfields converted regularly (yearly) to row crops (e.g., part of a crop rotation). In addition, Eastern Meadowlark habitat is often associated with grassy hedgerows (with scattered perch sites for singing) surrounded by other open habitat. Eastern Meadowlarks are moderately area-sensitive preferring larger tracts of grasslands over smaller fragments, they exhibit high site fidelity and breeding densities are positively associated with grassland area, the minimum area required is estimated at 5 ha (COSEWIC 2011d). Territory sizes are variable across the species range, but generally vary from 1.2 to 6.0 ha (Hull 2003).

During field investigations, 11 Eastern Meadowlark observations were recorded at three (3) breeding bird point count survey locations (BBS4, BBS10 and BBS11). Observations at BBS10 and BBS11 were noted at a distance of 75 and 100 m respectively from the point count station along the road. Observations at BBS4 were approximately 25 m north of the existing road ROW, where one (1) single Eastern Meadowlark was observed on two (2) separate dates (June 28 and July 7, 2016). Based on these field observations, suitable habitat for Eastern Meadowlark is present within the Project study area, and in close proximity to the ROW. As such, the proposed Project has the probability of impacting this species, as the existing habitat extends up to the edge of pavement. Additional efforts for protection and/or permits and approvals may be required during detailed design.

Bobolink

Bobolinks in Ontario nest primarily in forage crops (e.g., hayfields and to a lesser extent pastures) dominated by species such as timothy, Kentucky bluegrass, orchard grass, and smooth brome. Hayfields and meadows dominated by broad-leaved flowering plants, such as clover, alfalfa or wild carrot (but containing lower proportions of grass species) are less commonly used. These hayfields provide grasses used for nesting, feeding, and seeking cover to escape from predators and poor weather conditions (e.g., excess cold, wind, rain, and sun). Bobolinks are moderately area-sensitive, preferring habitat patches greater than 10 ha (Herkert 1991), and are most likely to nest in fields surrounded by other open habitats as opposed to forested areas (COSEWIC 2010d).

No Bobolink were observed during the field investigations. However, Bobolink were documented in the Block 2 Servicing Strategy for the Fruitland – Winona Secondary Plan Lands (Aquafor Beech Ltd., 2018).

Documentation was noted in Figure 3-5 of the report at the southwest corner of Barton Street and Clover Road. The 300 m buffer for the species extends up to the road ROW. Based on this secondary source information, and the suitable habitat is present within the Project study area and in close proximity to the ROW, the Project has the probability of impacting this species. Additional efforts for protection and/or permits and approvals may be required during detailed design.

3.2.3.3 Mammals

Through a secondary source review it was determined that five (5) mammal SAR have the potential to exist within the Project study area, including Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis, Tri-coloured Bat and American Badger. A review of potential habitat within the Project study area was made during the field investigations. None of the above mammals were observed incidentally during field investigations. The vegetation surveys revealed that habitat suitable for bat maternity roosting is very limited within the Project study area though habitat suitable for foraging is present. Based on information collected during the secondary source review, and field observations, suitable habitat in areas searched (i.e., along the ROW and in close proximity) do not support critical habitat for any of these species. As the entire Project study area was not exhaustively searched, there is a probability these species may occur. In the event large swaths of forests will require clearing as part of this Project, additional investigations may be required, or suitable mitigation measures applied for clearing activities and timing of works.

3.2.3.4 Amphibians and Reptiles

Through a secondary source review and MNRF correspondence it was determined that one (1) amphibian and three (3) reptile SAR have the potential to exist within the Project study area; Jefferson Salamander, Blanding's Turtle, Spiny Softshell and Eastern Hog-nosed Snake. Both Spiny Softshell and Blanding's Turtle do not have suitable habitat within the Project study area, and were therefore not included in Table 3-2. Based on information collected during the secondary source review, and field observations, suitable habitat in areas searched (i.e., along the ROW and in close proximity) did not reveal these species or their habitat. As the entire Project study area was not exhaustively searched, there is a probability these species may occur, but impacts as a result of the proposed Project are considered limited to non-existent.

3.2.3.5 Invertebrates

MNRF correspondence indicated the potential for three (3) species of invertebrate SAR to exist near the Project study area. A Monarch butterfly was observed during the field investigation, and could be considered a present within the Project study area, as habitat areas that support Common Milkweed (known preferred plant) occurs. Both Mottled Duskywing and West Virginia White were not observed during the field investigations, nor were their specialized plant species needed to support their life cycle. As the entire Project study area was not exhaustively searched, habitats may occur, but they are well outside the existing ROW. Given that no specific element occurrences of either of these species has been recorded for the Project study area, the probability of either of these species and their habitats to occur has been categorized as low.

3.2.4 Natural Heritage System

Within the City of Hamilton Official Plans (Rural and Urban) (2012, 2013) the Natural Heritage System consists of Core Areas, Linkages and the matrix of lands between them. The System approach aims to identify Core Areas, and include supportive features (i.e., linkages) that maintain the ecological function and connectivity of the natural system. According to Section 2.3 of the Urban Official Plan, Core Areas

include: key natural heritage features, key hydrologic features, and provincially significant and local natural areas.

Key natural heritage features are defined as:

- Significant habitat of endangered and threatened species
- Fish habitat;
- Significant Woodlands
- Significant Wetlands;
- Life Science Areas of Natural and Scientific Interest (ANSIs)
- Significant valleylands;
- Significant wildlife habitat;
- Sand barrens, savannahs, and tallgrass prairies; and
- Alvars

Key hydrologic features are defined as:

- Permanent and intermittent streams;
- Lakes (and their littoral zones);
- Seepage areas and springs; and
- Wetlands.

Local natural areas are defined as:

- Environmentally Significant Area (ESA)
- Unevaluated wetlands
- Earth Science Areas of Natural and Scientific Interest (ANSI)

3.2.4.1 Core Areas

Based on a review of the Urban and Rural Official Plans, several Core Areas are within the Project study area. Review of Schedule B2 of the Urban Official Plan, and that of the Rural Official Plan, three (3) significant woodlands are located within the Project study

- One is east of Glover Road;
- One south of Barton just east of Jones Road; and
- One located at the intersection of Fifty Road and Highway 8.

The woodland east of Glover Road and that south of Barton east of Jones Road were both identified as a Fresh-Moist Green Ash Hardwood Lowland Deciduous Forest Type (FOD7-2). These wooded communities were observed throughout the Project study area, and were dominated by Red Ash. As a result of the

Emerald Ash Borer, many of the Ash observed were unhealthy and in the process of dying or already dead. Associate species consist of Willow, Manitoba Maple and invasive European Buckthorn.

Both communities track small watercourses and the City of Hamilton Official Plan also shows areas of linkage (naturalized vegetation which ecologically connect Core Areas) associated with both woodlands. These Core Areas and linkages have been evaluated during previous projects in the vicinity (More Than Engineering 2012a, b, Dougan & Associates 2016, Aquafor Beech 2016, 2017). There is also an area considered linkage at the west end of the Project study area characterized in Figure 3-2 as Fresh – Moist Deciduous Woodland Ecosite (WODM5; City of Hamilton 2013, Dougan & Associates 2016, Aquafor Beech 2016, 2017). Linkages are defined as connecting natural areas and can provide movement corridors as well as providing habitats for many wildlife species.

Two (2) polygons designated as the Fifty Mile Creek Wetland Complex and the Fifty Valley Creek ESA (Core Areas) run through the very eastern end of the Project study area. These polygons have been classified as Fresh – Moist Willow Lowland Deciduous Forest Type (FOD7-3) just north-east and south-west of the intersection of Fifty Road and Highway 8. This community is dominated by Willow species with occasional occurrences of American Elm, Manitoba Maple, Black Walnut, Siberian Elm and Staghorn Sumac.

Significant Woodlands designated under the Urban Hamilton Official Plan have a 15 meter (m) vegetation protection zone to protect the Core Area and its ecological functions (City of Hamilton 2013). These Core Areas (Significant Woodlands), as well as their associated linkages and vegetation protection zones have been considered Environmental Constraints to previous project works (Aquafor Beech Limited 2016, 2018). A third area, south of Barton Road, just west of Glover Road, has been designated a Candidate Core Area (Aquafor Beech Limited 2018). As such, the two (2) woodlands identified in the Urban Hamilton Official Plan (Woodland along Barton, east of Glover Road, and the woodland south of Barton just east of Jones Road) would have a 15 m buffer applied. The Rural Hamilton Official Plan identifies a 30 m vegetation protection zone. This protection requirement would apply to the significant woodland identified as part of the Fifty Creek Wetland Complex at Fifty Road and Highway 8 intersection.

Review of additional schedules within the Urban Official Plan identified no wetlands, ESAs or ANSIs within the Project study area. However, the section associated with Fifty Road and Highway 8 intersection identified the following Core Areas within the Rural Official Plan:

- A local ESA (on the southeast corner of Fifty Road and Hwy 8 – Schedule B6);
- A wetland (Key Hydrologic Feature) (Schedule B4).

A small section of Fifty Mile Creek Wetland Complex runs through the South East end of the Project study area. Fifty Mile Creek Wetland Complex is considered an evaluated wetland, but is not provincially significant).

The City of Hamilton Urban Official Plan (2013; UHOP Volume 1 policy C.2.3 and C.2.3.3) states that the natural features and ecological functions of Core Areas shall be protected and where possible and deemed feasible to the satisfaction of the City, enhanced. To accomplish this, vegetation removal and encroachment into Core Areas shall generally not be permitted, and appropriate vegetation protection zones shall be applied to all Core Areas as per the corresponding Official Plans (City of Hamilton 2013).

3.2.4.2 Significant Wildlife Habitat

Seasonal Concentration Areas

Seasonal concentration areas are those habitats where large numbers of a single species or many species congregate at one (or several) times a year. The SWH Criterion Schedules for Ecoregion 7E outlines criteria for seasonal concentration areas of Animals. Based on the field investigations completed no seasonal concentration areas were observed. Information obtained through secondary source material may indicate the possibility for seasonal concentration areas within the Project study area (e.g., Snake hibernaculum) but complete confirmation cannot be made as the entire Project study area was not exhaustively searched due to land access restrictions.

Rare Vegetation Communities

No rare vegetation communities were identified during the field investigation.

Specialized habitat for Wildlife

Specialized habitat for wildlife are those microhabitats that are critical to a species or several species. The SWH Criterion Schedules for Ecoregion 7E outlines criteria for specialized wildlife habitat. Based on secondary source information and that documented during field investigations, although ecosites that may support specialized habitat were observed within the Project study area, the size of the ecosites, and number to individuals observed would not be considered significant in that the Project study area can be considered as having specialized habitat for wildlife.

Habitat for Species of Conservation Concern

Habitat for species of conservation concern includes wildlife habitats for Special Concern and Provincially Rare (low S ranking species) in southern Ontario. Both species of conservation concern or their habitat are not provided protection under the *ESA*. Best management practices, including avoiding or minimising impacts within potential habitat areas and scheduling work (e.g., vegetation clearing or structure removal) outside of core breeding time. The SWH Criterion Schedules for Ecoregion 7E outlines criteria for habitat for species of conservation concern. Based on habitats and ecosites documented during field investigations, habitat for Special Concern and rare species occurs within the Project study area. Through a review of secondary source information, completion of field investigations and correspondence with MNRF, 27 species of conservation concern occur, and are documented in Table 3-3. While there were records of 27 species, only two (2) were documented during the field investigations: Western Chorus Frog and the Monarch. Observations of Western Chorus Frog were made during the 2019 anuran call surveys. Observations of this species were between 50 and 100 m from the road ROW. The Monarch was incidentally noted during completion of other field investigations (i.e., ELC). It is assumed this species may be utilizing the habitat along roadsides and in cultural meadows within the Project study area as both Swamp and Common Milkweed (species 'host plant') were observed in ecosite SWD1-1 and ecosite FOD7-2.

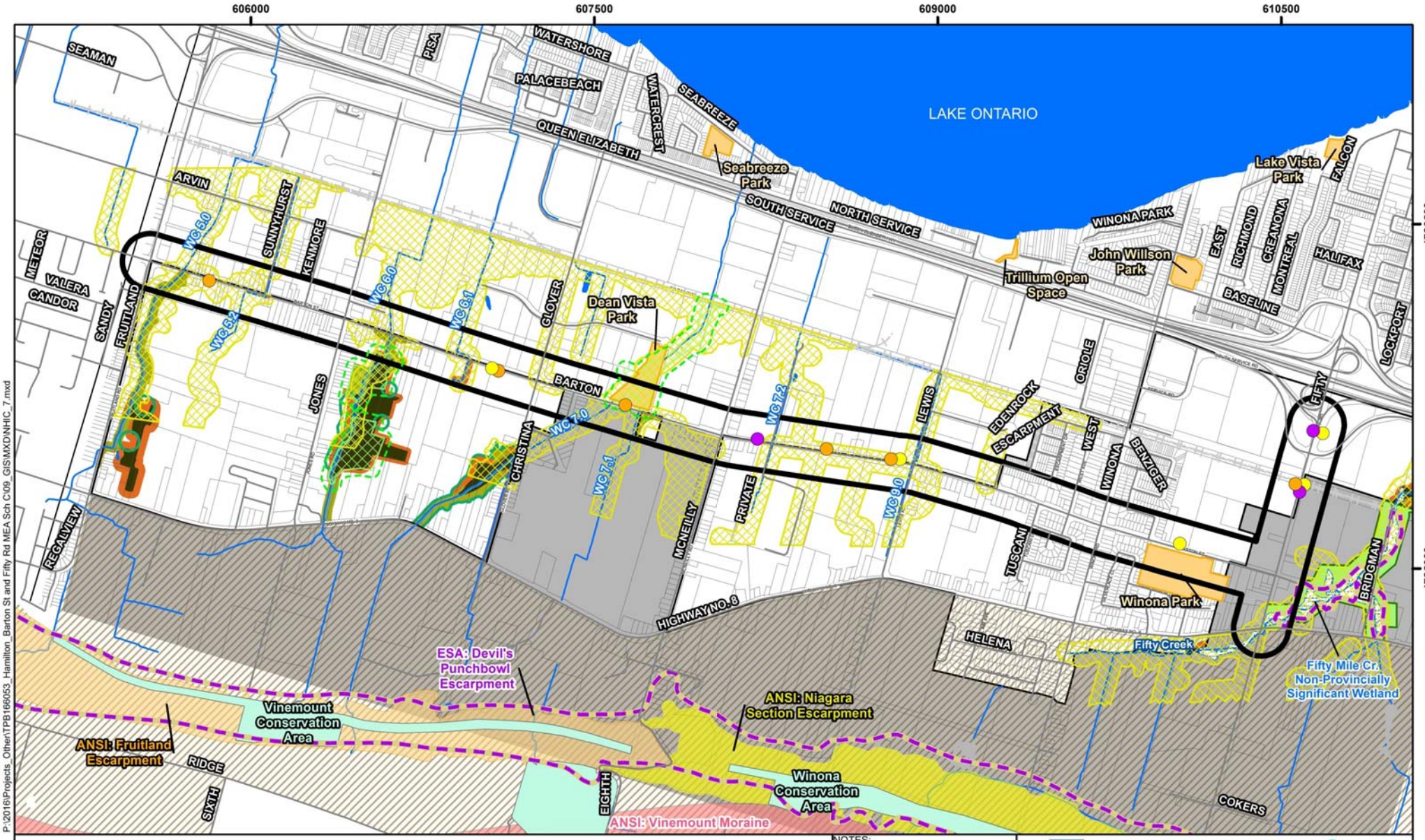
Table 3-3: Species of Conservation Concern Recorded in the Project Study Area

Species Common Name	Scientific Name
Bald Eagle	*Haliaeetus leucocephalus*
Black Tern	*Chlidonias niger*
Canada Warbler	*Cardellina canadensis*
Common Nighthawk	*Chordeiles minor*
Eastern Wood-Pewee	*Contopus virens*
Golden-winged Warbler	*Vermivora chrysoptera*
Grasshopper Sparrow	*Ammodramus savannarum*
Hooded Warbler	*Setophaga citrina*
Peregrine Falcon	*Falco peregrinus*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Short-eared Owl	*Asio flammeus*
Wood Thrush	*Hylocichla mustelina*
Woodland Vole	*Microtus pinetorum*
Western Chorus Frog	*Pseudacris triseriata*
Eastern Musk Turtle	*Graptemys geographica*
Northern Map Turtle	*Chelydra serpentine*
Snapping Turtle	*Chelydra serpentina*
Eastern Milksnake	*Lampropeltis triangulum*
Eastern Ribbonsnake	*Thamnophis sauritis*
Monarch Butterfly	*Danaus plexippus*
West Virginia White	*Pieris virginiensis*
Arrow Clubtail	*Stylurus spiniceps*
Broad Beech Fern	*Phegopteris hexagonoptera*
Eastern Few-fruited Sedge	*Carex oligocarpa*
Green Dragon	*Arisaema dracontium*
Lichen	*Bacidia trachoma*
Perfoliate Bellwort	*Uvularia perfoliata*

3.2.4.3 Animal Movement Corridors

Animal movement corridors are habitats that link two (2) or more wildlife habitats that are critical to the maintenance of a population of a particular species or group of species, particularly in highly fragmented landscapes (MNRF 2000). These corridor habitats serve a key ecological function to enable wildlife to move between areas of SWH or core natural areas with a reduced risk. Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another (MNRF 2000). These corridors may include valleylands, dense vegetated riparian buffer areas, hedgerows and are potentially used by a variety of wildlife species including migratory and breeding birds, reptiles, and amphibians. The SWH Criterion Schedules for Ecoregion 7E outlines one wildlife habitat for consideration; amphibian movement corridor.

Amphibian movement corridors may be found in all ecosites that are associated with water and are determined based on identifying significant breeding habitat. As no significant breeding habitat was documented during the field investigations, amphibian movement corridors are considered absent from those areas associated within 100 m of the road ROW. As the entire Project study area was not exhaustively searched there is a probability these habitats could exist elsewhere within the Project study area, but it is unlikely any negative impacts would occur as a result of the proposed Project.



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LEGEND

- Approximate Study Area
- Woodland Protection Zone
- Significant Woodland
- ANSI: ANSI[2]: Earth Science, Vinemount Moraine, Regional
- ANSI: ANSI[2]: Life Science, Fruitland Escarpment, Provincial
- ANSI: ANSI[2]: Life Science, Niagara Section Escarpment, Provincial
- NAME: Niagara Escarpment Planning Parks (NEPOSS[3])
- ESA: ESA[1]: - Fifty Creek Valley - Devil's Punchbowl Escarpment
- Greenbelt Plan
- Niagara Escarpment Plan
- HCA Regulation Limits [5]
- Hamilton Parks
- Railway
- Watercourse
- Wetland
- Waterbody

Natural Heritage Information from Fruitland-Winona Secondary Plan

- Core Areas
- Linkages
- Vegetation Protection Zone
- Lands in the Rural Area
- Restoration Area

Terrestrial Species at Risk*

- Bank Swallow
- Barn Swallow
- Eastern Meadowlark

NOTES:
* Field survey results, AMECFW.
[1] Environmentally sensitive area (ESA) extracted from City of Hamilton under Open data licence agreement.
[2] Areas of Natural and Scientific Interest (ANSI). Extracted from LIO, MNRF.
[3] Niagara Escarpment Parks and Open Space System (NEPOSS) extracted from LIO, MNRF.
[4] SAR data obtained from NHIC database June 2016. Location is generalized based on squares of 1 Km square.
[5] Georeferenced and digitized data representation of HCA regulation Limits

Datum & Projection: NAD 1983 UTM Zone 17N

0 0.5 1 1.5 2 Kilometres

Hamilton

amec foster wheeler

BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Natural Heritage System

PROJECT N°: TPB166053 | FIGURE: 3-2

SCALE: 1:23,000 | DATE: November 2017

4.0 IMPACT ASSESSMENT

The proposed Project is anticipated to have minimal long-term impact on the natural environment due to the minimal footprint being created through the proposed widening activities along Barton Street and Fifty Road. As part of the Class EA, four (4) design concepts will be assessed for Barton Street, and four (4) design concepts will be assessed for Fifty Road.

The four (4) design concepts for Barton Street include:

- Alternative 1 – Widening along the centerline
- Alternative 2 – Widening further along the north side by four (4) m
- Alternative 3 – Widened ROW north but maintain property line

Similarly for Fifty road, the four (4) design concepts are as follows:

- Alternative 1 – Widen the ROW along the existing centerline
- Alternative 2 – Widen the ROW to avoid constraints (Hybrid)
- Alternative 3 – Widen the ROW to the east

Based on the overall evaluation criteria, it has been identified that the preferred alternative for Barton Street is Alternative 3 – Widened ROW north but maintain property line and that associated with Fifty Road was widening the ROW to the east (Alternative 3). Based on the overall evaluation criteria, all three (3) design concepts for both roadways will have similar cross-sections and will be implemented using similar construction methods each having a similar impact on the natural environment. As such, an assessment of the generalized impacts associated with the proposed works, combined with the prescribed mitigation measures to avoid or minimize the anticipated impacts on the natural heritage environment is summarized in Table 4-1. Potential Project impacts and site-specific mitigation measures should be further refined during the detailed design stage for the Project. The intent of this preliminary effects' assessment is to identify potential constraints and mitigation considerations for the evaluation of alternatives based on documented and observed natural features present within the Project study area.

4.1 Recommended Alternatives

All three (3) of the alternative design concepts for both roadways will pose minimal permanent impact (vegetation loss) and temporary impacts on the natural environment within the Project study area. Evaluation criteria for natural heritage were identified to include:

- impacts to overall natural features as identified as part of the natural heritage system;
- species at risk impacts;
- wildlife impacts; and
- vegetation and wetland impacts.

Impact to natural heritage features is similar for all Alternatives along Barton Street from Fruitland Road to Fifty Road, with the exception of significant woodlands, whereby Alternative 1 will result in a loss of 0.14 ha, Alternative 2 and 3 will result in 0.06 ha loss of the feature. Similarly, with respect to SAR habitat for Eastern Meadowlark and Bobolink, the ROW alignment associated with Alternative 1 may impact approximately 0.89 ha of agricultural or cultural meadow communities, Alternative 2 and 3 will impact

approximately 0.65 ha. Additional SAR noted, Barn and Bank Swallow, were only observed flying over the road corridor. As such, each Alternative will likely result in some temporary loss of foraging habitat to each of these species. Additional losses to vegetation communities will occur for all Alternatives particularly the Fresh-Moist Green Ash Hardwood Lowland Deciduous Forest located north east of Jones Road and Barton Street, albeit this woodland community has not been identified as significant. Based on a review of impacts, Alternative 3 would be the most favorable from a woodland loss perspective, as it results in the least amount of impact, however, it results in the greatest impact to the cultural meadow and/or agricultural communities which have been identified to support SAR.

Along Fifty Road, Alternative 3 was identified as the preferred Alternative. For Alternative 3, there will be a loss to the agricultural and cultural meadow communities along the east (representing a loss of 0.963 ha overall), however no impact to the Fifty Creek Wetland Complex (the Fresh-Moist Willow Lowland Deciduous Forest). Measures to try and minimize disturbance to the agricultural and cultural meadow communities should be reviewed during detailed design. The loss of the agricultural field and meadows, although larger compared to Alternative 3, none of these communities along the east provide significant wildlife habitat, nor habitat for noted SAR that prefer these habitats.

Overall it is important to note, this entire road corridor will be rapidly changing land use over the course of the next decade supporting various development projects and infrastructure. Therefore, while these impacts may be temporary or permanent in nature as a result of the road widening for this Project, additional cumulative impacts will incur as a whole on existing features.

Table 4-1: Generalized impacts and proposed mitigation and monitoring

Activity	Feature	Potential Impacts	Mitigation	Monitoring
Pre-Construction - land clearing, site preparation	Topography and Soils	• Changes to soil moisture. • Increased erosion and soil compaction. • Changes to drainage and surface runoff.	• Minimize footprint disturbance to the extent possible. • Maintain existing stormwater strategies (as required). • Prepare an erosion and sediment control (ESC) plan in accordance with the Greater Golden Horseshoe Area Conservation Authorities Erosion and Sediment Control Guidelines for Urban Construction (2006). • Minimize soil exposure - restore or stabilize areas using erosion matting as work progresses. • Schedule work to avoid peak runoff volumes (i.e., during spring freshet). • All ESC measures to remain in place until all areas associated with construction activities have been stabilized.	• Inspect ESC measures after installation and before construction to ensure they were installed in accordance with specifications. • Monitor construction areas and ESC measures daily and prior to and immediately after precipitation events to ensure they are functioning according to design details and are maintained throughout construction.
	Vegetation	• Changes to overall tree cover and vegetation composition. • Introduction of invasive (non-native) species. • Edge impacts/ encroachment. • Loss of shade for associated watercourse and input of organic material. • Increase of impervious surface.	• Minimize footprint disturbance to the extent possible. • Minimize soil exposure - restore or stabilize areas using erosion matting as work progresses. • Provide restoration and/or compensation using native, non-invasive seed mix, trees and shrubs (as required). All work zones to be clearly identified on design drawings.	• Pre-construction clearing will be monitored to ensure clearing activities are completed in accordance with approved and specified work zones. • Inspect tree protection and ESC measures after installation and before construction to ensure they were installed in accordance with specifications.

Activity	Feature	Potential Impacts	Mitigation	Monitoring
			• Establish clear vegetation protection zones. • Provide detailed clearing, ESC and restoration plans. • Clearly identify stockpile and laydown/staging areas on detailed drawings. • All trees shall be protected in accordance with the City's Tree Protection By-laws (Public Property (By-law No. 15-125); Private Property (Urban Woodland By-law No. 14-212); Private Rural – Regional (By-law No. R00-05). • Tree protection to be installed prior to construction works. • Those areas designated as tree protection zones (TPZs) are to be considered "no-go" zones, whereby no stockpiles, storage materials or grade changes shall occur within its' boundary.	• If clearing works will be within 50 mof a Butternut, the tree should be monitored throughout clearing activities to ensure no impacts to its survival occur as a result of the Project. Additional consultation with MNRF will determine any additional monitoring requirements during detailed design. •
	Wildlife	• Changes to wildlife dynamics (i.e., attract different species). • Impacts to nesting birds protected under the MBCA.	• Minimize footprint disturbance to the extent possible. • Maintain woodland sizes as much as possible. • Restore area to existing or better condition with native, non-invasive plant materials. • Avoid clearing during the breeding bird window – March 31 through August 31. If not	• Monitor pre-construction clearing activities to ensure wildlife are not impacted. • Monitor nests as needed (e.g., daily) until inactive.

Activity	Feature	Potential Impacts	Mitigation	Monitoring
			possible, a bird nest survey by a qualified avian biologist should be conducted to determine presence and locations of active nests prior to construction. Bird nest surveys should be completed immediately prior to clearing events. If a nesting migratory bird is identified within or adjacent to the construction site, the contractor must stop work within the immediate area and contact the contract administrator for next steps.	
	Species-at-Risk (SAR)	• A three (3) SAR were documented during the field investigation two (2) of which were flyovers (Barn and Bank Swallows). Eastern Meadowlark was confirmed by Wood, and Bobolink was documented in the Block 2 Secondary Plan by Aquafor Beech Ltd.	• Minimize impacts to the areas where both Eastern Meadowlark and Bobolink were observed. Further consultation and assessment during detailed design will be required for both species. • If additional SAR are encountered during construction, works within the immediate area must cease and MECP must be notified immediately.	• Monitoring requirements for both Eastern Meadowlark and Bobolink will be provided following future consultation with MECP during detailed design. • If additional SAR are encountered, monitoring will follow proper protocols as identified by MECP and in accordance with the *Endangered Species Act*, (ESA), 2007 and associated Regulations.
Construction	Topography and Soils	• Changes to drainage and surface runoff. • Grading and soil disturbance during construction can lead to erosion and sedimentation. • Stockpiled materials, equipment or construction activities may	• Develop and implement an ESC plan. • Minimize footprint disturbance to the extent possible. • Maintain existing stormwater strategies (as required).	• Monitor construction areas and ESC measures daily and prior to and immediately after precipitation events to ensure they are functioning according to design details and are maintained throughout construction.

Activity	Feature	Potential Impacts	Mitigation	Monitoring
		encroach on natural areas beyond the proposed impact areas which may cause greater soil compaction.	• Minimize soil exposure - restore or stabilize areas using erosion matting as work progresses. • Schedule work to avoid peak runoff volumes (i.e., during spring freshet). • All ESC measures to remain in place until all areas associated with construction activities have been stabilized.	
	Vegetation	• Stockpiled materials, equipment or construction activities may encroach on natural areas beyond the proposed impact areas which may cause greater vegetative loss. • Disturbed areas as a result of site clearing activities may allow for invasive species to be introduced and spread throughout natural areas, which may prevent natural species from re-establishing. • Dust from work activities has the potential to settle on adjacent vegetation.	• Minimize footprint disturbance to the extent possible. • Minimize soil exposure - restore or stabilize areas using erosion matting as work progresses. • Provide restoration using native, non-invasive seed mix, trees and shrubs (as required). All work zones to be clearly identified on design drawings. • Ensure stockpile and staging/laydown areas are in designated areas. • All trees shall be protected in accordance with the City's Tree By-laws. • Those areas designated as tree protection zones (TPZs) are to be considered "no-go" zones, whereby no stockpiles, storage materials or grade changes shall occur within its' boundary.	• Monitor construction areas, tree protection and ESC measures daily and prior to and immediately after precipitation events to ensure they are functioning according to design details and are maintained throughout construction.

Activity	Feature	Potential Impacts	Mitigation	Monitoring
			• Use dust suppressants during construction (e.g., water trucks).	
	Wildlife	• Interaction with wildlife. • Dust from work activities has the potential to settle on adjacent vegetation and may disrupt wildlife and their habitat. • Noise and light from construction may disrupt wildlife and their life cycle processes (e.g., predator calls). • Increased road mortality on birds, turtles, and amphibian associated with construction vehicles.	• Develop and implement an ESC Plan, including wildlife exclusion measures. • Provide wildlife crossing passage in culverts. • Use dust suppressants during construction (e.g., water trucks). • Maintain woodlands as much as possible (i.e., minimize disturbance). • Follow noise prevention measures as identified during detailed design and respective City's Noise By-law No. 11-285 (as required).	• Monitor during construction activities and relocate wildlife as necessary in accordance with the Wildlife Scientific Collectors Permit (to be obtained during detailed design from MNRF). • Monitor dust and noise levels and mitigate accordingly.
	Species-at-Risk (SAR)	• A three (3) SAR were documented during the field investigation two (2) of which were flyovers (Barn and Bank Swallows). Eastern Meadowlark was confirmed by Wood, and Bobolink was documented in the Block 2 Secondary Plan by Aquafor Beech Ltd.	• Minimize impacts to the cultural meadows as much as possible. Further consultation and assessment during detailed design will be required for the species. If additional SAR are encountered during construction, works within the immediate area must cease and MECP must be notified immediately.	• Monitoring requirements for Eastern Meadowlark and Bobolink will be provided following future consultation with MECP during detailed design. • If additional SAR are encountered, monitoring will follow proper protocols as identified by MECP and in accordance with the *Endangered Species Act*, (ESA), 2007 and associated Regulations.
Operation and Maintenance	Topography and Soils	• If upgrades or future repair (e.g., re-paving, culvert repair) are required may require in-water works and/or excavation activities similar to those experienced during construction.	• Upgrades and/or future repair to be completed in accordance with applicable mitigation measures as identified during the construction activity phase.	• Monitoring will be completed subject to the scale of maintenance work.

Activity	Feature	Potential Impacts	Mitigation	Monitoring
			• All required permitting and/or approvals to be obtained as required.	
	Vegetation	• Trees adjacent to the ROW may need to be pruned or removed.	• Tree pruning to be kept to a minimum and shall be completed by a qualified tree care professional.	• Monitoring will be completed subject to the scale of maintenance work.
	Wildlife	• Increased traffic volumes may increase wildlife and vehicle collision numbers. • Increased traffic volumes may increase noise and vehicle pollution which may interfere with wildlife activities.	• Traffic volumes will be assessed and discussed within the Environmental Study Report (ESR). Recommendations within the ESR shall assist with mitigating impacts associated with increased traffic etc.	• No monitoring required.
	Species-at-Risk (SAR)	• No impacts to SAR during operation and maintenance is anticipated. Requirements post construction will be identified further during detailed design through consultation with MECP.	• If additional SAR are encountered during operation and maintenance, MECP must be notified immediately. • MECP will prescribe additional information relating to Eastern Meadowlark and Bobolink during detailed design.	• Monitoring requirements for Eastern Meadowlark and Bobolink post construction during the operation and maintenance phases will be provided following future consultation with MECP during detailed design.

5.0 PRELIMINARY ENVIRONMENTAL MITIGATION MEASURES

As the Project progresses to detailed design, site-specific mitigation measures should be developed in order to protect the terrestrial environments and their respective ecological function. Where possible, avoidance measures should be implemented before resorting to mitigation and lastly rehabilitation to minimize negative effects on natural heritage features. If the mitigation measures and/or BMPs are implemented, they will likely reduce the possible effects from the proposed Transportation Improvements.

5.1 Construction Timing

Construction timing should take into consideration natural heritage features, more specifically the wildlife that inhabit the features within the Project Study Area. Vegetation removal should not take place during the local breeding bird season, March 31 through August 31, to comply with the *MBCA*. Due to the uncertainty that lies with nest sweeps during construction, especially during leaf-on conditions, it is recommended that all tree clearing occur outside the above-noted breeding bird window.

5.2 Erosion and Sediment Control Measures

Disturbance and removal of existing trees and vegetation should be minimized where possible and confined to the footprint of the Project. No development, construction or grading should occur outside of the Project limit once it has been confirmed during the detailed design phase. An ESC plan should be developed prior to construction, and applicable ESC measures implemented to avoid impacts to terrestrial features as identified.

Efforts should be made to reduce areas of exposed soils, and erosion and sediment transport during the construction phase. Erosion and sediment controls should be installed prior to construction activities, and remain in place until all disturbed areas are fully stabilized so as to retain sediment on-site and prevent its entry into nearby watercourses and adjacent ditches. All ESC measures shall be installed and consistent with Ontario Provincial Standards and Specifications (OPSS) and in accordance with the Erosion and Sediment Control Guidelines for Urban Construction (2006, as amended).

All materials and equipment shall be operated and stored in such a manner that prevents any deleterious substance from entering the water and drainage ditches

Minimizing dust production to the extent practical by implementing dust suppression methods and thereby minimizing the zone of influence. Primary dust suppression methods can include road watering in cases where watering will not promote entry of chemicals in to nearby wetlands or waterways

In addition, all ESC measures should be monitored/inspected during construction to confirm they are maintained and functioning as designed. In the event ESC measures are not performing, additional measures should be investigated and implemented immediately. All ESC measures (e.g., sediment control logs) should be reflected on all construction drawings with notes on requirements.

5.3 Tree Clearing and Vegetation Protection and Replacement

No development, construction or grading should occur outside of the construction envelope once it has been confirmed during the detailed design phase. Vegetation protection zones should be established for those woodlands as per the respective Official Plan (Rural or Urban) requirements (e.g., 15 m buffers or 30 m buffers) where feasible.

Trees shall be protected in accordance with the City's Tree By-laws. All disturbed areas should be restored with native, non-invasive seed mix, in addition to native trees and shrubs that are reflective of existing

communities. Compensation for loss of woodland and wetland should be coordinated with HCA, with exact details of compensation to be further identified during detailed design.

5.4 Wildlife Protection Measures

Efforts should be made for the protection of wildlife during construction. The contractor should refer to the MNRF SAR Handling Manual (2011) to ensure wildlife encountered during construction are properly handled and/or reported as necessary.

If clearing (or other work) in migratory bird habitat is required during the active breeding season, a nest survey must be conducted by a qualified avian biologist immediately (e.g., within 1 day) prior to commencement of the works to identify and locate active nests of species protected under the MBCA. In the event that bird nests protected under the MBCA, FWCA or *ESA* are encountered during construction, work must stop in the vicinity of the sighting until further direction is provided. These species and their nests must not be disturbed, tormented, injured in any way, destroyed, and/or separated from young. A protective buffer area should be established around the nest and should be determined in consultation with a qualified avian biologist, as well as the MNRF, MECP and/or Canadian Wildlife Service (CWS), as necessary.

Road widening should be designed so that they are not barriers to herpetiles moving between habitats. Suitable ecopassages may be required to allow movement.

Sufficient culverts should be installed under the road to ensure that lateral drainage is not impeded. Where possible, roadside ditches should never be designed so that they remove water from the wetland and cause localized drying.

Where feasible, works will be conducted during daylight hours, unless otherwise necessary, to avoid potential effects of artificial night lighting on crepuscular and nocturnal species.

Minimize sources of unnecessary noise or encroachment of worker activities into nearby habitats to limit the extent of the Project of influence when possible.

6.0 Permits and Approvals

Based on a preliminary assessment, it is anticipated that the following permits and approvals will be required for this Project as it pertains to the terrestrial environment:

- A Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Regulation permit from the HCA under *Ontario Regulation 161/06* to facilitate works within the regulated areas associated with the road corridor (i.e., culvert works);
- MECP Permit-to-Take-Water (PTTW) or Registration. Approval is required if more than 50,000 litres of water per day will be taken during Project activities. For those transportation projects that will take more than 50,000 litres but less than or equal to 400,000 litres per day, may meet the requirements to register their Project using the new MMECP Environmental Activity and Sector Registry (EASR) protocol.
- Permits and/or approvals associated with Eastern Meadowlark and Bobolink will be further investigated during detailed design, similar to those requirements for Bank and Barn Swallow foraging habitat; and
- Wildlife Scientific Collectors Permit for potential wildlife relocation during construction.

