Appendix B

Natural Environmental Assessment (LGL Limited)

SCHEDULE B CLASS EA
MILTON WASTEWATER FORCEMAIN

EXISTING CONDITIONS – NATURAL ENVIRONMENT

prepared for

CIMA+

by

LGL LIMITED
environmental research associates

Version History:

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September 2017	2	Final to incorporate agency comments

SEPTEMBER 2017

LGL PROJECT TA8619

SCHEDULE B CLASS EA – MILTON WASTEWATER FORCEMAIN

EXISTING CONDITIONS – NATURAL ENVIRONMENT

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LGL PROJECT TA8619

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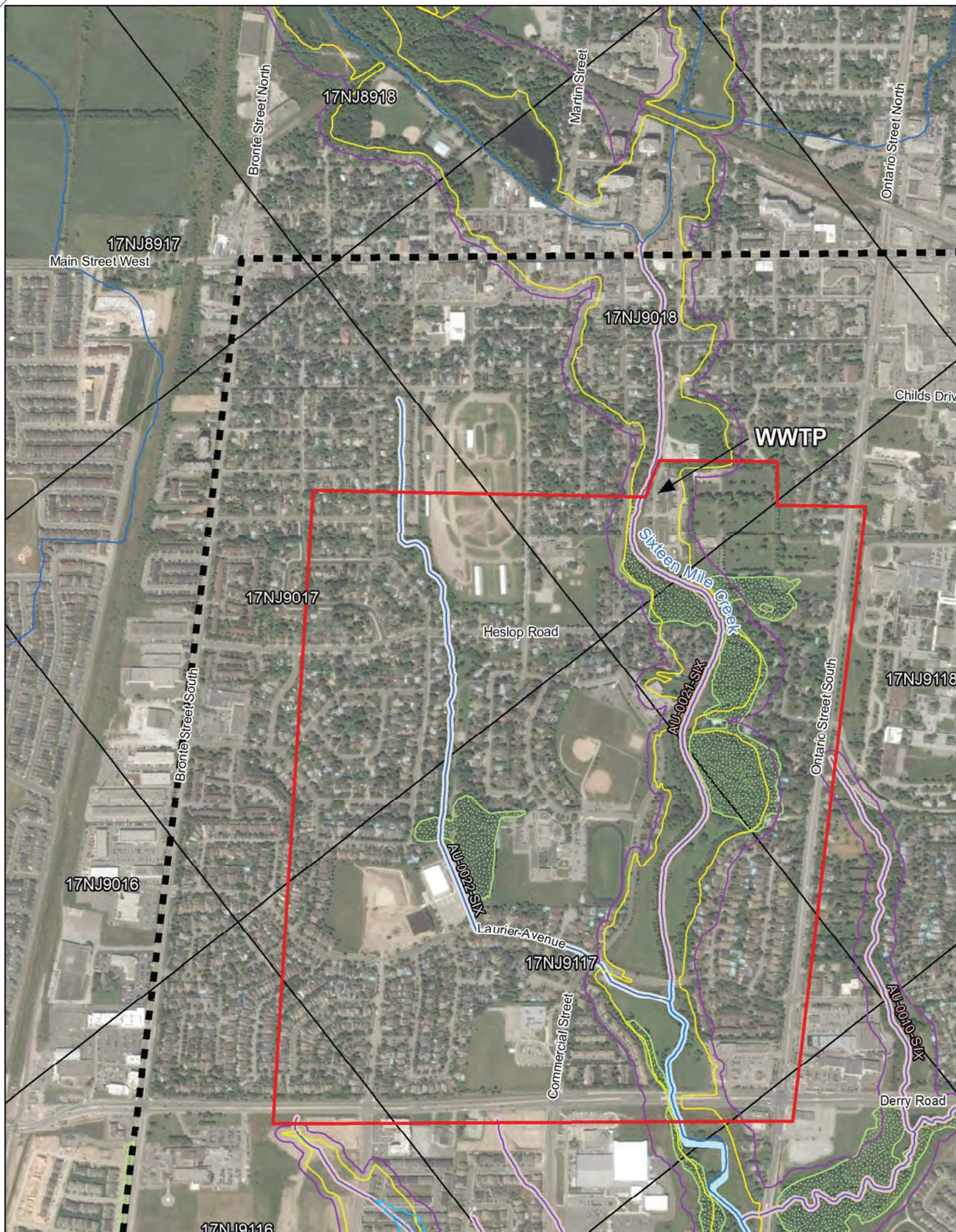
1.0 INTRODUCTION

LGL has been retained by CIMA on behalf of the Regional Municipality of Halton (Halton) to provide natural sciences support to identify the preferred alignment of an additional forcemain at the Fulton Wastewater Pumping Station (WWPS) in Milton, Ontario. The project was identified as a Schedule B Municipal Class Environmental Assessment (EA) under the wastewater servicing strategy developed for the Milton Wastewater Treatment Plant (WWTP). This report represents a combination of desktop assessment and subsequent field reconnaissance to verify available background information. The information collected to describe existing conditions has been used to identify natural heritage constraints for the purpose of evaluating alternative route alignments within the study area shown in Figure 1.

1.1 STUDY AREAS

The study area lies within the Sixteen Mile Creek Watershed and includes an area to encompass routing options from the WWPS to the collector at Derry Road and Santa Maria Boulevard (Figure 1). The primary study area defined for that purpose is bordered by Ontario Street South, Derry Road West, Bowes Street and the WWTP site as shown in Figure 1. To define an area suitable for collection of available background information, a secondary study area was defined to include adjacent areas which extend to Main Street West (to the northwest), Centennial Forest Drive (to the northeast), an easement south of Derry Road West (to the southeast) and Bronte Street South (to the southwest) as shown in Figure 1.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AU-0021-SIX
17NJ9118
Bronte Street South
Ontario Street South
17NJ9016
AU-0022-SIX
Laurier Avenue
17NJ9117
Commercial Street
AU-0040-SIX
Derry Road
17NJ9116

2.0 EXISTING CONDITIONS – DESKTOP REVIEW

Documentation of existing conditions has been based on a desktop assessment of aerial imagery and a review of background data from secondary sources to describe natural heritage conditions within the secondary study area. The review of existing background documentation and data layers, included the following resources:

- Site aerial imagery;
- Mapping of physiography and soils;
- MNRF Natural Heritage Information Centre (NHIC) database;
- Land Information Ontario (LIO) MNRF data layers;
- MNRF fisheries records;
- MNRF data request submission;
- Conservation Halton GIS Layers; and,
- Sixteen Mile Creek Impact Assessment Study – Milton Wastewater Treatment Plant Discharge, 2015.

Secondary source information was compiled and analyzed in order to develop a general description of the terrestrial and aquatic ecosystems, vegetation and wildlife within the project area. In addition, MNRF was consulted to obtain any additional information regarding the natural heritage system and potential species at risk in the project area (pers. comm. A. McAllister Aurora District MNRF, May 2016).

2.1 PHYSIOGRAPHY

According to Chapman and Putnam (1984), the project study area is situated within the Peel Plain physiographic region of Southern Ontario. Soils in the study area are dominated by the Chinguacousy clay loam (Gillespie and Wicklund 1971). The Chinguacousy soils which are imperfectly drained are generally found on gently sloping areas of the landscape. Poorly drained Jeddo clay loam is found within depressional sites and is associated with the valley of Sixteen Mile Creek as it flows south of Parkway Drive in Milton. A pocket of well drained Fox sandy loam soil also occurs south of Parkway Drive and west of Regional Road 25.

Until 1940, the Peel Plain was predominantly under agricultural use. In more recent years a great deal of the land across the broader landscape has been used for urban development; and, as a result, the area is currently sparsely farmed. The project study area occurs within a fully urbanized landscape with the natural environment comprised primarily of park lands associated with school yards and recreational areas, the forested areas adjacent to Sixteen Mile Creek, and residential trees.

2.2 SIGNIFICANT NATURAL AREAS

Natural areas within the study area in the form of parklands, stream corridors, and open fields were screened for any designations within various local, regional and provincial policies, the results of which are summarized in the following sections.

2.2.1 Areas of Natural and Scientific Interest (ANSIs)

Areas of Natural and Scientific Interest (ANSI) are designated by the MNRF. Records contained within the MNRF LIO database did not indicate the presence of any Life Science or Earth Science ANSIs within, or in close proximity to the study area.

2.2.2 Significant Wetlands

Wetland features were identified through available GIS data layers provided by MNRF through LIO as shown in Figure 1 and confirmed through MNRF consultation (A. McAllister Aurora District MNRF May 2016). Three types of wetland features are identified in MNRF data layers: provincially significant wetlands (PSWs), evaluated wetlands and unevaluated wetlands. The status of wetlands is determined through an evaluation according to the Ontario Wetland Evaluation System (OWES). PSWs are those for which an OWES evaluation has resulted in a score sufficient to qualify as a provincially significant feature. Unevaluated wetlands are wetland features that have not undergone an OWES evaluation; while, those presented as evaluated wetlands are features where an OWES evaluation has been completed but the score is insufficient to qualify as a provincially significant feature. Evaluated wetlands may also be considered locally significant wetlands.