Please note the above list is not exhaustive, and additional permits and approvals may be required and will be confirmed during the detailed design phase.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The majority of the Project study area along the road ROW are developed lands in the form of residential, agricultural, commercial, and light industrial land uses. As such, the primary lands to be impacted by the proposed Project have already been impacted by anthropogenic factors and are classified as cultural. Project activities may result in disturbance in the form of exhaust emissions, dust, and vegetation removal, however, general mitigation measures, if implemented accordingly shall minimize negative impacts associated with the proposed Project.

A summary of environmental findings and recommendations are as follows:

- As noted, the majority of the Project study area is categorized by anthropogenic and cultural communities;
- The Project study area is located within areas as regulated by the Hamilton Conservation Authority (O.Reg. 161/06);
- Three (3) significant woodlands are located within the Project study area, which provide habitat for local wildlife and act as linkages within the rural and urban landscapes;
- Three (3) SAR (Eastern Meadowlark, Barn Swallow and Bank Swallow) were documented during the field investigations, with an additional SAR (Bobolink) reported from secondary source review. Additional consultation with MECP will be required during detailed design to identify permit and approval requirements;
- One evaluated (non-provincially significant) wetland (Fifty Creek Wetland Complex) is located within the Project study area;
- No significant wildlife habitat was observed during the field investigations based on either species occurrence observations, or habitat which meets size and function criteria.
- Several species of conservation concern were noted during the secondary source review, however, only two (2) species were observed during the field investigations which included Western Chorus Frog and Monarch butterfly;
- An ESA is located at the corner of Fifty Road and Highway 8 as associated with the significant woodland and evaluated wetland;
- All vegetation clearing and grubbing should be kept to a minimum and areas shall be restored to equal or better condition with native, non-invasive species that are reflective of the vegetation observed and/or known to the City of Hamilton;
- Where possible, the City should try to mitigate effects of the Project on existing barriers to wildlife movement from culvert extension, repair or replacement. This can be done by investigating wildlife passage at any new culverts during detailed design and incorporating them where feasible;
- Treed areas to be preserved shall be protected in accordance with the City's specifications and by-law requirements;
- Core Areas identified shall be protected in accordance with respective buffers and protection zones as identified in the City's Urban and Rural Official Plans;
- Monitoring during construction is recommended with additional monitoring as per restoration and SAR requirements post-construction;

- During detailed design an ESC, spill prevention, wildlife rescue restoration plan should be developed and implemented in advance of construction to prevent potential impacts to natural heritage features within the Project Limits;
- Vegetation removal should not take place during the local breeding bird season, March 31 through August 31, to comply with the *MBCA*. Due to the uncertainty that lies with nest sweeps during construction, especially during leaf-on conditions, it is recommended that all tree clearing occur outside the above-noted breeding bird window;
- Mitigation measures identified herein should be further reviewed and refined during detailed design; and
- Compensation for loss of vegetation communities shall be discussed further with the City and HCA to ensure some form of offsetting is implemented within the same watershed.

8.0 CLOSURE

This Report has been prepared based on a review of secondary source information, agency consultations, and field investigations and is reflective of the proposed Project study area identified at the time of the Report. This Report is intended to support the Municipal Class EA for the Project and may also be used to support future planning phases and design relative to future field work and/or permit and approval discussions.

Regards,

Wood Environment & Infrastructure Solutions,
a Division of Wood Canada Limited

Erin M. Hellinga
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COSEWIC. 2011b. COSEWIC assessment and status report on the Barn Swallow *Hirundo rustica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 37 pp.

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COSEWIC. 2011a. COSEWIC assessment and status report on the King Rail *Rallus elegans* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 32 pp.

COSEWIC. 2011c. COSEWIC assessment and status report on the Yellow-breasted Chat *auricollis* subspecies *Icteria virens auricollis* and the Yellow-breasted Chat *virens* subspecies *Icteria virens* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xvi + 51 pp.

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COSEWIC. 2013b. COSEWIC assessment and status report on the Little Brown Myotis *Myotis* lucifugus, Northern Myotis Myotis septentrionalis and Tri-colored Bat Perimyotis subflavus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxiv + 93 pp.

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Appendix A

Correspondence

Harris, Becky

From: Laurence, Anne Marie (MNRF) <annemarie.laurence@ontario.ca>
Sent: Thursday, August 04, 2016 4:24 PM
To: Ferguson, Brittany
Subject: RE: Information Request - Barton Street and Fifty Road Improvements
Attachments: SAR List City of Hamilton Aug 4 2016.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

My apologies, I hit send too quickly. That should have read "**City of Hamilton"** (correction highlighted below) and I've attached the municipal SAR list accordingly.

Best regards,

Anne Marie

From: Laurence, Anne Marie (MNRF)
Sent: August-04-16 4:20 PM
To: 'Ferguson, Brittany'
Subject: RE: Information Request - Barton Street and Fifty Road Improvements

Hi Brittany

The Ministry of Natural Resources and Forestry, Guelph District Office, has reviewed the natural heritage information available for the above-described study area.

We note that the study area includes wetlands that that have been evaluated as non-PSW (i.e., Fifty Mile Creek Wetland Complex).

In addition, please be advised that there are records in the area for the following species at risk (SAR): Barn Owl (endangered), Barn Swallow (threatened), Bobolink (threatened), and Chimney Swift. However, because the province has not been surveyed comprehensively for the presence of listed species, the absence of a record is not an appropriate indicator of the absence of SAR/SAR habitat from an area.

To determine the presence of SAR for a given study area, the District's recommended approach includes the following:

I. Habitat Inventory

MNRF 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 SAR 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 SAR known to occur within the planning area. The list of SAR known to occur in **the City of Hamilton** is attached for your reference. The species-specific COSEWIC status reports (www.cosewic.gc.ca) are a good

source of information on habitat needs and will be helpful in determining the suitability of the study areas ecosites for a given species.

Please note that the Species at Risk in Ontario list (SARO) 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 https://www.ontario.ca/environment-and-energy/species-risk-ontario-list.

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 at http://www.ontario.ca/environment-and-energy/help-protect-species-risk.

SAR 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 SAR 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 SAR was surveyed for, and provide a rationale for why certain species were not afforded a survey (e.g. habitat within the study area is not suitable for a specific SAR). Please note that some targeted surveys may require provincial authorizations.

Other information

We additionally recommend contacting the municipality and the conservation authority to determine if they have any additional information or records of interest for the study area.

I trust the above information is of assistance.

Best regards,

Anne Marie

Anne Marie Laurence
Management Biologist
Ministry of Natural Resources & Forestry
Guelph District
(519) 826-4132

From: Ferguson, Brittany [mailto:brittany.ferguson@amecfw.com]
Sent: June-27-16 11:27 AM
To: Thompson, Melinda (MNRF)
Cc: Rideout, Daryl T; King, Maria E; Young, Rob
Subject: Information Request - Barton Street and Fifty Road Improvements

Hello Melinda,

On behalf of the City of Hamilton, Amec Foster Wheeler would like to request information related to Species at Risk and natural heritage features in the vicinity of the proposed road widening and intersection improvements of Barton Street from Fruitland to Fifty Road, and road widening of Fifty Road.

If you have any questions regarding the attached submittal, please do not hesitate to contact me at the undersigned.

Kind regards,

Brittany Ferguson, B.Sc.

Environmental Biologist
Amec Foster Wheeler
Environment & Infrastructure

160 Traders Blvd, Suite 110
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Hamilton

Date Generated: June-30-16

Amphibian	SARO	Protection	Habitat Information	Timing Windows	Survey Protocol
Jefferson Salamander *Ambystoma jeffersonianum*	END	Species Protection and Habitat Regulation	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	Active: March – October Hibernates: October – March Breeding: Late March - Mid April	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol

Bird	SARO	Protection	Habitat Information	Timing Windows	Survey Protocol
Acadian Flycatcher *Empidonax virescens*	END	Species Protection and General Habitat Protection	Generally requires large areas of mature, undisturbed forest; avoids the forest edge; often found in well wooded swamps and ravines.	Migrate South before Winter	Follow Breeding Bird Survey Protocol
Bald Eagle *Haliaeetus leucocephalus*	SC	N/A	Prefers deciduous and mixed-deciduous forest; and habitat close to water bodies such as lakes and rivers. They roost in super canopy trees such as Pine.	Breed and Nest - April or May Some Migrate South when waterbodies freeze over	Follow Breeding Bird Survey Protocol
Bank Swallow *Riparia riparia*	THR	Species Protection and General Habitat Protection	It nests in a wide variety of naturally and anthropogenically created vertical banks, which often erode and change over time including aggregate pits and the shores of large lakes and rivers.	Migrate South before Winter	Follow Breeding Bird Survey Protocol. Colony and Roost information should be recorded and submitted using Bird Studies Canada's Ontario Bank Swallow Project data forms (2010).
Barn Owl *Tyto alba*	END	Species Protection and Habitat Regulation	Generally prefer low-elevation, open country; often associated with agricultural lands, especially pasture. Nests are located in buildings, hollow trees and cavities in cliffs.	Active Year Round Some leave for the Winter	Follow Breeding Bird Survey Protocol Night surveys may be helpful as they are very vocal
Barn Swallow *Hirundo rustica*	THR	Species Protection and General Habitat Protection	Prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	Migrate South before Winter	Follow Breeding Bird Survey Protocol

Black Tern *Chlidonias niger*	SC	N/A	Generally prefer freshwater marshes and wetlands; nest either on floating material in a marsh or on the ground very close to water	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Bobolink *Dolichonyx oryzivorus*	THR	Species Protection and General Habitat Protection	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands	Migrate South for the Winter	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Canada Warbler *Cardellina canadensis*	SC	N/A	Generally prefers wet coniferous, decidiuous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest.	Arrive in Early May Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Cerulean Warbler *Setophaga cerulea*	THR	Species Protection and General Habitat Protection	Generally found in mature deciduous forests with an open understorey; also nests in older, second-growth deciduous forests.	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Chimney Swift *Chaetura pelagica*	THR	Species Protection and General Habitat Protection	Historically found in deciduous and coniferous, usually wet forest types, all with a well developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys	Nesting - Late April to Mid-May Migrate South in September or Early October	Chimney Swift Monitoring Protocol. Bird Studies Canada, March 2009
Common Nighthawk *Chordeiles minor*	SC	N/A	Generally prefer open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nest on flat roof-tops).	Migrate South for the Winter	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol

Eastern Meadowlark *Sturnella magna*	THR	Species Protection and General Habitat Protection	Generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps.	Migrate South for the Winter	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Eastern Whip-poor-will *Caprimlugus vociferus*	THR	Species Protection and General Habitat Protection	Generally prefer semi-open deciduous forests or patchy forests with clearings; areas with little ground cover are also preferred; In winter they occupy primarily mixed woods near open areas.	Nesting: May - July	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Eastern Wood-Pewee *Contopus virens*	SC	N/A	Associated with deciduous and mixed forests. Within mature and intermediate age stands it prefers areas with little understory vegetation as well as forest clearings and edges.	Migrate South for the Winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Golden-winged Warbler *Vermivora chrysoptera*	SC	N/A	Generally prefer areas of early successional vegetation, found primarily on field edges, hydro or utility right-of-ways, or recently logged areas.	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Henslow's Sparrow *Ammodramus henslowii*	END	Species Protection and General Habitat Protection	Generally found in old fields, pastures and wet meadows. They prefer areas with dense, tall grasses, and thatch, or decaying plant material	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
King Rail *Rallus elegans*	END	Species Protection and General Habitat Protection	Generally this species requires large marshes with open shallow water that merges with shrubby areas	Breed from Late April to mid-May Migrate South for the Winter	Follow Marsh Monitoring Protocol.
Least Bittern *Ixobrychus exilis*	THR	Species Protection and General Habitat Protection	Generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants	Migrate South for the Winter	Follow Marsh Monitoring Protocol; 10 day window of male calling (variable timing). Does not respond well to playback. Very difficult to detect.

Louisiana Waterthrush *Seiurus motacilla*	SC	N/A	Generally inhabits mature forests along steeply sloped ravines adjacent to running water. It prefers clear, cold streams and densely wooded swamps	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Peregrine Falcon *Falco peregrinus*	SC	N/A	Generally nest on tall, steep cliff ledges adjacent to large waterbodies; some birds adapt to urban environments and nest on ledges of tall buildings, even in densely populated downtown areas.	Active Year Round - Lay Eggs around Easter Hatching occurs around Mother's Day Young fledge around Father's	Visit ideal habitat locations and listen/look for individuals in the vicinity.
Prothonotary Warbler *Protonotaria citrea*	END	Species Protection and General Habitat Protection	Generally found in the dead trees of flooded woodlands or deciduous swamp forests; Carolinia Zone	Migrate South for the Winter Eggs are laid from Late May - Early July	Follow Breeding Bird Survey Protocol
Red-Headed Woodpecker *Melanerpes erythrocephalus*	SC	N/A	Generally prefer open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, as well as along beaver ponds and brooks	Active from May to September	Follow Breeding Bird Survey Protocol
Short-eared Owl *Asio flammeus*	SC	N/A	Generally prefers a wide variety of open habitats, including grasslands, peat bogs, marshes, sand-sage concentrations, old pastures and agricultural fields	Active Year Round	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Wood Thrush *Hylocichla mustelina*	SC	N/A	Nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. Prefers large forest mosaics, but may also nest in small forest fragments.	Migrate South for the Winter Arrive in Ontario in mid to late spring	Follow Breeding Bird Survey Protocol
Yellow-breasted Chat *Icteria virens*	END	Species Protection and General Habitat Protection	Generally prefer dense thickets around wood edges, riparian areas, and in overgrown clearings	Migrate South for the Winter Arrive in Ontario Early May	Follow Breeding Bird Survey Protocol

Fish	SARO	Protection	Habitat Information	Timing Windows	Survey Protocol
American Eel *Anguilla rostrata*	END	Species Protection and General Habitat Protection	All fresh water, estuaries and coastal marine waters that are accessible to the Atlantic Ocean; 12-mile Creek watershed and Lake Ontario	Active Year Round	Electrofishing For information please contact your local MNRF office, CA or DFO
Grass Pickerel *Esox americanus vermiculatus*	SC	N/A	Generally occur in wetlands with warm, shallow water and an abundance of aquatic plants; occur in the St. Lawrence River, Lake Ontario, Lake Erie, and Lake Huron	Spawn from late March to early May	For information please contact your local MNRF office, CA and/or DFO
Redside Dace *Clinostomus elongatus*	END	Species Protection and Habitat Regulation	Generally found in pools and slow-moving areas of small headwater streams with a moderate to high gradient	Spawning occurs in May	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Silver Shiner *Notropis photogenis*	THR	Species Protection and General Habitat Protection	Generally prefer moderate to large, deep, relatively clear streams with swift currents, and moderate to high gradients	Spawning occurs in May and June	For information please contact your local MNRF office, CA and/or DFO
Insect	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
Monarch Butterfly *Danaus plexippus*	SC	N/A	Exist primarily wherever milkweed and wildflowers exist; abandoned farmland, along roadsides, and other open spaces	Usually migrate south in late September and October	Watch for adults along roadsides and in open fields. Caterpillars feed on milkweeds: Common milkweed grows in open disturbed habitats (fields, roadsides, etc) and swamp milkweed grows in wet habitats (along streams, lakes, marshes) Adults can be spotted from a distance; caterpillars must be looked for carefully on the host plant.
Mottled Duskywing *Erynnis martialis*	END	Species Protection and General Habitat Protection	Generally inhabits a range of grassland, shrubland, and savanna habitats that contain well drained soils and the presence of its host plants Prairie Redroot (Ceanothus herbaceus) or New Jersey Tea (Ceanothus americanus).	Adult butterfly emerges from pupa in late March and early April	Watch for adults near host plants or search for caterpillars on the host plant Adults can be spotted from a distance; caterpillars must be looked for carefully on the host plant.

West Virginia White *Pieris virginiensis*	SC	N/A	Generally prefer moist, deciduous woodlands. The larvae feed only on the leaves of the two-leaved toothwort (Cardamine diphylla), which is a small, spring-blooming plant of the forest floor.	Adult butterfly emerges from pupa in late March; flies only in April and May	Watch for adults within moist, deciduous woodlands Caterpillars feed on the two-leaved toothwort: Toothwort grows in damp, open, rich hardwood woodlands and blooms from April to June. Adults can be spotted from a distance; caterpillars must be searched for carefully by checking host plant
Mammal	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
American Badger *Taxidea taxus*	END	Species Protection and Habitat Regulation	Generally prefers open habitats, whether natural (grasslands) or man-made (agricultural fields, road right-of-ways, golf courses).	Breed: Late Summer Semi-dormant over Winter	Determine if soils are suitable (sandy or loamy) Dens and Woodchuck burrows should be surveyed for use
Eastern Small-footed Myotis *Myotis leibii*	END	Species Protection and General Habitat Protection	Overwintering habitat: Caves and mines that remain above 0 degrees Celsuis Maternal Roosts: primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses and under tree bark.	Hibernates in caves and mines during winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Little Brown Myotis *Myotis lucifugus*	END	Species Protection and General Habitat Protection	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh).	Hibernates during winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Northern Myotis *Myotis septentrionalis*	END	Species Protection and General Habitat Protection	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: Often asssociated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns etc.)	Hibernates during winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol

Tri-coloured Bat *Perimyotis subflavus*	END	Species Protection and General Habitat Protection	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: Can be in trees or dead clusters of leaves or arboreal lichens on trees. May also use barns or similar structures.	Hibernates during winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Woodland Vole *Microtus pinetorum*	SC	N/A	Generally associated with deciduous forests in areas of soft, friable, often sandy soil beneath deep humus, where it can burrow easily.	Active Year Round	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Mollusc	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
Eastern Pondmussel *Ligumia nasuta*	END	Species Protection and General Habitat Protection	Generally inhabit sheltered areas of lakes or slow streams in substrates of fine sand and mud	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. "Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)." Fisheries and Oceans Canada. (2008).
Lilliput *Taxolasma parvum*	END	Species Protection and General Habitat Protection	Found in a variety of habitats including small to large rivers, wetlands, shallows of lakes, ponds and reservoirs. They are common in soft substrates with over 50% of the substrate type comprised of sand and a mud/muck/silt combination. Typically occur with or near Green Sunfish, Bluegill, White Crappie, and Johnny Darter	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. "Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)." Fisheries and Oceans Canada. (2008): Print.
Rainbow Mussel *Villosa iris*	THR	Species Protection and General Habitat Protection	Most abundant in shallow, well-oxygenated reaches of small- to medium-sized rivers and sometimes lakes, on substrates of cobble, gravel, sand and occasionally mud	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. "Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)." Fisheries and Oceans Canada. (2008): Print.
Plant	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**

American Chestnut *Castanea dentata*	END	Species Protection and General Habitat Protection	Found in deciduous forest communities; this tree prefers arid forests with acid and sandy soils.	Flowers occur in Late Spring and Early Summer	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species Perform detailed floristic inventory Look for distinictive fruits on the ground
American Columbo *Frasera caroliniensis*	END	Species Protection and General Habitat Protection	Most commonly associated with open deciduous forested slopes, thickets and clearings; grows in a variety of relatively stable habitats as well as on a wide variety of soils.	Germination and development of the rosette begin in early spring Flowers open in May Fruit production continues	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species Look for spikes from last years flowers
American Ginseng *Panax quinquefolius*	END	Species Protection and General Habitat Protection	Grows in rich, moist, undisturbed and relatively mature deciduous woods in areas of neutral soil (such as over limestone or marble bedrock).	Flowering begins in June and continues until August The fruit develop from July to August and ripen in August and September	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Broad Beech Fern *Phegopteris hexagonoptera*	SC	N/A	Generally inhabits shady areas of beech and maple forests where the soil is moist or wet	The frond of the Broad Beech Fern appears towards the end of May	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Butternut *Juglans cinerea*	END	Species Protection and General Habitat Protection	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows	Flowers from April to June. Fruits reach maturity during the month of September or October	Walk slowly and systematically in grid fashion through suitable habitat pausing every 30 meters for a detailed scan of trees within sight. Areas with dense foliage or many saplings will require a more intensive survey to detect sapling butternut. Use Butternut Health Assessment Protocol if planning on removing trees.
Eastern Flowering Dogwood *Cornus florida*	END	Species Protection and Habitat Regulation	Generally grows in deciduous and mixed forests, in the drier areas of its habitat, although it is occasionally found in slightly moist environments; Also grows around edges and hedgerows	Flowering occurs in mid-May, just as the leaves begin to develop. Fruit turns red at the end of summer.	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species Easiest to detect during Spring when in flower Also look for distinctive bark

Few-flowered Club-rush *Trichophorum planifolium*	END	Species Protection and Habitat Regulation	Generally found in Dry Fresh Oak deciduous forests and Dry Fresh Oak-Maple-Hickory deciduous forests (only found on RBG property).	Plants flower early before the forest canopy	Seaches for this species should only be done in March or April, when the species is most visible Walk slowly and systematically in grid fashion, pausing to scan for plants every 1 meters Distinguishing this species from similar species is difficult
Green Dragon *Arisaema dracontium*	SC	N/A	Generally grows in damp deciduous forests and along streams.	Flowering occurs in May and June	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Hoary Mountain-mint *Pycnanthemum incanum*	END	Species Protection and General Habitat Protection	Oak savannas and prairies, dry sites.	Flowering occurs in July	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Red Mulberry *Morus rubra*	END	Species Protection and General Habitat Protection	Generally grows in moist forest habitats. In Ontario, these include slopes and ravines of the Niagara Escarpment, and sand spits and bottom lands; Can grow in open areas such as hydro corridors	Flowering occurs when leaves emerge in late spring. Fruit emerges in Mid-July.	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from the similar White Mulberry Distinguishing Red Mulberry and the hybrid Red and White Mulberry will require the collection of leaves for generic testing, which requires a 17(2)(b) permit
Spotted Wintergreen *Chimaphila maculata*	END	Species Protection and General Habitat Protection	Generally grow in sandy habitats in dry-mesic oak-pine woods.	Flowering occurs in late July to early August	Watch for the distinct evergreen leaves in suitable habitat May be easiest to search in fall and spring
White Wood Aster *Eurybia divaricata*	THR	Species Protection and General Habitat Protection	Generally grows in open, dry, deciduous forests. It has been suggested that it may benefit from some disturbance, as it often grows along trails.	Flowering occurs in early September, and sets fruit later in the month	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Reptile	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**

Blanding's Turtle *Emydoidea blandingii*	THR	Species Protection and General Habitat Protection	Generally occur in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest 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.	Eggs are laid in June, with hatchlings emerging in late September and early October.	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Eastern Hog-nosed Snake *Heterodon platirhinos*	THR	Species Protection and General Habitat Protection	Generally prefer habitats with sandy, well-drained soil and open vegetative cover, such as open woods, brushland, fields, forest edges and disturbed sites. The species is often found near water.	Mating occurs in spring and in August and early September. Eggs are laid in June. Hatching occurs in late August or early September	In early spring, look for individuals near ideal hibernation sites During egg-laying period (June), look for nesting females in sandy areas in early morning and late evening. Rest of the season, survey intensively and systematically by flipping rocks
Eastern Ribbonsnake *Thamnophis sauritus*	SC	N/A	Generally occur along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting.	Hibernate: October - April Mating: Early Spring Hatching: Early Fall (September)	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Northern Map Turtle *Graptemys geographica*	SC	N/A	Generally inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as rocks and logs) and exposure to the sun for at least part of the day.	Active: At night Hibernate: October - April Hatching: Late August - Early September	Scan shoreline in spring and partially submerged logs/rocks in summer for basking turtles Be aware that map turtles do not allow as close of approach as other turtles before leaving a basking site Snorkel in desired aquatic habitat

Snapping Turtle *Chelydra serpentina*	SC	N/A	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	Nesting: Late May and June Hibernate: October - April	Scan offshore rocks and logs for basking turtles (10am-2pm) Snorkel in desired aquatic habitat Nesting Season: Search known or preferred nesting habitat areas for females
Spiny Softshell *Apalone spinifera*	THR	Species Protection and General Habitat Protection	Generally prefer marshy creeks, swift-flowing rivers, lakes, impoundments, bays, marshy lagoons, ditches and ponds near rivers	Lay eggs in June or July Hibernate over winter	Best time to survey is during nesting season when females are active laying eggs Visual searches should be conducted in appropriate habitat

Harris, Becky

From: McDonell, Lesley <Lesley.McDonell@conservationhamilton.ca>
Sent: Friday, February 17, 2017 1:27 PM
To: Ferguson, Brittany
Cc: Kenny, Darren
Subject: RE: Information Request - Barton Street and Fifty Road Improvements
Attachments: Database agreement_2017.pdf; Birds_STCK 136.pdf; Fifty Creek fisheries Data.pdf; Fifty Creek Fisheries Station Locations.pdf; Herpetofauna_STCK 136.pdf; Leps&Ods_STCK 136.pdf; Mammals_STCK 136.pdf; Plants_STCK 136.pdf

Hi Brittany,

Sorry it has taken a bit of time for me to get back to you. I was reviewing my emails and realized I had pulled all the data together but had not sent it along. Can you please sign, scan and return the second page of the database agreement file to me. Attached is the data for the Fifty Creek Valley ESA (STCK-136). The data is for the entire ESA. It is located on the eastern edge of the study area provided in your information request. We have also included fisheries information for 50 Creek. Please let me know if you have any questions.

Have a great weekend,
Lesley

Lesley McDonell
Terrestrial Ecologist
Hamilton Conservation Authority
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From: Ferguson, Brittany [mailto:
Sent: Thursday, January 19, 2017 11:36 AM
To: Kenny, Darren <Darren.Kenny@conservationhamilton.ca>
Cc: Rideout, Daryl T <Daryl.Rideout@amecfw.com>; Young, Rob <Rob.Young@amecfw.com>
Subject: Information Request - Barton Street and Fifty Road Improvements

Hello Mr. Kenny,

On behalf of the City of Hamilton, Amec Foster Wheeler would like to request any information that Hamilton Region Conservation Authority (HCA) may have pertaining to relevant natural heritage features and Species at Risk in the vicinity of the proposed road widening and improvement project. Details of the proposed works, including mapping of the study area are enclosed in the attached letter.

If you have any questions regarding the attached submittal, please do not hesitate to contact me at the undersigned.

Kind Regards,

Brittany Ferguson, B.Sc.
Environmental Biologist
Amec Foster Wheeler
Environment & Infrastructure

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Year	Species Code	Scientific Name	Common Name	Native Status	City of Hamilton Status	Source
2000	B-AMCR	Corvus brachyrhynchos	American Crow	N		990
2002	B-AMCR	Corvus brachyrhynchos	American Crow	N		1001
2000	B-AMGO	Carduelis tristis	American Goldfinch	N		990
2002	B-AMGO	Carduelis tristis	American Goldfinch	N		1001
2012	B-AMGO	Carduelis tristis	American Goldfinch	N		1002
2002	B-AMKE	Falco sparverius	American Kestrel	N	uncommon	1001
2002	B-AMRO	Turdus migratorius	American Robin	N		1001
2012	B-AMRO	Turdus migratorius	American Robin	N		1002
2012	B-BAOR	Icterus galbula	Baltimore Oriole	N		1002
2000	B-BANS	Riparia riparia	Bank Swallow	N	uncommon	990
2002	B-BANS	Riparia riparia	Bank Swallow	N	uncommon	1001
2012	B-BANS	Riparia riparia	Bank Swallow	N	uncommon	1002
2000	B-BCCH	Poecile atricapillus	Black-capped Chickadee	N		990
2002	B-BCCH	Poecile atricapillus	Black-capped Chickadee	N		1001
2012	B-BCCH	Poecile atricapillus	Black-capped Chickadee	N		1002
2000	B-BLJA	Cyanocitta cristata	Blue Jay	N		990
2002	B-BLJA	Cyanocitta cristata	Blue Jay	N		1001
2002	B-BHCO	Molothrus ater	Brown-headed Cowbird	N		1001
2012	B-BHCO	Molothrus ater	Brown-headed Cowbird	N		1002
2002	B-CEDW	Bombycilla cedrorum	Cedar Waxwing	N		1001
2002	B-CHSW	Chaetura pelagica	Chimney Swift	N	uncommon	1001
2002	B-COGR	Quiscalus quiscula	Common Grackle	N		1001
2012	B-COGR	Quiscalus quiscula	Common Grackle	N		1002
2002	B-COYE	Geothlypis trichas	Common Yellowthroat	N		1001
2012	B-EABL	Sialia sialis	Eastern Bluebird	N	uncommon	1002
2002	B-EAKI	Tyrannus tyrannus	Eastern Kingbird	N		1001
2000	B-EUST	Sturnus vulgaris	European Starling	I		990
2002	B-EUST	Sturnus vulgaris	European Starling	I		1001
2012	B-EUST	Sturnus vulgaris	European Starling	I		1002
2012	B-FISP	Spizella pusilla	Field Sparrow	N		1002
2002	B-GRCA	Dumetella carolinensis	Gray Catbird	N		1001
2012	B-GRCA	Dumetella carolinensis	Gray Catbird	N		1002

Year	Species Code	Scientific Name	Common Name	Native Status	City of Hamilton Status	Source
2002	B-HAWO	Picoides villosus	Hairy Woodpecker	N	uncommon	1001
2002	B-HOFI	Carpodacus mexicanus	House Finch	I		1001
2012	B-HOFI	Carpodacus mexicanus	House Finch	I		1002
2000	B-HOSP	Passer domesticus	House Sparrow	I		990
2002	B-HOWR	Troglodytes aedon	House Wren	N		1001
2012	B-HOWR	Troglodytes aedon	House Wren	N		1002
2002	B-MODO	Zenaida macroura	Mourning Dove	N		1001
2000	B-NOCA	Cardinalis cardinalis	Northern Cardinal	N		990
2002	B-NOCA	Cardinalis cardinalis	Northern Cardinal	N		1001
2012	B-NOCA	Cardinalis cardinalis	Northern Cardinal	N		1002
2012	B-NOFL	Colaptes auratus	Northern Flicker	N		1002
2012	B-OROR	Icterus spurius	Orchard Oriole	N	uncommon	1002
2002	B-PUMA	Progne subis	Purple Martin	N	uncommon	1001
2002	B-RTHA	Buteo jamaicensis	Red-tailed Hawk	N	uncommon	1001
2012	B-RTHA	Buteo jamaicensis	Red-tailed Hawk	N	uncommon	1002
2000	B-RWBL	Agelaius phoeniceus	Red-winged Blackbird	N		990
2002	B-RWBL	Agelaius phoeniceus	Red-winged Blackbird	N		1001
2012	B-RWBL	Agelaius phoeniceus	Red-winged Blackbird	N		1002
2012	B-SAVS	Passerculus sandwichensis	Savannah Sparrow	N		1002
2000	B-SOSP	Melospiza melodia	Song Sparrow	N		990
2002	B-SOSP	Melospiza melodia	Song Sparrow	N		1001
2012	B-SOSP	Melospiza melodia	Song Sparrow	N		1002
2002	B-WAVI	Vireo gilvus	Warbling Vireo	N		1001
2012	B-WAVI	Vireo gilvus	Warbling Vireo	N		1002
2012	B-WIFL	Empidonax traillii	Willow Flycatcher	N		1002
2002	B-YWAR	Dendroica petechia	Yellow Warbler	N		1001
2012	B-YRWA	Dendroica coronata	Yellow-rumped Warbler	N	rare	1002

2002	M-GRSQ	Sciurus carolinensis	Gray Squirrel	N	common	1001
2012	M-MEVO	Microtus pennsylvanicus	Meadow Vole	N	common	1002
2000	M-RACC	Procyon lotor	Raccoon	N	common	990
2002	M-RACC	Procyon lotor	Raccoon	N	common	1001
2000	M-WTDE	Odocoileus virginianus	White-tailed Deer	N	common	990
2002	M-WTDE	Odocoileus virginianus	White-tailed Deer	N	common	1001
2012	M-WTDE	Odocoileus virginianus	White-tailed Deer	N	common	1002
2000	M-WOOD	Marmota monax	Woodchuck	N	common	990

Year	Species Code	Scientific Name	Common Name	Native Status	City of Hamilton Status	Source
2000	H-AMTO	Bufo americanus americanus	Eastern American Toad	N		990
2002	H-EAGA	Thamnophis sirtalis sirtalis	Eastern Garter Snake	N		1001
2000	H-GRFR	Rana clamitans	Green Frog	N		990
2002	H-GRFR	Rana clamitans	Green Frog	N		1001
2002	H-LEFR	Rana pipiens	Northern Leopard Frog	N		1001
2012	H-MICF	Pseudacris triseriata	Western Chorus Frog	N		1002

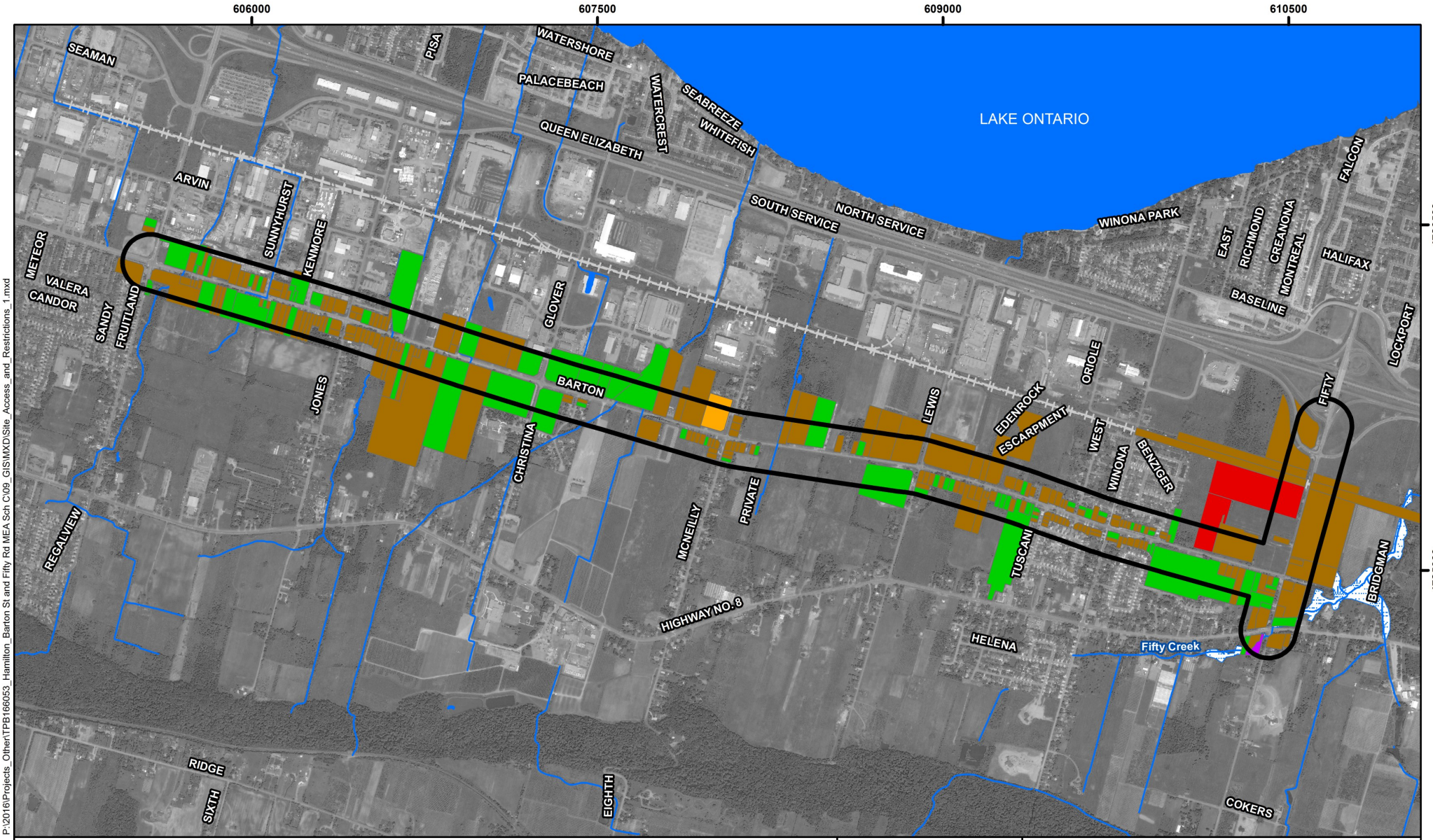
Year	Species Code	Scientific Name	Common Name	Native Status	City of Hamilton Status	Source
2002	L-LESK	Ancyloxypha numitor	Least Skipper	N		1001
2012	L-LESK	Ancyloxypha numitor	Least Skipper	N		1002
2012	L-SUAZ	Celastrina neglecta	Summer Azure	N		1002
2012	L-CORI	Coenonympha tullia	Common Ringlet	N		1002
2002	L-LWSA	Megisto cymela	Little Wood Satyr	N		1001
2012	L-LWSA	Megisto cymela	Little Wood Satyr	N		1002
2000	L-MOCL	Nymphalis antiopa	Mourning Cloak	N		990
2002	L-CAWH	Pieris rapae	Cabbage White	I		1001
2012	L-CAWH	Pieris rapae	Cabbage White	I		1002
2002	L-LODA	Polites mystic	Long Dash	N		1001
2002	L-PESK	Polites peckius	Peck's Skipper	N		1001
2012	L-QUMA	Polygonia interrogationis	Question Mark	N		1002
2002	L-EUSK	Thymelicus lineola	European Skipper	I		1001
2012	L-EUSK	Thymelicus lineola	European Skipper	I		1002
2012	L-READ	Vanessa atalanta	Red Admiral	N		1002
2002	O-GRDA	Anax junius	Common Green Darner	N	common	1001
2002	O-FABL	Enallagma civile	Familiar Bluet	N	common	1001
2002	O-EAPO	Erythemis simplicicollis	Eastern Pondhawk	N	common	1001
2002	O-EAPO	Erythemis simplicicollis	Eastern Pondhawk	N	common	1001
2002	O-EAFO	Ischnura verticalis	Eastern Forktail	N	common	1001
2012	O-EAFO	Ischnura verticalis	Eastern Forktail	N	common	1002
2002	O-COSW	Lestes disjunctus	Northern Spreadwing	N	common	1001
2002	O-COWH	Libellula lydia	Common Whitetail	N	common	1001
2012	O-COWH	Libellula lydia	Common Whitetail	N	common	1002
2002	O-TSSK	Libellula pulchella	Twelve-spotted Skimmer	N	common	1001
2012	O-TSSK	Libellula pulchella	Twelve-spotted Skimmer	N	common	1002
2002	O-BUDA	Pachydiplax longipennis	Blue Dasher	N	common	1001

Year	Species Code	Scientific Name	Common Name	Native Status	City of Hamilton Status	Source
2000	P-ACENEGU	Acer negundo	Manitoba Maple	N		990
2000	P-ACEPLAT	Acer platanoides	Norway Maple	I		990
2000	P-ACESACC	Acer saccharinum	Silver Maple	N		990
2000	P-ALIPLAN	Alisma plantago-aquatica	Water-plantain	N		990
2000	P-ALLPETI	Alliaria petiolata	Garlic Mustard	I		990
2000	P-ARCMIMI	Arctium minus ssp. minus	Common Burdock	I		990
2000	P-ARITRTR	Arisaema triphyllum triphyllum	Jack-in-the-pulpit	N		990
2000	P-BIDCERN	Bidens cernua	Nodding Beggar-ticks	N		990
2000	P-CALSEPI	Calystegia sepium	Hedge Bindweed	N		990
2000	P-CARSTIP	Carex stipata	Awl-fruited Sedge	N		990
2000	P-CAROVAT	Carya ovata	Shagbark Hickory	N		990
2000	P-CHEMAJU	Chelidonium majus	Greater Celandine	I		990
2000	P-CORFORA	Cornus foemina racemosa	Grey Dogwood	N		990
2000	P-CRA__SP	Crataegus sp.	Hawthorn	N		990
2000	P-ECHLOBA	Echinocystis lobata	Wild Cucumber	N		990
2000	P-EQUPRAT	Equisetum pratense	Meadow Horsetail	N	uncommon	990
2000	P-ERIPHPH	Erigeron philadelphicus ssp. Philadelphicus	Philadelphia Fleabane	N		990
2000	P-FRANIGR	Fraxinus nigra	Black Ash	N		990
2000	P-GLEHEDE	Glechoma hederacea	Ground-ivy	I		990
2000	P-HEMFULV	Hemerocallis fulva	Orange Day-lily	I		990
2000	P-HESMATR	Hesperis matronalis	Dame's Rocket	I		990
2000	P-HYDVIRG	Hydrophyllum virginianum	Virginia Waterleaf	N		990
2000	P-IMPCAPE	Impatiens capensis	Spotted Touch-me-not	N		990
2000	P-JUGCINE	Juglans cinerea	Butternut	N		990
2000	P-JUGNIGR	Juglans nigra	Black Walnut	N		990
2000	P-LAPCANA	Laportea canadensis	Wood Nettle	N		990
2000	P-LEMMINO	Lemna minor	Common Duckweed	N		990
2000	P-LIGVULG	Ligustrum vulgare	Privet	I		990
2000	P-LONTATA	Lonicera tatarica	Tartarian Honeysuckle	I		990
2000	P-LYSNUMM	Lysimachia nummularia	Moneywort	I		990
2000	P-MEDLUPU	Medicago lupulina	Black Medick	I		990

Year	Species Code	Scientific Name	Common Name	Native Status	City of Hamilton Status	Source
2000	P-OXA__SP	Oxalis sp.	Wood-sorrel Species	N		990
2000	P-PARINSE	Parthenocissus inserta	Virginia Creeper	N		990
2000	P-POTFOLI	Potamogeton foliosus	Leafy Pondweed	N	rare	990
2000	P-POTPECT	Potamogeton pectinatus	Sago Pondweed	N	common	990
2000	P-PRUPENS	Prunus pensylvanica	Pin Cherry	N		990
2000	P-PRUSERO	Prunus serotina	Wild Black Cherry	N		990
2000	P-RANACRI	Ranunculus acris	Tall Buttercup	N		990
2000	P-RANFIBU	Ranunculus ficaria bulbifera	Lesser Celandine	N		990
2000	P-RHACATH	Rhamnus cathartica	Common Buckthorn	I		990
2000	P-RIBAMER	Ribes americanum	Wild Black Currant	N		990
2000	P-ROBPSEU	Robinia pseudo-acacia	Black Locust	I		990
2000	P-ROSMULT	Rosa multiflora	Multiflora Rose	I		990
2000	P-RUBIDID	Rubus idaeus idaeus	Red Raspberry	I		990
2000	P-SAGLATI	Sagittaria latifolia	Broadleaf Arrowhead	N		990
2000	P-SALNIGR	Salix nigra	Black Willow	N		990
2000	P-SOLDULC	Solanum dulcamara	Climbing Nightshade	I		990
2000	P-TAROFFI	Taraxacum officinale	Common Dandelion	I		990
2000	P-THADIOI	Thalictrum dioicum	Early Meadow-rue	N		990
2000	P-TILAMER	Tilia americana	American Basswood	N		990
2000	P-RHURARY	Toxicodendron rydbergii	Rydberg's Poison-ivy	N		990
2000	P-TUSFARF	Tussilago farfara	Coltsfoot	I		990
2000	P-TYP__SP	Typha sp.	Cattail Species	N		990
2000	P-ULMAMER	Ulmus americana	White Elm	N		990
2000	P-URTDIDI	Urtica dioica dioica	European Stinging Nettle	I		990
2000	P-VALAMER	Vallisneria americana	Tape Grass	N	rare	990
2000	P-VICCRAC	Vicia cracca	Bird Vetch	I		990
2000	P-VITAEST	Vitis aestivalis	Summer Grape	N		990
2000	P-VITRIPA	Vitis riparia	Riverbank Grape	N		990

Appendix B

Site Access and Restrictions



P:\2016\Projects_Other\TPB166053_Hamilton_Barton St and Fifty Rd MEA Sch C\09_GIS\MXD\Site_Access_and_Restrictions_1.mxd

LEGEND

Site Access and Restrictions (for properties along study area)

- Permission Granted
- Notice prior to Land Access
- Possible Conditional Permission Given.
- Permission Denied
- No response rec'd. Required PTE to this property

- Approximate Study Area
- Railway
- Watercourse
- Wetland
- Waterbody

NOTES:
- Aerial Imagery from ESRI, online services.

Hamilton

amec foster wheeler

BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Site Access and Restrictions

Datum & Projection: NAD 1983 UTM Zone 17N

N W E S

PROJECT N°: TPB166053

FIGURE: Appendix B

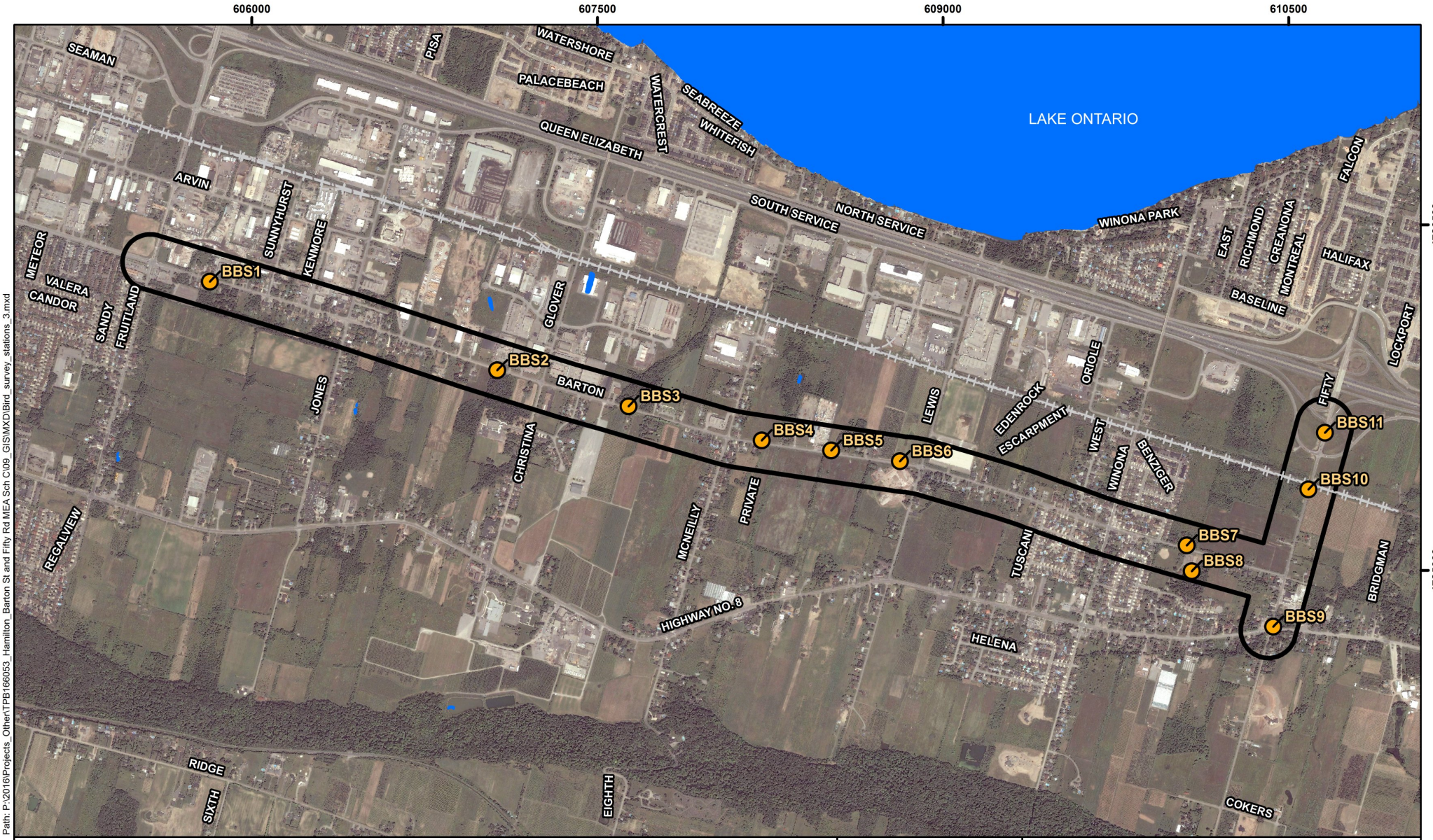
SCALE: 1:23,000

DATE: October 2018

0 0.5 1 1.5 2 Kilometres

Appendix C

Breeding Bird Survey and Anuran Point Count Stations



Path: P:\2016\Projects_Other\TPB166053_Hamilton_Barton St and Fifty Rd MEA Sch C\09_GIS\MXD\Bird_survey_stations_3.mxd

LEGEND

- Approximate Study Area
- Breeding Bird Survey Stations (labelled with ID number)
- Railway
- Waterbody

NOTES:
- Aerial Imagery from ESRI, online services.

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BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Breeding Birds Survey Point Count Stations

Datum & Projection: NAD 1983 UTM Zone 17N

0 0.5 1 1.5 2 Kilometres

N W E S

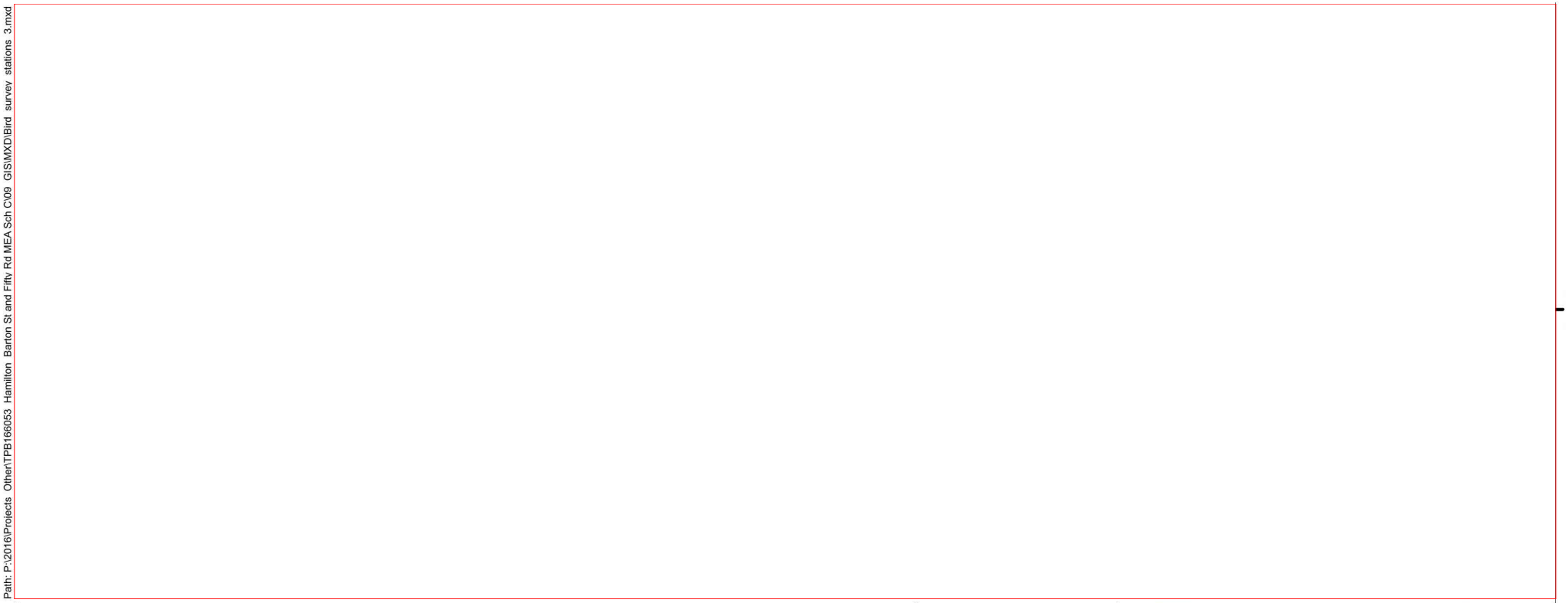
PROJECT N°: TPB166053

FIGURE: Appendix C

SCALE: 1:23,000

DATE: September 2017

Path: P:\2016\Projects Other\TPB166053 Hamilton Barton St and Fifty Rd MEA Sch C\09 GIS\MXD\Bird survey stations 3.mxd



LEGEND

- Amphibian Point Count Stations

NOTES:
- Aerial Imagery from ESRI, online services.

Hamilton

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BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Amphibian **Survey Point Count Stations**

Datum & Projection: NAD 1983 UTM Zone 17N

N W E S

PROJECT N°: TPB166053

FIGURE: Appendix C

SCALE: 1:23,000

DATE: June 2019

Appendix D
Compiled Plant Species List

Compiled Plant Species List[1]

Scientific Name	Common Name	Reginal Rank	Provincial Rank	Global Rank	ESA Status	SARA Status	Source
Acer negundo	Manitoba Maple	N	S5	G5			3
Acer platanoides	Norway Maple	I	SNA	GNR			3
Acer saccharinum	Silver Maple	N	S5	G5			3
Acer X freemanii	Freeman's Maple	--	SNA	GNA			
Alisma plantago-aquatica	Water-plantain	N	S5	G5			3
Alliaria petiolata	Garlic Mustard	I	SNA	GNR			3
Ambrosia artemisiifolia	Annual Ragweed	N	S5	G5			
Arctium minus ssp. minus	Common Burdock	I	SNA	GNR			3
Arisaema dracontium	Green Dragon	H	S3	S5	SC		2
Arisaema triphyllum	Jack-in-the-pulpit	N	S5	G5			3
Asclepias incarnata	Swamp Milkweed	N	S5	G5			
Asclepias syriaca	Common Milkweed	N	S5	G5			
Asparagus officinalis	Garden Asparagus	I	SNA	G5?			
Bacidia trachona	Lichen	--	S1S2	G5			1
Bidens cernua	Nodding Beggarticks	N	S5	G5			3
Bromus inermis	Smooth Brome	I	SNA	G5TNR			
Calystegia sepium	Hedge Bindweed	N	S5	G5T5			3
Carex oligocarpa	Eastern Few-fruited Sedge	H	S3	G4G5			1
Carex stipata	Awl-fruited Sedge	N	S5	G5			3
Carex sp.	Sedge sp.	--	--	--			
Carya ovata	Shagbark Hickory	N	S5	G5			3
Castanea dentata	American Chestnut	h	S1S2	G4	END	END	2
Catalpa speciosa	Northern Catalpa	I	SNA	G4?			
Chelidonium majus	Greater Celandine	I	SNA	GNR			3
Chimaphila maculata	Spotted Wintergreen	H	S2	G5	END	END	2
Cichorium intybus	Chicory	I	SNA	GNR			
Circaea canadensis	Broad-leaved Enchanter's Nightshade	N	S5	G5T5			
Cirsium arvense	Canada Thistle	I	SNA	GNR			
Cornus florida	Eastern Flowering Dogwood	N	S2?	G5	END	END	2
Cornus racemosa	Gray Dogwood	N	S5	G5?			3
Crataegus sp.	Hawthorn sp.	--	--	--			3

Scientific Name	Common Name	Reginal Rank	Provincial Rank	Global Rank	ESA Status	SARA Status	Source
Daucus carota	Wild Carrot	I	SNA	GNR			
Dipsacus fullanum	Common Teasel	I	SNA	GNR			
Echinochloa muricata	Barnyard Grass	H	S4?S5	G5T5			
Echinocystis lobata	Wild Mock-cucumber	N	S5	G5			3
Equisetum pratense	Meadow Horsetail	h	S5	G5			3
Erigeron canadensis	Canada Horseweed	N	S5	G5			
Erigeron philadelphicus	Philadelphia Fleabane	N	S5	G5			3
Eurybia divaricate	White Wood Aster	H	S2S3	G5	THR	THR	2
Euthamia graminifolia	Grass-leaved Goldenrod	N	S5	G5			
Ficaria verna	Fig-root Buttercup	I	SNA	GNR			3
Frasera caroliniensis	American Columbo	H	S2	G5	END	END	2
Fraxinus americana	White Ash	N	S4	G5			
Fraxinus nigra	Black Ash	N	S4	G5			3
Fraxinus pennsylvanica	Red Ash	N	S4	G5			
Geum sp.	Avens sp.	--	--	--			
Glechoma hederacea	Ground Ivy	I	SNA	GNR			3
Glyceria striata	Fowl Mannagrass	N	S5	G5			
Hemerocallis fulva	Orange Daylily	I	SNA	GNA			3
Hesperis matronalis	Dame’s Rocket	I	SNA	G4G5			3
Hydrophyllum virginianum	Virginia Waterleaf	N	S5	G5			3
Hypericum perforatum	Common St. John’s-wort	I	SNA	GNR			
Impatiens capensis	Spotted Touch-me-not	N	S5	G5			3
Inula helenium	Elecampane	I	SNA	GNR			
Juglans cinerea	Butternut	N	S2?	G4	END	END	2,3
Juglans nigra	Black Walnut	N	S4?	G5			3
Lamium sp.	Deadnettle sp.	--	--	--			
Laportea canadensis	Wood Nettle	N	S5	G5			3
Lemna minor	Lesser Duckweed	N	S5	G5			3
Ligustrum vulgare	European Privet	I	SNA	GNR			3
Linaria vulgaris	Butter-and-eggs	I	SNA	GNR			
Lonicera tatarica	Tartarian Honeysuckle	I	SNA	GNR			3
Lonicera sp.	Honeysuckle sp.	--	--	--			
Lysimachia nummularia	Creeping Jennie	I	SNA	GNR			3

Scientific Name	Common Name	Reginal Rank	Provincial Rank	Global Rank	ESA Status	SARA Status	Source
Lythrum salicaria	Purple Loosestrife	I	SNA	G5			
Magnolia acuminata	Cucumber Tree	--	S2	G5	END	END	1
Malus pumila	Common Apple	I	SNA	G5			
Medicago lupulina	Black Medic	I	SNA	GNR			3
Melilotus albus	White Sweet-clover	I	SNA	G5			
Mentha arvensis	Wild Mint	N	S5	G5T5			
Morus alba	White Mulberry	I	SNA	GNR			
Morus rubra	Red Mulberry	H	S2	G5	END	END	2
Oxalis sp.	Wood-sorrel sp.	--	--	--			3
Panax quinquefolius	American Ginseng	H	S2	G3G4	END	END	2
Parthenocissus quinquefolia	Virginia Creeper	N	S4?	G5			3
Phegopteris hexagonoptera	Broad Beech Fern	H	S3	G5	SC		2
Phleum pratense	Timothy	I	SNA	GNR			
Pinus strobus	Eastern White Pine	N	S5	G5			
Pinus sylvestris	Scots Pine	I	SNA	GNR			
Plantago lanceolata	English Plantain	I	SNA	G5			
Plantago major	Common Plantain	I	SNA	G5			
Populus balsamifera	Balsam Poplar	N	S5	G5			
Populus tremuloides	Trembling Aspen	N	S5	G5			
Potamogeton foliosus	Leafy Pondweed	H	S5	G5			3
Prunella vulgaris	Self-heal	I	SNA	G5TU			
Prunus pensylvanica	Pin Cherry	N	S5	G5			3
Prunus serotina	Black Cherry	N	S5	G5			3
Prunus sp.	Cherry sp.	--	--	--			
Pycnanthemum incanum	Hoary Mountain-mint	H	S1	G5	END	END	2
Quercus bicolor	Swamp White Oak	N	S4	G5			
Quercus macrocarpa	Bur Oak	N	S5	G5			
Ranunculus acris	Tall Buttercup	I	SNA	G5			3
Rhamnus cathartica	Common Buckthorn	I	SNA	GNR			3
Rhus typhina	Staghorn Sumac	N	S5	G5			
Ribes americanum	Wild Black Currant	N	S5	G5			3
Robinia pseudoacacia	Black Locust	I	SNA	G5			3
Rosa multiflora	Multiflora Rose	I	SNA	GNR			3

Scientific Name	Common Name	Reginal Rank	Provincial Rank	Global Rank	ESA Status	SARA Status	Source
Rosa sp.	Rose sp.	--	--	--			
Rubus idaeus	Common Red Raspberry	I	SNA	G5T5			3
Rubus occidentalis	Black Raspberry	N	S5	G5			
Sagittaria latifolia	Broad-leaved Arrowhead	N	S5	G5			3
Salix nigra	Black Willow	N	S4	G5			3
Salix x fragilis	Willow hybrid	I	--	--			
Salix sp.	Willow sp.	--	--	--			
Solanum dulcamara	Climbing Nightshade	I	SNA	GNR			3
Solidago altissima	Tall Goldenrod	N	S5	GNR			
Solidago canadensis	Canada Goldenrod	N	S5	G5T5			
Solidago juncea	Early Goldenrod	N	S5	G5			
Sonchus arvensis	Field Sow-thistle	I	SNA	GNRTNR			
Stuckenia pectinata	Sago Pondweed	N	S5	G5			3
Symphyotrichum lanceolatum	White Panicled Aster	N	S5	G5T5			
Symphyotrichum novae-angliae	New England Aster	N	S5	G5			
Syringa vulgaris	Common Lilac	I	SNA	GNR			
Taraxacum officinale	Common Dandelion	I	SNA	G5			3
Thalictrum dioicum	Early Meadow-rue	N	S5	G5			3
Thuja occidentalis	Eastern White Cedar	N	S5	G5			
Tilia americana	American Basswood	N	S5	G5			3
Toxidendron rydbergii	Poison-ivy	N	S5	G5			3
Trichophorum planifolium	Few-flowered Club-rush	H	S1	G4G5	END	END	2
Trifolium arvense	Rabbit-foot Clover	I	SNA	GNR			
Trifolium campestre	Low Hop Clover	I	SNA	GNR			
Tussilago farfara	Colt's-foot	I	SNA	GNR			3
Typha x glauca	Cattail hybrid	--	--	--			
Typha sp.	Cattail sp.	--	--	--			3
Ulmus americana	White Elm	N	S5	G5			3
Ulmus pumila	Siberian Elm	I	SNA	GNR			
Urtica dioica dioica	European Stinging Nettle	I	SNA	G5T5?			3
Uvularia perfoliata	Perfoliate Bellwort	H	S1S2	G5			1
Vallisneria americana	Eel-grass	H	S5	G5			3
Vicia cracca	Tufted Vetch	I	SNA	GNR			3

Scientific Name	Common Name	Reginal Rank	Provincial Rank	Global Rank	ESA Status	SARA Status	Source
Vitis aestivalis	Summer Grape	N	S4	G5			3
Vitis riparia	Riverbank Grape	N	S5	G5			3
--	Grass sp.	--	--	--			

[1] Shaded species are those observed/reported during AMEC 2016 and 2017 site investigations

Source

1 – NHIC species occurrences (MNRF 2017b)

2 – MNRF SAR list for the City of Hamilton (Correspondence, Appendix A)

3 – Hamilton Conservation Authority Correspondence – Natural Areas Inventory (2014)

Regional Rank: I Introduced; N Native (known from more than 10 sites); H Rare (known from 5 or fewer sites); h Uncommon (known from 6-10 sites)

Provincial Rank: S1 Extremely Rare; S2 Very Rare; S3 Rare to Uncommon; S4 Common and Apparently Secure; S5 Very Common and Demonstrably Secure; SNA Not Applicable/Provincially non-native, not suitable target for conservation activities; U Unrankable (data deficient)

Global Rank: G4 Apparently Secure; G5 Secure; T rank applies to a subspecies or variety; NR Not Ranked (not yet assessed); NA Not Applicable (not suitable target for conservation activities); U Unrankable (data deficient)

Appendix E
Compiled Wildlife Species List

Compiled Wildlife Species List[1]

Scientific Name	Common Name	Regional Rank	S-Rank	G-Rank	ESA** Status	SARA * Status	Source
BIRDS							
Phasianus colchicus	Ring-necked Pheasant	R (I)	SNA	G5			1
Meleagris gallopavo	Wild Turkey	C	S5	G5			1
Branta canadensis	Canada Goose	C	S5	G5			1
Cygnus olor	Mute Swan	R (I)	SNA	G5			1
Aix sponsa	Wood Duck	U	S5	G5			1
Anas strepera	Gadwall	R	S4	G5			1
Anas platyrhynchos	Mallard [α]	C	S5	G5			1
Anas discors	Blue-winged Teal	R	S4	G5			1
Phalacrocorax auritus	Double-crested Cormorant	A	S5B	G5			
Ardea Herodias	Great Blue Heron	U	S4	G5			1
Butorides virescens	Green Heron	U	S4B	G5			1
Ixobrychus exilis	Least Bittern	R	S4B	G5	THR	THR	5*
Cathartes aura	Turkey Vulture	U	S5B	G5			1
Circus cyaneus	Northern Harrier [α]	R	S4B	G5			1
Accipiter striatus	Sharp-shinned Hawk	R	S5	G5			1
Accipiter cooperii	Cooper's Hawk	U	S4	G5			1
Buteo jamaicensis	Red-tailed Hawk	C	S5	G5			1,6
Falco peregrinus	Peregrine Falcon	R	S3B	G4	SC	SC	5*
Falco sparverius	American Kestrel [α]	U	S4	G5			1,6
Haliaeetus leucocephalus	Bald Eagle	R	S2N,S4B	G5	SC		5*
Rallus limicola	Virginia Rail	U	S5B	G5			1
Rallus elegans	King Rail	E	S2B	G4	END	END	5*
Porzana carolina	Sora	U	S4B	G5			1
Charadrius vociferus	Killdeer	A	S5B, S5N	G5			1
Actitis macularius	Spotted Sandpiper	C	S5	G5			1
Bartramia longicauda	Upland Sandpiper	R	S4B	G5			1
Calidris pusilla	Semipalmated Sandpiper	--	S3B, S4N	G5			
Tringa flavipes	Lesser Yellowlegs	--	S4B, S4N	G5			
Gallinago delicata	Wilson's Snipe	R	S5B	G5			1
Scolopax minor	American Woodcock	C	S4B	G5			1
Larus delawarensis	Ring-billed Gull	A	S5B, S4N	G5			1
Hydroprogne caspia	Caspian Tern	C	S3B	G5			
Sterna hirundo	Common Tern	C	S4B	G5			1
Chlidonias niger	Black Tern	E	S3B	G4	SC		5*
Columba livia	Rock Pigeon	A (I)	SNA	G5			1

Scientific Name	Common Name	Regional Rank	S-Rank	G-Rank	ESA** Status	SARA * Status	Source
Zenaida macroura	Mourning Dove	A	S5	G5			1,6
Coccyzus americanus	Yellow-billed Cuckoo	R	S4B	G5			1
Coccyzus erythropthalmus	Black-billed Cuckoo [α]	U	S5B	G5			1
Megascops asio	Eastern Screech-Owl	U	S4	G5			1
Bubo virginianus	Great Horned Owl	C	S4	G5			1
Asio flammeus	Short-eared Owl [α]	R	S2N, S4B	G5	SC	SC	1,5*
Tyto alba	Barn Owl	E	S1	G5	END	END	5
Chaetura pelagica	Chimney Swift [α]	U	S4B, S4N	G5	THR	THR	1,5,6
Chordeiles minor	Common Nighthawk	R	S4B	G5	SC	THR	5*
Caprimulugus vociferous	Eastern Whip-poor-will	R	S4B	G5	THR	THR	5*
Archilochus colubris	Ruby-throated Hummingbird	U	S5B	G5			1
Megaceryle alcyon	Belted Kingfisher [α]	U	S4B	G5			1
Melanerpes erythrocephalus	Red-headed Woodpecker [α]	R	S4B	G5	SC	THR	1,5*
Melanerpes carolinus	Red-bellied Woodpecker	U	S4	G5			1
Picoides pubescens	Downy Woodpecker	C	S5	G5			1
Picoides villosus	Hairy Woodpecker	U	S5	G5			1,6
Colaptes auratus	Northern Flicker [α]	C	S4B	G5			1,6
Dryocopus pileatus	Pileated Woodpecker	U	S5	G5			1
Contopus virens	Eastern Wood-Pewee [α]	C	S4B	G5	SC		1,5*
Empidonax virescens	Acadian Flycatcher	R	S2S3B	G5	END	END	5*
Empidonax alnorum	Alder Flycatcher	U	S5B	G5			1
Empidonax traillii	Willow Flycatcher [α]	C	S5B	G5			1,6
Empidonax minimus	Least Flycatcher	U	S4B	G5			1
Sayornis phoebe	Eastern Phoebe	U	S5B	G5			1
Myiarchus crinitus	Great Crested Flycatcher	C	S4B	G5			1
Tyrannus tyrannus	Eastern Kingbird [α]	A	S4B	G5			1,6
Vireo gilvus	Warbling Vireo	C	S5B	G5			1,6
Vireo olivaceus	Red-eyed Vireo	C	S5B	G5			1
Cyanocitta cristata	Blue Jay	A	S5	G5			1,6
Corvus bracyrhynchos	American Crow	C	S5B	G5			1,6
Bombycilla cedrorum	Cedar Waxwing	C	S5B	G5			1,6
Poecile atricapillus	Black-capped Chickadee	A	S5	G5			1,6
Eremophila alpestris	Horned Lark	C	S5B	G5			1
Progne subis	Purple Martin	U	S4B	G5			1,6
Tachycineta bicolor	Tree Swallow	A	S4B	G5			1
Stelgidopteryx serripennis	Northern Rough-winged Swallow	C	S4B	G5			1
Riparia riparia	Bank Swallow [α]	U	S4B	G5	THR		1,5*,6
Petrochelidon pyrrhonota	Cliff Swallow	U	S4B	G5			

Scientific Name	Common Name	Regional Rank	S-Rank	G-Rank	ESA** Status	SARA * Status	Source
Hirundo rustica	Barn Swallow	C	S4B	G5	THR		1,5
Baeolophus bicolor	Tufted Titmouse	R	S4	G5			1
Sitta canadensis	Red-breasted Nuthatch	U	S5	G5			1
Sitta carolinensis	White-breasted Nuthatch	C	S5	G5			1
Thryothorus ludovicianus	Carolina Wren	R	S4	G5			1
Troglodytes aedon	House Wren	C	S5B	G5			1,6
Troglodytes hiemalis	Winter Wren	U	S5B	G5			1
Cistothorus platensis	Sedge Wren	R	S4B	G5			1
Cistothorus palustris	Marsh Wren	U	S4B	G5			1
Polioptila caerulea	Blue-gray Gnatcatcher	U	S4B	G5			1
Dumetella carolinensis	Gray Catbird	A	S4B	G5			1,6
Mimus polyglottos	Northern Mockingbird	U	S4	G5			1
Toxostoma rufum	Brown Thrasher [α]	U	S4B	G5			1
Sturnus vulgaris	European Starling	A (I)	SNA	G5			1,6
Sialia sialis	Eastern Bluebird	U	S5B	G5			1,6
Catharus fuscescens	Veery	C	S4B	G5			1
Hylocichla mustelina	Wood Thrush [α]	C	S4B	G4	SC		1,5*
Turdus migratorius	American Robin	A	S5B	G5			1,6
Passer domesticus	House Sparrow	A (I)	SNA	G5			1,6
Haemorhous mexicanus	House Finch	A (I)	SNA	G5			1,6
Spinus tristis	American Goldfinch	A	S5B	G5			1,6
Seiurus aurocapilla	Ovenbird	C	S4B	G5			1
Seiurus motacilla	Louisiana Waterthrush	R	S3B	G5	THR	SC	5*
Vermivora chrysoptera	Golden-winged Warbler	R	S4B	G4	SC	THR	5*
Vermivora sp.	Blue/Golden-winged Warbler [α]	R / U					1
Setophaga cerulean	Cerulean Warbler	R	S3B	G4	THR	SC	5*
Geothlypis trichas	Common Yellowthroat	C	S5B	G5			1,6
Setophaga citrina	Hooded Warbler [α]	R	S4B	G5		THR	1
Setophaga ruticilla	American Redstart	U	S5B	G5			1
Protonotaria citrea	Prothonotary Warbler	R	S1B	G5	END	END	1,5*
Setophaga petechia	Yellow Warbler	A	S5B	G5			1,6
Setophaga coronate	Yellow-rumped Warbler	R	S5B	G5			6
Setophaga pensylvanica	Chestnut-sided Warbler	U	S5B	G5			1
Setophaga caerulescens	Black-throated Blue Warbler	R	S5B	G5			1
Cardellina canadensis	Canada Warbler [α]	R	S4B	G5	SC	THR	1,5*
Icteria virens	Yellow-breasted Chat	R	S2B	G5	END	SC	5*
Dolichonyx oryzivorus	Bobolink [α]	U	S4B	G5	THR		1,4,5
Agelaius phoeniceus	Red-winged Blackbird	A	S4	G5			1,6

Scientific Name	Common Name	Regional Rank	S-Rank	G-Rank	ESA** Status	SARA * Status	Source
Sturnella magna	Eastern Meadowlark α	U	S4B	G5	THR		1,5*
Quiscalus quiscula	Common Grackle	A	S5B	G5			1,6
Molothrus ater	Brown-head Cowbird	A	S4B	G5			1,6
Icterus spurius	Orchard Oriole	U	S4B	G5			1,6
Icterus galbula	Baltimore Oriole α	C	S4B	G5			1,6
Pipilo erythrophthalmus	Eastern Towhee α	U	S4B	G5			1
Spizella passerine	Chipping Sparrow	A	S5B	G5			1
Spizella pusilla	Field Sparrow α	C	S4B	G5			1,6
Pooecetes gramineus	Vesper Sparrow α	U	S4B	G5			1
Passerculus sandwichensis	Savannah Sparrow α	A	S4B	G5			1,6
Ammodramus savannarum	Grasshopper Sparrow α	U	S4B	G5	SC		1
Ammodramus henslowii	Henslow's Sparrow	E	SHB	G4	END	END	5*
Melospiza melodia	Song Sparrow	A	S5B	G5			1,6
Melospiza georgiana	Swamp Sparrow	C	S5B	G5			1
Cardinalis cardinalis	Northern Cardinal	A	S5	G5			1,6
Pheucticus ludovicianus	Rose-breasted Grosbeak α	C	S4B	G5			1
Passerina cyanea	Indigo Bunting	C	S4B	G5			1
Piranga olivacea	Scarlet Tanager	U	S4B	G5			1
MAMMALS							
Didelphis virginiana	Virginia Opossum	C	S4	G5			2
Mamota monax	Woodchuck	C	S5	G5			2,6
Sciurus carolinensis	Eastern Gray Squirrel	C	S5	G5			2,6
Tamias striatus	Eastern Chipmunk	C	S5	G5			2
Tamiasciurus hudsonicus	Red Squirrel	C	S5	G5			2
Castor Canadensis	Beaver	C	S5	G5			2
Napaeozapus insignis	Woodland Jumping Mouse	U	S5	G5			2
Zapus hudsonius	Meadow Jumping Mouse	C	S5	G5			2
Microtus pinetorum	Woodland Vole	R	S3?	G5	SC	SC	5*
Microtus pennsylvanicus	Meadow Vole	C	S5	G5			2,6
Ondatra zibethicus	Muskrat	C	S5	G5			2
Peromyscus leucopus	White-footed Mouse	C	S5	G5			2
Peromyscus maniculatus	Deer Mouse	C	S5	G5			2
Rattus norvegicus	Norway Rat	C (I)	SNA	G5			2
Erethizon dorsatum	Porcupine	C	S5	G5			2
Lepus europaeus	European Hare	C (I)	SNA	G5			2
Sylvilagus floridanus	Eastern Cottontail	C	S5	G5			2
Blarina brevicauda	Northern Short-tailed Shrew	C	S5	G5			2
Sorex cinereus	Common Shrew	C	S5	G5			2