No PSWs or evaluated wetlands are present within the study area. However, an unevaluated wetland associated with a tributary of Sixteen Mile Creek (AU-0003_SIX) south of Derry Road and outside of the primary study area is identified in the LIO data layer (Figure 1).

2.2.3 Significant Woodlands

LIO data layers indicate the presence of wooded areas within the study area including the riparian areas of Sixteen Mile Creek and its tributaries (Figure 1). The woodland features associated with the creek are part of the northwest to southeast connection across the broader landscape. These forests are also identified within the mapping of natural areas included in local and regional Official Plans, and are further described below in Section 2.3. Generally speaking, the extent of woodland within the study area is limited.

2.2.4 Environmentally Sensitive Areas (ESA)

Environmentally Sensitive Areas (ESAs) are identified in the City of Milton's Official Plan (OP). No such areas, as identified in Schedule B (August 2008) of the City's OP, are located within the limits of the study area.

2.2.5 Significant Wildlife Habitat

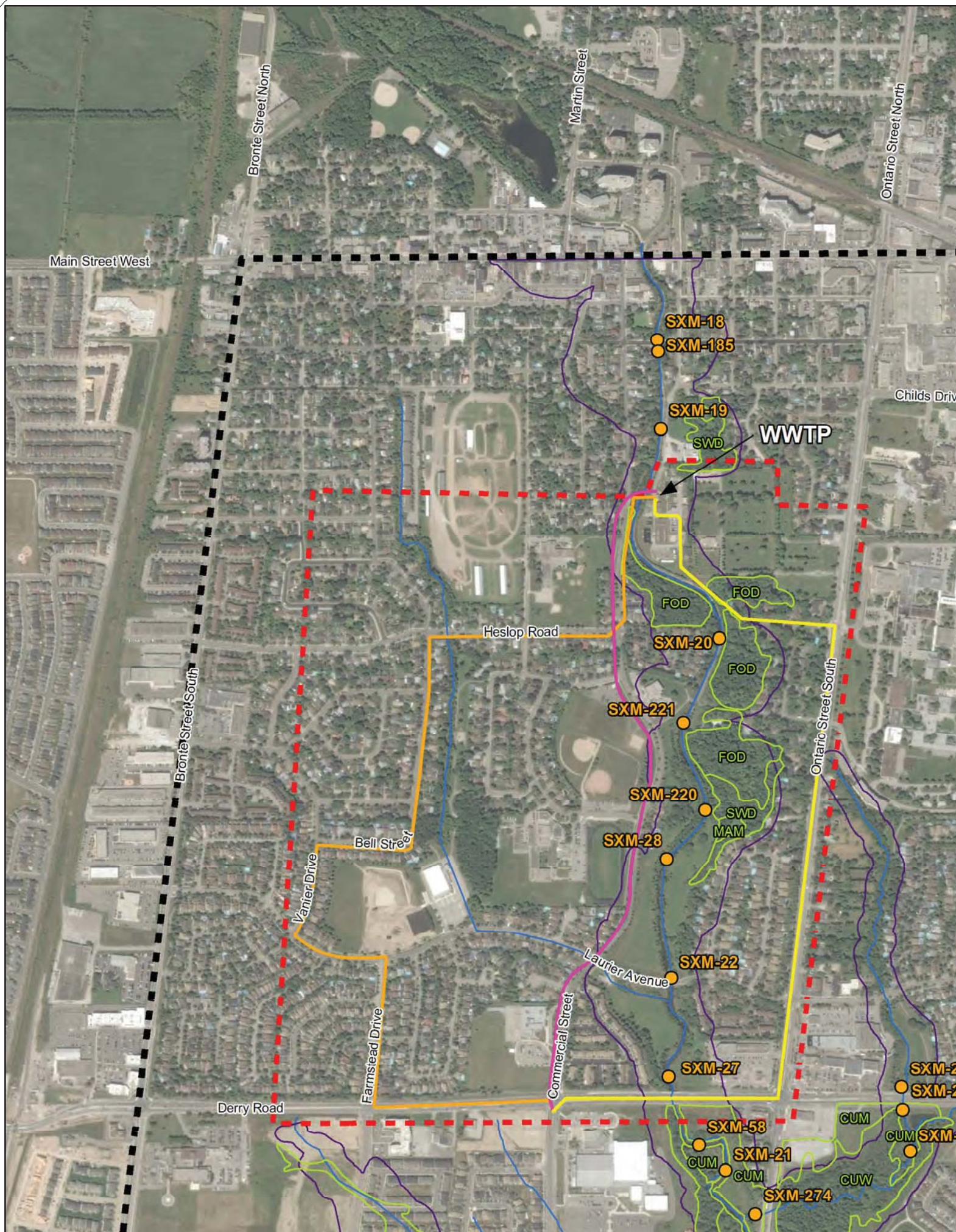
A data request submission to MNRF did not return any available data for significant wildlife habitat (SWH) in the project area.

2.3 VEGETATION AND VEGETATION COMMUNITIES

Data made available by Conservation Halton (CH) includes the Ecological Land Classification (ELC) of vegetation communities in natural areas (Figure 2). Within the primary study area the following ELC communities are documented:

- FOD (deciduous forest);
- SWD (deciduous swamp); and,
- MAM (mineral marsh).

The secondary study area includes the vegetation communities listed above as well as areas of cultural meadow (CUM), cultural woodland (CUW), and some small pockets of cultural plantation (CUP). Most of the ELC data provided by Conservation Halton corresponds with the riparian corridors of Sixteen Mile Creek and its tributary as they occur within the study area.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SXM-185
Childs Driv
SXM-19
WWTP
SWD
FOD
FOD
Heslop Road
SXM-20
FOD
Bronte Street South
SXM-221
FOD
Ontario Street South
SXM-220
SWD
MAM
Bell Street
SXM-28
Vanier Drive
Laurier Avenue
SXM-22
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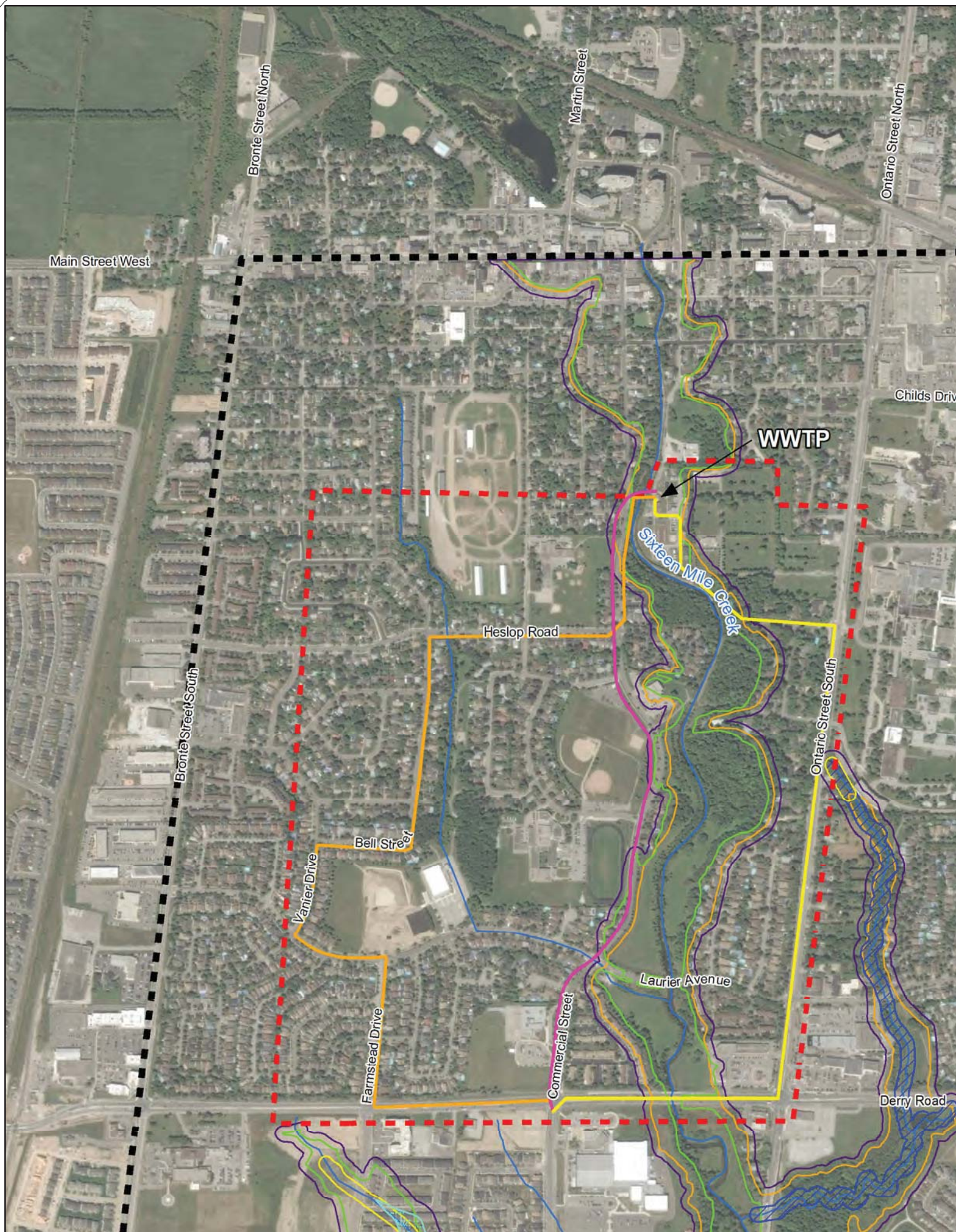
CUM
CUM
SXM-21
CUM
CUM
CUW
SXM-274


Bronte Street North
Martin Street
Ontario Street North
Main Street West
Childs Driv
WWTP
Sixteen Mile Creek
Heslop Road
Bronte Street South
Ontario Street South
Bell Street
Vanier Drive
Laurier Avenue
Farmstead Drive
Commercial Street
Derry Road

2.4 SURFACE WATER FEATURES

Information provided by Conservation Halton (CH) includes fisheries data (Figure 2), and the limits of headwaters, floodplains, valley features, and meander belts where available (Figure 3). Sixteen Mile Creek is the major watercourse in the study area which currently receives treated effluent from the Milton WWTP. The secondary study area includes tributaries of the creek, portions of which are buried below ground. Further details regarding the nature of these watercourses are provided in the subsections below, including a summary of the fisheries data obtained from CH and MNRF.

2.4.1 Sixteen Mile Creek

The fish habitat of Sixteen Mile Creek is documented to support a variable fish community depending on the characteristics of the individual reaches (Conservation Halton 2013). Below the Kelso dam, the West Branch flows through protected parkland with dense riparian cover, clean cobble/gravel substrate and a natural channel. Extensive groundwater discharge, originating from the Niagara Escarpment, provides coldwater conditions for resident and migratory species such as rainbow trout, brown trout, brook trout and mottled sculpin. In the vicinity of Milton, the channel flows through a fishway adjacent to the Milton Mill Pond, which supplements its water levels from the creek. Downstream of the Milton Mill Pond and just upstream of Martin Street, discharge from the pond enters the adjacent channel resulting in increased stream temperatures directly downstream of the pond. From Martin Street through downtown Milton and just above Derry Road, the creek is entrenched into a concrete channel. Within the concrete channel, storm sewers and the Milton wastewater treatment plant (WWTP) discharge effluent into the creek.

Downstream of the WWTP the hardened channel of the West Branch flows into a natural channel below Parkway Drive East. Erosion problems are noted along this reach. A small tributary from east of Ontario Street contributes potential coldwater conditions to the west branch. The reach of Sixteen Mile Creek north of Laurier Avenue is identified by MNRF as recovery habitat for Redside Dace, an endangered species afforded protection under the *Endangered Species Act, 2007* (A. McAllister, pers. comm. June 2, 2016). In May 2017 this species was added to Schedule 1 of the federal *Species at Risk Act,* and provided protection as an endangered species. Downstream (south) of Laurier Avenue the creek provides habitat for Silver Shiner, a species identified as threatened on the Species at Risk in Ontario (SARO) list. Silver Shiner habitat includes the occupied reach of the creek and the floodplain (A. McAllister, pers. comm. June 2, 2016).

2.4.2 Fish Communities

Available information from MNRF's LIO database identifies the upper reach of Sixteen Mile Creek as a warmwater feature, while the thermal regime of the downstream reach is classified as coolwater. However, Conservation Halton manages the creek as a coldwater system through the study area. Similarly, although the tributary that approaches from the west side of the creek (AU-0022-SIX on Figure 1) is identified by MNRF to have a coolwater thermal regime, the system is managed by CH as coldwater. Therefore, the construction timing window for works within or near a coldwater system would apply to project works (i.e. no in-water works between September 15 and June 30). The tributary identified as AU-0022-SIX on Figure

1 is buried from the John Tonelli Sport Centre on Laurier Avenue to its confluence with Sixteen Mile Creek below the Laurier Avenue bridge. No fish data was available for this tributary. The tributary that flows into Sixteen Mile Creek below Derry Road (AU-0010-SIX in Figure 1) from east of Ontario Street supports a warmwater fishery. Available fisheries data from CH and MNRF for this tributary (trib1) as well as the main branch of Sixteen Mile Creek is summarized in Table 1.

Table 1: Fish Occurrence Data for Sixteen Mile Creek and its Tributaries within the Study Area.

Common Name	Scientific Name	Area of Occurrence	S Rank	SARA Status	SARO Status	Thermal Regime	
Bluntnose Minnow	*Pimephales notatus*	CH - main MNRF - upper/lower main	S5	NAR	NAR	warmwater	m tu
Brassy Minnow	*Hybognathus hankinsoni*	CH - main MNRF - lower main	S5	none	none	coolwater	in
Brook Stickleback	*Culaea inconstans*	CH - main, trib1 MNRF - upper/lower main	S5	none	none	coolwater	in
Brook Trout	*Salvenlinus fontinalis*	MNRF - lower main	S5	none	none	coldwater	in
Brown Bullhead	*Ameiurus nebulosus*	MNRF - upper main	S5	none	none	warmwater	in
Brown Trout	*Salmo trutta*	CH - main MNRF - upper/lower main	SNR	none	none	coldwater	in si
Central Mudminnow	*Umbra limi*	CH - main MNRF - upper main	S5	none	none	coolwater	to
Chinook Salmon	*Oncorhynchus tshawytscha*	CH - trib1	SNA	none	none	coldwater	in
Common Carp	*Cyprinus carpio*	CH - main	SNA	none	none	warmwater	to
Common Shiner	*Luxilus cornutus*	MNRF - lower main	S5	none	none	coolwater	m
Creek Chub	*Semotilus atromaculatus*	CH - main, trib1 MNRF - upper/lower main, trib1	S5	none	none	coolwater	in
Eastern Blacknose Dace	*Rhinichthys atratulus*	CH - main, trib1 MNRF - upper/lower main, trib1	SNR	none	none	coolwater	in
Fantail Darter	*Etheostoma flabellare*	CH - main MNRF - upper/lower main	S4	none	none	coolwater	in
Fathead Minnow	*Pimephales promelas*	CH - main, trib1 MNRF - upper/lower main, trib1	S5	none	none	warmwater	to
Golden Shiner	*Notemigonus crysoleucas*	CH - main MNRF - lower main	S5	none	none	coolwater	m tu
Goldfish	*Carassius auratus*	CH - main, trib1 MNRF - upper/lower main	SNA	none	none	warmwater	to
Green Sunfish	*Lepomis cyanellus*	CH - main	S4	NAR	NAR	warmwater	to

Common Name	Scientific Name	Area of Occurrence	S Rank	SARA Status	SARO Status	Thermal Regime	
Johnny Darter	*Etheostoma nigrum*	CH - main MNRF - upper/lower main	S5	none	none	coolwater	m
Largemouth Bass	*Micropterus salmoides*	CH - main MNRF - upper/lower main	S5	none	none	warmwater	to to
Longnose Dace	*Rhinichthys cataractae*	CH - main MNRF - upper/lower main	S5	none	none	coolwater	m
Mottled Sculpin	*Cottus baridii*	CH - main MNRF - upper main	S5	none	none	coldwater	in
Northern Hog Sucker	*Hypentelium nigricans*	CH - main MNRF - upper/lower main	S4	none	none	warmwater	in si
Northern Redbelly Dace	*Chrosomus eos*	CH - main MNRF - upper/lower main	S5	none	none	coolwater	in
Pumpkinseed	*Lepomis gibbosus*	CH - main, trib1 MNRF - upper/lower main	S5	none	none	warmwater	in
Rainbow Darter	*Etheostoma caeruleum*	CH - main MNRF - upper/lower main	S4	none	none	coolwater	in
Rainbow Trout	*Oncorhynchus mykiss*	CH - main MNRF - upper/lower main	S5	none	none	*coldwater*	in
Redside Dace	*Clinostmus elongatus*	MNRF - upper/lower main	S2	END (Sch1)	END	*coolwater*	in
River Chub	*Nocomis micropogon*	CH - main MNRF - lower main	S4	NAR	NAR	*coolwater*	in
Rock Bass	*Ambloplites rupestris*	CH - main MNRF - upper/lower main	S5	none	none	coolwater	in
Rosyface shiner	*Notropis rubellus*	CH - main MNRF - lower main	S4	NAR	NAR	warmwater	in
Sea Lamprey	*Petromyzon marinus*	MNRF - lower main	SNA	none	none	coolwater	in
Silver Shiner	*Notropis photogenis*	CH - main	S2S3	SC (Sch3)	THR	warmwater	in
Smallmouth Bass	*Micropterus dolomieu*	CH - main, trib1 MNRF - upper/lower main	S5	none	none	coolwater	m
Stonecat	*Noturus flavus*	CH - main MNRF - lower main	S4	none	none	warmwater	to

Common Name	Scientific Name	Area of Occurrence	S Rank	SARA Status	SARO Status	Thermal Regime	
Striped Shiner	*Luxilus chrysocephalus*	CH - main	S4	NAR	NAR	coolwater	in
White Sucker	*Catostomus commersonii*	CH - main, trib1 MNRF - upper/lower main	S5	none	none	coolwater	g m tu
Yellow Bullhead	*Ameiurus natalis*	CH - main	S4	none	none	warmwater	to
Yellow Perch	*Perca flavescens*	CH - main	S5	none	none	coolwater	m