Scientific Name	Common Name	Regional Rank	S-Rank	G-Rank	ESA** Status	SARA * Status	Source
Sorex fumeus	Smoky Shrew	C	S5	G5			2
Condylura cristata	Star-nosed Mole	C	S5	G5			2
Parascalops breweri	Hairy-tailed Mole	U	S4	G5			2
Eptesicus fuscus	Big Brown Bat	?	S4	G5			2*
Lasionycteris noctivagans	Silver-haired Bat	?	S4	G3G4			2*
Lasiurus borealis	Eastern Red Bat	?	S4	G3G4			2*
Lasiurus cinereus	Hoary Bat	?	S4	G3G4			2*
Myotis leibii	Eastern Small-footed Myotis	--	S2S3	G4	END		2*,5*
Myotis lucifuga	Little Brown Myotis	?	S4	G3	END	END	2*,5*
Myotis septentrionalis	Northern Long-eared Myotis	?	S3	G1G2	END	END	2*,5*
Perimyotis subflavus	Tri-colored Bat	--	S3?	G2G3	END	END	2*,5*
Canis latrans	Coyote	C	S5	G5			2
Vulpes vulpes	Red Fox	C	S5	G5			2
Mustela ermine	Ermine	R / U	S5	G5			2
Mustela frenata	Long-tailed Weasel	C	S4	G5			2
Neovison vison	American Mink	C	S4	G5			2
Taxidea taxus	American Badger	R	S2	G5	END	END	5*
Mephitis mephitis	Striped Skunk	C	S5	G5			2
Procyon lotor	Raccoon	C	S5	G5			2,6
Odocoileus virginianus	White-tailed Deer	C	S5	G5			2,6
AMPHIBIANS							
Anaxyrus americanus	American Toad	A	S5	G5			3,6
Hyla versicolor	Gray Treefrog	A	S5	G5			3*
Pseudacris crucifer	Spring Peeper	A	S5	G5			3
Pseudacris maculata	Western Chorus Frog (Great Lakes / St. Lawrence –Canadian Shield population)	C	S3	G5TNR		THR	3,6
Lithobates catesbeiana	American Bullfrog	U	S4	G5			3*
Lithobates clamitans	Green Frog	A	S5	G5			3,6
Lithobates pipiens	Northern Leopard Frog	A	S5	G5			3,6
Lithobates sylvatica	Wood Frog	C	S5	G5			3
Ambystoma laterale	Blue-spotted Salamander	R	S4	G5			3*
Ambystoma hybrid	Jefferson x Blue-spotted Salamander Complex	R	--	--			3
Ambystoma jeffersonianum	Jefferson Salamander	R	S2	G4	END	END	3*, 5*
Ambystoma maculatum	Spotted Salamander	R	S4	G5			3*
Plethodon cinereus	Eastern Red-backed Salamander	C	S5	G5			3
Notophthalmus viridescens	Red-spotted Newt	R	S5	G5T5			3
REPTILES							

Scientific Name	Common Name	Regional Rank	S-Rank	G-Rank	ESA** Status	SARA * Status	Source
Chelydra serpentina	Snapping Turtle	C	S3	G5	SC	SC	3,5*
Chrysemys picta marginata	Midland Painted Turtle	C	S4	G5T5			3
Emydoidea blandingii	Blanding's Turtle	R	S3	G4	THR	THR	3*,5*
Graptemys geographica	Northern Map Turtle	R	S3	G5	SC	SC	5*
Apalone spinifera	Spiny Softshell	R	S3	G5	END	THR	5*
Sternotherus odoratus	Eastern Musk Turtle	R	S3	G5	SC	THR	3*
Lampropeltis Triangulum	Eastern Milksnake	U	S4	G5		SC	3,4
Nerodia sipedon	Northern Watersnake	R	S5	G5T5			3*
Hereodon platirhinos	Eastern Hog-nosed Snake	--	S3	G5	THR	THR	5*
Opheodrys vernalis	Smooth Greensnake	R	S4	G5			3*
Storeria dekayi	DeKay's Brownsnake	U	S5	G5			3
Storeria occipitomaculata	Red-bellied Snake	R	S5	G5			3
Thamnophis sauritus	Eastern Ribbonsnake	R	S4	G5	SC	SC	5*
Thamnophis sirtalis sirtalis	Eastern Gartersnake	A	S5	G5T5			3,6
Crotalus horridus	Timber Rattlesnake	E	SX	G4	EXP	EXP	4
INVERTEBRATES							
Anax junius	Common Green Darner	C	S5	G5			6
Ancyloxypha numitor	Least Skipper	C	S5	G5			6
Celastrina neglecta	Summer Azure	C	S5	G5			6
Coenonympha tullia	Common Ringlet	C	S5	G5			6
Danaus plexippus	Monarch	C	S2N, S4B	G4	SC	SC	5*
Enallagma civile	Familiar Bluet	C	S5	G5			6
Erynnis martialis	Mottled Duskywing	R	S2	G3	END		5*
Erythemis simplicicollis	Eastern Pondhawk	C	S5	G5			6
Ischnura verticalis	Eastern Forktail	C	S5	G5			6
Lestes disjunctus	Northern Spreadwing	C	S5	G5			6
Plathemis Lydia	Common Whitetail	C	S5	G5			6
Libellula pulchella	Twelve-spotted Skimmer	C	S5	G5			6
Megisto cymela	Little Wood Satyr	C	S5	G5			6
Nymphalis antiopa	Mourning Cloak	C	S5	G5			6
Pachydiplax longipennis	Blue Dasher	C	S5	G5			6
Pieris rapae	Cabbage White	C (I)	SNA	G5			6
Pieris virginiensis	West Virginia White	U	S3	G3?	SC		5*
Polites mystic	Long Dash Skipper	C	S5	G5			6
Polites peckius	Peck's Skipper	C	S5	G5			6
Polygonia interrogationis	Question Mark	C	S5	G5			6
Stylurus spiniceps	Arrow Clubtail	--	S2	G5			4
Thymelicus lineola	European Skipper	C (I)	SNA	G5			6

Scientific Name	Common Name	Regional Rank	S-Rank	G-Rank	ESA** Status	SARA * Status	Source
Vanessa atalanta	Red Admiral	C	S5	G5			6

[1] Shaded species are those observed/reported during AMEC 2016 and 2017 site investigations

Source
1 - Second (2001-2005) Atlas of the Breeding Birds of Ontario (Cadman et al. 2007)
2 - Atlas of the Mammals of Ontario (Dobbyn 1994; Species reported in the vicinity during 1970 – 1993); Bat data supplemented by Bat Conservation International (*) (BCI 2017).
3 - Ontario Reptile & Amphibian Atlas (Ontario Nature 2016); * Historical records greater than 20 years prior
4 – NHIC species occurrences (MNRF 2017b)
5 – MNRF SAR Correspondence; * MNRF SAR list for the City of Hamilton (Appendix A)
6 – Hamilton Conservation Authority Correspondence – Natural Areas Inventory (NAI) 2014

**SARA* = Species at Risk Act
***ESA* = Endangered Species at Risk Act
[α] Indicates "priority species" as listed by Ontario Partners in Flight 2008

Birds Regional Rank: E Extirpated; R Rare (1 - 20 estimated breeding pairs in City of Hamilton); U Uncommon (21 - 200 estimated breeding pairs in City of Hamilton); C Common (201 - 1000 estimated breeding pairs in City of Hamilton); A Abundant (> 1000 estimated breeding pairs in City of Hamilton); I Introduced

Mammals Regional Rank: E Extirpated; R Rare (species recorded from 1 or 2 sites); U Uncommon (species recorded from 3 or 4 sites); C Common (species recorded at more than 4 sites); ? Uncertain; I Introduced

Herpetofauna Regional Rank: E Extirpated; R Rare (species recorded within 1 – 10 natural areas within the last 20 years); U Uncommon (species recorded within 11 – 25 natural areas within the last 20 years); C Common (species recorded within 26 to 200 squares, for species in fewer than 26 squares all records were examined and the number of occurrences was used to determine status); A Abundant (species recorded in more than 200 squares)

Invertebrates Regional Rank: R Rare (species recorded from 5 or fewer stations); U Uncommon (species recorded from 6 – 15 stations); C Common (species recorded at more than 15 stations)

Provincial Rank: S1 Extremely Rare; S2 Very Rare; S3 Rare to Uncommon; S4 Common and Apparently Secure; S5 Very Common and Demonstrably Secure; SNA Not Applicable/Provincially non-native, not suitable target for conservation activities; S#B Breeding; S#N Non-breeding

Global Rank: G1 Critically Imperiled; G2 Imperiled; G3 Vulnerable; G4 Apparently Secure; G5 Secure; T rank applies to a subspecies or variety; NR Not Ranked

SARA/*ESA* Designation: END Endangered, THR Threatened, SC Special Concern

Appendix F
Results of the Breeding Bird Survey and Amphibian Survey Data Sheets

Breeding Bird Point Count Survey Results

Bird Species		Breeding Bird Survey Station										
		1	2	3	4	5	6	7	8	9	10	11
American Crow	*Corvus brachyrhynchos*		X	X		X				X		
American Goldfinch	*Spinus tristis*	X	X	X	X	X	X	X	X	X	X	X
American Robin	*Turdus migratorius*	X	X	X	X	X	X	X	X	X	X	X
Baltimore Oriole*	*Icterus galbula*			X				X				
Bank Swallow*	*Riparia riparia*		X				X	X			X	X
Barn Swallow	*Hirundo rustica*	X	X	X		X	X				X	
Black-capped Chickadee	*Poecile atricapillus*	X								X		
Blue Jay	*Cyanocitta cristata*	X	X		X	X		X	X	X	X	
Brown-headed Cowbird	*Molothrus ater*		X		X	X	X				X	
Caspian Tern	*Hydroprogne caspia*							X				
Cedar Waxwing	*Bombycilla cedrorum*	X		X	X	X	X			X	X	
Chipping Sparrow	*Spizella passerina*			X					X			
Cliff Swallow	*Petrochelidon pyrrhonota*				X							
Common Grackle	*Quiscalus quiscula*	X	X	X	X	X	X	X	X		X	X
Double-crested Cormorant	*Phalacrocorax auritus*		X									
Downy Woodpecker	*Picoides pubescens*	X		X		X		X	X			
Eastern Kingbird*	*Tyrannus tyrannus*			X		X					X	
Eastern Meadowlark*	*Sturnella magna*				X						X	X
European Starling	*Sturnus vulgaris*	X	X	X	X	X	X	X	X	X	X	X
Field Sparrow*	*Spizella pusilla*	X										
Gray Catbird	*Dumetella carolinensis*		X	X				X		X	X	
Green Heron	*Butorides virescens*					X						
Horned Lark	*Eremophila alpestris*					X	X					
House Sparrow	*Passer domesticus*	X	X	X	X	X	X	X	X	X		
House Wren	*Troglodytes aedon*			X		X			X	X		
Indigo Bunting	*Passerina cyanea*										X	X
Killdeer	*Charadrius vociferus*	X	X	X	X	X	X	X	X			X
Mourning Dove	*Zenaida macroura*	X	X	X	X		X	X	X	X	X	X
Northern Cardinal	*Cardinalis cardinalis*	X		X	X	X	X	X	X	X	X	
Northern Flicker*	*Colaptes auratus*			X								
Northern Mockingbird	*Mimus polyglottos*				X							
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*				X	X						
Orchard Oriole	*Icterus spurius*					X						
Purple Martin	*Progne subis*							X	X			
Red-winged Blackbird	*Agelaius phoeniceus*		X	X	X	X	X	X			X	X
Ring-billed Gull	*Larus delawarensis*	X	X		X		X					X
Rock Pigeon	*Columba livia*				X	X	X					X
Savannah Sparrow*	*Passerculus sandwichensis*		X		X	X	X				X	X
Sharp-shinned Hawk	*Accipiter striatus*			X				X				
Song Sparrow	*Melospiza melodia*	X	X	X	X	X	X	X		X	X	X
Tree Swallow	*Tachycineta bicolor*	X				X						
Warbling Vireo	*Vireo gilvus*			X	X							
Willow Flycatcher*	*Empidonax traillii*				X							
Yellow Warbler	*Setophaga petechia*	X			X					X	X	X

* Indicates “priority species” as listed by Ontario Partners in Flight 2008

Anuran breeding survey results (2019)

Date 2019	Weather	Survey Point Count Locations											
		1	2	3	4	5	6	7	8	9	10	11	12
April 8	11°C Clear – no wind	No calls	WCF – 2 Lvl.1	WCF – 1 Lvl.1	WCF – 6 Lvl.1	No calls	No calls	WCF – 3 Lvl.1	No calls	No calls	No calls	No calls	No calls
May 6	19°C – cloudy – no wind	No calls	No calls	No calls	WCF – 1 Lvl.1	No calls	No calls	WCF – 1 Lvl.1	No calls	No calls	No calls	No calls	WCF – 1 Lvl.1 SPPE -1 Lvl.1
June 11	20°C – clear – no wind	No calls	No calls	No calls	AT-1 Lvl.1	No calls	No calls	AT – 1 Lvl.1	No calls	No calls	GTF -1 AT – 1 Lvl.1	No calls	No calls

Note: WCF: Western Chorus Frog, Lvl; Level/Code 1: Calls not simultaneous, number of individuals can be accurately counted; AT: American Toad.

Appendix G
Photo Appendix

Photo 1: Cultural Meadow (CUM1-1)

Photo 2: Buckthorn Deciduous Shrub Thicket (THDM2-6)

Photo 3: Fresh-Moist Deciduous Woodland Ecosite (WODM5)

Photo 4: Stream within Deciduous Woodland Ecosite (WODM5)

Photo 5: Fresh-Moist Green Ash Hardwood Lowland Deciduous Forest (FOD7-2)

Photo 6: Fresh-Moist Willow Lowland Deciduous Forest (FOD7-3)

Photo 7: Fresh-Moist Shagbark Hickory Deciduous Forest (FOD9-4)

Photo 8: Swamp White Oak Mineral Deciduous Swamp (SWD1-1)

Aquatic Habitat Existing Conditions & Preliminary Impact Assessment Report (Final)

Class Environmental Assessment – Improvements to Barton Street and Fifty Road
The City of Hamilton
TPB166053

Prepared for:

The City of Hamilton

71 Main Street West, 6th Floor, Hamilton, Ontario, Canada, L8R 4Y5

April 2021

Aquatic Habitat Existing Conditions & Preliminary Impact Assessment Report (Final)

Class Environmental Assessment – Improvements to Barton Street and Fifty Road
TPB166053

Prepared for:

The City of Hamilton
71 Main Street West, 6th Floor, Hamilton, Ontario, Canada, L8R 4Y5

Prepared by:

Wood Environment & Infrastructure Solutions
a Division of Wood Canada Limited
2020 Winston Park Drive, Suite 600
Oakville, Ontario, L6H 6X7
Canada
T: (647) 271-0882
April 2021

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Third-party disclaimer

Executive summary

The City of Hamilton is proposing to widen and improve approximately 5.0 kilometres (km) of Barton Street Road from Fruitland Road to Fifty Road and an additional 1.0 km of Fifty Road from South Service Road to Highway No. 8 as per the Hamilton Transportation Master Plan (TMP). Additional works will include replacement or extension of the existing crossing structures on site to accommodate the widening of the roadway, changes to drainage (ditches), and provision of multi-use pathways on both sides of the roadway. These roadway improvements were identified as a Schedule 'C' Project. The TMP satisfied Phases 1 and 2 of the Municipal Class EA process.

Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood) (formerly Amec Foster Wheeler) has been retained by the City of Hamilton to undertake the required Schedule 'C' Municipal Class EA for the proposed improvements to the sections of Barton Street and Fifty Road under study. This Aquatic Habitat Existing Conditions Report will inform the preparation of an Environmental Study Report (ESR) for the project and aid in the completion of the Municipal Class EA Process.

Within the study area, there are nine (9) drainage features which cross the Barton Street right-of-way, including four (4) ephemeral drainages (Crossings 5.2, 6.1, 7.2 and 9.0) and five (5) intermittent features (Crossings 5.0, 6.0, 7.0, 7.1 and 12.0). These drainage features are under the regulatory jurisdiction of the Hamilton Region Conservation Authority (HRCA) and the Guelph District Ministry of Natural Resources and Forestry. Drainage systems from 5.0 to 9.0 are known as the Stoney Creek numbered watercourses and are considered as Core Areas within the City of Hamilton's Natural Heritage System. All drainage features are within the Niagara Escarpment drainage and are classified as first order streams except for Fifty Creek, which is a second order watercourse. Fish were observed in Fifty Creek during the on-site investigations. The remaining drainage features likely provide minimal seasonal contributions to downstream reaches and may be seasonally or periodically occupied by fish. No aquatic Species at Risk have been recorded in the drainage features present on site.

This report provides a summary of existing aquatic conditions from both secondary source information and field investigations conducted on April 28 and October 3, 2017. Potential environmental effects from the project works have been assessed and measures to mitigate these effects have been identified.

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1.0 Introduction

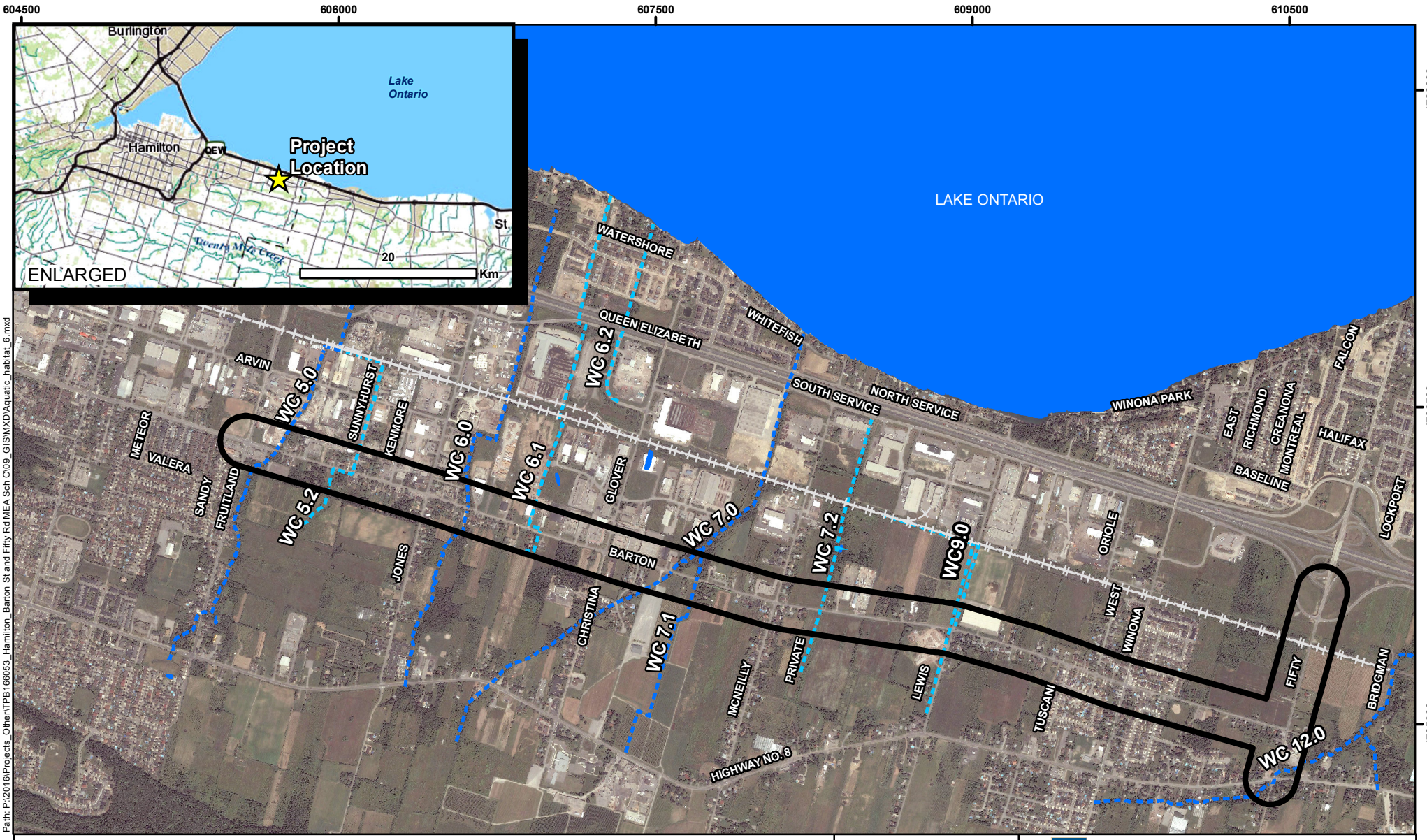
The City of Hamilton is proposing to widen and improve approximately 5.0 kilometres (km) of Barton Street Road from Fruitland Road to Fifty Road and an additional 1.0 km of Fifty Road from South Service Road to Highway No. 8 (hereafter referred to as 'the Project') as per the Hamilton Transportation Master Plan (TMP). The roadway requires improvements due to existing and projected structural deficiencies, intersection and road capacity deficiencies and changes in surrounding land use. Additional works will include replacement or extension of the existing crossing structures on site to accommodate the widening of the roadway, changes to drainage (ditches), and provision of multi-use pathways on both sides of the roadway. These roadway improvements were identified as a Schedule 'C' Project. The TMP satisfied Phases 1 and 2 of the Municipal Class EA process.

Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood) has been retained by the City of Hamilton to undertake the required Schedule 'C' Municipal Class EA for the proposed improvements to the sections of Barton Street and Fifty Road under study. This Aquatic Habitat Existing Conditions Report will inform the preparation of an Environmental Study Report (ESR) for the project and aid in the completion of the Municipal Class EA Process.

1.1 Study Area

Barton Street is an east-west arterial corridor under the jurisdiction of the City of Hamilton. The project area encompasses approximately 5.0 km of Barton Street Road from Fruitland Road to Fifty Road and an additional 1.0 km of Fifty Road from South Service Road to Highway No. 8 (Figure 1-1; herein referred to as the 'study area').

There are several minor drainage features within the study area that drain a mixture of urban residential, industrial, agricultural and natural lands. Data gathered from both secondary source information and field investigations identified nine drainage features within the project limits (Figures 1-2 to 1-8). Drainage systems from 5.0 to 9.0 are known as the Stoney Creek numbered watercourses and are considered as Core Areas within the City of Hamilton's Natural Heritage System. The most notable drainage feature is Fifty Creek, which is classified as a second order stream. These drainage features are under the regulatory jurisdiction of the Hamilton Region Conservation Authority (HRCA) and the Guelph District Ministry of Natural Resources and Forestry (MNRF).



Path: P:\2016\Projects_Other\TPB166053_Hamilton_Barton St and Fifty Rd MEA Sch C\09_GIS\MXD\Aquatic_habitat_6.mxd

LEGEND

- Approximate Study Area
- Railway

Secondary Sources - Survey 2012[1] (labelled with watercourse ID)

- Intermittent Watercourse
- Ephemeral Watercourse

NOTES:
[1] Fish Habitat Survey, Aquafor, 2012.

0 0.5 1 1.5 2 Kilometres

Datum & Projection: NAD 1983 UTM Zone 17N

Hamilton

amec foster wheeler

BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Project Location, Site Map and Flow Status

PROJECT N°: TPB166053	**FIGURE: 1-1**
SCALE: 1:25,000	DATE: November 2017

605600 4786600 605800 606000 606200 4786400 606400

WC5.0
Zone of General Assessment
200m Downstream

WC5.0
Zone of Detailed Assesment
50m Downstream

WC5.0
Zone of Detailed Assesment
20m Upstream

WC5.0
Zone of General Assessment
50m Upstream

WC 5.0

WC 5.2

BARTON ST

FRUITLAND RD

SUNNYHURST AV

KENMORE AV

JONES RD

SANDY DR

VALERA DR

4786200 606400 4786000

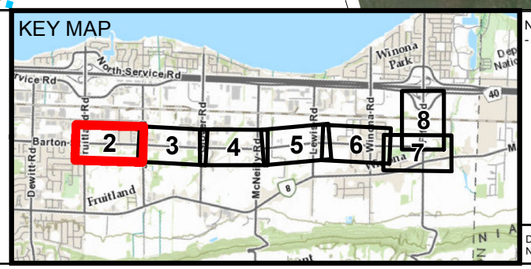
P:\2016\Projects_Other\TPB166053_Hamilton_Barton St and Fifty Rd MEA\Sch C\09_GIS\MXD\Aquatic_habitat_series_3.mxd

LEGEND

- Watercourse Crossing
- Zone of Detailed Assesment
- Zone of General Assessment
- Intermittent Watercourse
- Ephemeral Watercourse

0 100 200 300 400 500 Metres

KEY MAP



NOTES:
- Background extracted from Google Earth.

Datum & Projection:
NAD 1983 UTM Zone 17N

Hamilton

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BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Aquatic Study Area WC 5.0 and WC 5.2

PROJECT N°: TPB166053	**FIGURE: 1-2**
SCALE: 1:2,500	DATE: November 2017

606600 606800 4786200 607000 607200 607400

607400 4786000 4785800 4785600

WC6.0
Zone of General Assessment
200m Downstream

WC6.0
Zone of Detailed Assesment
50m Downstream

WC6.0
Zone of Detailed Assesment
20m Upstream

WC6.0
Zone of General Assessment
50m Upstream

WC 6.0

WC 6.0

WC 6.1

WC 6.1

JONES RD

BARTON ST

GLOVER RD

ARVIN AV

WILLOW LN

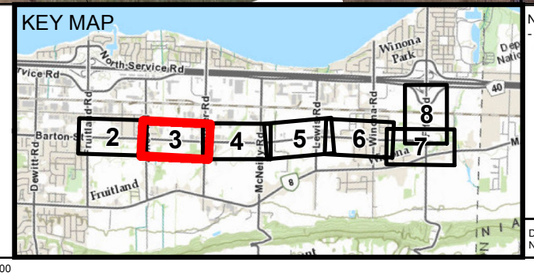
P:\2016\Projects_Other\TPB166053_Hamilton_Barton St and Fifty Rd MEA Sch C\09_GIS\MXD\Aquatic_habitat_series_3.mxd

LEGEND

- Watercourse Crossing
- Zone of Detailed Assesment
- Zone of General Assessment
- Intermittent Watercourse
- Ephemeral Watercourse

0 100 200 300 400 500 Metres

KEY MAP



NOTES:
- Background extracted from Google Earth.

Datum & Projection:
NAD 1983 UTM Zone 17N

Hamilton

amec foster wheeler

BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Aquatic Study Area WC 6.0 and WC 6.1

PROJECT Nº: TPB166053	**FIGURE: 1-3**
SCALE: 1:2,500	DATE: November 2017

607400
607600
607800
608000
608200
4785800
4785600
4785400
608200

WC 6.3
GLOVER RD
CHRISTINA AV
WILLOW LN
BARTON ST
MCNEILLY RD

WC7.1
Zone of General Assessment
200m Downstream

WC7.0
Zone of General Assessment
200m Downstream

WC7.0
Zone of Detailed Assesment
50m Downstream

WC7.1
Zone of Detailed Assesment
50m Downstream

WC7.0
Zone of Detailed Assesment
20m Upstream

WC7.0
Zone of General Assessment
50m Upstream

WC7.1
Zone of Detailed Assesment
20m Upstream

WC7.1
Zone of General Assessment
50m Upstream

WC 7.0
WC 7.1
WC 7.0
WC 7.1

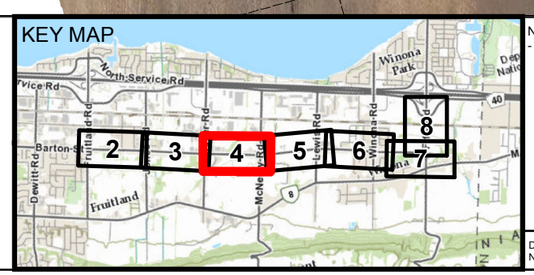
P:\2016\Projects_Other\TPB166053_Hamilton_Barton St and Fifty Rd MEA Sch C\09_GIS\MXD\Aquatic_habitat_aries_9.mxd

LEGEND

- Watercourse Crossing
- Zone of Detailed Assesment
- Zone of General Assessment
- Intermittent Watercourse

0 100 200 300 400 500 Metres

KEY MAP



NOTES:
- Background extracted from Google Earth.

Datum & Projection:
NAD 1983 UTM Zone 17N

Hamilton

amec foster wheeler

BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Aquatic Study Area WC 7.0 and WC 7.1

PROJECT Nº: TPB166053	**FIGURE: 1-4**
SCALE: 1:2,500	DATE: November 2017

608200 608400 608600 608800 609000

4785600

4785400

4785200

PRIVATE RD

ARVIN AV

WC 7.2

WC 7.2

BARTON ST

WC 9.0

WC 9.0

LEWIS RD

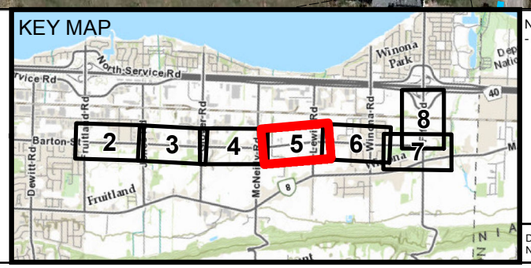
P:\2016\Projects_Other\TPB166053_Hamilton_Barton St and Fifty Rd MEA Sch C\09_GIS\MXD\Aquatic_habitat_series_9.mxd

LEGEND

- Watercourse Crossing
- Ephemeral Watercourse

0 100 200 300 400 500 Metres

KEY MAP



NOTES:
- Background extracted from Google Earth.

Datum & Projection: NAD 1983 UTM Zone 17N

N W E S

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BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Aquatic Study Area WC. 7.2 and WC 9.0

PROJECT N°: TPB166053	**FIGURE: 1-5**
SCALE: 1:2,500	DATE: November 2017

609200 4785600 609400 609600 609800 4785400 610000

ARVIN AV
NORBROOK DR
EDENROCK DR
ESCARPMENT DR
WEST AV
BENZIGER LN
NAPA LN
BARTON ST
WINONA RD
DUBONNET DR
CHIANTI CR
ORVIETO CT
TUSCANI DR
SILVERLACE CL
PARKMANOR DR
MILLIKIN DR
YELLOWWOOD DR

4785200
610000
4785000

(c) 2015 Google

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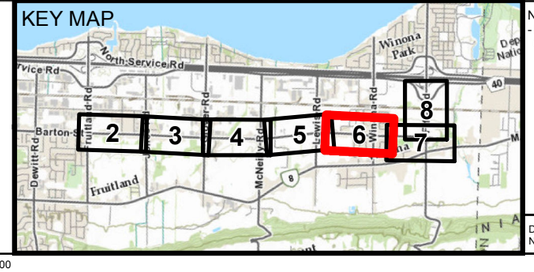
LEGEND

KEY MAP



NOTES:
- Background extracted from Google Earth.

Datum & Projection:
NAD 1983 UTM Zone 17N

0 100 200 300 400 500 Metres

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BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Aquatic Study Area

PROJECT Nº: TPB166053	**FIGURE: 1-6**
SCALE: 1:2,500	DATE: November 2017

610000 610200 4785200 610400 610600 610800 4785000 4784800 4784600 610800

NAPA LN
BARTON ST
FIFTY RD
BRIDGMAN LN
MILLIKIN DR
PARKMANOR DR
MAPLE GATE DR
HIGHWAY NO. 8
WC 12.0

WC12.0 A
Zone of General Assessment
200m Downstream

WC12.0 B
Zone of General Assessment
200m Downstream

WC12.0 A
Zone of Detailed Assesment
50m Downstream

WC12.0 B
Zone of Detailed Assesment
50m Downstream

WC 12.0 B

WC12.0 A
Zone of Detailed Assesment
20m Upstream

WC12.0 B
Zone of Detailed Assesment
20m Upstream

WC 12.0 A

WC12.0 B
Zone of General Assessment
50m Upstream

WC12.0 A
Zone of General Assessment
50m Upstream

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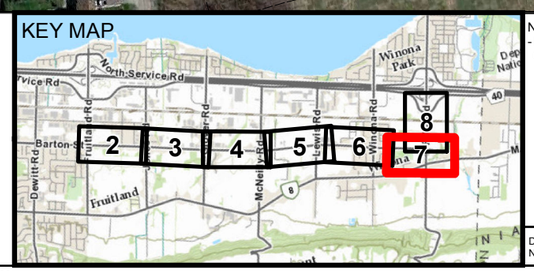
LEGEND

- Watercourse Crossing
- Zone of Detailed Assesment
- Zone of General Assessment
- Intermittent Watercourse

0 100 200 300 400 500 Metres

KEY MAP



NOTES:
- Background extracted from Google Earth.

Datum & Projection:
NAD 1983 UTM Zone 17N

Hamilton

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BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Aquatic Study Area
WC 12.0 A and WC 12.0 B

PROJECT N°: TPB166053	**FIGURE: 1-7**
SCALE: 1:2,500	DATE: November 2017

610400 610600 4785800 610800 611000

611000 4785600 4785400 4785200 4785000 610800

RAMP QEW NIAGARA TO FIFTY

SOUTH SERVICE RD

FIFTY RD

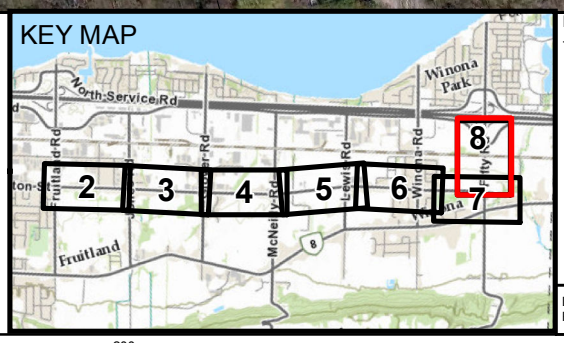
BARTON ST

WC 12.0

LEGEND

Intermittent Watercourse

KEY MAP



NOTES:
- Background extracted from Google Earth.

Datum: NAD83
Projection: UTM Zone 17N

0 25 50 100 150 200 Metres

Hamilton

amec foster wheeler

BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

Aquatic Study Area

PROJECT N°: TPB166053	**FIGURE: 1-8**
SCALE: 1:2,500	DATE: November 2017

Path: P:\2016\Projects_Other\TPB166053_Hamilton_Barton St and Fifty Rd MEA Sch C\09_GIS\MXD\Aquatic_habitat_series_portarit_3.mxd, 18 November 2017

2.0 METHODOLOGY

Wood undertook a secondary source data review and biophysical inventories of the Project study area. The purpose of the inventory was to characterize and evaluate the existing biophysical environment to provide baseline data to support the design and approval process for the Project. Field surveys were conducted on April 28, 2017. Additional surveys were conducted on October 3, 2017 to assess the early fall conditions of the watercourses. Information collected from the field surveys was used in conjunction with secondary source information to identify fish community, existing conditions of the aquatic habitat, and probability of aquatic Species at Risk (SAR) presence.

2.1 Secondary Source Review

Secondary sources and databases were reviewed to ascertain fish community and aquatic habitat data for the watercourses within the project limits. Information provided by external agencies, publicly-available topographic data, and correspondence with external agencies, which were reviewed included:

- More Than Engineering (MTE), Natural Heritage Features Constraints Report (2012);
- Colville Consulting; ELC Mapping for 238 Jones Road (2016);
- City of Hamilton and A.J. Clarke & Associates LTD., Cormorant Road Extension (2015);
- Aquafor Beech Limited, SCUBE Subwatershed Study (2013);
- AECOM: Fruitland Road from Barton Street to Highway 8 Municipal Class Environmental Assessment Study, Phases 1 and 2 Report (2010);
- Correspondence with Hamilton Conservation Authority; Fruitland-Winona Block Servicing Strategy – Block 3 Terms of Reference (2016);
- Dougan & Associates, Memorandum (2016);
- Dillon, Natural Heritage Assessment of Lands Bounded by Fruitland Road, Glover Road, Barton Street and Highway 8 Draft Report (2009);
- Aquafor Beech, Growth Management Planning and Economic Development Department (2016);
- Itrans Consulting Inc., Lewis Road Reconstruction Class Environmental Assessment Report (2009);
- Aerial imagery from Bing Maps (Bing 2017);
- MNRF's Natural Heritage Information Centre (NHIC) (MNRF 2017);
- Correspondence with the Aurora District MNRF (Appendix A);
- Fisheries and Oceans Canada's (DFO) Distribution of Aquatic SAR mapping (DFO 2017); and
- Topographic data extracted from Land Information Ontario (Government of Ontario 2015).