MNRF - Ministry of Natural Resources and Forestry
CH - Conservation Halton
main - main branch of Sixteen Mile Creek (CH stations SXM -18, 19, 20, 21, 22, 27, 28, 58, 185, 220, 221, 497, 516 in Figure 2 and MNRF statio
branch) and AU-0019-SIX (lower main branch) in Figure 1.
trib1 - tributary of Sixteen Mile Creek east of Ontario Street (CH stations SXM- 233, 234, 274, and 431 in Figure 2; MNRF station AU-0010_SIX in
Species Information Source: Eakins, R. J. 2014. Ontario Freshwater Fishes Life History Database. Version 4.53. On-line database. (http://www.
August 2016

2.5 SPECIES AT RISK

A review of the MNRF's NHIC database was conducted to search for SAR occurrence records for the study area. Records for a total of 8 species were returned (Table 2). The dates of the records returned suggest they are mostly historical (> 20 years old). Given the changes that have occurred across the landscape since these observations were made and the nature of the areas where project works are anticipated to occur (a highly urbanized, developed landscape), it is unlikely that habitat for all of these SAR is currently available. Two of the species listed in Table 2 are afforded protection under the *Endangered Species Act* (ESA), namely the Rusty-patched Bumblebee and Redside Dace. As of May 2017, Redside Dace is also provided protection under the federal *Species at Risk Act, 2002* as an endangered species.

Table 2: NHIC Search Results for the Study Area.

Group	Common Name	Scientific Name	S Rank	SARA	SARO	Last Observation Date	Extirpated?
Plants	Carey's Sedge	*Carex careyana*	S2			1978-06-09	
	Virginia Bluebells	*Mertensia virginica*	S3			1982-05-26	
	Greater Round-leaved Orchid	*Platanthera macrophylla*	S2			1978-07-08	
	Northern Hawthorn	*Crataegus pruinosa var. dissona*	S3			1982-05-26	
Invertebrate	Rusty-patched Bumblebee	*Bombus affinis*	S1	END	END	1973-05-22	
Reptiles	Eastern Milksnake	*Lampropeltis triangulum*	3	SC Schedule 1		1984-?	
	Timber Rattlesnake	*Crotalus horridus*	SX	EXP	EXP	1950	Y
Fish	Redside Dace	*Clinostomus elongatus*	S2	END Schedule 1	END	1998-08-14	

Table 2 Legend

S-Rank (Provincial or Subnational ranks): used by the Natural Heritage Information Centre to set protection priorities for rare species and natural communities. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

SX-presumed extirpated; not located despite intensive searches
SH-historical; no known extant occurrences in past 20 years
S1-critically imperiled; typically 1 to 5 extant occurrences
S2-imperiled; typically 6 to 20 extant occurrences
S3-vulnerable; typically 21 to 80 extant occurrences
S4-apparently secure; uncommon but not rare; some cause for long-term concern; usually >80 extant occurrences
S5-secure; common, widespread and abundant
SNA-status not applicable; not a suitable target for conservation (e.g. non-native species)
SU-unrankable; insufficient information to rank confidently
SNR-not ranked

SARA Status – Status of Species under Species at Risk Act. Upon receiving an assessment of a species from COSEWIC, the Governor in Council may, on the recommendation of the Minister, amend the Schedule 1 wildlife species at risk list and add a wildlife species; reclassify a listed wildlife species; or remove a listed wildlife species. The basic prohibitions of SARA do not apply to those species listed on Schedule 1 as Special Concern

THR-threatened; a wildlife species likely to become endangered if limiting factors are not reversed
END-endangered; a wildlife species facing imminent extirpation or extinction
EXT-extirpated; a species no longer existing in the wild in Canada but occurring elsewhere

SC-special concern; a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats
Schedule 1 is established as the official list of wildlife species at risk in Canada; once a species is added to Schedule 1, it benefits from all the legal protection afforded
Schedule 3 includes species assessed using dated criteria that require reassessment to determine whether they should be included in Schedule 1

SARO Status – Species at Risk in Ontario
END-Endangered; a species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA
EXP-Extirpated; a species that no longer exists in the wild in Ontario but exists elsewhere
THR-Threatened; a species that is at risk of becoming endangered in Ontario if limiting factors are not reversed
SC-Special Concern; a species with characteristics that make it sensitive to human activities or natural events

Extirpated? – Yes (Y) indicates a species that no longer exists in the wild in Ontario but exists elsewhere

Further consultation with MNRF Aurora District office in May 2016 identified records for 8 SAR that occur within or adjacent to the study area and 3 SAR with the potential to occur in or adjacent to the study area. All of the SAR listed by the district office are tolerant of urban landscapes and are considered to have potential to occur. Of the 11 SAR identified through MNRF consultation, two (Milksnake and Redside Dace) were previously identified in the NHIC database search as shown in Table 2. Since the time data was received from MNRF, Milksnake has been down listed so that it is no longer included in the Species at Risk in Ontario (SARO) listing. SAR with occurrence records for areas within or adjacent to the study area as identified through MNRF consultation include the following:

- Snapping Turtle (SC);
- Silver Shiner (THR);
- Chimney Swift (THR);
- Barn Swallow (THR);
- Bobolink (THR);
- Butternut (END); and,
- Redside Dace (END).

Those species with potential to occur as per MNRF consultation include:

- Bank Swallow (THR);
- Eastern Meadowlark (THR); and,
- Little Brown Myotis (END).

All of the SAR identified through consultation with MNRF and the NHIC database search are further considered in Section 3.3 in the context of site conditions documented during the 2016 field investigation.

3.0 EXISTING CONDITIONS – 2016 FIELD INVESTIGATION

Existing conditions as documented in Section 2.0 through review of available background information were confirmed for the primary study area during a field investigation on June 8, 2016. Efforts were made to confirm conditions in proximity to the routing of three alternative solutions under consideration for the EA as shown in Figure 4 and further described below.

3.1 FIELD INVESTIGATION METHODS

3.1.1 Vegetation and Vegetation Communities

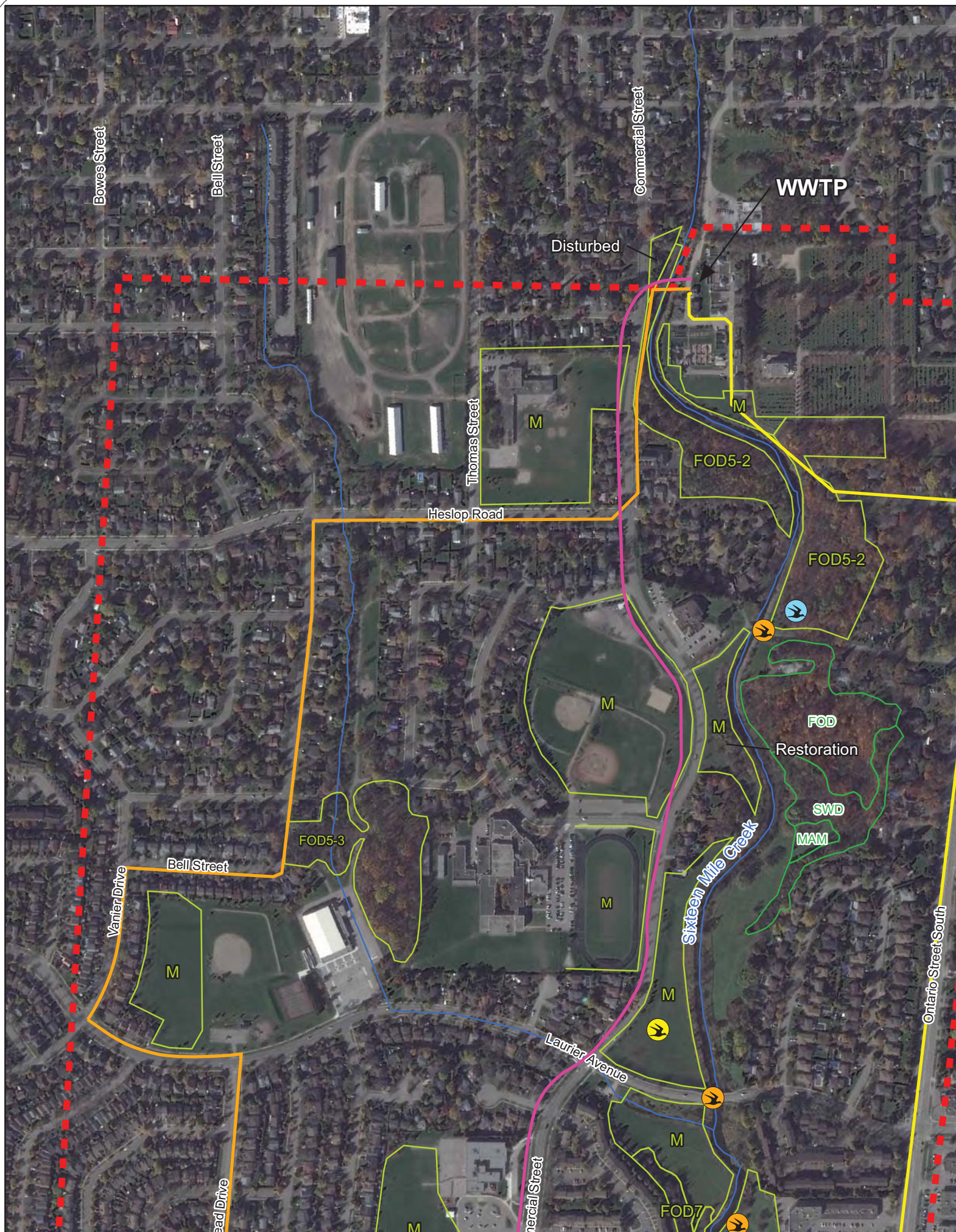
The geographical extent and composition of vegetation communities were initially reviewed through interpretation of aerial imagery for the project area and review of available data from CH. Field investigation was then conducted on June 8, 2016 for areas where property access was provided (or from nearest accessible vantage point). Natural heritage vegetation communities identified within the study area were classified according to the *Ecological Land Classification for Southern Ontario: First Approximation and Its Application* (Lee et al. 1998). The objective of the field effort was to confirm and refine the ELC data provided by CH for natural areas, and to assess ELC for natural areas in proximity to project works where no background data was available. Local plant species status was reviewed against Halton Region (Crins et. al. 2006). Vegetation community status was reviewed for Ontario (NHIC 1997). Vascular plant nomenclature follows Newmaster *et al*. (1998) with a few exceptions that have been updated to Newmaster 2008.

3.1.2 Wildlife and Wildlife Habitat

Wildlife observations were completed on June 8, 2016 through pedestrian survey of the study site in natural areas and where structures with the potential to provide habitat (e.g. bridges, culverts) were noted in proximity to the routing of alternatives. Wildlife identification was completed through visual and auditory observations as well as indirect incidental observations (i.e. tracks, scat, and scents). In accordance with the Ontario Breeding Bird Atlas Protocol (2001), breeding evidence for each bird species was documented during the wildlife survey. Wildlife observations were screened for those listed as at risk provincially, federally, or of local concern.

3.1.3 Aquatic Habitat

Site investigation of aquatic habitat focused on the reaches of Sixteen Mile Creek in proximity to project works, particularly where crossings of the creek have been proposed. As well, additional surface water and drainage features were investigated as they were encountered in proximity to the alignments under consideration for forcemain routing. The objective of site investigation as it pertained to surface water features was to supplement the data collected through background review to include a description of general morphology and habitat conditions.


Bowes Street
Bell Street
Commercial Street
WWTP
Disturbed
Thomas Street
M
FOD5-2
Heslop Road
FOD5-2
M
M
FOD
Restoration
SWD
MAM
FOD5-3
Bell Street
Vanier Drive
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Sixteen Mile Creek
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M
Ontario Street South
Laurier Avenue
M
Commercial Street
FOD7
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3.2 FIELD INVESTIGATION RESULTS

3.2.1 Vegetation and Vegetation Communities

3.2.1.1 Vegetation

A total of 49 species were inventoried within the vegetation communities displayed in Figure 4 and summarized in Table 3. A complete list of vascular plant species documented can be found in Appendix B. A total of 69% of the plant species identified on site are considered native to Ontario while the remaining 31% are considered introduced and non-native to the province. The vast majority of the species found are common within Halton Region. Only one species is indented to be locally uncommon (Shagbark Hickory – *Carya ovata var. ovata*). No federally or provincially listed plant species at risk were documented within the study area.

3.2.1.2 Vegetation Communities

Table 3 provides a summary of the vegetation communities documented within the study area. Given the highly urban and residential nature of the study area, only four different community types were documented. The naturalized forest communities that were found within the study area were primarily situated around the riparian floodplain of Sixteen Mile Creek. Remaining areas include mainly manicured, cultural, or anthropogenic community types. Several previously disturbed or manicured communities adjacent to Sixteen Mile Creek (CUM1-1 and M) appear to have undergone restoration planting recently, with many young tree saplings present.

Table 3: Ecological Land Classification (ELC) of Vegetation Communities within the Study Area.

ELC Code	Vegetation Type	Species Association	Comments
Terrestrial – Natural/Semi-natural			
FOD	DECIDUOUS FOREST		
FOD5-2	Dry-Fresh Sugar Maple-Beech Deciduous Forest	**Canopy:** Sugar Maple (*Acer saccharum*), American Beech (*Fagus grandifolia*), Basswood (*Tillia americana*), Red Ash (*Fraxinus pennsylvanica*), Black Walnut (*Juglans nigra*) **Under storey:** Choke Cherry (*Prunus virginiana var. virginiana*), Red Ash, Staghorn Sumac (*Rhus hirta*) **Ground Cover:** Canada Goldenrod (*Solidago canadensis*), Trillium (*Trillium grandiflorum*), Jack-in-the-Pulpit (*Arasaema triphyllum ssp. triphyllum*)	• Sugar Maple dominated. • Naturalized forest community along upper slope reaches of Sixteen Mile Creek. • Urban encroachment visible with yard waste dumping, disturbance, etc. • Includes some large diameter dead standing trees (Beech, White Pine (*Pinus strobus*), Sugar Maple)

ELC Code	Vegetation Type	Species Association	Comments
FOD5-3	Dry-Fresh Sugar Maple-Oak Deciduous Forest	**Canopy:** Sugar maple, Red Oak, Shagbark Hickory, Bur Oak (*Quercus macrocarpa*) **Under storey:** Red Ash, Choke Cherry, Tartarian Honeysuckle (*Lonicera tatarica*), Ironwood (*Ostrya virginiana*) **Ground Cover:** Canada Goldenrod, Common Burdock (*Arctium minus*), Inserted Virginia Creeper (*Parthenocissus vitaea*), Bloodroot (*Sanguinaria canadensis*)	• Small, remnant forest fragment, with some signs of encroachment and disturbance • Understorey and ground layers open. • Includes walking trails along channelized creek.
FOD7	Fresh-Moist Lowland Deciduous Forest	**Canopy:** Manitoba Maple (*Acer negundo*), Willow (*Salix sp.*) **Under storey:** Red Ash, **Ground Cover:** Riverbank Grape (*Vitis riparia*), Canada Goldenrod	• West of Sixteen Mile Creek, north of Derry Road. • Small, treed riparian fragment. • Sloping down to creek.
Terrestrial – Cultural			
CUM	CULTURAL MEADOW		
CUM1-1	Dry-Moist Old Field Cultural Meadow	**Under storey:** Red Ash, Common Buckthorn, Staghorn Sumac **Ground Cover:** Grasses (*Poa spp.*), Canada Goldenrod	• Primarily occurs within the road ROW and has likely been maintained/mowed frequently • Includes Restoration areas along Derry Road and Commercial Street.

3.2.2 Wildlife and Wildlife Habitat

3.2.2.1 Wildlife

A total of 31 wildlife species were documented during the field investigation; 30 birds and one mammal species, as summarized in Table 4. The majority of the species observed are considered secure and common to the community types found on site, including a mix of urban tolerant species as well as some more sensitive species in the naturalized forest areas. Approximately 70% of the bird species observed are considered migratory and are regulated under the *Migratory Birds Convention Act* (MBCA), while an additional 5 species are regulated under the *Fish and Wildlife Conventions Act*. Only 4 of the observed bird species are not under any legislative protection; American Crow (*Corvus brachyhrynchos)*, Common Grackle (*Quiscalus quiscula*), European Starling (*Sturnus vulgaris*), and Red-winged Blackbird (*Agelaius phoeniceus*). One of the species observed is considered an area sensitive species according to the *Significant Wildlife Habitat Technical Guide* (SWHTG 2000); Bald Eagle (*Haliaeetus leucocephalus*), which was observed flying overhead but not stopping within the study area. A total of three species were confirmed to be breeding within the study area, with breeding evidence such as active nests and recently fledged young noted during the June site investigation. An additional six species were documented as probable breeders for the area.

3.2.2.2 Wildlife Habitat

The forested communities (FOD5-2) along Sixteen Mile Creek within the study area represent the highest quality habitat available for wildlife. These forests include trees of various ages and condition (including dead standing trees), and also include species that are mast producing (i.e. Black Walnut, Oak, Beech). Several large diameter trees were noted as having cavities or sloughing bark. These elements may afford shelter, habitat, and food opportunities for a variety of wildlife, including the potential for species at risk bats such as Little Brown Myotis (*Myotis lucifugus*). Large diameter trees with sloughing bark or cavities have the potential to act as maternal roosting locations for this species. This forest area also provides habitat to the Red-eyed Vireo (*Vireo olivaceus*), which is noted as an interior species within the SWHTG (2000). This forested habitat also meets criteria as Candidate Significant Wildlife Habitat as Eastern Wood Pewee (*Contopus virens*), a Special Concern species, was heard singing within this community during the 2016 field investigation.

Remaining communities on site do not represent high-quality habitat, but do offer nesting opportunities for other more urban tolerant species. The bridge at Laurier Avenue was noted as having an active Barn Swallow (*Hirundo rustica*) nest, while the bridge at Derry Road had multiple active Barn Swallow and Cliff Swallow (*Petrochelidon pyrrhonota*) nests. Artificial Barn Swallow nest cups were also affixed to the underside of the bridge, but were not in use at the time of survey.

Table 4: Wildlife Species Documented within the Study Area, June 2016.