The MNRF NHIC database utilizes a 1 km x 1 km system. The Project study area overlaps with eleven 1 km^2 NHIC atlas squares, including: 17PH0586, 17PH0686, 17PH0786, 17PH0585, 17PH0685, 17PH0785, 17PH0885, 17PH0985, 17PH1085, 17PH0984, 17PH1084.

Terrestrial ecological components are provided in the Wood (2017) Terrestrial Habitat Existing Conditions Report.

2.2 Field Surveys

To augment the secondary source information identified above, Wood conducted fish habitat field assessments on April 28, 2017. Field conditions were assessed in accordance with the MTO Environmental Guide to Fish and Fish Habitat (MTO, 2009) as it is a repeatable and detailed methodology for assessing linear transportation corridors. Where property access was obtainable, the study area at each site included a zone of detailed assessment extending from 20 m upstream to 50 m downstream of the Barton Street right-of-way (ROW). General habitat mapping was also conducted an additional 30 m upstream (20 to 50 m upstream of the ROW) and 150 m downstream (50 m to 200 m downstream of the ROW) of the detailed mapping zones. Mapping of the study areas are provided in Figures 1-2 to 1-8.

Biophysical habitat conditions were recorded for each station and results are presented in Section 3.0. Field collection sheets are provided in Appendix B. Photographic records from the April 2017 site visit are provided in a photographic log (Appendix C). Habitat assessment data was recorded for each crossing with water flow and results are summarized in Section 3.0. Where fish habitat sensitivity and thermal regime were not available from MNRF and other secondary sources, habitat conditions were evaluated to determine these values.

3.0 RESULTS

3.1 Potential Constraints

Potential constraints are features which may influence the design or implementation of the works and include significant natural habitat features (i.e., Areas of Natural of Scientific Interest, Environmentally Sensitive Areas, evaluated/unevaluated wetlands) as well as the presence of SAR and species of conservation concern.

No significant habitats or SAR/conservation concern species are found within the study area. As such, only general warm water constraints will apply to the watercourses on site (i.e., appropriate timing windows, use of OPSS approved Erosion and Sediment Control measures, etc.). Further discussion of aquatic SAR recorded in the vicinity of the project area is included below.

3.1.1 Aquatic Species at Risk

A review of secondary sources (as listed in Section 2.1) and an online search of the MNRF NHIC database was conducted for the immediate vicinity of the site to identify potential SAR within the watercourses. A search of the 1 km NHIC squares encompassing the Project study area determined that no aquatic SAR have been recorded in the vicinity of the Project study area.

Correspondence with MNRF also indicated no records of aquatic SAR in the vicinity of the study area; however, four terrestrial SAR have been recorded in the vicinity of the project study area (Appendix A). Further details of the terrestrial SAR and probability of occurrence within the study area are provided in Wood's (2017) Terrestrial Habitat Existing Conditions Report.

3.1.2 Existing Fish and Fish Habitat

A preliminary assessment of the study area indicated that the Barton Street and Fifty Road corridor crosses nine drainage features. All drainage features drain lands associated with the Niagara Escarpment and are classified as first order streams except for Fifty Creek, which is second order watercourse. The project area has been significantly influenced by human activity, with land use within the study area characterized by residential, commercial, industrial and agricultural areas. Natural areas are primarily associated with the drainage corridors in the vicinity of Crossings 5.0, 6.0, 12.0 (Fifty Creek), and downstream reaches of 7.0, 7.1, and 7.2.

The watercourses at Crossings 5.2, 6.1, 7.2 and 9.0 have ephemeral flows. These ephemeral drainage features were dry at the time of the site visits and exhibited poorly defined channels containing terrestrial vegetation. These features provide minimal contributions (i.e., form and function) to downstream areas which would be maintained post-construction. The watercourses at Crossings 5.0, 6.0, 7.0, 7.1 and 12.0 were found to have intermittent flows. These features exhibited some flow during the April, 2017 field investigations, however, only Crossings 7.1 and 12.0 had some water evident in pooled areas during the October 2017 site visit; the remaining watercourses were dry. The intermittent drainage features on site are classified as having warm water thermal regimes (Table 3-1).

Fifty Creek provides habitat to warm water fish species including Creek Chub (Semotilus atromaculatus), Lake Chub (Couesius plumbeus), Pumpkinseed (Lepomis gibbosus), White Sucker (Catostomus commersoni), Fathead Minnow (Pimephales promelas), and Green Sunfish (Lepomis cyanellus)

(Appendix A). In the immediate area of the crossing, these species are likely only present during the spring, following the spring freshet, when consistent flows are evident within the reach. Cyprinids were observed in pools in the vicinity of the Crossing 12.0 during the October 2017 site visit.

The other intermittent drainage features on site, (located at Crossings 5.0, 6.0, 7.0 and 7.1), likely also provide seasonal habitat to fish. The sensitivity of the intermittent watercourses on site are low; however, these watercourse are considered to provide seasonal habitat and to support what DFO defines under the federal Fisheries Act as a Commercial, Recreational or Aboriginal (CRA) fishery. As such, appropriate timing and mitigation measures should be applied to protect fish during sensitive timing periods and to maintain/enhance fish passage at the crossings. Mitigation measures and timing window considerations are discussed in Section 5.0.

These results are primarily in keeping with the findings of previous studies completed within the area; with the exception of the watercourse at Crossing 5.0, which was previously found to have a permanent flow, and at Crossing 6.1, which was previously determined as having an intermittent flow (Aquafor Beech Limited, 2013). Previously, only Crossings 7.0 and 12.0 were identified as providing 'direct' habitat to fish, all other watercourses within the study area were found to provide 'indirect' fish habitat (Aquafor Beech Limited, 2013).

Biophysical parameters recorded during the 2017 field investigation for the aforementioned intermittent drainage features are provided in the sub-sections below. Biophysical parameters were not collected for the ephemeral drainage features on site which were dry during the field investigations. Channel characteristics and substrate compositions were determined by averaging the values from each of the morphological units (run, riffles, flats, and pools). Detailed observations by morphology are provided in the field sheets provided in Appendix B. Photos of the crossings are provided in Appendix C. A summary of the flow and temperature regimes for each of these features is provided in Table 3-1 and depicted in Figure 1-1. Water chemistry results for each of the crossings are provided in Table 3-2. An aerial view of the site (Figure 1-1) provides a reference for the drainage system orientation with respect to Barton Street with a more detailed view of the area illustrated in Figures 1-2 to 1-8.

Table 3-1: Existing Aquatic Habitat Conditions Summary Table

Crossing No. and Watercourse Name (where applicable)	Flow[1]	Thermal Regime	Substrate Type1 (approximate distribution over investigated area)	Aquatic Vegetation[1]	Supports a Fishery	Fish Species Present
5.0	Intermittent	Warm [2]	8% boulder 66% cobble 12% gravel 5% sand 9% silt	Some emergent species evident	Indirectly	Not applicable – stream dry
5.2	Ephemeral	None	Not assessed	Terrestrial vegetation (grass sp.) present within channel	Indirectly	Not applicable – stream dry
6.0	Intermittent	Warm [2]	49% boulder 37% cobble 7% gravel 7% silt	Overhanging vascular macrophytes	Indirectly	Not applicable – stream dry
6.1	Ephemeral	None	Not assessed	Terrestrial vegetation (grass sp.) present within channel	Indirectly	Not applicable – stream dry
7.0	Intermittent	Warm	45% silt 5% clay 25% muck 25% detritus	Submergent and emergent species evident	Indirectly	Not applicable – stream dry
7.1	Intermittent	Warm [3]	30% boulder 60% cobble 10% silt	None	Indirectly	Not applicable – stream dry
7.2	Ephemeral	None	Not assessed	Terrestrial vegetation (grass sp.) present within channel	Indirectly	Not applicable – stream dry
9.0	Ephemeral	None	Not assessed	Terrestrial vegetation (grass sp.) present within channel	Indirectly	Not applicable – stream dry
12.0 (Fifty Creek)	Intermittent	Warm [3]	40% silt 30% muck 30% detritus	None	Directly	Creek Chub[2] Lake Chub[2] Pumpkinseed[2] White Sucker[2] Fathead Minnow[2] Green Sunfish[2]

Source:
[1] Wood field investigations [2] Per. Comm. MNRF, 2017 (Appendix A)

Table 3-2: Water Chemistry Results Summary (as measured April 28, 2017)

Crossing No. and Watercourse Name (where applicable)	Water Temperature (°C)	Air Temperature (°C)	Conductivity (µ s/cm)	Total Dissolved Solids (ppm)	pH	Dissolved Oxygen (mg/L)
5.0	11.7	15.0	820	n/a	6.78	11.30
6.0	14.7	18.0	1180	590	8.78	11.68
7.0	17.6	18.9	865	430	6.81	N/A*
7.1	17.0	18.0	1220	n/a	8.72	11.85
12.0 (Fifty Creek)	17.6	18.0	940	497	9.60	7.55

** N/A: Not available*

3.1.3 Watercourse Crossing 5.0 – Unnamed Tributary

3.1.3.1 Origin and Flow

This drainage feature originates approximately 2.5 km south of Barton Street in the agricultural and rural residential areas to the south of the Niagara Escarpment. The feature drains primarily through agricultural and rural residential areas in its southern extent prior to crossing Barton Street, after which point the landscape is dominated by industrial areas. After flowing through 1.3 km of industrialized lands, this drainage feature reports to Lake Ontario within the Newport Yacht Club lands (Figure 1-2).

Stream flow observed during the April 2017 investigations was low, and flow was completely absent from the watercourse during the October 2017 site visit. These findings indicate that the watercourse is intermittent and may only provide seasonal habitat for fish.

3.1.3.2 General Morphology and Habitat Conditions

Upstream of Crossing

The stream morphology was uniformly distributed between riffles (50%) and flats (50%) with a substrate comprised of cobble (60%), gravel (25%), silt (10%), and boulders (5%). During the field investigation, the mean wetted width was 1.65 m with a mean depth of 0.07 m. The mean bankfull width was 2.85 m with a mean bankfull depth of 0.23 m. The banks were stable to slightly unstable. Overhead vegetation provided between 90 to 100% cover and in-stream cover was provided primarily by cobble.

Within Crossing

The crossing structure is comprised of two culvert types along its continuous length: the upstream structure begins as a large diameter 0.87 m high x 1.0 m wide Corrugated Steel Pipe (CSP) culvert. A 1.0 m

high x 1.85 m wide concrete box culvert connects to the CSP and carries flows under the remaining portion of the roadway. The culvert has a flow comprised of riffles/flats. No substrate is present in the upstream CSP, however; substrate is present within the downstream end of the crossing within the concrete box culvert.

Downstream of Crossing

The downstream channel morphology was primarily riffles (30%) and runs (30%) with sections of pools (20%) and flats (20%). Substrate within the reach was comprised primarily of cobble (77%), with boulders (6%), sand (5%), silt (8.5%) and gravel (3.5%) evident. During the April 28, 2017 field investigation, the mean wetted width was 1.13 m with a mean wetted depth of 0.16 m. The mean bankfull width was 1.44 m with a mean bankfull depth of 0.44 m. The banks were stable. Overhead vegetation provided between 90 to 100% cover and in-stream cover was provided primarily by cobble.

3.1.3.3 Fisheries Limitations

No limitations or fish passage barriers were observed in the direct vicinity of the crossing; however, the intermittent nature of this stream means that it is impassable to fish species during dry periods of the year. Fruitland Falls, located on the Niagara Escarpment, located approximately 2.1 km upstream of the study area, provides an additional barrier to upstream fish movement.

The surrounding land uses found in the upstream and downstream reaches of this watercourse may contribute nutrients (i.e., nitrogen from agricultural sprays and lawn fertilizers, salts from roadway runoff) and sediments to the watercourse.

3.1.4 Watercourse Crossing 6.0 – Unnamed Tributary

3.1.4.1 Origin and Flow

This drainage feature originates approximately 1.5 km south of Barton Street, within agricultural fields. The drainage feature drains north primarily though agricultural, residential, and natural areas before flowing under Barton Street through two culverts, a CSP and a concrete box culvert (Figure 1-3). The tributary then continues for approximately 1.8 km downstream of Barton Street through primarily industrial areas before discharging into Lake Ontario.

Stream flow observed during the April 2017 investigations was low, and flow was completely absent from the watercourse during the October 2017 site visit. These findings indicate that the watercourse is intermittent and may only provide seasonal habitat for fish.

3.1.4.2 General Morphology and Habitat Conditions

Upstream of Crossing

The stream morphology was distributed between pools (80%), riffles (10%) and flats (10%). Substrate was comprised of boulder (64.5%), cobble (17%), gravel (9.5%), and silt (9%). During the April 2017 field investigation, the mean wetted width was 1.75 m and mean wetted depth was 0.33 m. The mean bankfull width was 3.15 m and mean bankfull depth of 0.41 m. The banks were predominantly stable throughout the reach. Overhead vegetation provided between 60 to 90% cover and in-stream cover was provided primarily by cobble.

Within Crossing

The crossing structure is comprised of two culverts. The culvert on the west side is a CSP culvert measuring approximately 1.85 m wide x 1.0 m high. The culvert on the east side has two components: including a CSP culvert at the downstream extent while the upstream end is a concrete box culvert. The box culvert measures approximately 1.0 m wide x 0.87 m high. The west culvert has a flow comprised of riffles/flats. The CSP has no bottom substrate in its upstream portion, but does contain substrate in its downstream portion. The east culvert has a similar flow comprised of riffles/flats with a predominantly cobble substrate found throughout the entirety of the culvert.

Downstream of Crossing

The stream morphology was distributed between runs (70%), and riffles (30%). The substrate was comprised of cobble (80%), gravel (10%), and silt (10%). During the April 2017 field investigation, the mean wetted width was 1.45 m with a mean wetted depth of 0.06 m. The mean bankfull width was 2.98 m with a mean bankfull depth of 0.19 m. The banks were slightly unstable. Overhead vegetation provided between 30 to 60% cover.

3.1.4.3 Fisheries Limitations

No limitations or fish passage barriers were observed in the direct vicinity of the crossing; however, the intermittent nature of this stream means that it is impassable to fish species during dry periods of the year. Furthermore, the Jones Road Falls, located upstream of the study area on the Niagara Escarpment is a fish migration barrier, limiting the movement of fish upstream.

The surrounding land uses found in the upstream and downstream reaches of this watercourse may contribute nutrients (i.e., nitrogen from agricultural sprays, lawn fertilizers, salt from roadway runoff) and sediments to the watercourse.

3.1.5 Watercourse Crossing 7.0 – Unnamed Tributary

3.1.5.1 Origin and Flow

The unnamed tributary originates approximately 2.5 km south of Barton Street, within agricultural fields above the Niagara Escarpment. The watercourse drains northwards primarily though agricultural, residential, and natural land use before flowing under Barton Street through two culverts, a CSP and a concrete box culvert (Figure 1-4). The tributary flows approximately 1.4 km downstream of Barton Street through primarily industrial, natural and residential lands before discharging into Lake Ontario.

Stream flow observed during the April 2017 investigations was low, and flow was completely absent from the watercourse during the October 2017 site visit. These findings indicate that the watercourse is intermittent and may only provide seasonal habitat for fish.

3.1.5.2 General Morphology and Habitat Conditions

Upstream of Crossing

The morphology of this feature was comprised entirely of flats (100%). The substrate was comprised of fines including silt (40%), muck (30%), and detritus (30%). During the April 2017 field investigation, the

mean wetted width was 2.0 m with a mean wetted depth of 0.20 m. The mean bankfull width was 3.0 m with a mean bankfull depth of 0.28 m. The banks were predominantly stable throughout the reach. Overhead vegetation provided between 1 to 30% cover.

Within Crossing

The crossing structure is comprised of two culverts. The culvert on the west side is a CSP culvert for its entire length and measures approximately 2.0 m wide x 1.4 m high at the upstream opening. The culvert on the east side begins as a CSP culvert and then changes to a box culvert near the downstream section of the crossing. The west side culvert has a flow comprised of flats with fine substrate lining the bottom. The east culvert was not passing water at the time of field investigations. However, the downstream section of the east culvert contained standing water and fine substrate lined the bottom. The upstream portion of the east culvert (CSP section) was heavily filled in with earth, and with terrestrial vegetation.

Downstream of Crossing

The stream morphology consisted entirely of flats (100%). The substrate was mainly fines, including silt (50%), muck (20%) and detritus (20%) with some clay (10%). During the April 2017 field investigation, the mean wetted width was 3.2 m with a mean wetted depth of 0.25 m. The mean bankfull width was 4.5 m with a mean bankfull depth of 0.28 m. The banks were predominantly stable to slightly unstable throughout the reach. Overhead vegetation provided between 1 to 30% cover.

3.1.5.3 Fisheries Limitations

No barriers to fish movement were observed in the immediate vicinity of the crossing.

3.1.6 Watercourse Crossing 7.1 – Unnamed Tributary

3.1.6.1 Origin and Flow

This drainage feature originates approximately 2.3 km south of Barton Street, within agricultural fields above the Niagara Escarpment. The drainage feature drains north primarily though agricultural, industrial, and natural areas. Immediately south of Highway No. 8, the drainage feature is conveyed under an industrial area for approximately 280 m. The drainage feature continues north where it flows under Barton Street through a single closed bottom concrete box culvert (Figure 1-4). It then flows approximately 115 m before its confluence with drainage feature 7.0 (Section 3.1.5), which continues 1.3 km downstream through primarily industrial, natural and residential lands before ultimately discharging into Lake Ontario.

Stream flow observed during the April 2017 investigations was low, and only a small pool was found at the downstream end of the crossing during the October 2017 site visit. These findings indicate that the watercourse is intermittent and may only provide seasonal habitat for fish.

3.1.6.2 General Morphology and Habitat Conditions

Upstream of Crossing

The stream morphology was comprised entirely of flats (100%). The substrate was comprised of cobble (80%), silt (10%), and boulders (10%). During the April 2017 field investigation, the mean wetted width was 1.0 m with a mean wetted depth of 0.19 m. The mean bankfull width was 1.3 m with a mean bankfull

depth of 0.21 m. The banks were stable throughout the reach. Overhead vegetation provided 30 to 60% cover.

Within Crossing

The crossing structures are divided into a box culvert for the downstream portion, and a CSP culvert for the upstream portion. The CSP culvert on the upstream section measures approximately 1.0 m dia. at the upstream opening. The culvert flow morphology was comprised of riffle/flat with no substrate lining the bottom of the CSP for the upstream portion, and no substrate lining the downstream portion of the closed bottom box culvert. The downstream box culvert was slightly perched at the time of observation with a vertical drop of approximately 0.03 m.

Downstream of Crossing

The stream morphology was comprised entirely pool (100%). The substrate was predominantly small boulders (50%), cobble (40%), and silt (10%). During the April 2017 field investigation the mean wetted width was 3.0 m with a mean wetted depth of 0.38 m. The mean bankfull width was 3.3 m with a mean bankfull depth of 0.63 m. The banks were predominantly stable to slightly unstable throughout the reach. Overhead vegetation provided between 90 to 100% cover.

3.1.6.3 Fisheries Limitations

The box culvert downstream of Barton Street is slightly perched with an approximate vertical drop of 0.03 m. It is likely that this drop creates a barrier to upstream movement of small-bodied fishes during normal/low flows.

3.1.7 Watercourse Crossing 12.0 (A and B) – Fifty Creek

3.1.7.1 Origin and Flow

Fifty Creek originates approximately 1.6 km south of Fifty Road at the intersection with Highway No. 8, within agricultural fields south of the Niagara Escarpment. The watercourse drains north primarily though agricultural, and natural land use. The watercourse continues north where it flows under Fifty Road (Crossing 12.0 A) and then immediately under Highway No. 8 (Crossing 12.0 B), (Figure 1-7). Open footed culverts are present at each crossing. The watercourse continues north for approximately 2.9 km downstream through primarily agricultural, natural and residential land use before discharging into Lake Ontario.

During the October 2017 site visit, no flow was evident within the watercourse. Several disconnected pools of water were evident in the area upstream of Crossing 12.0 A; however, the watercourse beneath this structure was dry. Some pooling was evident in the watercourse between the structures and more water was observed at Crossing 12.0 B and in areas downstream of this crossing. Cyprinid species were observed within the pools located at the inlet and outlet of Crossing 12.0 B. These findings indicate that the watercourse is intermittent and may only provide seasonal habitat for fish.

3.1.7.2 General Morphology and Habitat Conditions

Upstream of Crossings

The stream morphology was comprised entirely of flats (100%). The substrate was comprised of silt (40%), muck (30%), and detritus (30%). During the April 2017 field investigation the mean wetted width was 2.9 m with a mean wetted depth of 0.11 m. The mean bankfull width was 4.8 m and the mean bankfull depth was 0.11 m, the same as the wetted depth. The banks were stable throughout the reach. Overhead vegetation provided 30 to 60% cover.

Within Crossings

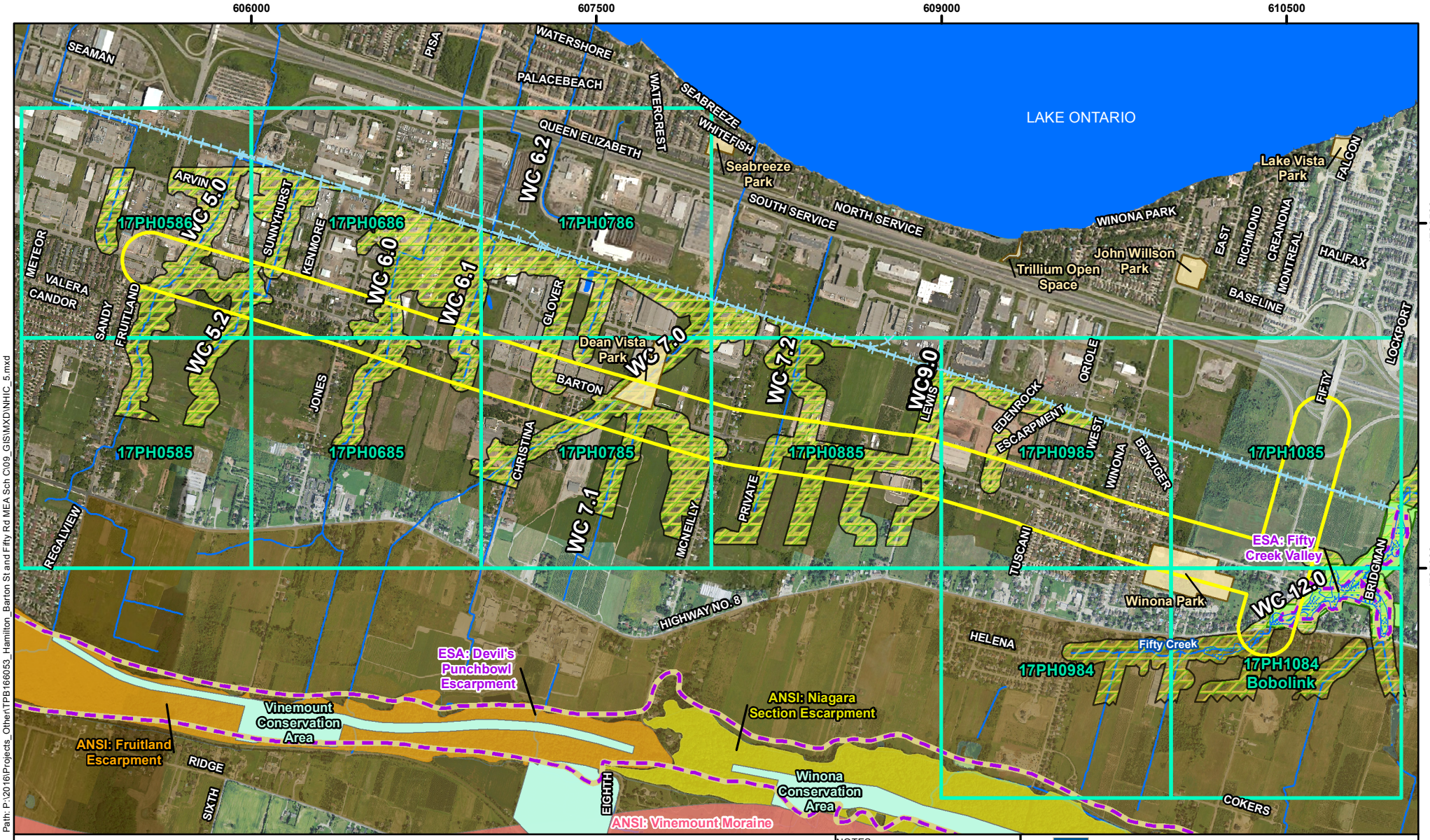
The crossing structures (Crossings 12.0 A and 12.0 B) are both open foot culverts measuring approximately 4.0 m wide x 1.15 m high. The flow within the culverts is comprised of flats, and has a substrate consisting of fines. Some detritus was evident.

Downstream of Crossings

The stream morphology within this reach was comprised of entirely of flats (100%). The substrate within this reach is consistent with the area upstream of the crossings, comprising of silt (40%) and muck (30%). Some detritus (30%) was also evident. During the April 2017 field investigation, the mean wetted width was 3.5 m with a mean wetted depth of 0.12 m. The mean bankfull width was 4.0 m with a mean bankfull depth of 0.16 m. The banks were stable throughout the reach. Overhead vegetation provided 30 to 60% cover.

3.1.7.3 Fisheries Limitations

No notable limitations to fisheries were observed at the immediate crossing location.



Path: P:\2016\Projects_Other\TPB166053_Hamilton_Barton St and Fifty Rd MEA Sch C\09_GIS\MXD\NHIC_5.mxd

LEGEND

- Approximate Study Area
- ESA [1] : - Fifty Creek Valley - Devil's Punchbowl Escarpment
- ANSI [2]: Earth Science, Vinemount Moraine, Regional
- ANSI [2]: Life Science, Fruitland Escarpment, Provincial
- ANSI [2]: Life Science, Niagara Section Escarpment, Provincial
- Niagara Escarpment Planning Parks (NEPOSS[3])
- Greenbelt Plan
- Niagara Escarpment Plan
- 1 Km Square NHIC [4] (SAR occurrence observations reported within the past 20 years)
- HCA Regulation Limits [5]
- Hamilton Parks
- Railway
- Wetland
- Watercourse
- Waterbody

NOTES:
[1] Environmentally sensitive area (ESA) extracted from City of Hamilton under Open data licence agreement.
[2] Areas of Natural and Scientific Interest (ANSI). Extracted from LIO, MNRF.
[3] Niagara Escarpment Parks and Open Space System (NEPOSS) extracted from LIO, MNRF.
[4] SAR data obtained from NHIC database June 2016. Location is generalized based on squares of 1 Km square.
[5] Georeferenced and digitized data representation of HCA regulation Limits

Datum & Projection: NAD 1983 UTM Zone 17N

0 0.5 1 1.5 2 Kilometres

Hamilton

amec foster wheeler

BARTON STREET, HAMILTON ENVIRONMENTAL ASSESSMENT

SAR and Natural Heritage Features

PROJECT N°: TPB166053 | **FIGURE: 3-1**

SCALE: 1:23,000 | DATE: August 2018

4.0 PRELIMINARY IMPACT ASSESSMENT

The proposed construction activities may lead to the modification, or alteration of the drainage features found on site. Improvement, extension or replacement of the existing crossing structures is likely and may lead a minor increase in the area of enclosed channel, and may require channel plan alterations to facilitate new inlet and outlet channels. Further to this, additional areas of temporary impact will result during the construction stage, but these impacts would be considered short lived and mitigatable.

In-water works should proceed during the appropriate open timing windows for the thermal regime and fish species present so as to avoid impacts to these species during sensitive timing periods (Section 5.2). Sections of the waterbodies may need to be dewatered to permit works 'in-the-dry'. In these instances, cofferdams and bypass pumping and/or flumes should be utilized to isolate the work areas. Isolating and dewatering work areas may leave fish stranded within work areas which would require fish salvage efforts prior to construction to prevent fish mortality.

During the works, runoff from construction activities may lead to a temporary increase in erosion risk due to increased area of exposed soil, the presence of stockpiled materials or the concentration of flow during flow bypass. This poses an increased risk of siltation to the watercourse leading to increased surface water turbidity and decrease water clarity which would be harmful for fish. Spills and leaks such as the introduction of sediment, concrete outwash, and other deleterious substances (e.g., salt, paint, solvents, oil and grease) during construction could allow contaminated water to enter the river. The potential for such effects is low if appropriate mitigation and environmental protection planning measures are applied consistent with Ontario Provincial Standards and federal measures to avoid serious harm.

Limited temporary and/or permanent removal of shrubs/trees and/or riparian vegetation may be required. Vegetation removals can result in a temporary increase in erosion and sedimentation risk. Furthermore, vegetation removal may cause a temporary loss of overhead cover for fish and could result in increased water temperatures and instability in channel banks.

5.0 PRELIMINARY ENVIRONMENTAL MITIGATION MEASURES

5.1 Mitigation Measures

Specific mitigation measures have been developed to minimize and/or avoid significant short-term and long-term adverse environmental effects resulting from the proposed construction activities on fish and fish habitat. Principal mitigation measures for construction activities in or near to the watercourses include:

- Prior to commencement of works, design and implement standard Erosion and Sediment Control (ESC) measures, consistent with Ontario Provincial Standards and Specifications (OPSS) and maintain ESC measures through all phases of the Project until vegetation is re-established and all disturbed ground is permanently stabilized.

- All materials and equipment used for the purpose of site preparation and Project construction will be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, silt, etc.) from entering a watercourse.

- Stabilize stockpiles and embankments when not in use/as soon as possible following use, in order to prevent sedimentation to the watercourse.

- A protocol to minimize spills/leaks and their impact to the environment should be provided in an Emergency Spill Response Plan. Routine inspections of the Project construction site should be conducted to ensure continued use and function of best management practices, mitigation measures and spill control and prevention measures. As appropriate, spills will be reported to the Ministry of Environment and Climate Change (MOECC) Spills Action Centre.

- Staging of the Project will limit vegetation disturbance and minimize the amount of time disturbed soil is exposed.

- Land drainage systems, whether naturally occurring or man-made are not to be used as receptors for any substance or material other than clean water complying with local municipal bylaws or storm water as intended.

- All disturbed areas of the work site should be stabilized and revegetated promptly, and/or treated with appropriate erosion protection materials. In riparian and aquatic habitats, all temporarily disturbed areas will be reinstated to original condition, or better, upon completion of works.

- Should the watercourse bed and/or bank be temporarily impacted as a result of construction activities, these areas should be rehabilitated to pre-construction condition.

5.2 Potential Habitat Enhancement Opportunities

Potential enhancement measures which could be utilized to improve aquatic habitat following construction activities include:

- Enhancement of watercourse buffers through riparian restoration and revegetation;

- Redesign existing structures or select new structures to improve fish passage:
  - Consider flow velocities and select structures, grading, etc. that will ensure crossing structures are passable by fish species known to inhabit the watercourse;
  - Embed culverts/crossings to avoid perching, appropriately tie-in structures at inlet and outlet to prevent fish passage issues;
- Enhance riparian vegetation to increase shading to the watercourse, and maintain cooler water temperatures as well as increase bank stability and provide scour protection.

5.3 Timing Restrictions

- Implement restricted timing for the activities to protect warm water fish species as follows:
  - The timing restrictions for the warm water watercourses present on site permit in-water work from July 1 to March 31 of any year.
  - Additionally, works should be scheduled during a period in which flows within the channels are absent or minimal where practicable.

6.0 CLOSURE

Field investigations were completed in accordance with the MTO Fish Guide (MTO 2009) and combined with secondary source background data to summarize the characteristics of the watercourse associated with the Project site. Of the nine watercourses identified within the study area, five watercourses are classified as having an intermittent flow and may provide seasonal or periodic habitat to fish. These watercourses are considered to support CRA fisheries; however, they have low sensitivity and provide only minor contributions to downstream reaches. Correspondence from MNRF indicated no records of aquatic SAR in the vicinity of the study area. As such, the in-water works should proceed within the appropriate warm water timing window for warm water fish communities (July 1 to March 31) and appropriate mitigation measures should be applied to avoid harm to fish and fish habitat.

Proper planning, design, and implementation of the mitigation measures detailed above will ensure maximum protection to fish and fish habitat and restoration of each project site to pre-construction or better conditions.

Yours truly,
Wood Environment & Infrastructure Solutions
a Division of Wood Canada Limited

Erin M. Hellinga, B.Sc.
Senior Environmental Biologist

7.0 REFERENCES

AECOM. 2010. Fruitland Road from Barton Street to Highway 8 Municipal Class Environmental Assessment Study, Phases 1 and 2 Report.

Aquafor Beech Limited. 2013. SCUBE Subwatershed Study.

Aquafor Beech Limited. 2016. Growth Management Planning and Economic Development Department. RE: SCUBE Block2 – Draft Concept Plan. September 16, 2016.

City of Hamilton and A.J. Clarke & Associates LTD. 2015. Cormorant Road Extension.

Colville Consulting. 2016. ELC Mapping for 238 Jones Road.

Dillon. 2009. Natural Heritage Assessment of Lands Bounded by Fruitland Road, Glover Road, Barton Street and Highway 8 Draft Report.

Dougan & Associates. 2016. Memorandum Update of NHS work completed for Fruitland-Winona Block 1. October 17, 2016.

Hamilton Conservation Authority (HCA). 2016. Correspondence Regarding Fruitland-Winona Block Servicing Strategy – Block 3 Terms of Reference.

Itrans Consulting Inc. 2009. Lewis Road Reconstruction Class Environmental Assessment Report.

Laurence, Anne Marie. "RE: Information Request - Barton Street and Fifty Road Improvements". Received by Brittany Ferguson, Sept 12 2017.

More Than Engineering (MTE). 2012. Natural Heritage Features Constraints Report.

Appendix A

Correspondence

Rideout, Daryl T

From: Laurence, Anne Marie (MNRF) <annemarie.laurence@ontario.ca>
Sent: August-04-16 4:24 PM
To: Ferguson, Brittany
Subject: RE: Information Request - Barton Street and Fifty Road Improvements
Attachments: SAR List City of Hamilton Aug 4 2016.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

From: Laurence, Anne Marie (MNRF)
Sent: August-04-16 4:20 PM
To: 'Ferguson, Brittany'
Subject: RE: Information Request - Barton Street and Fifty Road Improvements

Hi Brittany

The Ministry of Natural Resources and Forestry, Guelph District Office, has reviewed the natural heritage information available for the above-described study area.

We note that the study area includes wetlands that that have been evaluated as non-PSW (i.e., Fifty Mile Creek Wetland Complex).

In addition, please be advised that there are records in the area for the following species at risk (SAR): Barn Owl (endangered), Barn Swallow (threatened), Bobolink (threatened), and Chimney Swift. However, because the province has not been surveyed comprehensively for the presence of listed species, the absence of a record is not an appropriate indicator of the absence of SAR/SAR habitat from an area.

To determine the presence of SAR for a given study area, the District's recommended approach includes the following:

I. Habitat Inventory

MNRF 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 SAR 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 SAR known to occur within the planning area. The list of SAR known to occur in **the City of Hamilton** is attached for your reference. The species-specific COSEWIC status reports (www.cosewic.gc.ca) are a good source of information on habitat needs and will be helpful in determining the suitability of the study areas ecosites for a given species.

Please note that the Species at Risk in Ontario list (SARO) 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 https://www.ontario.ca/environment-and-energy/species-risk-ontario-list.

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 at http://www.ontario.ca/environment-and-energy/help-protect-species-risk.

SAR 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 SAR 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 SAR was surveyed for, and provide a rationale for why certain species were not afforded a survey (e.g. habitat within the study area is not suitable for a specific SAR). Please note that some targeted surveys may require provincial authorizations.

Other information

We additionally recommend contacting the municipality and the conservation authority to determine if they have any additional information or records of interest for the study area.

I trust the above information is of assistance.

Best regards,

Anne Marie

Anne Marie Laurence
Management Biologist
Ministry of Natural Resources & Forestry
Guelph District
(519) 826-4132

From: Ferguson, Brittany [mailto:brittany.ferguson@amecfw.com]
Sent: June-27-16 11:27 AM
To: Thompson, Melinda (MNRF)
Cc: Rideout, Daryl T; King, Maria E; Young, Rob
Subject: Information Request - Barton Street and Fifty Road Improvements

Hello Melinda,

On behalf of the City of Hamilton, Amec Foster Wheeler would like to request information related to Species at Risk and natural heritage features in the vicinity of the proposed road widening and intersection improvements of Barton Street from Fruitland to Fifty Road, and road widening of Fifty Road.

If you have any questions regarding the attached submittal, please do not hesitate to contact me at the undersigned.

Kind regards,

Brittany Ferguson, B.Sc.
Environmental Biologist
Amec Foster Wheeler
Environment & Infrastructure

160 Traders Blvd, Suite 110
Mississauga, Ontario, Canada L4Z 3K7

D +1 (905) 568 2929 x 4122
E brittany.ferguson@amecfw.com
amecfw.com

Rideout, Daryl T

From: McDonell, Lesley <Lesley.McDonell@conservationhamilton.ca>
Sent: February-17-17 1:27 PM
To: Ferguson, Brittany
Cc: Kenny, Darren
Subject: RE: Information Request - Barton Street and Fifty Road Improvements
Attachments: Database agreement_2017.pdf; Birds_STCK 136.pdf; Fifty Creek fisheries Data.pdf; Fifty Creek Fisheries Station Locations.pdf; Herpetofauna_STCK 136.pdf; Leps&Ods_STCK 136.pdf; Mammals_STCK 136.pdf; Plants_STCK 136.pdf

Hi Brittany,

Sorry it has taken a bit of time for me to get back to you. I was reviewing my emails and realized I had pulled all the data together but had not sent it along. Can you please sign, scan and return the second page of the database agreement file to me. Attached is the data for the Fifty Creek Valley ESA (STCK-136). The data is for the entire ESA. It is located on the eastern edge of the study area provided in your information request. We have also included fisheries information for 50 Creek. Please let me know if you have any questions.