Type	Scientific Name	Common Name	OBBA Code	Breeding Evidence	G-Rank
Bird	*Corvus brachyhrynchos*	American Crow	H	Possible	G5
Bird	*Carduelis tristis*	American Goldfinch	P	Probable	G5
Bird	*Turdus migratorius*	American Robin	P	Probable	G5
Bird	***Haliaeetus leucocephalus***	**Bald Eagle**	**X**	**Observed**	**G5**
Bird	***Hirundo rustica***	**Barn Swallow**	**AE**	**Confirmed**	**G5**
Bird	*Ceryle alcyon*	Belted Kingfisher	S	Possible	G5
Bird	*Poecile atricapillus*	Black-capped Chickadee	S	Possible	G5
Bird	*Cyanocitta cristata*	Blue Jay	P	Probable	G5
Bird	*Bombycilla cedrorum*	Cedar Waxwing	P	Probable	G5
Bird	***Chaetura pelagica***	**Chimney Swift**	**H**	**Possible**	**G5**
Bird	*Petrochelidon pyrrhonota*	Cliff Swallow	AE	Confirmed	G5
Bird	*Quiscalus quiscula*	Common Grackle	H	Possible	G5
Bird	*Picoides pubescens*	Downy Woodpecker	H	Possible	G5
Bird	*Sayornis phoebe*	Eastern Phoebe	S	Possible	G5
Bird	***Contopus virens***	**Eastern Wood Pewee**	**S**	**Possible**	**G5**
Bird	*Sturnus vulgaris*	European Starling	FY	Confirmed	G5
Bird	*Dumetella carolinensis*	Gray Catbird	S	Possible	G5
Bird	*Myiarchus crinitus*	Great Crested Flycatcher	S	Possible	G5
Bird	*Troglodytes aedon*	House Wren	S	Possible	G5
Bird	*Charadrius vociferus*	Killdeer	S	Possible	G5
Bird	*Cardinalis cardinalis*	Northern Cardinal	P	Probable	G5
Bird	*Stelgidopteryx serripennis*	Northern Rough-winged Swallow	S	Possible	G5
Bird	*Vireo olivaceus*	Red-eyed Vireo	S	Possible	G5
Bird	*Buteo jamaicensis*	Red-tailed Hawk	H	Possible	G5
Bird	*Agelaius phoeniceus*	Red-winged Blackbird	A	Probable	G5
Bird	*Larus delawarensis*	Ring-billed Gull	X	Observed	G5
Bird	*Melospiza melodia*	Song Sparrow	S	Possible	G5
Bird	*Cathartes aura*	Turkey Vulture	X	Observed	G5
Bird	*Vireo gilvus*	Warbling Vireo	S	Possible	G5
Bird	*Dendroica petechia*	Yellow Warbler	S	Possible	G5
Mammal	*Sciurus carolinensis*	Eastern Gray Squirrel			G5

Legend Table 4
Bold entries indicate species included in the SARO listing
OBBA Breeding Evidence Codes
Observed X - Species observed in its breeding season (no breeding evidence)
Possible H - Species observed in its breeding season in suitable nesting habitat; **S** – Singing male(s) present, or breeding calls heard in suitable nesting habitat
Probable P - Pair observed in suitable nesting habitat; **T** - Permanent territory presumed through registration of territorial behaviour on at least 2 days, a week or more apart at the same place; **D** - Courtship or display, including interaction between a male and a female or two males, including feeding or copulation; **V** - Visiting probable nest site; **A** - Agitated behaviour or anxiety calls of an adult; **B** - Brood Patch on adult female or cloacal protuberance on adult male; **N** - Nest-building or excavation of nest hole
Confirmed DD - Distraction display or injury feigning; **NU** - Used nest or egg shells found (occupied or laid within the period of the survey); **FY** – recently fledged or downy young, including incapable of sustained flight; **AE** – adult leaving/entering occupied nest; **FS** – adult carrying fecal sac; **CR** – adult carrying food for young; **NE** – nest containing eggs; **NY** – nest with young seen or heard
G- Rank (Global Rank): assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts and The Nature Conservancy to designate a rarity rank based on the range-wide status of species, subspecies or variety, according to the following:
G5-very common; demonstrably secure under present conditions
S-Rank (Provincial or Subnational ranks): used by the Natural Heritage Information Centre to set protection priorities for rare species and natural communities. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.
SX-presumed extirpated; not located despite intensive searches
SH-historical; no known extant occurrences in past 20 years
S1-critically imperilled; typically 1 to 5 extant occurrences
S2-imperiled; typically 6 to 20 extant occurrences
S3-vulnerable; typically 21 to 80 extant occurrences
S4-apparently secure; uncommon but not rare; some cause for long-term concern; usually >80 extant occurrences
S5-secure; common, widespread and abundant
SNA-status not applicable; not a suitable target for conservation (e.g. non-native species)
COSEWIC – Committee on the Status of Endangered Wildlife in Canada
NAR- not at risk; a wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances
THR-threatened; a wildlife species likely to become endangered if limiting factors are not reversed
END-endangered; a wildlife species facing imminent extirpation or extinction
EXT-extirpated; a species no longer existing in the wild in Canada but occurring elsewhere
SC-special concern; a wildlife species that may become a threatened or an endangered species because of
SARA – Species at Risk Act
Schedule 1- official list of wildlife species at risk
THR-threatened; a wildlife species likely to become endangered if limiting factors are not reversed
END-endangered; a wildlife species facing imminent extirpation or extinction
EXT-extirpated; a species no longer existing in the wild in Canada but occurring elsewhere
SC-special concern; a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats
SARO –Species at Risk in Ontario
END-Endangered; a species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA
EXP-Extirpated; a species that no longer exists in the wild in Ontario but exists elsewhere
THR-Threatened; a species that is at risk of becoming endangered in Ontario if limiting factors are not reversed
SC-Special Concern; a species with characteristics that make it sensitive to human activities or natural events
FWCA – Fish and Wildlife Conservation Act, 1997
P-protected species, G – game species, F – furbearing species
MBCA – Migratory Birds Convention Act, 1994
X - Migrant species afforded protected
SWH-TG – Species with specific habitat requirements and considered 'area sensitive' as a result (Ontario Ministry of Natural Resources (OMNR). 2000. Significant Wildlife Habitat Technical Guide. Queen's Printer for Ontario. Ontario, Canada.)
Interior Species – 'X' indicates that species requires interior habitat
Halton NAI – Halton Natural Areas Inventory
R - Rare (5 or fewer sites); U - Uncommon (6-15 sites); ? - Requires Further Revision; E – Extirpated; C – Common; I – Introduced; N – Native
Conservation Priority (Halton)
Level 1 – highest priority; Level 4 – lowest priority

3.2.3 Aquatic Habitat

Proposed alternatives for the installation of a forcemain include a potential crossing of Sixteen Mile Creek in the area of the existing Milton Wastewater Treatment Plant and Fulton Street WWPS. Available habitat in the creek was characterized during a June 8, 2016 field investigation at accessible vantage points to include the area of the proposed crossing (north of Sydney Street), the cemetery property adjacent to the WWPS, the footbridge at the bottom of Parkway Drive, and the bridges at Laurier Avenue and Derry Road. The creek has been entrenched and hardened downstream of Martin Street and through much of the study area (to just south of Parkway Drive). The hardened portion is considered to represent a warm water thermal regime. Downstream of Parkway Drive the channel is naturalized and identified by MNRF to be a cool water system.

Immediately downstream of the Fulton Street WWPS the wetted width and wetted depth of the creek were observed to be approximately 6.0m and 0.5 – 1.0m, respectively. Some algae was observed on the bottom of the concrete channel during the time of survey. The hardened bottom and banks of the channel limit opportunities for in-stream and overhead cover through this area; however, a narrow band of mature deciduous trees and shrubbery offer some cover on the north side in the vicinity of the WWPS (Appendix D, Photos 1 to 3). Beyond the trees, the natural areas of the wastewater treatment plant property are generally comprised of manicured lawn. Downstream of the WWPS on the south side of the creek, riparian vegetation includes a deciduous forest dominated by Sugar Maple and Beech. As well, the riparian areas along the northeast bank through the middle reaches of the study area are dominated by deciduous forest.

At the Parkway Drive footbridge (Eagle Bridge) the creek was observed to offer habitat of similar characteristic to that in proximity to the WWPS as described above; an entrenched concrete channel with little to no in-stream cover and a narrow band of tree/shrub riparian vegetation (Appendix D, Photo 4).

Upstream of Laurier Avenue Sixteen Mile Creek takes on a natural channel form and flows through a well-defined valley system with a relatively wide floodplain. Available instream habitat in the vicinity of the Laurier Avenue bridge is predominantly run/glide, with riffle habitat noted approximately 100m upstream of the bridge. Instream cover was observed in the form of vegetation and woody debris (Appendix C). The creek bottom is generally comprised of soft fine substrates with some gravel/boulder (Appendix D, Photos 9 and 10). Attached algae was noted in the channel at this location. The wetted width was approximately 14 – 16 m and the wetted depth generally less than 1.0 m at the time of survey. Creek banks are steep and portions are rip-rap lined. Woody vegetation cover is limited both upstream and downstream of the bridge location; however, recent restoration efforts were noted in areas upstream and downstream of Laurier Avenue. Shading to the creek, particularly upstream of the bridge, is provided by a narrow band of mature riparian trees, beyond which is a mix of manicured grass and residential (Figure 4). Sixteen Mile Creek downstream of the Laurier Avenue bridge is identified by MNRF to provide habitat for Silver Shiner, a species identified as threatened and afforded protection under the ESA. Silver Shiner habitat includes the occupied reach of the creek and the floodplain. Additionally, the bridge structure offers opportunity for Barn Swallow nesting as described in Section 3.2.2.