Have a great weekend,
Lesley

Lesley McDonell
Terrestrial Ecologist
Hamilton Conservation Authority
838 Mineral Springs Road, P.O. Box 81067
Ancaster, Ontario L9G 4X1
OFFICE 905 525 2181 ext. 231 **FAX** 905 648 4622
EMAIL lesley.mcdonell@conservationhamilton.ca
WEB conservationhamilton.ca

From: Ferguson, Brittany [mailto:
Sent: Thursday, January 19, 2017 11:36 AM
To: Kenny, Darren <Darren.Kenny@conservationhamilton.ca>
Cc: Rideout, Daryl T <Daryl.Rideout@amecfw.com>; Young, Rob <Rob.Young@amecfw.com>
Subject: Information Request - Barton Street and Fifty Road Improvements

Hello Mr. Kenny,

On behalf of the City of Hamilton, Amec Foster Wheeler would like to request any information that Hamilton Region Conservation Authority (HCA) may have pertaining to relevant natural heritage features and Species at Risk in the vicinity of the proposed road widening and improvement project. Details of the proposed works, including mapping of the study area are enclosed in the attached letter.

If you have any questions regarding the attached submittal, please do not hesitate to contact me at the undersigned.

Kind Regards,

Brittany Ferguson, B.Sc.
Environmental Biologist

Amec Foster Wheeler
Environment & Infrastructure

160 Traders Blvd, Suite 110
Mississauga, Ontario, Canada L4Z 3K7

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E brittany.ferguson@amecfw.com
amecfw.com

Year	Species Code	Scientific Name	Common Name	Native Status	City of Hamilton Status	Source
2000	B-AMCR	Corvus brachyrhynchos	American Crow	N		990
2002	B-AMCR	Corvus brachyrhynchos	American Crow	N		1001
2000	B-AMGO	Carduelis tristis	American Goldfinch	N		990
2002	B-AMGO	Carduelis tristis	American Goldfinch	N		1001
2012	B-AMGO	Carduelis tristis	American Goldfinch	N		1002
2002	B-AMKE	Falco sparverius	American Kestrel	N	uncommon	1001
2002	B-AMRO	Turdus migratorius	American Robin	N		1001
2012	B-AMRO	Turdus migratorius	American Robin	N		1002
2012	B-BAOR	Icterus galbula	Baltimore Oriole	N		1002
2000	B-BANS	Riparia riparia	Bank Swallow	N	uncommon	990
2002	B-BANS	Riparia riparia	Bank Swallow	N	uncommon	1001
2012	B-BANS	Riparia riparia	Bank Swallow	N	uncommon	1002
2000	B-BCCH	Poecile atricapillus	Black-capped Chickadee	N		990
2002	B-BCCH	Poecile atricapillus	Black-capped Chickadee	N		1001
2012	B-BCCH	Poecile atricapillus	Black-capped Chickadee	N		1002
2000	B-BLJA	Cyanocitta cristata	Blue Jay	N		990
2002	B-BLJA	Cyanocitta cristata	Blue Jay	N		1001
2002	B-BHCO	Molothrus ater	Brown-headed Cowbird	N		1001
2012	B-BHCO	Molothrus ater	Brown-headed Cowbird	N		1002
2002	B-CEDW	Bombycilla cedrorum	Cedar Waxwing	N		1001
2002	B-CHSW	Chaetura pelagica	Chimney Swift	N	uncommon	1001
2002	B-COGR	Quiscalus quiscula	Common Grackle	N		1001
2012	B-COGR	Quiscalus quiscula	Common Grackle	N		1002
2002	B-COYE	Geothlypis trichas	Common Yellowthroat	N		1001
2012	B-EABL	Sialia sialis	Eastern Bluebird	N	uncommon	1002
2002	B-EAKI	Tyrannus tyrannus	Eastern Kingbird	N		1001
2000	B-EUST	Sturnus vulgaris	European Starling	I		990
2002	B-EUST	Sturnus vulgaris	European Starling	I		1001
2012	B-EUST	Sturnus vulgaris	European Starling	I		1002
2012	B-FISP	Spizella pusilla	Field Sparrow	N		1002
2002	B-GRCA	Dumetella carolinensis	Gray Catbird	N		1001
2012	B-GRCA	Dumetella carolinensis	Gray Catbird	N		1002

Year	Species Code	Scientific Name	Common Name	Native Status	City of Hamilton Status	Source
2002	B-HAWO	Picoides villosus	Hairy Woodpecker	N	uncommon	1001
2002	B-HOFI	Carpodacus mexicanus	House Finch	I		1001
2012	B-HOFI	Carpodacus mexicanus	House Finch	I		1002
2000	B-HOSP	Passer domesticus	House Sparrow	I		990
2002	B-HOWR	Troglodytes aedon	House Wren	N		1001
2012	B-HOWR	Troglodytes aedon	House Wren	N		1002
2002	B-MODO	Zenaida macroura	Mourning Dove	N		1001
2000	B-NOCA	Cardinalis cardinalis	Northern Cardinal	N		990
2002	B-NOCA	Cardinalis cardinalis	Northern Cardinal	N		1001
2012	B-NOCA	Cardinalis cardinalis	Northern Cardinal	N		1002
2012	B-NOFL	Colaptes auratus	Northern Flicker	N		1002
2012	B-OROR	Icterus spurius	Orchard Oriole	N	uncommon	1002
2002	B-PUMA	Progne subis	Purple Martin	N	uncommon	1001
2002	B-RTHA	Buteo jamaicensis	Red-tailed Hawk	N	uncommon	1001
2012	B-RTHA	Buteo jamaicensis	Red-tailed Hawk	N	uncommon	1002
2000	B-RWBL	Agelaius phoeniceus	Red-winged Blackbird	N		990
2002	B-RWBL	Agelaius phoeniceus	Red-winged Blackbird	N		1001
2012	B-RWBL	Agelaius phoeniceus	Red-winged Blackbird	N		1002
2012	B-SAVS	Passerculus sandwichensis	Savannah Sparrow	N		1002
2000	B-SOSP	Melospiza melodia	Song Sparrow	N		990
2002	B-SOSP	Melospiza melodia	Song Sparrow	N		1001
2012	B-SOSP	Melospiza melodia	Song Sparrow	N		1002
2002	B-WAVI	Vireo gilvus	Warbling Vireo	N		1001
2012	B-WAVI	Vireo gilvus	Warbling Vireo	N		1002
2012	B-WIFL	Empidonax traillii	Willow Flycatcher	N		1002
2002	B-YWAR	Dendroica petechia	Yellow Warbler	N		1001
2012	B-YRWA	Dendroica coronata	Yellow-rumped Warbler	N	rare	1002

Hamilton Conservation Authority - Fifty Creek Fisheries Data

Station Code	Survey Date (M/D/Y)	Survey Length (m)	Type of Survey	Gear Type	Electrofisher Seconds	*Scientific Name*	Common Name	Total number of Fish Sampled
FIF123-A1	07-Jul-99	no data	Presence/ Absence	Backpack Electrofishing	no data	*Pimephales promelas*	Fathead Minnow	no data
	18-Jul-06	50	Presence/ Absence	Backpack Electrofishing unit	88	No Fish	No Fish	no data
	20-Jul-09	50	Presence/ Absence	Backpack Electrofishing unit	567	No Fish	No Fish	no data
FIF125-A1	07-Jul-99	40	Presence/ Absence	Electrofishing unit	503	*Catostomus commersoni*	White sucker	no data
FIF126-A1f	12-Jul-13	40	Presence/ Absence	Backpack Electrofishing unit	172	*Catostomus commersoni*	White sucker	2
	15-Jul-14	50	Presence/ Absence	Backpack Electrofishing unit	270	*Luxilus cornutus*	Common shiner	2
						Lepomis cyanellus	Green sunfish	1
						Catostomus	White sucker	10
						promelas	Fathead minnow	4
	06-Aug-15	50	Presence/ Absence	Backpack Electrofishing unit	800	*Catostomus commersoni*	White sucker	7
	02-Aug-16	50	Presence/ Absence	Backpack Electrofishing unit	480	*Catostomus commersoni*	White sucker	2

Fisheries Station Location

Station Code	Locality of Station	Watershed	Sub-watershed	Drainage System	Easting	Northing
FIF123-A1	70m upstream of Highway 8, east branch	Stoney Creek	Fifty Creek	Lake Ontario	610927	4784620
FIF125-A1	35m upstream of South Service Road	Stoney Creek	Fifty Creek	Lake Ontario	611232	4785562
FIF126-A1f	50 m downstream of Baseline Rd	Stoney Creek	Watercourse 12 (Fifty Creek)	Lake Ontario	611492	4785811

Year	Species Code	Scientific Name	Common Name	Native Status	City of Hamilton Status	Source
2000	H-AMTO	Bufo americanus americanus	Eastern American Toad	N		990
2002	H-EAGA	Thamnophis sirtalis sirtalis	Eastern Garter Snake	N		1001
2000	H-GRFR	Rana clamitans	Green Frog	N		990
2002	H-GRFR	Rana clamitans	Green Frog	N		1001
2002	H-LEFR	Rana pipiens	Northern Leopard Frog	N		1001
2012	H-MICF	Pseudacris triseriata	Western Chorus Frog	N		1002

Year	Species Code	Scientific Name	Common Name	Native Status	City of Hamilton Status	Source
2002	L-LESK	Ancyloxypha numitor	Least Skipper	N		1001
2012	L-LESK	Ancyloxypha numitor	Least Skipper	N		1002
2012	L-SUAZ	Celastrina neglecta	Summer Azure	N		1002
2012	L-CORI	Coenonympha tullia	Common Ringlet	N		1002
2002	L-LWSA	Megisto cymela	Little Wood Satyr	N		1001
2012	L-LWSA	Megisto cymela	Little Wood Satyr	N		1002
2000	L-MOCL	Nymphalis antiopa	Mourning Cloak	N		990
2002	L-CAWH	Pieris rapae	Cabbage White	I		1001
2012	L-CAWH	Pieris rapae	Cabbage White	I		1002
2002	L-LODA	Polites mystic	Long Dash	N		1001
2002	L-PESK	Polites peckius	Peck's Skipper	N		1001
2012	L-QUMA	Polygonia interrogationis	Question Mark	N		1002
2002	L-EUSK	Thymelicus lineola	European Skipper	I		1001
2012	L-EUSK	Thymelicus lineola	European Skipper	I		1002
2012	L-READ	Vanessa atalanta	Red Admiral	N		1002
2002	O-GRDA	Anax junius	Common Green Darner	N	common	1001
2002	O-FABL	Enallagma civile	Familiar Bluet	N	common	1001
2002	O-EAPO	Erythemis simplicicollis	Eastern Pondhawk	N	common	1001
2002	O-EAPO	Erythemis simplicicollis	Eastern Pondhawk	N	common	1001
2002	O-EAFO	Ischnura verticalis	Eastern Forktail	N	common	1001
2012	O-EAFO	Ischnura verticalis	Eastern Forktail	N	common	1002
2002	O-COSW	Lestes disjunctus	Northern Spreadwing	N	common	1001
2002	O-COWH	Libellula lydia	Common Whitetail	N	common	1001
2012	O-COWH	Libellula lydia	Common Whitetail	N	common	1002
2002	O-TSSK	Libellula pulchella	Twelve-spotted Skimmer	N	common	1001
2012	O-TSSK	Libellula pulchella	Twelve-spotted Skimmer	N	common	1002
2002	O-BUDA	Pachydiplax longipennis	Blue Dasher	N	common	1001

2002	M-GRSQ	Sciurus carolinensis	Gray Squirrel	N	common	1001
2012	M-MEVO	Microtus pennsylvanicus	Meadow Vole	N	common	1002
2000	M-RACC	Procyon lotor	Raccoon	N	common	990
2002	M-RACC	Procyon lotor	Raccoon	N	common	1001
2000	M-WTDE	Odocoileus virginianus	White-tailed Deer	N	common	990
2002	M-WTDE	Odocoileus virginianus	White-tailed Deer	N	common	1001
2012	M-WTDE	Odocoileus virginianus	White-tailed Deer	N	common	1002
2000	M-WOOD	Marmota monax	Woodchuck	N	common	990

Year	Species Code	Scientific Name	Common Name	Native Status	City of Hamilton Status	Source
2000	P-ACENEGU	Acer negundo	Manitoba Maple	N		990
2000	P-ACEPLAT	Acer platanoides	Norway Maple	I		990
2000	P-ACESACC	Acer saccharinum	Silver Maple	N		990
2000	P-ALIPLAN	Alisma plantago-aquatica	Water-plantain	N		990
2000	P-ALLPETI	Alliaria petiolata	Garlic Mustard	I		990
2000	P-ARCMIMI	Arctium minus ssp. minus	Common Burdock	I		990
2000	P-ARITRTR	Arisaema triphyllum triphyllum	Jack-in-the-pulpit	N		990
2000	P-BIDCERN	Bidens cernua	Nodding Beggar-ticks	N		990
2000	P-CALSEPI	Calystegia sepium	Hedge Bindweed	N		990
2000	P-CARSTIP	Carex stipata	Awl-fruited Sedge	N		990
2000	P-CAROVAT	Carya ovata	Shagbark Hickory	N		990
2000	P-CHEMAJU	Chelidonium majus	Greater Celandine	I		990
2000	P-CORFORA	Cornus foemina racemosa	Grey Dogwood	N		990
2000	P-CRA__SP	Crataegus sp.	Hawthorn	N		990
2000	P-ECHLOBA	Echinocystis lobata	Wild Cucumber	N		990
2000	P-EQUPRAT	Equisetum pratense	Meadow Horsetail	N	uncommon	990
2000	P-ERIPHPH	Erigeron philadelphicus ssp. Philadelphicus	Philadelphia Fleabane	N		990
2000	P-FRANIGR	Fraxinus nigra	Black Ash	N		990
2000	P-GLEHEDE	Glechoma hederacea	Ground-ivy	I		990
2000	P-HEMFULV	Hemerocallis fulva	Orange Day-lily	I		990
2000	P-HESMATR	Hesperis matronalis	Dame's Rocket	I		990
2000	P-HYDVIRG	Hydrophyllum virginianum	Virginia Waterleaf	N		990
2000	P-IMPCAPE	Impatiens capensis	Spotted Touch-me-not	N		990
2000	P-JUGCINE	Juglans cinerea	Butternut	N		990
2000	P-JUGNIGR	Juglans nigra	Black Walnut	N		990
2000	P-LAPCANA	Laportea canadensis	Wood Nettle	N		990
2000	P-LEMMINO	Lemna minor	Common Duckweed	N		990
2000	P-LIGVULG	Ligustrum vulgare	Privet	I		990
2000	P-LONTATA	Lonicera tatarica	Tartarian Honeysuckle	I		990
2000	P-LYSNUMM	Lysimachia nummularia	Moneywort	I		990
2000	P-MEDLUPU	Medicago lupulina	Black Medick	I		990

Year	Species Code	Scientific Name	Common Name	Native Status	City of Hamilton Status	Source
2000	P-OXA__SP	Oxalis sp.	Wood-sorrel Species	N		990
2000	P-PARINSE	Parthenocissus inserta	Virginia Creeper	N		990
2000	P-POTFOLI	Potamogeton foliosus	Leafy Pondweed	N	rare	990
2000	P-POTPECT	Potamogeton pectinatus	Sago Pondweed	N	common	990
2000	P-PRUPENS	Prunus pensylvanica	Pin Cherry	N		990
2000	P-PRUSERO	Prunus serotina	Wild Black Cherry	N		990
2000	P-RANACRI	Ranunculus acris	Tall Buttercup	N		990
2000	P-RANFIBU	Ranunculus ficaria bulbifera	Lesser Celandine	N		990
2000	P-RHACATH	Rhamnus cathartica	Common Buckthorn	I		990
2000	P-RIBAMER	Ribes americanum	Wild Black Currant	N		990
2000	P-ROBPSEU	Robinia pseudo-acacia	Black Locust	I		990
2000	P-ROSMULT	Rosa multiflora	Multiflora Rose	I		990
2000	P-RUBIDID	Rubus idaeus idaeus	Red Raspberry	I		990
2000	P-SAGLATI	Sagittaria latifolia	Broadleaf Arrowhead	N		990
2000	P-SALNIGR	Salix nigra	Black Willow	N		990
2000	P-SOLDULC	Solanum dulcamara	Climbing Nightshade	I		990
2000	P-TAROFFI	Taraxacum officinale	Common Dandelion	I		990
2000	P-THADIOI	Thalictrum dioicum	Early Meadow-rue	N		990
2000	P-TILAMER	Tilia americana	American Basswood	N		990
2000	P-RHURARY	Toxicodendron rydbergii	Rydberg's Poison-ivy	N		990
2000	P-TUSFARF	Tussilago farfara	Coltsfoot	I		990
2000	P-TYP__SP	Typha sp.	Cattail Species	N		990
2000	P-ULMAMER	Ulmus americana	White Elm	N		990
2000	P-URTDIDI	Urtica dioica dioica	European Stinging Nettle	I		990
2000	P-VALAMER	Vallisneria americana	Tape Grass	N	rare	990
2000	P-VICCRAC	Vicia cracca	Bird Vetch	I		990
2000	P-VITAEST	Vitis aestivalis	Summer Grape	N		990
2000	P-VITRIPA	Vitis riparia	Riverbank Grape	N		990

Hamilton

Date Generated: June-30-16

Amphibian	SARO	Protection	Habitat Information	Timing Windows	Survey Protocol
Jefferson Salamander *Ambystoma jeffersonianum*	END	Species Protection and Habitat Regulation	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	Active: March – October Hibernates: October – March Breeding: Late March - Mid April	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol

Bird	SARO	Protection	Habitat Information	Timing Windows	Survey Protocol
Acadian Flycatcher *Empidonax virescens*	END	Species Protection and General Habitat Protection	Generally requires large areas of mature, undisturbed forest; avoids the forest edge; often found in well wooded swamps and ravines.	Migrate South before Winter	Follow Breeding Bird Survey Protocol
Bald Eagle *Haliaeetus leucocephalus*	SC	N/A	Prefers deciduous and mixed-deciduous forest; and habitat close to water bodies such as lakes and rivers. They roost in super canopy trees such as Pine.	Breed and Nest - April or May Some Migrate South when waterbodies freeze over	Follow Breeding Bird Survey Protocol
Bank Swallow *Riparia riparia*	THR	Species Protection and General Habitat Protection	It nests in a wide variety of naturally and anthropogenically created vertical banks, which often erode and change over time including aggregate pits and the shores of large lakes and rivers.	Migrate South before Winter	Follow Breeding Bird Survey Protocol. Colony and Roost information should be recorded and submitted using Bird Studies Canada's Ontario Bank Swallow Project data forms (2010).
Barn Owl *Tyto alba*	END	Species Protection and Habitat Regulation	Generally prefer low-elevation, open country; often associated with agricultural lands, especially pasture. Nests are located in buildings, hollow trees and cavities in cliffs.	Active Year Round Some leave for the Winter	Follow Breeding Bird Survey Protocol Night surveys may be helpful as they are very vocal
Barn Swallow *Hirundo rustica*	THR	Species Protection and General Habitat Protection	Prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	Migrate South before Winter	Follow Breeding Bird Survey Protocol

Black Tern *Chlidonias niger*	SC	N/A	Generally prefer freshwater marshes and wetlands; nest either on floating material in a marsh or on the ground very close to water	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Bobolink *Dolichonyx oryzivorus*	THR	Species Protection and General Habitat Protection	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands	Migrate South for the Winter	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Canada Warbler *Cardellina canadensis*	SC	N/A	Generally prefers wet coniferous, decidiuous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest.	Arrive in Early May Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Cerulean Warbler *Setophaga cerulea*	THR	Species Protection and General Habitat Protection	Generally found in mature deciduous forests with an open understorey; also nests in older, second-growth deciduous forests.	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Chimney Swift *Chaetura pelagica*	THR	Species Protection and General Habitat Protection	Historically found in deciduous and coniferous, usually wet forest types, all with a well developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys	Nesting - Late April to Mid-May Migrate South in September or Early October	Chimney Swift Monitoring Protocol. Bird Studies Canada, March 2009
Common Nighthawk *Chordeiles minor*	SC	N/A	Generally prefer open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nest on flat roof-tops).	Migrate South for the Winter	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol

Eastern Meadowlark *Sturnella magna*	THR	Species Protection and General Habitat Protection	Generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps.	Migrate South for the Winter	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Eastern Whip-poor-will *Caprimlugus vociferus*	THR	Species Protection and General Habitat Protection	Generally prefer semi-open deciduous forests or patchy forests with clearings; areas with little ground cover are also preferred; In winter they occupy primarily mixed woods near open areas.	Nesting: May - July	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Eastern Wood-Pewee *Contopus virens*	SC	N/A	Associated with deciduous and mixed forests. Within mature and intermediate age stands it prefers areas with little understory vegetation as well as forest clearings and edges.	Migrate South for the Winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Golden-winged Warbler *Vermivora chrysoptera*	SC	N/A	Generally prefer areas of early successional vegetation, found primarily on field edges, hydro or utility right-of-ways, or recently logged areas.	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Henslow's Sparrow *Ammodramus henslowii*	END	Species Protection and General Habitat Protection	Generally found in old fields, pastures and wet meadows. They prefer areas with dense, tall grasses, and thatch, or decaying plant material	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
King Rail *Rallus elegans*	END	Species Protection and General Habitat Protection	Generally this species requires large marshes with open shallow water that merges with shrubby areas	Breed from Late April to mid-May Migrate South for the Winter	Follow Marsh Monitoring Protocol.
Least Bittern *Ixobrychus exilis*	THR	Species Protection and General Habitat Protection	Generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants	Migrate South for the Winter	Follow Marsh Monitoring Protocol; 10 day window of male calling (variable timing). Does not respond well to playback. Very difficult to detect.

Louisiana Waterthrush *Seiurus motacilla*	SC	N/A	Generally inhabits mature forests along steeply sloped ravines adjacent to running water. It prefers clear, cold streams and densely wooded swamps	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Peregrine Falcon *Falco peregrinus*	SC	N/A	Generally nest on tall, steep cliff ledges adjacent to large waterbodies; some birds adapt to urban environments and nest on ledges of tall buildings, even in densely populated downtown areas.	Active Year Round - Lay Eggs around Easter Hatching occurs around Mother's Day Young fledge around Father's	Visit ideal habitat locations and listen/look for individuals in the vicinity.
Prothonotary Warbler *Protonotaria citrea*	END	Species Protection and General Habitat Protection	Generally found in the dead trees of flooded woodlands or deciduous swamp forests; Carolinia Zone	Migrate South for the Winter Eggs are laid from Late May - Early July	Follow Breeding Bird Survey Protocol
Red-Headed Woodpecker *Melanerpes erythrocephalus*	SC	N/A	Generally prefer open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, as well as along beaver ponds and brooks	Active from May to September	Follow Breeding Bird Survey Protocol
Short-eared Owl *Asio flammeus*	SC	N/A	Generally prefers a wide variety of open habitats, including grasslands, peat bogs, marshes, sand-sage concentrations, old pastures and agricultural fields	Active Year Round	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Wood Thrush *Hylocichla mustelina*	SC	N/A	Nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. Prefers large forest mosaics, but may also nest in small forest fragments.	Migrate South for the Winter Arrive in Ontario in mid to late spring	Follow Breeding Bird Survey Protocol
Yellow-breasted Chat *Icteria virens*	END	Species Protection and General Habitat Protection	Generally prefer dense thickets around wood edges, riparian areas, and in overgrown clearings	Migrate South for the Winter Arrive in Ontario Early May	Follow Breeding Bird Survey Protocol

Fish	SARO	Protection	Habitat Information	Timing Windows	Survey Protocol
American Eel *Anguilla rostrata*	END	Species Protection and General Habitat Protection	All fresh water, estuaries and coastal marine waters that are accessible to the Atlantic Ocean; 12-mile Creek watershed and Lake Ontario	Active Year Round	Electrofishing For information please contact your local MNRF office, CA or DFO
Grass Pickerel *Esox americanus vermiculatus*	SC	N/A	Generally occur in wetlands with warm, shallow water and an abundance of aquatic plants; occur in the St. Lawrence River, Lake Ontario, Lake Erie, and Lake Huron	Spawn from late March to early May	For information please contact your local MNRF office, CA and/or DFO
Redside Dace *Clinostomus elongatus*	END	Species Protection and Habitat Regulation	Generally found in pools and slow-moving areas of small headwater streams with a moderate to high gradient	Spawning occurs in May	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Silver Shiner *Notropis photogenis*	THR	Species Protection and General Habitat Protection	Generally prefer moderate to large, deep, relatively clear streams with swift currents, and moderate to high gradients	Spawning occurs in May and June	For information please contact your local MNRF office, CA and/or DFO
Insect	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
Monarch Butterfly *Danaus plexippus*	SC	N/A	Exist primarily wherever milkweed and wildflowers exist; abandoned farmland, along roadsides, and other open spaces	Usually migrate south in late September and October	Watch for adults along roadsides and in open fields. Caterpillars feed on milkweeds: Common milkweed grows in open disturbed habitats (fields, roadsides, etc) and swamp milkweed grows in wet habitats (along streams, lakes, marshes) Adults can be spotted from a distance; caterpillars must be looked for carefully on the host plant.
Mottled Duskywing *Erynnis martialis*	END	Species Protection and General Habitat Protection	Generally inhabits a range of grassland, shrubland, and savanna habitats that contain well drained soils and the presence of its host plants Prairie Redroot (Ceanothus herbaceus) or New Jersey Tea (Ceanothus americanus).	Adult butterfly emerges from pupa in late March and early April	Watch for adults near host plants or search for caterpillars on the host plant Adults can be spotted from a distance; caterpillars must be looked for carefully on the host plant.

West Virginia White *Pieris virginiensis*	SC	N/A	Generally prefer moist, deciduous woodlands. The larvae feed only on the leaves of the two-leaved toothwort (Cardamine diphylla), which is a small, spring-blooming plant of the forest floor.	Adult butterfly emerges from pupa in late March; flies only in April and May	Watch for adults within moist, deciduous woodlands Caterpillars feed on the two-leaved toothwort: Toothwort grows in damp, open, rich hardwood woodlands and blooms from April to June. Adults can be spotted from a distance; caterpillars must be searched for carefully by checking host plant
Mammal	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
American Badger *Taxidea taxus*	END	Species Protection and Habitat Regulation	Generally prefers open habitats, whether natural (grasslands) or man-made (agricultural fields, road right-of-ways, golf courses).	Breed: Late Summer Semi-dormant over Winter	Determine if soils are suitable (sandy or loamy) Dens and Woodchuck burrows should be surveyed for use
Eastern Small-footed Myotis *Myotis leibii*	END	Species Protection and General Habitat Protection	Overwintering habitat: Caves and mines that remain above 0 degrees Celsuis Maternal Roosts: primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses and under tree bark.	Hibernates in caves and mines during winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Little Brown Myotis *Myotis lucifugus*	END	Species Protection and General Habitat Protection	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh).	Hibernates during winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Northern Myotis *Myotis septentrionalis*	END	Species Protection and General Habitat Protection	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: Often asssociated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns etc.)	Hibernates during winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol

Tri-coloured Bat *Perimyotis subflavus*	END	Species Protection and General Habitat Protection	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: Can be in trees or dead clusters of leaves or arboreal lichens on trees. May also use barns or similar structures.	Hibernates during winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Woodland Vole *Microtus pinetorum*	SC	N/A	Generally associated with deciduous forests in areas of soft, friable, often sandy soil beneath deep humus, where it can burrow easily.	Active Year Round	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Mollusc	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
Eastern Pondmussel *Ligumia nasuta*	END	Species Protection and General Habitat Protection	Generally inhabit sheltered areas of lakes or slow streams in substrates of fine sand and mud	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. "Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)." Fisheries and Oceans Canada. (2008).
Lilliput *Taxolasma parvum*	END	Species Protection and General Habitat Protection	Found in a variety of habitats including small to large rivers, wetlands, shallows of lakes, ponds and reservoirs. They are common in soft substrates with over 50% of the substrate type comprised of sand and a mud/muck/silt combination. Typically occur with or near Green Sunfish, Bluegill, White Crappie, and Johnny Darter	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. "Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)." Fisheries and Oceans Canada. (2008): Print.
Rainbow Mussel *Villosa iris*	THR	Species Protection and General Habitat Protection	Most abundant in shallow, well-oxygenated reaches of small- to medium-sized rivers and sometimes lakes, on substrates of cobble, gravel, sand and occasionally mud	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. "Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)." Fisheries and Oceans Canada. (2008): Print.
Plant	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**

American Chestnut *Castanea dentata*	END	Species Protection and General Habitat Protection	Found in deciduous forest communities; this tree prefers arid forests with acid and sandy soils.	Flowers occur in Late Spring and Early Summer	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species Perform detailed floristic inventory Look for distinictive fruits on the ground
American Columbo *Frasera caroliniensis*	END	Species Protection and General Habitat Protection	Most commonly associated with open deciduous forested slopes, thickets and clearings; grows in a variety of relatively stable habitats as well as on a wide variety of soils.	Germination and development of the rosette begin in early spring Flowers open in May Fruit production continues	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species Look for spikes from last years flowers
American Ginseng *Panax quinquefolius*	END	Species Protection and General Habitat Protection	Grows in rich, moist, undisturbed and relatively mature deciduous woods in areas of neutral soil (such as over limestone or marble bedrock).	Flowering begins in June and continues until August The fruit develop from July to August and ripen in August and September	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Broad Beech Fern *Phegopteris hexagonoptera*	SC	N/A	Generally inhabits shady areas of beech and maple forests where the soil is moist or wet	The frond of the Broad Beech Fern appears towards the end of May	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Butternut *Juglans cinerea*	END	Species Protection and General Habitat Protection	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows	Flowers from April to June. Fruits reach maturity during the month of September or October	Walk slowly and systematically in grid fashion through suitable habitat pausing every 30 meters for a detailed scan of trees within sight. Areas with dense foliage or many saplings will require a more intensive survey to detect sapling butternut. Use Butternut Health Assessment Protocol if planning on removing trees.
Eastern Flowering Dogwood *Cornus florida*	END	Species Protection and Habitat Regulation	Generally grows in deciduous and mixed forests, in the drier areas of its habitat, although it is occasionally found in slightly moist environments; Also grows around edges and hedgerows	Flowering occurs in mid-May, just as the leaves begin to develop. Fruit turns red at the end of summer.	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species Easiest to detect during Spring when in flower Also look for distinctive bark

Few-flowered Club-rush *Trichophorum planifolium*	END	Species Protection and Habitat Regulation	Generally found in Dry Fresh Oak deciduous forests and Dry Fresh Oak-Maple-Hickory deciduous forests (only found on RBG property).	Plants flower early before the forest canopy	Seaches for this species should only be done in March or April, when the species is most visible Walk slowly and systematically in grid fashion, pausing to scan for plants every 1 meters Distinguishing this species from similar species is difficult
Green Dragon *Arisaema dracontium*	SC	N/A	Generally grows in damp deciduous forests and along streams.	Flowering occurs in May and June	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Hoary Mountain-mint *Pycnanthemum incanum*	END	Species Protection and General Habitat Protection	Oak savannas and prairies, dry sites.	Flowering occurs in July	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Red Mulberry *Morus rubra*	END	Species Protection and General Habitat Protection	Generally grows in moist forest habitats. In Ontario, these include slopes and ravines of the Niagara Escarpment, and sand spits and bottom lands; Can grow in open areas such as hydro corridors	Flowering occurs when leaves emerge in late spring. Fruit emerges in Mid-July.	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from the similar White Mulberry Distinguishing Red Mulberry and the hybrid Red and White Mulberry will require the collection of leaves for generic testing, which requires a 17(2)(b) permit
Spotted Wintergreen *Chimaphila maculata*	END	Species Protection and General Habitat Protection	Generally grow in sandy habitats in dry-mesic oak-pine woods.	Flowering occurs in late July to early August	Watch for the distinct evergreen leaves in suitable habitat May be easiest to search in fall and spring
White Wood Aster *Eurybia divaricata*	THR	Species Protection and General Habitat Protection	Generally grows in open, dry, deciduous forests. It has been suggested that it may benefit from some disturbance, as it often grows along trails.	Flowering occurs in early September, and sets fruit later in the month	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Reptile	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**

Blanding's Turtle *Emydoidea blandingii*	THR	Species Protection and General Habitat Protection	Generally occur in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest 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.	Eggs are laid in June, with hatchlings emerging in late September and early October.	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Eastern Hog-nosed Snake *Heterodon platirhinos*	THR	Species Protection and General Habitat Protection	Generally prefer habitats with sandy, well-drained soil and open vegetative cover, such as open woods, brushland, fields, forest edges and disturbed sites. The species is often found near water.	Mating occurs in spring and in August and early September. Eggs are laid in June. Hatching occurs in late August or early September	In early spring, look for individuals near ideal hibernation sites During egg-laying period (June), look for nesting females in sandy areas in early morning and late evening. Rest of the season, survey intensively and systematically by flipping rocks
Eastern Ribbonsnake *Thamnophis sauritus*	SC	N/A	Generally occur along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting.	Hibernate: October - April Mating: Early Spring Hatching: Early Fall (September)	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Northern Map Turtle *Graptemys geographica*	SC	N/A	Generally inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as rocks and logs) and exposure to the sun for at least part of the day.	Active: At night Hibernate: October - April Hatching: Late August - Early September	Scan shoreline in spring and partially submerged logs/rocks in summer for basking turtles Be aware that map turtles do not allow as close of approach as other turtles before leaving a basking site Snorkel in desired aquatic habitat

Snapping Turtle *Chelydra serpentina*	SC	N/A	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	Nesting: Late May and June Hibernate: October - April	Scan offshore rocks and logs for basking turtles (10am-2pm) Snorkel in desired aquatic habitat Nesting Season: Search known or preferred nesting habitat areas for females
Spiny Softshell *Apalone spinifera*	THR	Species Protection and General Habitat Protection	Generally prefer marshy creeks, swift-flowing rivers, lakes, impoundments, bays, marshy lagoons, ditches and ponds near rivers	Lay eggs in June or July Hibernate over winter	Best time to survey is during nesting season when females are active laying eggs Visual searches should be conducted in appropriate habitat

Ferguson, Brittany

From: Laurence, Anne Marie (MNRF) <annemarie.laurence@ontario.ca>
Sent: September-12-17 1:37 PM
To: Ferguson, Brittany
Subject: RE: Information Request - Barton Street and Fifty Road Improvements

You're welcome Brittany. Regarding the fish populations within Fifty Creek, I am aware that Hamilton Conservation Authority conducted surveys (electrofishing) there in 2009. Fish species listed for that watercourse are as follows: creek chub, fathead minnow, green sunfish, lake chub, pumpkinseed and white sucker.

Anne Marie

From: Ferguson, Brittany [mailto:brittany.ferguson@amecfw.com]
Sent: September-12-17 12:48 PM
To: Laurence, Anne Marie (MNRF)
Subject: RE: Information Request - Barton Street and Fifty Road Improvements

Hello Anne Maria,

Thank you for providing the further information included below.

Can you confirm whether the MNRF has fish community records for those watercourses found within the study area? Namely, does the MNRF have any field collection records from Fifty Creek?

Kind Regards,

Brittany Ferguson, B.Sc.
Environmental Biologist
Amec Foster Wheeler
Environment & Infrastructure

160 Traders Blvd, Suite 110
Mississauga, Ontario, Canada L4Z 3K7

D +1 (905) 568 2929 x 4122
E brittany.ferguson@amecfw.com
amecfw.com

From: Laurence, Anne Marie (MNRF) [mailto:annemarie.laurence@ontario.ca]
Sent: August-04-16 4:24 PM
To: Ferguson, Brittany <brittany.ferguson@amec.com>
Subject: RE: Information Request - Barton Street and Fifty Road Improvements

My apologies, I hit send too quickly. That should have read "**City of Hamilton"** (correction highlighted below) and I've attached the municipal SAR list accordingly.

Best regards,

Anne Marie

From: Laurence, Anne Marie (MNRF)
Sent: August-04-16 4:20 PM
To: 'Ferguson, Brittany'
Subject: RE: Information Request - Barton Street and Fifty Road Improvements

Hi Brittany

The Ministry of Natural Resources and Forestry, Guelph District Office, has reviewed the natural heritage information available for the above-described study area.

We note that the study area includes wetlands that that have been evaluated as non-PSW (i.e., Fifty Mile Creek Wetland Complex).

In addition, please be advised that there are records in the area for the following species at risk (SAR): Barn Owl (endangered), Barn Swallow (threatened), Bobolink (threatened), and Chimney Swift. However, because the province has not been surveyed comprehensively for the presence of listed species, the absence of a record is not an appropriate indicator of the absence of SAR/SAR habitat from an area.