At Derry Road, the creek has a wetted width of approximately 10 m with a mix of riffle, run and pool habitat (Appendix C). Wetted depths ranged from approximately 1.5 m in the pool habitat upstream of the bridge to 0.5 m through the downstream riffle. Substrates were dominated by cobble and boulder. Slumping of rip rap into the creek was also noted (Appendix D, Photo 13). Instream cover is available in the form of woody debris, large diameter substrates and some instream vegetation. The floodplain north of the creek and west of Derry Road is comprised of cultural meadow with some recent restoration plantings (Appendix D, Photo 12). South of the creek the riparian vegetation is comprised of a forested edge (FOD7 in Figure 4) approximately 20m wide, backing on to residential properties. Additionally, the bridge structure offers opportunity for nesting birds to include Barn Swallow and Cliff Swallow (Appendix D, Photos 15 and 16).

3.3 SPECIES AT RISK

No plant species at risk were documented within the study area during the June 2016 field investigation.

A total of four species at risk birds were documented within the study area, including one confirmed to be breeding (Barn Swallow – *Hirundo rustica*). The locations of these observations are included in Figure 4. Two of the species observed are listed as Threatened (Barn Swallow and Chimney Swift (*Chaetura pelagica*)), while another two are listed as Special Concern (Bald Eagle (*Haliaeetus leucocephalus*) and Eastern Wood Pewee).

Barn Swallows were documented in several locations within the study area and confirmed as actively nesting on the underside of at least two bridges. These birds are aerial insectivores and were primarily observed in areas where bridges spanned Sixteen Mile Creek.

A single adult Bald Eagle was observed from the Derry Road bridge crossing of Sixteen Mile Creek, flying high overhead and heading south. It did not stop within the study area. No large stick nests were found in forested areas within the study area. Areas along the creek outside of the urban Milton boundary likely serve as better habitat for this species, as these birds can be intolerant to human disturbance.

The Chimney Swift was documented flying overhead near the Laurier Avenue bridge crossing. The individual moved west and did not stop. It is likely this species is nesting within the chimneys of older buildings in the area, though no nesting locations were confirmed.

The Eastern Wood Pewee observations included documentation of an individual singing within the FOD5-2 community on the east side of Sixteen Mile Creek. It is possible that this species is using the forested communities on site for breeding purposes.

The results of the background review conducted to locate records for species at risk data in the project area, along with field investigation results and information regarding species habitat preference were combined to determine a list of SAR with the potential to occur in proximity to project works. Table 5 summarizes the results of that effort to determine where there is potential for SAR to be impacted by project works, or where additional works related to SAR may be warranted.

Table 5: Screening for Species at Risk Habitat with Potential to Occur in the Study Area (MNRF Consultation, Ap

Species	SARO Status	ESA Protection (MNRF, 2016a)	Habitat Description (MNRF, 2016a)	Habitat Potential/Results of Field Investigation	Further I
Butternut (*Juglans cinerea*)	END	Species 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 seldom, 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.	Potential habitat is associated with deciduous forest or woodland edges. Pedestrian surveys were conducted in woodlands in proximity to proposed forcemain alignments where access was granted. No butternut were observed; however, there is potential for the species to occur.	During de survey of completed include a s any constr to identify be impacte works are any docun consultatio required to under the
Bank Swallow (*Riparia riparia*)	THR	Species and General Habitat Protection	Bank swallows nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable. The birds breed in colonies ranging from several to a few thousand pairs.	Potential habitat is generally associated with eroding banks along watercourses. The existing watercourse banks are hardened through most of the study area (including the area identified for the potential routing of a forcemain crossing) and bordered by dense vegetation in areas beyond the concrete. This type of bank condition is not suitable for this species.	None reco

Species	SARO Status	ESA Protection (MNRF, 2016a)	Habitat Description (MNRF, 2016a)	Habitat Potential/Results of Field Investigation	Further I
Barn swallow (*Hirundo rustica*)	THR	Species and General Habitat Description available	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. This species is well adapted to use anthropogenic structures and urbanized areas.	Pedestrian surveys were conducted in natural areas where access was provided to document birds during the breeding season. Suitable structures were also surveyed for nests where accessible and in proximity to routing of alternatives. Multiple active nests were observed under the bridges crossing Sixteen Mile Creek on Laurier Avenue and Derry Road.	Where any occur with season a s (e.g. bridg completed Habitat up nesting sit Category consultatio required to under the
Bobolink (*Dolichonyx oryziborus*)	THR	Species and General Habitat Protection (General Habitat Description)	Historically, Bobolinks lived in North American tallgrass prairie and other open meadows. With the clearing of native prairies, Bobolinks moved to living in hayfields. Bobolinks often build their small nests on the ground in dense grasses. Both parents usually tend to their young, sometimes with a third Bobolink helping. General habitat protection is provided for the area up to 300m from a nest.	Pedestrian surveys were conducted in natural areas where access was provided to document birds during the breeding season. No individuals of this species were observed. Any open, vegetated areas (i.e. Cultural Meadow) were sparse, with short or manicured grass. Several areas have also undergone restoration recently, with young trees planted and disturbed ground cover. No hay fields were noted in the study area.	None reco

Species	SARO Status	ESA Protection (MNRF, 2016a)	Habitat Description (MNRF, 2016a)	Habitat Potential/Results of Field Investigation	Further I
Chimney swift (*Chaetura pelagica*)	THR	Species and General Habitat Description available	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. This species is well adapted to use of anthropogenic structures and urbanized areas.	Pedestrian surveys were conducted in natural areas where access was provided to document birds during the breeding season. Individuals of this species were observed foraging high overhead in the field near Laurier Avenue and Commercial Street (Figure 4). Potential habitat is in the form of residential and industrial chimneys. No removal of buildings is anticipated as a part of forcemain construction.	None reco
Eastern Meadowlark (Sturnella magna)	THR	Species and General Habitat Protection (General Habitat Description)	Eastern Meadowlarks breed primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Small trees, shrubs or fence posts are used as elevated song perches.	Pedestrian surveys were conducted in natural areas where access was provided to document birds during the breeding season. No individuals of this species were observed. No appropriate tall grass meadow or agricultural hayfields were present within the study area.	None reco

Species	SARO Status	ESA Protection (MNRF, 2016a)	Habitat Description (MNRF, 2016a)	Habitat Potential/Results of Field Investigation	Further I
Little Brown Myotis (*Myotis lucifugus*)	END	Species and general habitat protection	Overwintering habitat is associated with caves and mines that remain above 0˚C. Maternal Roosts are associated with buildings (attics, barns etc.) and large diameter trees (25-44 cm DBH).	Potential habitat within the study area is associated with forest or woodland edges and the use of manmade structures as indicated under the habitat description. No removal of buildings is anticipated as a part of forcemain construction. Large diameter trees exist within the FOD5-2 communities documented in the study area.	Where any removal in for suitabl habitat and species sh according
Milksnake (*Lampropeltis triangulum*)	Species status has been updated since receipt of information from MNRF regarding SAR in May 2016. This species is no longer included on the SARO list.				
Snapping Turtle (*Chelydra serpentina*)	SC	N/A	Found in many types of freshwater bodies, including ponds with soft mud bottom, slow-moving streams, persistent wetland areas, as well as man-made features like golf course ponds or irrigation channels. (SARA Public Registry). Snapping turtles prefer shallow water so they can hide under soft mud and leaf litter with only their noses exposed. During the nesting season females travel in search of suitable nesting sites, usually gravelly or sandy areas along streams. Overwintering habitat is in the form of ponds of sufficient depth not to freeze in the winter season.	Pedestrian surveys were conducted where access was granted to identify potential wildlife habitat. Potential habitat is limited across the study area – Sixteen Mile Creek is hardened and 'trib 1' (follows Laurier Avenue) is buried throughout most of the study area. No ponds were documented within the primary study area. Notwithstanding, Snapping Turtle is assumed to occur within the aquatic habitat.	No further investigati However, aquatic ha trenchless considered this specie assumed th mitigation habitat of Redside D sufficient of this spe function to individual available e should be case of any conflicts.