To determine the presence of SAR for a given study area, the District's recommended approach includes the following:

I. Habitat Inventory

MNRF 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 SAR 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 SAR known to occur within the planning area. The list of SAR known to occur in **the City of Hamilton** is attached for your reference. The species-specific COSEWIC status reports (www.cosewic.gc.ca) are a good source of information on habitat needs and will be helpful in determining the suitability of the study areas ecosites for a given species.

Please note that the Species at Risk in Ontario list (SARO) 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 https://www.ontario.ca/environment-and-energy/species-risk-ontario-list.

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 at http://www.ontario.ca/environment-and-energy/help-protect-species-risk.

SAR 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 SAR 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 SAR was surveyed for, and provide a rationale for why certain species were not afforded a survey (e.g. habitat within the study area is not suitable for a specific SAR). Please note that some targeted surveys may require provincial authorizations.

Other information

We additionally recommend contacting the municipality and the conservation authority to determine if they have any additional information or records of interest for the study area.

I trust the above information is of assistance.

Best regards,

Anne Marie

_____

Anne Marie Laurence
Management Biologist
Ministry of Natural Resources & Forestry
Guelph District
(519) 826-4132

From: Ferguson, Brittany [mailto:brittany.ferguson@amecfw.com]
Sent: June-27-16 11:27 AM
To: Thompson, Melinda (MNRF)
Cc: Rideout, Daryl T; King, Maria E; Young, Rob
Subject: Information Request - Barton Street and Fifty Road Improvements

Hello Melinda,

On behalf of the City of Hamilton, Amec Foster Wheeler would like to request information related to Species at Risk and natural heritage features in the vicinity of the proposed road widening and intersection improvements of Barton Street from Fruitland to Fifty Road, and road widening of Fifty Road.

If you have any questions regarding the attached submittal, please do not hesitate to contact me at the undersigned.

Kind regards,

Brittany Ferguson, B.Sc.
Environmental Biologist
Amec Foster Wheeler
Environment & Infrastructure

160 Traders Blvd, Suite 110
Mississauga, Ontario, Canada L4Z 3K7

D +1 (905) 568 2929 x 4122
E brittany.ferguson@amecfw.com

amecfw.com

Appendix B

Field Records

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPB166053	Barton St.	28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No O Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
A. Law	Partly Cloudy	11:40	12:10

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
16	11.8	820 µs

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
		WC - 5.0	WCS.0US - ROW

LOCATION OF CROSSING:

GPS COORDINATES:	MTO CHAINAGE:
TOWNSHIP:	**MNR DISTRICT:** Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Residential / commercial	

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert O	CSP O	N/A O

Other O Describe: Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	✗	O	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area	–	–	50	50	–	
Mean depth wetted (m)			0.06	0.07		
Mean width wetted (m)			1.2	2.10		
Mean bankfull width (m)			2.10	3.60		
Mean bankfull depth(m)			0.214	0.242		
Substrate			10 = Bo 80 = Co 10 = Gr	40 = Co 40 = Gr 20 = Si		

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	O	✗	O	O
Right Upstream Bank	✗	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris / Instream / Overhanging	Organic debris	Vascular Macrophytes / Instream / Overhanging	None
90		15	75				10

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	✗	O	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
	—	—	—	100
Predominant Species				

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater: NO	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES:

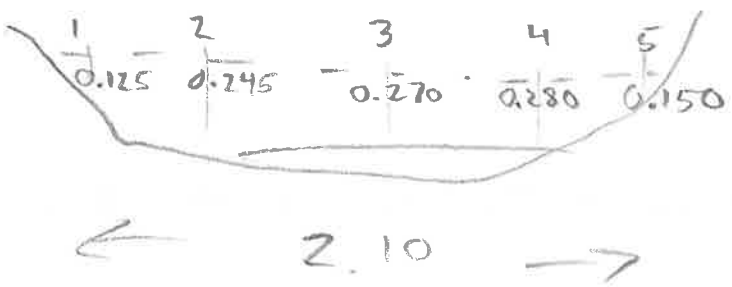
COMMENTS:

- WC 5.0 - US - Road
- DO = 11.36
- ph = 6.78

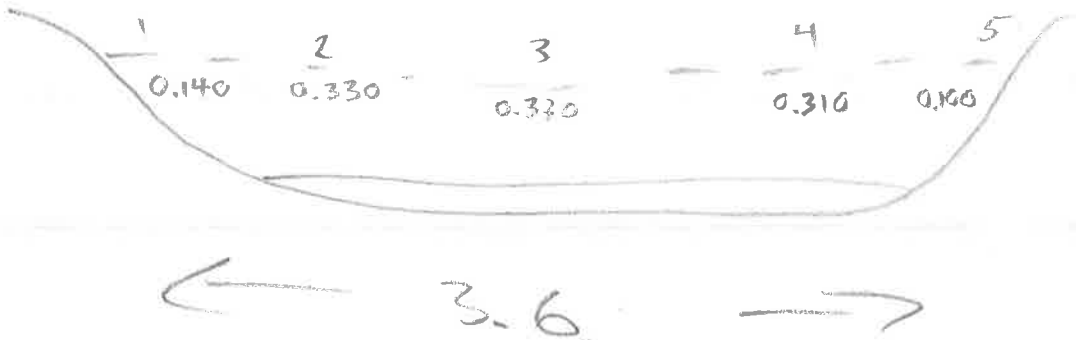
Additional Notes Appended? O No O Yes number of pages 2

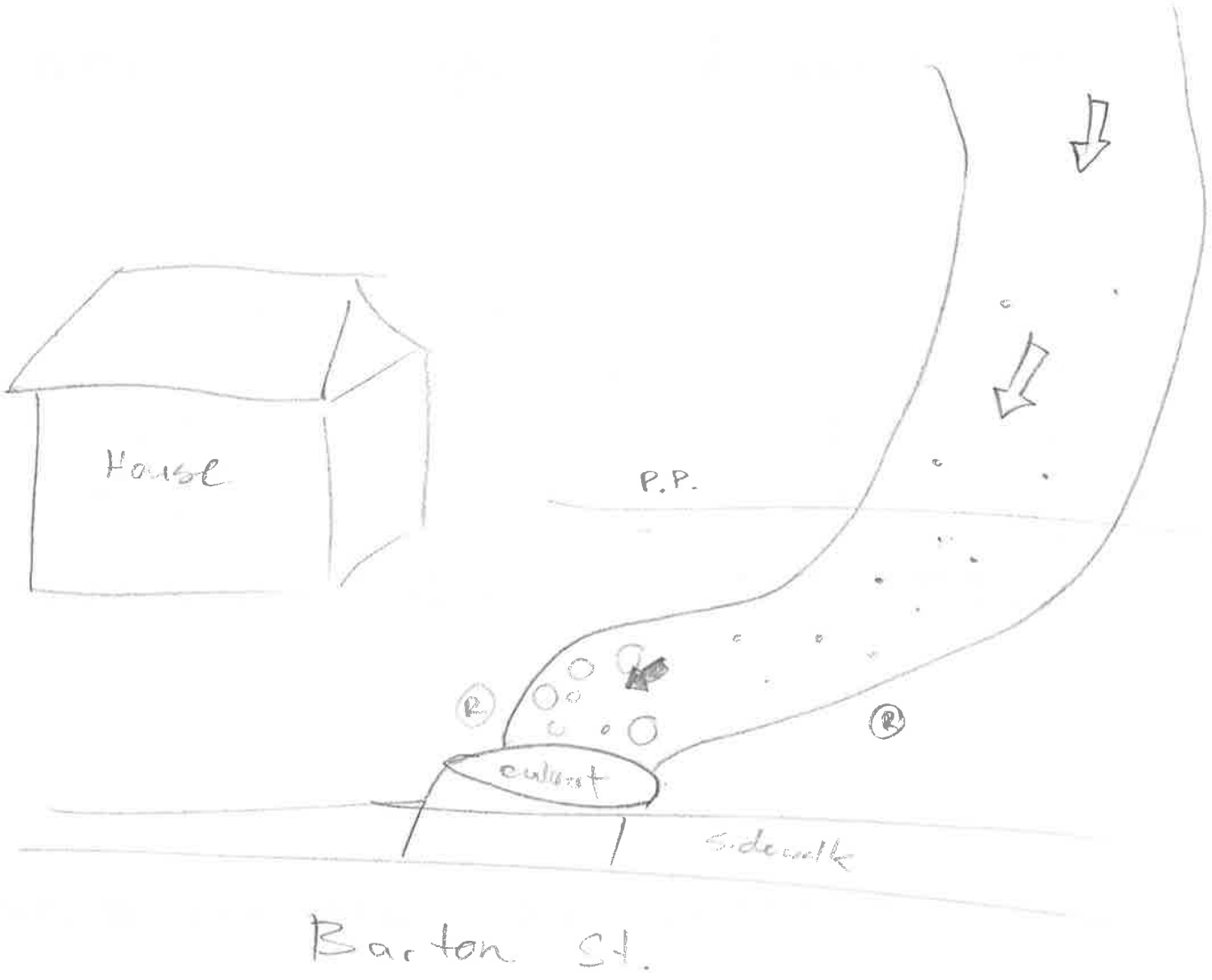
Bank Full

Riffle



Flat




House
P.P.
culvert
Sidewalk
Barton St.

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPBIC6053	Barton St.	28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No ⊘ Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
AL	Partly Cloudy	10:20	11:40

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
15	11.7	820 µS

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
		WC 5.0	WC 5.0 DS - ROW

LOCATION OF CROSSING: Barton St. East of Fruitland

GPS COORDINATES:	MTO CHAINAGE:

TOWNSHIP:	MNR DISTRICT:
Hamilton	

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Residential / commercial	Roadway / agriculture

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert O	CSP O	N/A O

Other O Describe:

Size (w x h) m^2 1.8 x 1.0

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	⊘	O	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area	30	20	30	20		
Mean depth wetted (m)	0.16	0.35	0.11	0.055		
Mean width wetted (m)	1.0	1.5	0.75	1.5		
Mean bankfull width (m)	1.0	2.10	1.2	1.8		
Mean bankfull depth(m)	0.492	0.782	0.242	0.330		
Substrate	90 = Co 5 = Gr 5 = Si	50 = Co 25 = Si 25 = Sa	80 = Co 20 = Bo	80 = Co 10 = Si 10 = Gr		

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	X	O	O	O
Right Upstream Bank	X	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris	Organic debris	Vascular Macrophytes	None
100	5	15	75	Instream Overhanging 5		Instream Overhanging	

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	X	O	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
	—	—	5	95
Predominant Species				

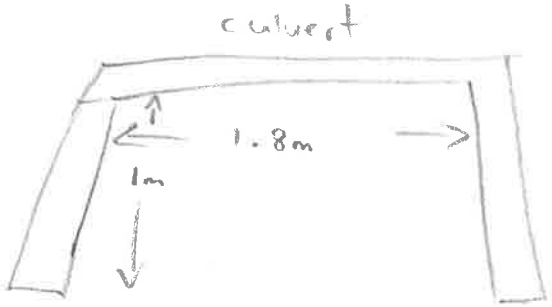
MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater NO	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES:

COMMENTS:

DO = 11.30

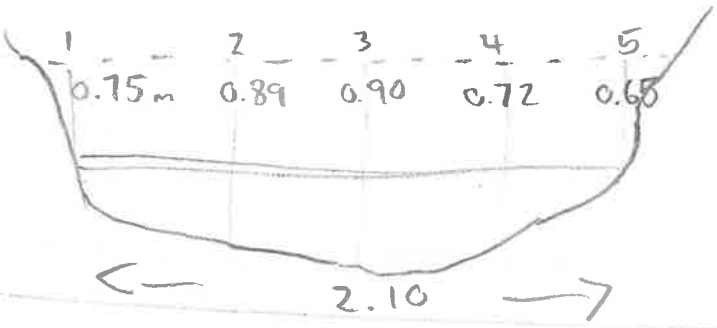
ph = 6.78



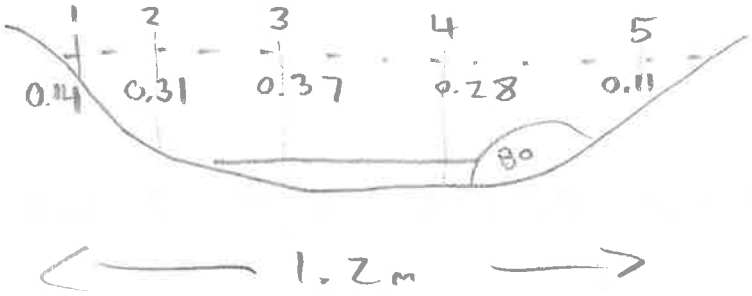
Additional Notes Appended? O No O Yes number of pages 2

BANK FULL

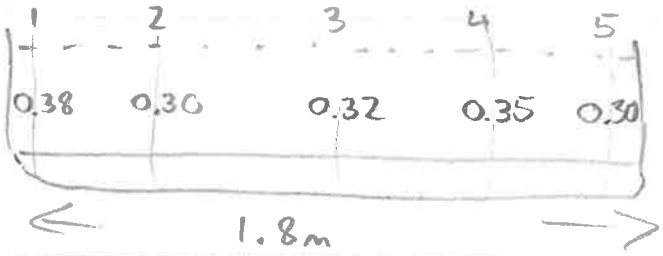
Pool



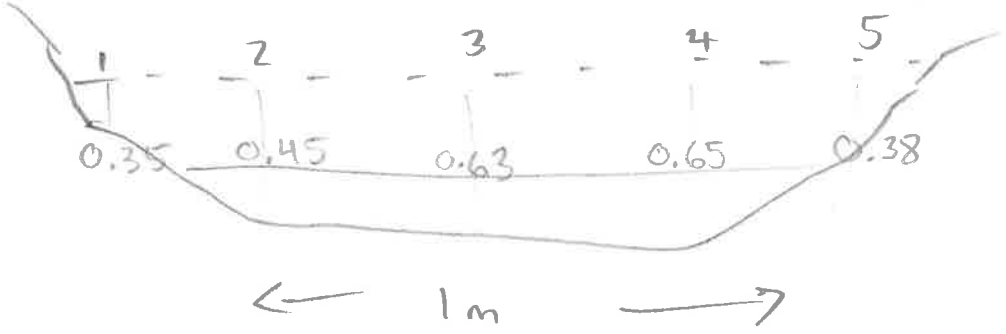
Riffle

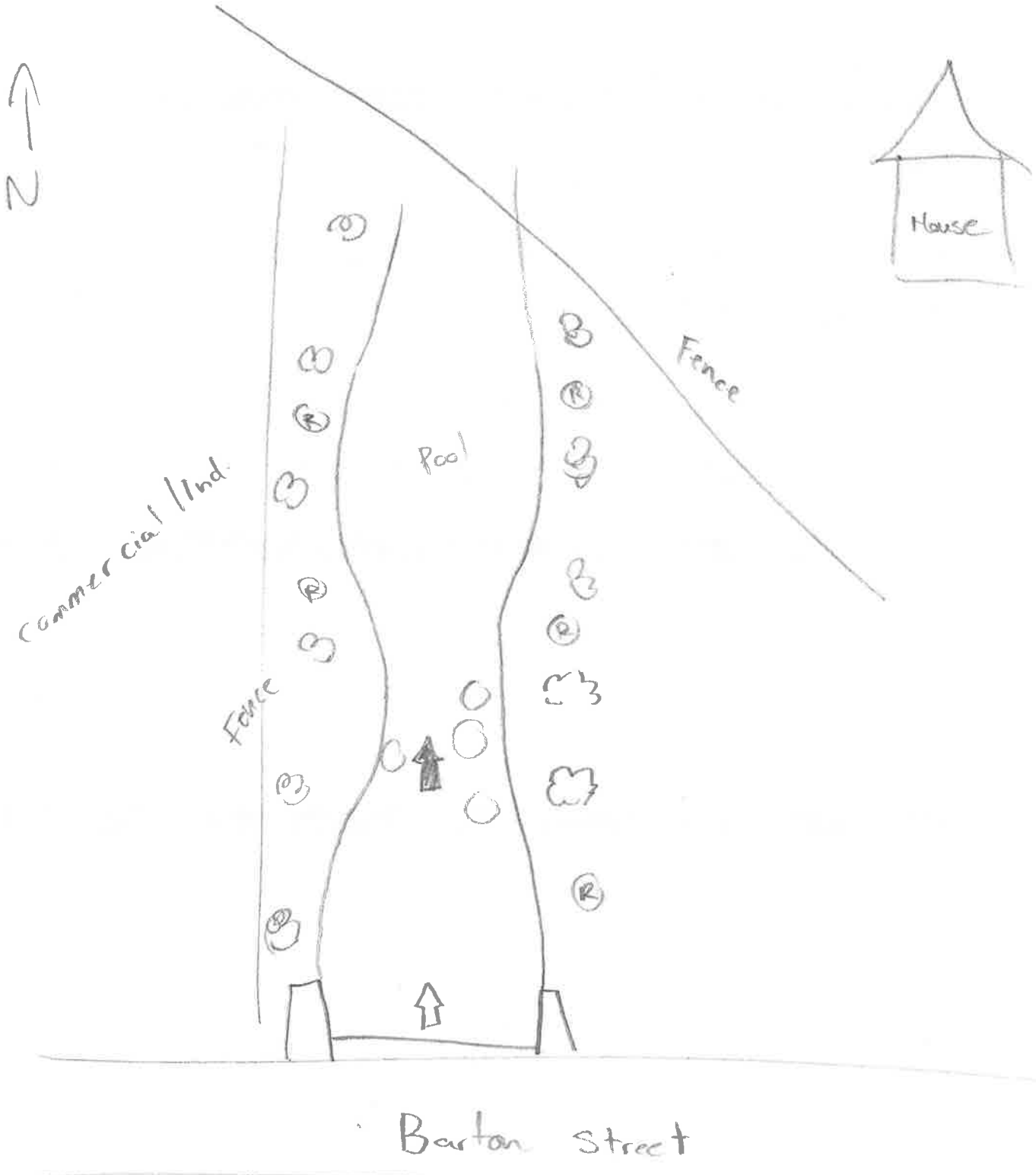


Flat



Run




N
House
Fence
Pool
commercial/Ind.
Fence
Barton Street

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPB166053	Barton St.	28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No O Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
AL Law	Partly Cloudy	12:18	12:28

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
17	N/A	N/A

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
		WC 5.2	WC 5.2 - US - ROW

LOCATION OF CROSSING:

GPS COORDINATES:	MTO CHAINAGE:
TOWNSHIP: Hamilton	MNR DISTRICT: Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Resident / agriculture	Road / agr.

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert O	CSP O	N/A O

Other O Describe: Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	O	O	✓	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area						
Mean depth wetted (m)						
Mean width wetted (m)						
Mean bankfull width (m)						
Mean bankfull depth(m)						
Substrate						

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	O	O	O	O
Right Upstream Bank	O	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris Instream Overhanging	Organic debris	Vascular Macrophytes Instream Overhanging	None

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	O	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
Predominant Species				

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES:

COMMENTS:

- Heavy rainfall previous day
- Small amount of water flowing @ time of observation
- Bottom of ditch grass filled
- Likely dry/emphemeral
- Photos taken

Additional Notes Appended? O No O Yes number of pages _____

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPB166053	Barton St	28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No O Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
ALaw	Partly Cloudy	12:30	12:45

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
17	N/A	N/A

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
		WC 5.2	WC 5.2 - DS - ROW

LOCATION OF CROSSING:

GPS COORDINATES:	MTO CHAINAGE:

TOWNSHIP:	MNR DISTRICT:
Hamilton	Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Residential	

EXISTING STRUCTURE TYPE

Bridge O	Box CulvertO	Open Foot Culvert O	CSP O	N/A O

Other O Describe: Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	O	O	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area						
Mean depth wetted (m)						
Mean width wetted (m)						
Mean bankfull width (m)						
Mean bankfull depth(m)						
Substrate						

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	O	O	O	O
Right Upstream Bank	O	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris Instream Overhanging	Organic debris	Vascular Macrophytes Instream Overhanging	None

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	O	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
Predominant Species				

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES:

COMMENTS:

- Took Photos
- Grassy drainage ditch

Additional Notes Appended? O No O Yes number of pages 2

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPB166053	Barton St.	28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No O Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
AL	Mostly Sunny	12:50	13:28

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
18	14.7	1180

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
		WC 6.0	WC 6.0 US - ROW

LOCATION OF CROSSING:

Barton St & Jones

GPS COORDINATES:	MTO CHAINAGE:

TOWNSHIP:	MNR DISTRICT:
Hamilton	Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Residential	Road / Agriculture

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert O	CSP O	N/A O

Other O Describe:	Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	✓	O	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area		80	10	10		
Mean depth wetted (m)		0.470	0.07	0.225		
Mean width wetted (m)		1.9	0.300	2.0		
Mean bankfull width (m)		3.40	1.50	2.8		
Mean bankfull depth(m)		0.349	0.124	0.344		
Substrate		80 = Bo 10 = Si 10 = Gr	90 = Co 5 = Gr 5 = Si	5 = Bo 80 = Co 10 = Gr		

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	5 = Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	☒	O	O	O
Right Upstream Bank	☒	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris / Instream / Overhanging	Organic debris	Vascular Macrophytes / Instream / Overhanging	None
90	5	10	70			5	10

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	☒	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
Predominant Species				100

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater: No	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES:

COMMENTS:

D.O: 11.68

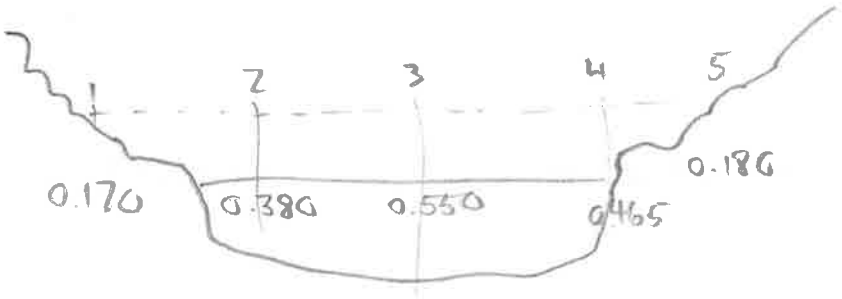
ppm: 590

ph: 8.78

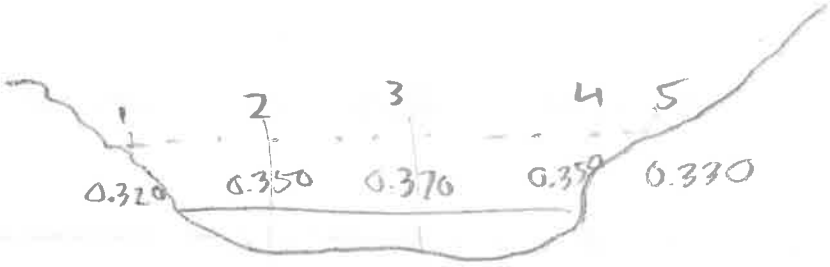
Additional Notes Appended? O No O Yes number of pages 2

Bank Full mm

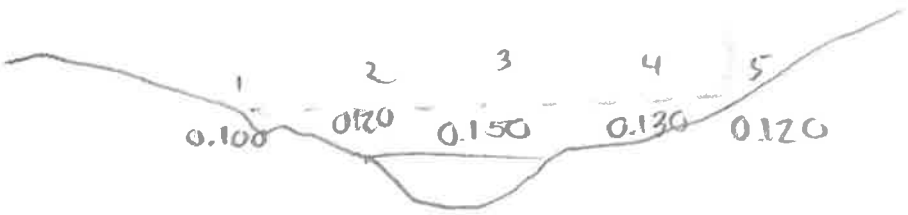
Pool

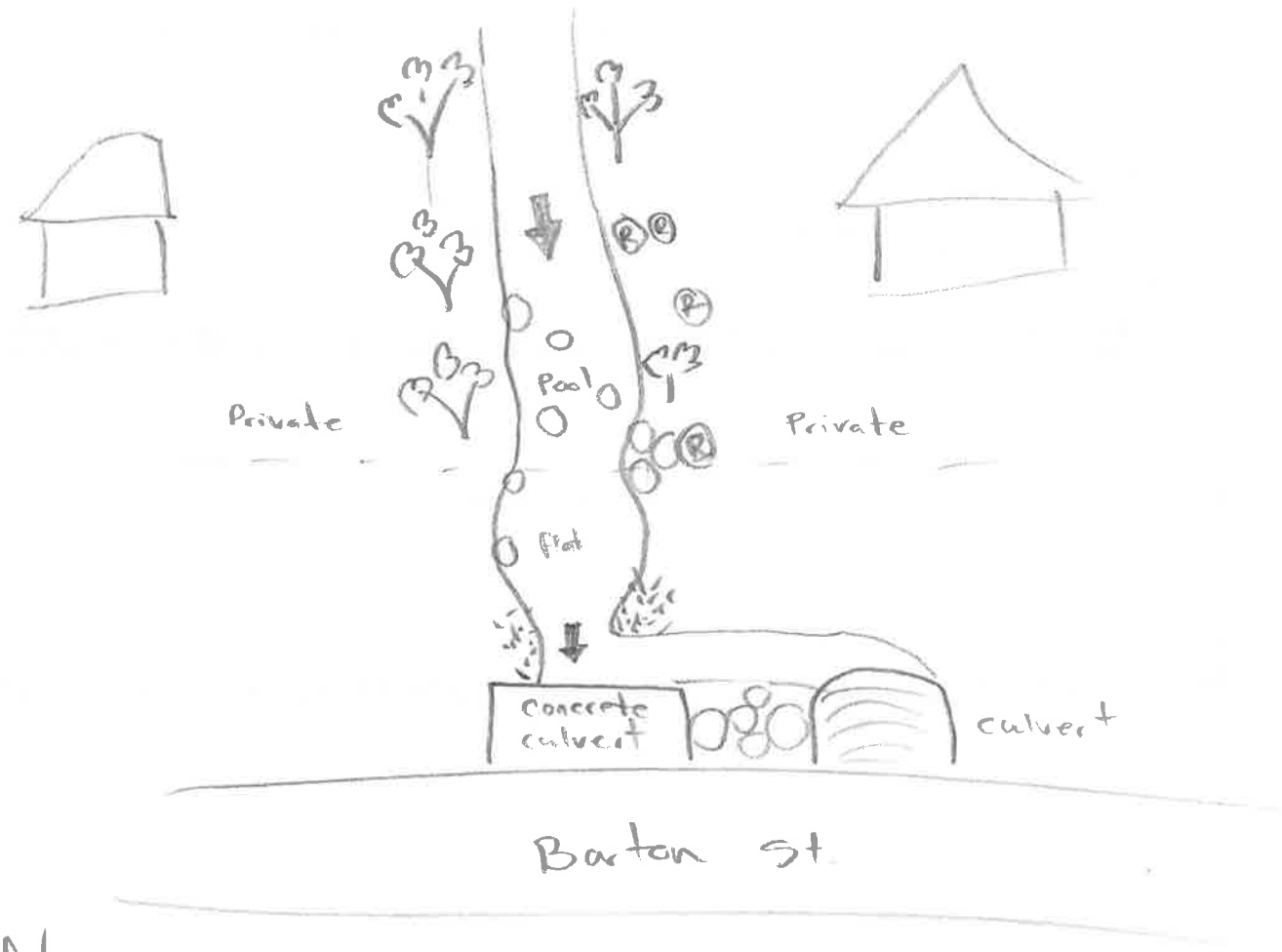


Flat



Riffle




Private
Pool
Private
Flat
Concrete culvert
culvert
Barton St

N

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPB166053	Barton St.	28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No O Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
AL Law		13:35	14:00

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
	Same as U/S	Same as U/S

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
		WC 6.0	WC 6.0 - DS - Dow

LOCATION OF CROSSING:

GPS COORDINATES:	MTO CHAINAGE:

TOWNSHIP:	MNR DISTRICT:
Hamilton	Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Residential / commercial	

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert ☒	CSP O	N/A O

Other O Describe: H 0.87 See comments Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	O	O	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area	70	—	30	—		
Mean depth wetted (m)	0.070	—	0.045	—		
Mean width wetted (m)	1.30	—	1.80	—		
Mean bankfull width (m)	2.80	—	3.40	—		
Mean bankfull depth(m)	0.193	—	0.182	—		
Substrate U/S	80 = Co 10 = Gr	—	80 = Co 10 = Gr 10 = Si	—		

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	O	~~O~~	O	O
Right Upstream Bank	O	~~O~~	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris / Instream / Overhanging	Organic debris	Vascular Macrophytes / Instream / Overhanging	None
50			50				50

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	O	~~O~~	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
Predominant Species				100

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent

POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other
		No	

POTENTIAL ENHANCEMENT OPPORTUNITIES:

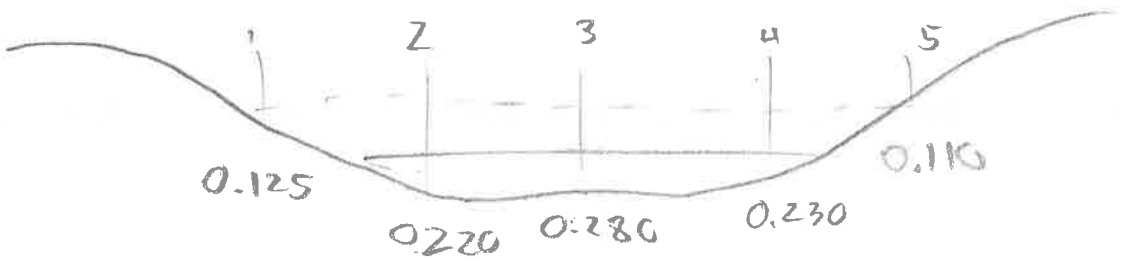
COMMENTS:

- 2 culverts
  - H 0.87 w 1.0
  - H 1.0 w 1.85
- Green frog observed

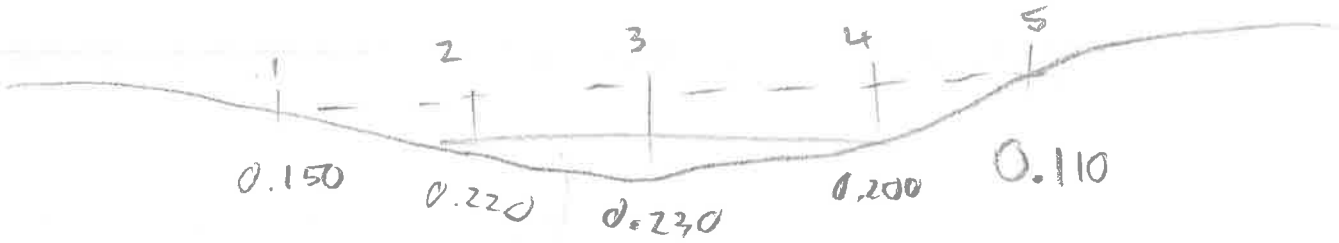
Additional Notes Appended? O No O Yes number of pages 2

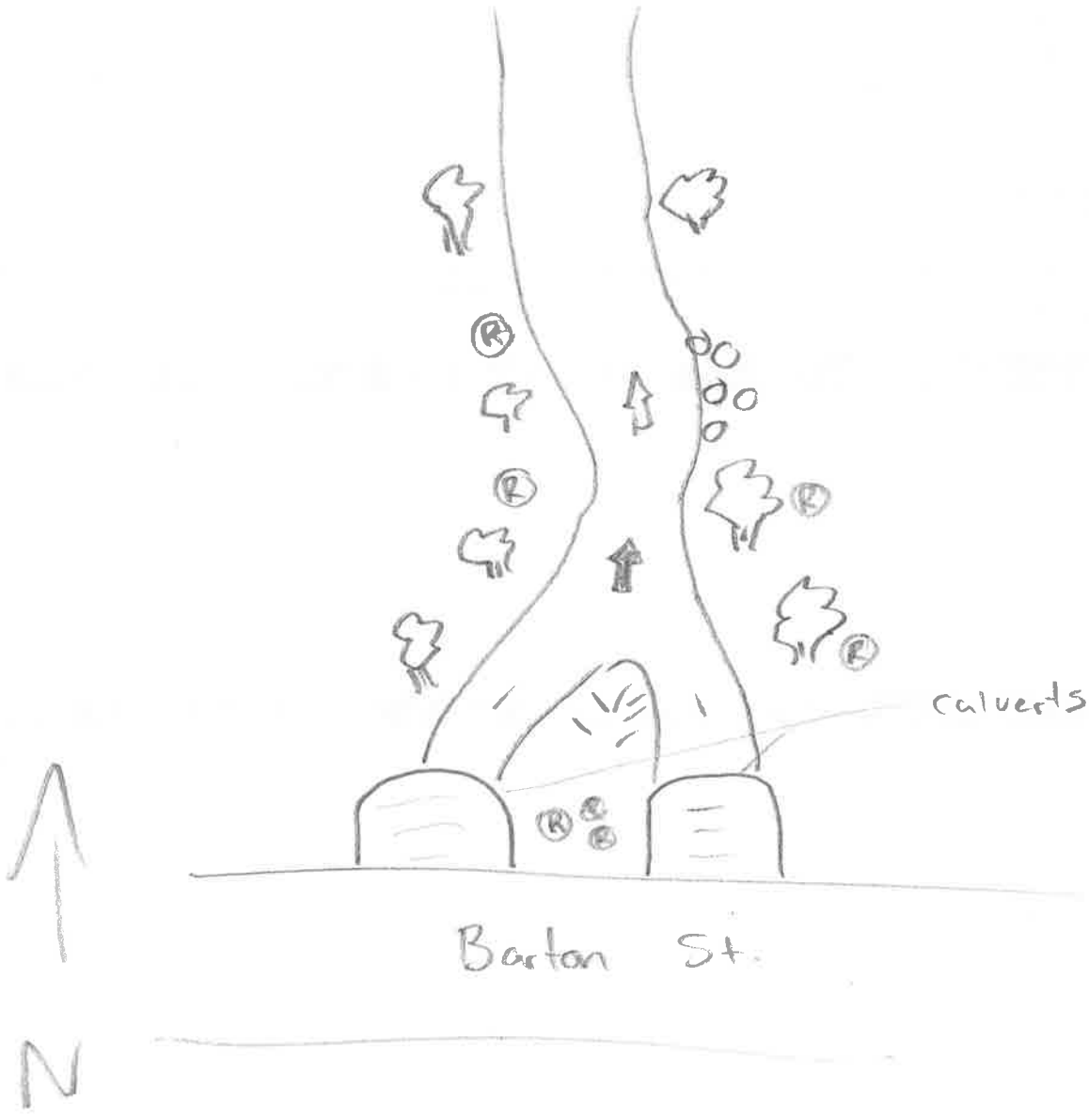
Bank Full

Run



Riffle




culverts
Barton St.
N

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPB166053	Barton St	28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No ☒ Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
AL	Cloudy	14:10	14:12

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
18	N/A	N/A

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
		WC 6.1	WC 6.1 - DS - Row

LOCATION OF CROSSING:

GPS COORDINATES:	MTO CHAINAGE:

TOWNSHIP:	MNR DISTRICT:
Hamilton	Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert O	CSP O	N/A O

Other O Describe: | Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	O	O	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area						
Mean depth wetted (m)						
Mean width wetted (m)						
Mean bankfull width (m)						
Mean bankfull depth(m)						
Substrate						

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	O	O	O	O
Right Upstream Bank	O	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris Instream Overhanging	Organic debris	Vascular Macrophytes Instream Overhanging	None

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	O	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
Predominant Species				

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES:

COMMENTS:

- Grassy drainage ditch
- Dry / partially wet

Additional Notes Appended? O No O Yes number of pages 2

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPB166053	Barton St.	28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No Ø Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
AL	Partly Cloudy	15:00	15:21

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
18.9	17.6	865 ppm 430

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
		WC 7.0	WC 7.0 - US - ROW

LOCATION OF CROSSING:

GPS COORDINATES:	MTO CHAINAGE:
TOWNSHIP: Hamilton	MNR DISTRICT: Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Agriculture / commercial / Residential	Agriculture

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert O	CSP O	N/A O

Other O Describe: Size (w x h) m^2 (2 x 1.4)

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	Ø	Ø	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area	—	—	—	100	—	
Mean depth wetted (m)				0.280		
Mean width wetted (m)				2.0		
Mean bankfull width (m)				3.0		
Mean bankfull depth(m)				0.198		
Substrate				40 = Si 30 = Mu 30 = D		

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	~~0~~	0	0	0
Right Upstream Bank	~~0~~	0	0	0

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris	Organic debris	Vascular Macrophytes	None
40		5		Instream 20 (grass) Overhanging	15	Instream Overhanging	60

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	0	0	0	~~0~~	0

VEGETATION TYPE (%): 20	Submergent	Floating	Emergent	None
Predominant Species	10 grass	—	10	80

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent

POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other
		No	

POTENTIAL ENHANCEMENT OPPORTUNITIES:

COMMENTS:

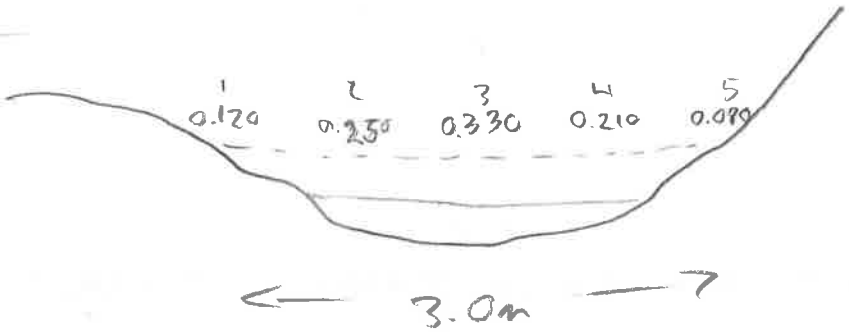
Ph = 6.81

- Green frog observed

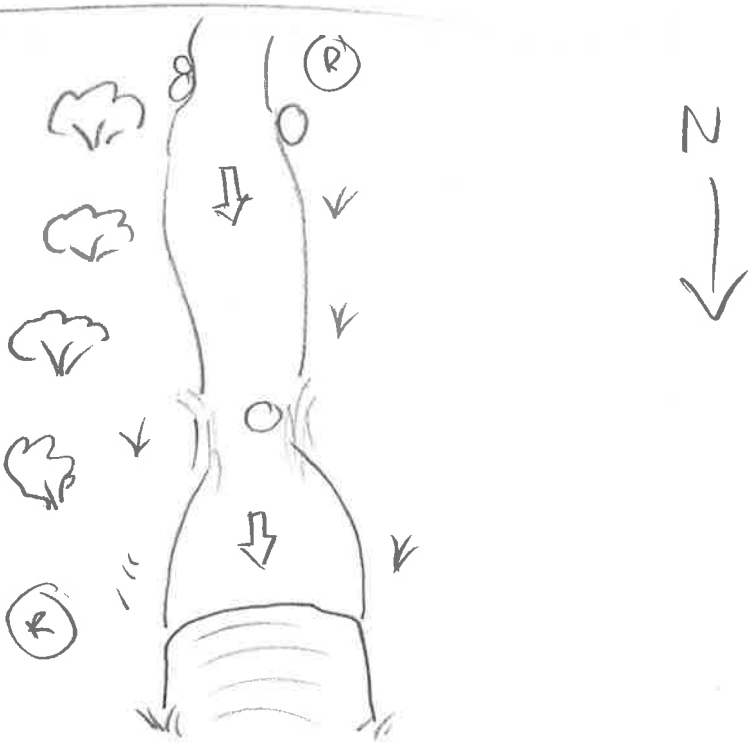
Additional Notes Appended? O No O Yes number of pages 2

Bank full

Flat



AERIAL MAP



Barton St.

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPB166053	Barton St.	28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No ~~O~~ Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
AL		15:23	15:37

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
←	Same as U/S	→

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
		WC 7.0	WC 7.0-DS - RAW

LOCATION OF CROSSING:

GPS COORDINATES:	MTO CHAINAGE:

TOWNSHIP:	MNR DISTRICT:
Hamilton	Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Residential	

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert O	CSP O	N/A O

Other O Describe: Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	~~O~~	~~O~~	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area				100		
Mean depth wetted (m)				0.250		
Mean width wetted (m)				3.2		
Mean bankfull width (m)				4.5		
Mean bankfull depth(m)				0.279		
Substrate				~~X~~ → 50=Si 20=D		20=Mu 10=Cl

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	X	O	O	O
Right Upstream Bank	X	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris 30 / Instream / Overhanging	Organic debris	Vascular Macrophytes / Instream / Overhanging	None
50					20		50

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	O	O	X	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
	50	—	—	50
Predominant Species				

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent

POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other
		No	

POTENTIAL ENHANCEMENT OPPORTUNITIES:

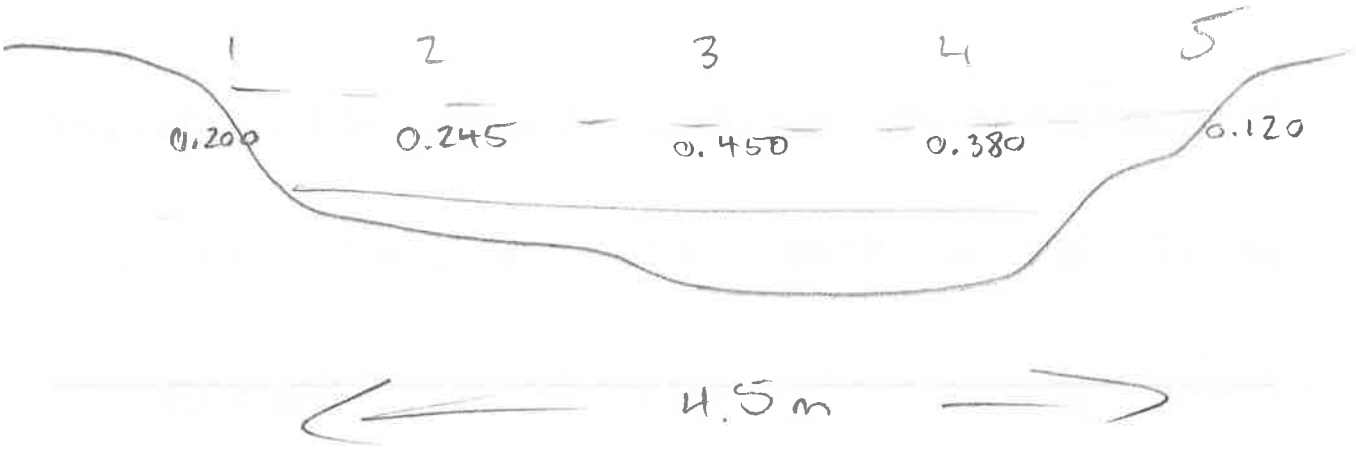
COMMENTS:

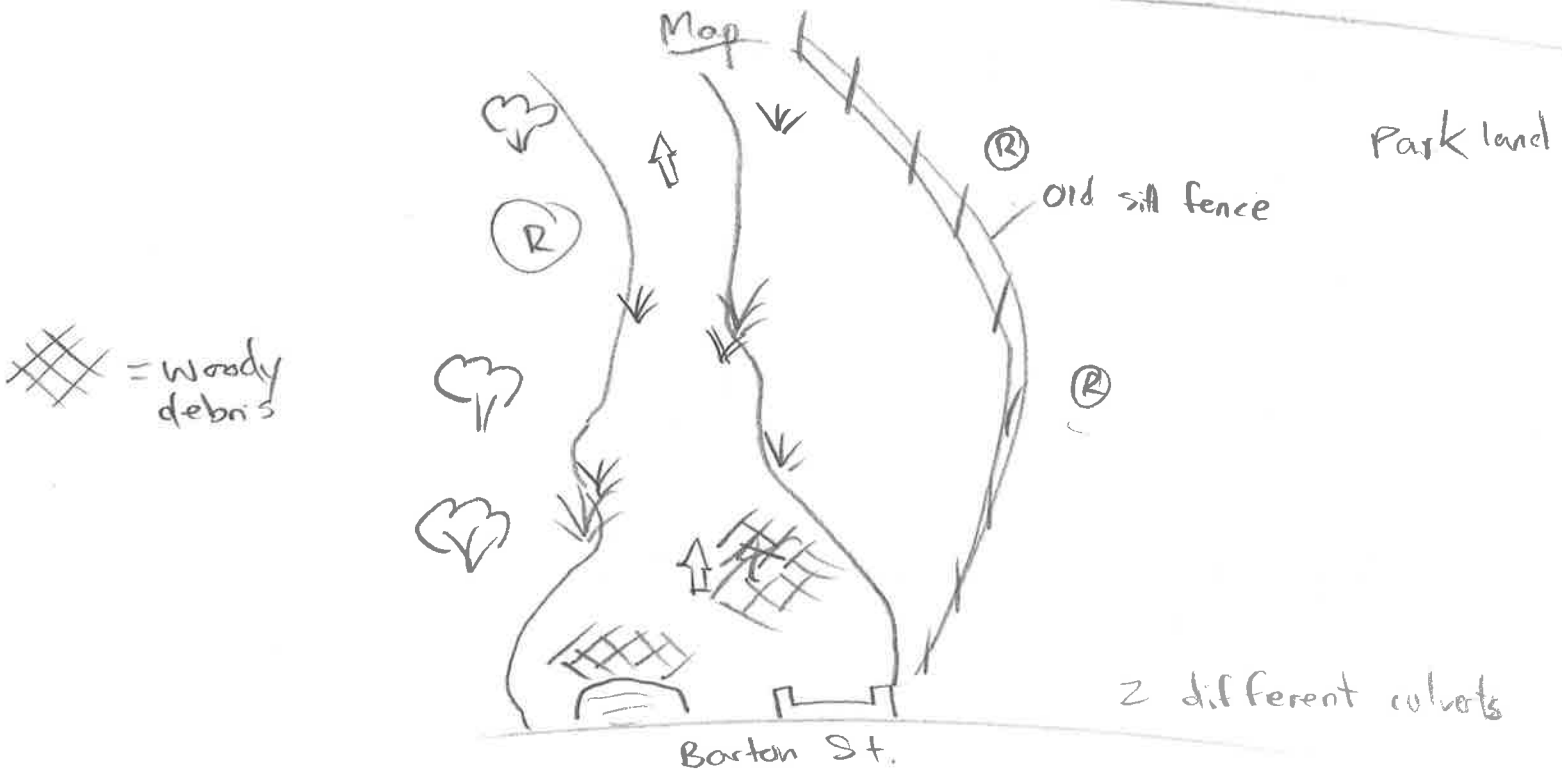
- Green frog observed
- Large woody/thatch debris jam 20m d/s of Rd.

Additional Notes Appended? O No O Yes number of pages 2

Bank Full

Flat





GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPB166053		28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No ☒ Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
AL	Partly Cloudy	15:40	15:55

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
18	17	1220

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
		WC 7.1	WC 7.1-US-ROW

LOCATION OF CROSSING:

GPS COORDINATES:	MTO CHAINAGE:
TOWNSHIP: Hamilton	MNR DISTRICT: Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Residential	

EXISTING STRUCTURE TYPE

Bridge O	Box CulvertO	Open Foot Culvert O	CSP O	N/A O

Other O Describe: Size (w x h) m^2 1m x 1m

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	O	☒	☒	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area				100		
Mean depth wetted (m)				0.205		
Mean width wetted (m)				1.0		
Mean bankfull width (m)				1.3		
Mean bankfull depth(m)				0.185		
Substrate				Bo=Co 10=Si to=Bo		

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	☒	O	O	O
Right Upstream Bank	☒	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris / Instream / Overhanging	Organic debris	Vascular Macrophytes / Instream / Overhanging	None
50		20	30				50

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	O	☒	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
Predominant Species				100

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater: No	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES:

COMMENTS:

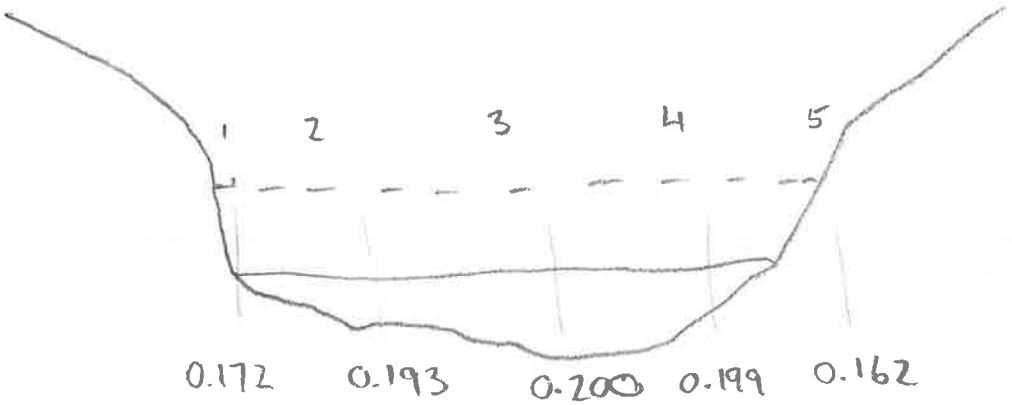
D.O. 11.85

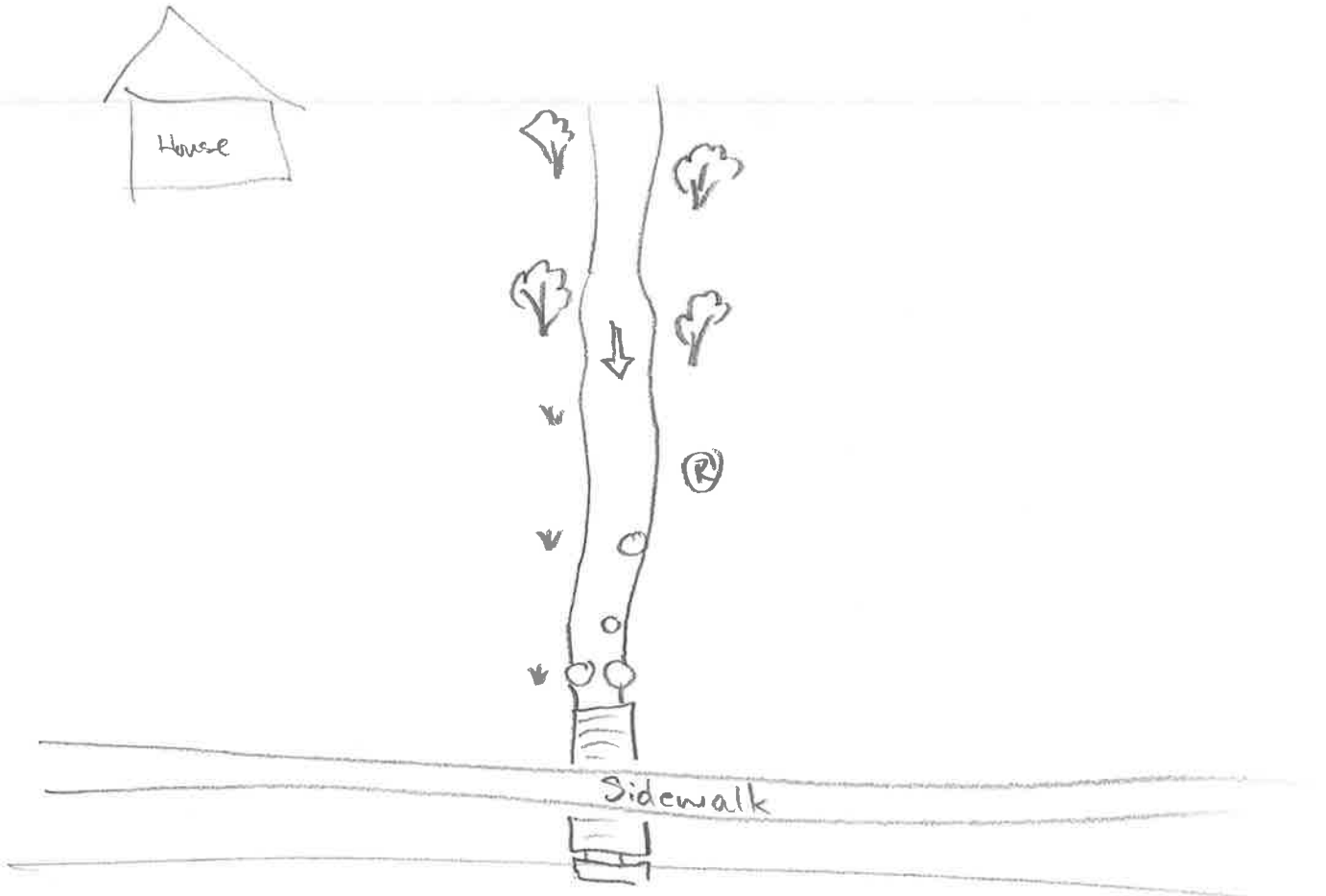
ph. 8.72

Additional Notes Appended? O No O Yes number of pages 2

Bank full

Flat





Barton St.

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPB166053	Barton St.	28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No ~~O~~ Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
A. Law	Partly Cloudy	17:20	17:40

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
18	17	1220

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
N/A	N/A	WC 7.1	WC 7.1-DS-ROW

LOCATION OF CROSSING: North of Barton St. (DS)

GPS COORDINATES:	MTO CHAINAGE:

TOWNSHIP:	MNR DISTRICT:
Hamilton	Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Natural / Agricultural / Res.	Agriculture / Roadway

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert ~~O~~	Open Foot Culvert O	CSP O	N/A O

Other O Describe: Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	~~O~~	O	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area		100				
Mean depth wetted (m)		0.38				
Mean width wetted (m)		3.0				
Mean bankfull width (m)		3.3				
Mean bankfull depth(m)		0.63				
Substrate		50=Bo 40=Co 10=Si				

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	O	X	O	O
Right Upstream Bank	X	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris	Organic debris	Vascular Macrophytes	None
90	5	40	30	Instream 10 Overhanging 5	0	Instream 0 Overhanging	10

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	X	O	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
Predominant Species				100

MIGRATORY OBSTRUCTIONS:	None	Seasonal Culvert	Permanent
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater No	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES:

COMMENTS:

DO = 11.85

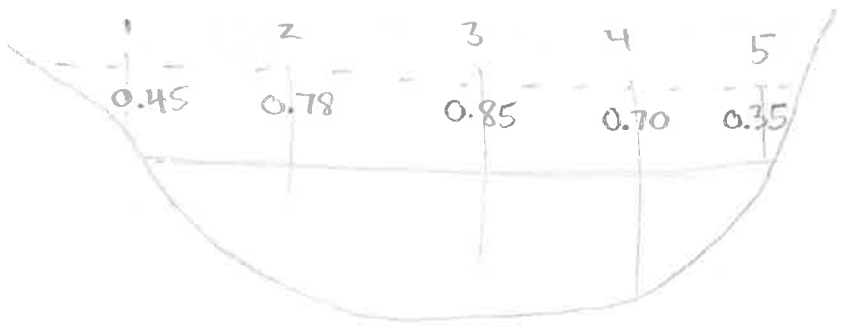
ph = 8.72

* Culvert slightly perched during low/normal flows
Potential barrier to small bodied fish.

Additional Notes Appended? O No O Yes **number of pages** 2

Bankfull

Pool



3.3m

Barton St

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPR166053	Barton St.	28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No Q Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
A. Law	Cloudy	16:05	16:10

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
18	N/A	N/A

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
		WC 7.2	WC 7.2-DS-ROW

LOCATION OF CROSSING:

GPS COORDINATES:	MTO CHAINAGE:

TOWNSHIP:	MNR DISTRICT:
Hamilton	Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Residential / Agricultural	Roadway / Agr.

EXISTING STRUCTURE TYPE

Bridge O	Box CulvertO	Open Foot Culvert O	CSP O	N/A O

Other O Describe: Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	O	O	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area						
Mean depth wetted (m)						
Mean width wetted (m)						
Mean bankfull width (m)						
Mean bankfull depth(m)						
Substrate						

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	O	O	O	O
Right Upstream Bank	O	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris Instream Overhanging	Organic debris	Vascular Macrophytes Instream Overhanging	None

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	O	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
Predominant Species				

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES:

COMMENTS:

- Grassy drainage ditch
- Dry / partially wet
- No fish habitat

Additional Notes Appended? O No O Yes number of pages 2

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPB166053	Barton St.	28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No O Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
AL	Cloudy	16:30	16:49

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
18	17.6	940 µS (PPm 497)

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
Fifty Creek		WC 12.0	WC 12.0-DS-ROW

LOCATION OF CROSSING: Hwy 8 & Fifty Rd.

GPS COORDINATES:	MTO CHAINAGE:

TOWNSHIP:	MNR DISTRICT:
Hamilton	Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Residential / commercial	Road Run-off

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert Ø	CSP O	N/A O

Other O Describe: Size (w x h) m^2 4m x 1.15

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	Ø	O	Ø	O	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area				100		
Mean depth wetted (m)				0.120		
Mean width wetted (m)				3.5		
Mean bankfull width (m)				4.0		
Mean bankfull depth(m)				0.162		
Substrate				40 - Si 30 - Mu 30 - D		

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	O	O	O	O
Right Upstream Bank	O	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris	Organic debris	Vascular Macrophytes	None
20	—	—	—	Instream — Overhanging 10	10	Instream — Overhanging	80

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	O	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
	—	—	—	100
Predominant Species				

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent

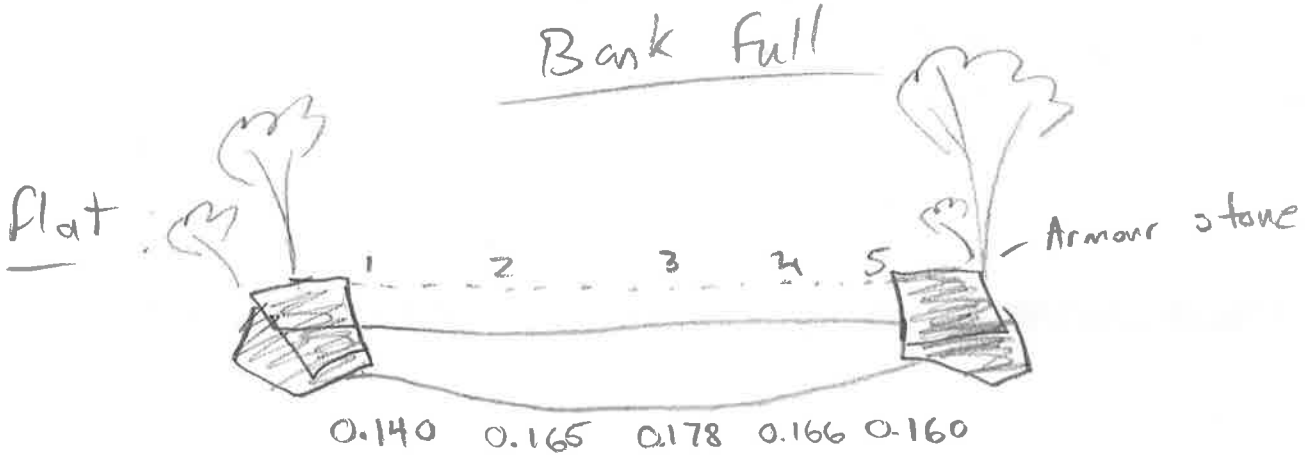
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other
		No	

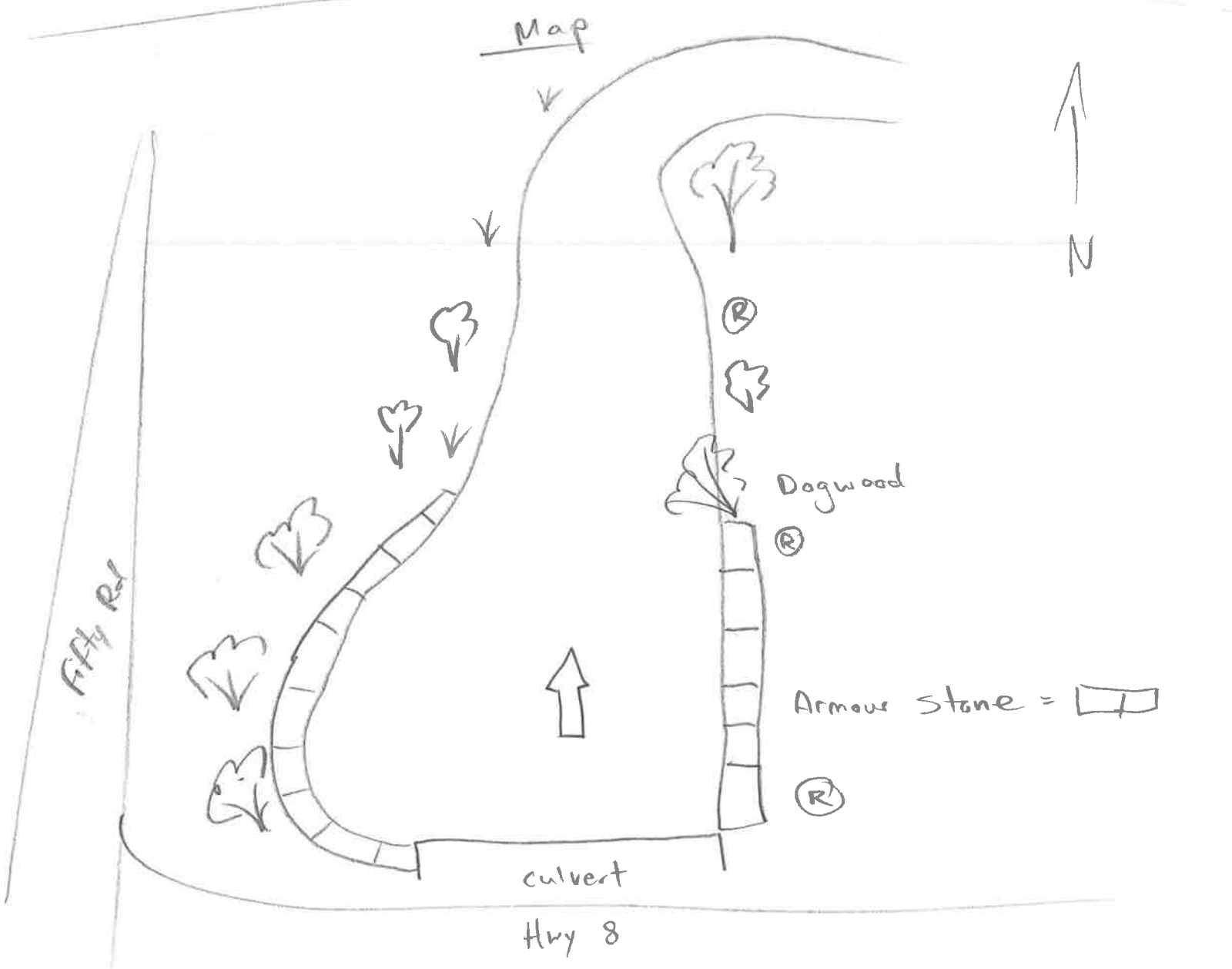
POTENTIAL ENHANCEMENT OPPORTUNITIES:

COMMENTS:

ph 9.6 D.O. 7.55

Additional Notes Appended? O No O Yes number of pages 2


Bank Full
flat
Armour stone
1
2
3
4
5
0.140
0.165
0.178
0.166
0.160


Map
N
Dogwood
Armour Stone =
culvert
Fifty Rd
Hwy 8

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
TPB166053	Barton St.	28	04	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No ☒ Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
A Low		16:50	16:59

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
18	Same as D/S	→

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
Fifty Creek		WC 12.0	WC 12.0-US-ROW

LOCATION OF CROSSING: Hwy 8 and Fifty Rd.

GPS COORDINATES:	MTO CHAINAGE:

TOWNSHIP:	MNR DISTRICT:
Hamilton	

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Res/comm	Roadway

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert ☒	CSP O	N/A O

Other O Describe: Size (w x h) m^2 4 x 1.15 m

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	☒	O	☒	O	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area				100		
Mean depth wetted (m)				0.110		
Mean width wetted (m)				2.9		
Mean bankfull width (m)				4.8		
Mean bankfull depth(m)				0.110		
Substrate				40 - Si 30 - Mu 30 - D		

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	X	O	O	O
Right Upstream Bank	X	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris	Organic debris	Vascular Macrophytes	None
70	–	–	–	Instream 5 Overhanging 5	20	Instream Overhanging	30

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	O	X	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
Predominant Species				100

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent

POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other
		No	

POTENTIAL ENHANCEMENT OPPORTUNITIES:

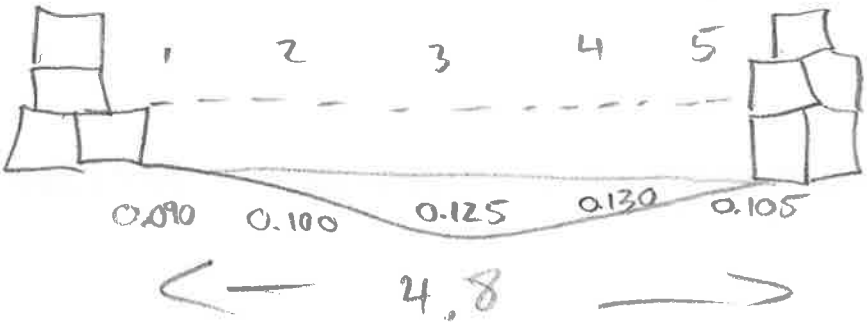
COMMENTS:

- Mallard duck pair using WC (male/female)

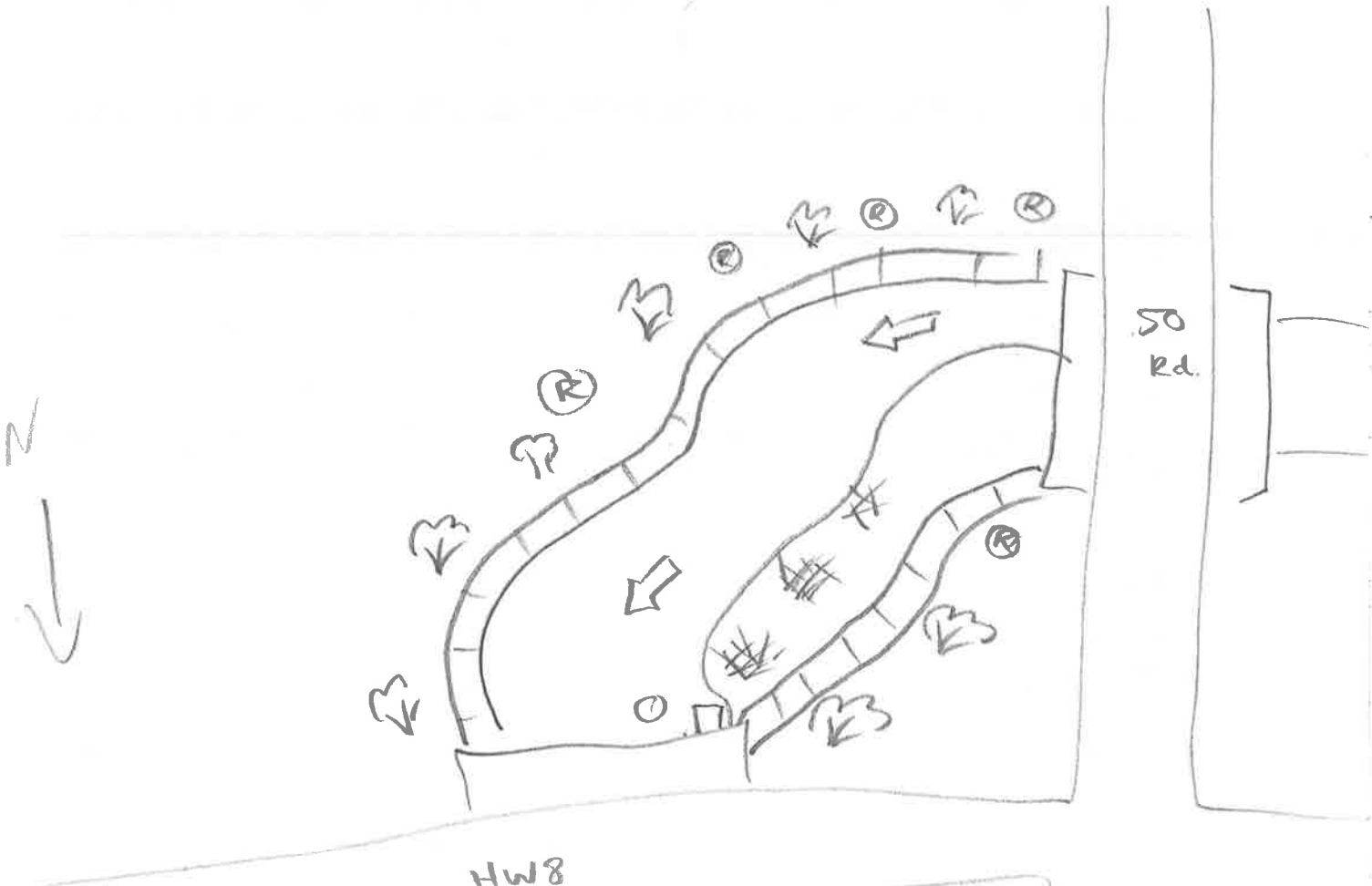
Additional Notes Appended? O No O Yes number of pages 2

Bank Full

flat



Map



Appendix C

Photographic Log

Photo 1: WC 5.0 facing downstream.

Photo 2: WC 5.0 within the ROW, facing upstream.

Photo 3: WC 5,0 standing at ROW facing upstream.

Photo 4: W 5.0 standing at upstream end of culvert facing downstream.

Photo 5: WC 5.0 within the ROW, facing downstream.

Photo 6: WC 5.0 facing upstream.

Photo 7: WC 5.2 facing upstream.

Photo 8: WC 5.2 standing at upstream end of culvert facing downstream.

Photo 9: WC 5.2, downstream of crossing.

Photo 10: WC 5.2 downstream of crossing.

Photo 11: WC 6.0 standing at downstream end of culverts facing upstream.

Photo 12: WC 6.0 facing downstream.

Photo 13: WC 6.0 standing at upstream end of culvert facing upstream.

Photo 14: WC 6.0, upstream end of culverts.

Photo 15: WC 6.0 within ROW.

Photo 16: WC 6.0 within ROW.

Photo 17: WC 6.1 upstream of crossing.

Photo 18: WC 6.1 downstream of crossing.

Photo 19: WC 7.0 facing downstream.

Photo 20: WC 7.0, downstream end of crossing.

Photo 21: WC 7.0, upstream end of crossing.

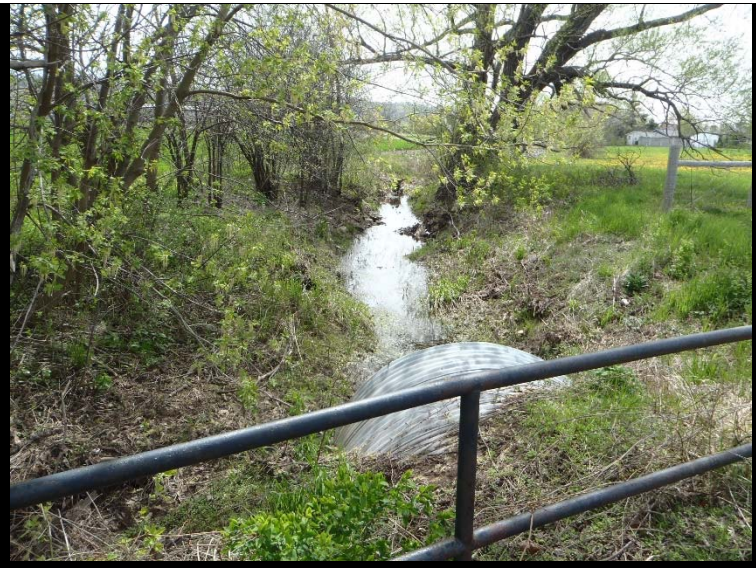


Photo 22: WC 7.0, at upstream end of crossing, facing upstream.

Photo 23: WC 7.1 facing downstream.

Photo 24: WC 7.1, downstream, end of crossing.

Photo 25: WC 7.1 substrate.

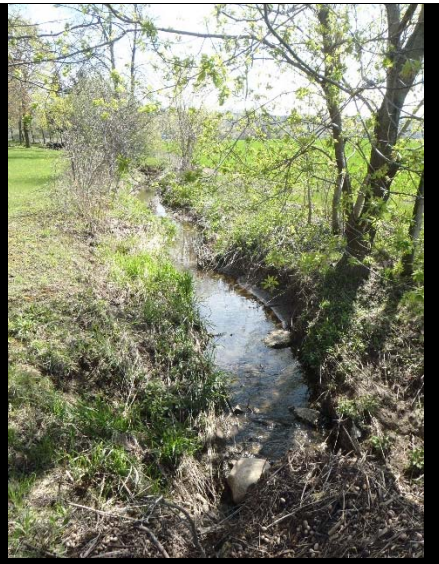


Photo 26: WC 7.1 at upstream end of crossing facing upstream.

Photo 27: WC 7.1 at upstream end of crossing facing downstream.

Photo 28: WC 7.1, merge point between two crossing structures.

Photo 29: WC 7.2 at upstream end of culvert, facing upstream.

Photo 30: WC 7.2 at upstream end of culvert.

Photo 31: WC 7.2 at downstream end of culvert.

Photo 32: WC 7.2 facing downstream.

Photo 33: WC 12, downstream end of crossing facing upstream.

Photo 34: WC 12 downstream of crossing.

Photo 35: WC 12 upstream of crossing.

Photo 36: WC 12 upstream of crossing.

Photo 37: WC 12 facing upstream.

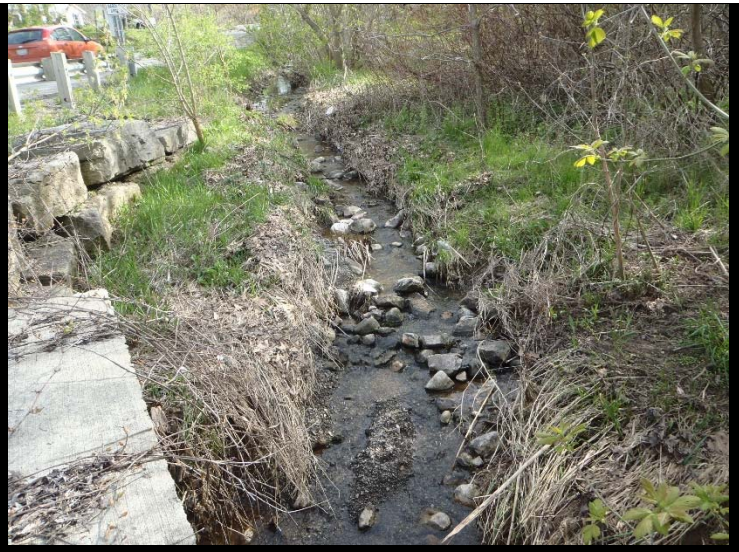


Photo 38: WC 12 facing upstream.