Species	SARO Status	ESA Protection (MNRF, 2016a)	Habitat Description (MNRF, 2016a)	Habitat Potential/Results of Field Investigation	Further I
Redside Dace (*Clinostomus elongates*)	SARO status – END SARA status - END	Species and General Habitat Protection (General Habitat Description)	Redside Dace are found in pools and slow-moving areas of small streams and headwaters with a gravel bottom. They are generally found in areas with overhanging grasses and shrubs, and can leap up to 10 cm out of the water to catch insects. During spawning, they can be found in shallow parts of streams, which are also popular spawning areas for other minnow species.	Aquatic habitat was characterized in proximity to proposed watercourse crossings of Sixteen Mile Creek. MNRF was consulted. Sixteen Mile Creek is identified as recovery habitat for this species to include the reach north of Laurier Avenue.	Any cross forcemain consultatio to ensure c and SARA
Silver Shiner (*Notropis photogenis*)	THR	Species and General Habitat Protection (General Habitat Description)	Generally prefer moderate to large, deep, relatively clear streams with swift currents, gravel or boulder bottoms, little to no vegetation, and moderate to high gradients Spawning occurs in May and June.	Aquatic habitat was characterized in proximity to proposed watercourse crossings of Sixteen Mile Creek. MNRF was consulted. Sixteen Mile Creek is identified as occupied habitat for this species to include the reach south of Laurier Avenue. Habitat protection includes the occupied reach as well as the floodplain of the creek.	Any cross forcemain floodplain Laurier Av consultatio compliance to this spe

4.0 SUMMARY OF CONSTRAINTS

Three routings for installation of a new forcemain between the existing Fulton Street WWPS and the maintenance hole at Derry Road and Commercial Street are under consideration as part of the Schedule B Class EA (Figure 4). Much of the routing of alternatives utilizes existing road rights of way. The most sensitive aspects from a natural heritage perspective are the crossing of Sixteen Mile Creek and the potential for tree removal within deciduous forest communities. Installation of the forcemain across the creek is planned to occur in one of two ways: where a new crossing is proposed, trenchless technology will be employed; and, where an existing bridge structure is in place, the forcemain will tie into the existing structure. The creek represents recovery habitat for Redside Dace (END) and occupied habitat for Silver Shiner (THR), both of which are afforded protection under the provincial Endangered Species Act, 2007. Redside Dace habitat extends north of Laurier Avenue, while Silver Shiner habitat is identified to include the reaches of the creek (and associated floodplain) south of Laurier Avenue. As well, Redside Dace has recently (May 2017) been afforded protection under Schedule 1 of the federal Species at Risk Act (SARA) as an endangered species. SARA protection is currently focused on individuals of the species; no critical habitat has been defined. However, protection under SARA should be revisited at detailed design and a DFO Request for Review should be initiated to ensure project compliance with SARA protection in place at that time. As well, once the construction method for installation of the forcemain across Sixteen Mile Creek is confirmed and relevant design details are known, project works can be assessed to determine whether they can adhere to the DFO 'Measures to avoid causing harm to fish and fish habitat including aquatic species at risk', and thereby comply with the Fisheries Act.

The bridge structures on Laurier Avenue and Derry Road represent habitat for Barn Swallows (THR) as active nests for this species were observed during the 2016 field investigation. The FOD communities are considered sensitive features given the limited quantity of woodland observed in the project area. Eastern Wood Pewee (identified on the species At Risk in Ontario (SARO) list as Special Concern) was documented in the FOD5-2 Sugar Maple-Beech Deciduous Forest during the 2016 field visit, therefore the feature represents candidate significant wildlife habitat (SWH). No field investigation to determine presence/absence for SAR bats has been completed to date. Where tree removals within FOD communities are proposed there is potential for impacts to SAR bats. Impacts to tree resources as they relate to street and residential trees are anticipated to be similar across all three of the alternative solutions.

The alternative solutions for forcemain routing are evaluated below and a preferred routing is identified from an environmental perspective to take into consideration all of the above sensitivities.

5.0 EVALUATION OF ALTERNATIVE SOLUTIONS

LGL has reviewed the alternative solutions proposed by the project team (as presented in Figure 4) against the natural heritage constraints as they relate to the scope of work reported herein and summarized above. Table 6 summarizes the impacts identified.

Table 6: Natural Environment Evaluation of Alternative Forcemain Alignments (as shown in Figure 4).

	Alternative A – Ontario Street	**Alternative B – C**
Overview of Natural Environment Impacts The impacts associated with construction of a new forcemain are assumed to be temporary in nature in that the operational infrastructure will be buried below ground with disturbed areas restored.	Much of the routing of this alternative utilizes existing road rights of way. The most sensitive aspects from a natural heritage perspective are the crossing of Sixteen Mile Creek and the removal of trees associated with the FOD5-2 community. The Sugar Maple-Beech Deciduous Forest (FOD5-2) supports Eastern Wood Pewee; and, as such represents Candidate SWH. The FOD5-2 community includes candidate bat maternity roosting habitat and may provide habitat for SAR bats. Impacts identified below assume the bridge structure on Derry Road will be used to support the forcemain as it crosses the creek. The bridge represents habitat for Barn Swallow (Threatened), a species afforded protection under the *Endangered Species Act, 2007.* Impacts to tree resources as they relate to street and residential trees and those in public spaces are also anticipated, but assumed to be similar across the three alternatives.	With the exception o of this alternative uti Creek represents rec for Silver Shiner (TH *Endangered Species* under the federal *Spe* identified to include below assume a trenc resources as they rela spaces are also antici alternatives.
Impact to Sensitive Features and Regulated Areas - Creek crossings, construction in the natural hazard areas (i.e. flood plains, erosion hazards, etc.), construction through wooded areas.	The northern portion of this alignment lies within the meander belt and valley wall erosion hazards, as well as the regulated floodplain and valley of Conservation Halton (CH). It also crosses a Sugar Maple-Beech Deciduous Forest (FOD5-2) where tree impacts are anticipated. The FOD 5-2 functions as candidate significant wildlife habitat for species of conservation concern (Eastern Wood Pewee - listed as Special Concern), therefore vegetation removals also represent an impact to the extent and quality of wildlife habitat. The remainder of the alignment utilizes existing road rights of way.	Given the proximity need for a new crossi within the regulated Conservation Halton are identified along t
Impact to Species at Risk – Potential to disrupt SAR habitat or impact individuals.	Much of the alignment follows road rights of way which are not generally considered to represent areas of high sensitivity from a natural heritage standpoint; however, the bridge structure on Derry Road over Sixteen Mile Creek provides habitat for Barn Swallow (Threatened, and afforded protection under the *Endangered Species Act, 2007*). The northern portion of this alignment lies within the meander belt limits of Sixteen Mile Creek. Infrastructure placement within the meander belt has the potential to impact habitat for Redside Dace (Endangered, and afforded protection under the *Endangered Species Act, 2007* and the federal *Species at Risk Act*.). Note: This analysis assumes that crossing of Sixteen Mile Creek at Derry Road will utilize the road right of way and existing bridge structure to remain outside of the floodplain and associated habitat for Silver Shiner (Threatened, and afforded protection under the *Endangered Species Act, 2007*).	Sixteen Mile Creek r and habitat for Silver protection under the also afforded protect for Silver Shiner is id Impacts to species at the treatment plant o proposed trenchless c habitat given that the hardened through thi construction (e.g. fra associated with this t can be achieved betw

In summary, Alternative A is considered to have the greatest potential to impact vegetation and wildlife. If this alternative is determined as the preferred solution and tree removals are proposed within the FOD5-2 community, additional field surveys will be required to determine presence/absence of bat SAR and bat habitat in the form of maternity roosting habitat. Spanning of the Derry Road bridge with a new forcemain may also affect Barn Swallow and/or their nest structures.

Alternatives B and C utilize existing road rights of way and manicured areas for much of the forcemain alignment. These alignments also require a crossing of Sixteen Mile Creek. The project team is proposing to use trenchless technology for this crossing to mitigate impacts to the natural environment, including those related to aquatic SAR.

From the perspective of natural environment LGL recommends the Alternative B Commercial Street alignment. With the exception of a new crossing of Sixteen Mile Creek, the routing of this alternative utilizes existing road rights of way. Of the alignments proposed within road rights of way, this is the shortest alternative and anticipated to result in the least impact to the urban forest canopy. Sixteen Mile Creek represents recovery habitat for Redside Dace (END) and habitat for Silver Shiner (THR), both of which are afforded protection under the Endangered Species Act, 2007. Redside Dace is also afforded protection under the federal Species at Risk Act. The potential for impacts to the habitat of these species can be greatly reduced through the use of trenchless technology for installation of the forcemain. Conducting works to align with the coldwater timing window would further mitigate impacts (i.e. no works between September 15 and June 30) associated with the potential risk of 'frac out' that is inherent to trenchless methodologies. Habitat for Silver Shiner is identified to include the floodplain of the creek. Therefore, mitigation to ensure restoration of any vegetation disturbance and stabilization of soils within or in proximity to the floodplain limits during construction will be especially important for the protection of habitat. Fencing to delineate the construction zone and prevent wildlife movement, particularly in the vicinity of Sixteen Mile Creek, is also recommended. These and other mitigation recommendations are provided in more detail in the section that follows.

Further consultation with MNRF will be required for any of the three alternatives presented given that all are in proximity to SAR habitat by virtue that they are all require a watercourse crossing of Sixteen Mile Creek. As well, consultation with DFO will be required to determine the need for permits/approvals under the Fisheries Act and SARA where creek crossings are proposed.

6.0 MITIGATION RECOMMENDATIONS

The following are provided as recommendations based on the potential impacts identified above. Best management practices intended to avoid or minimize impacts are outline under 6.1 General Recommendations. In addition, mitigation recommendations specific to the various natural environment components are described in the following subsections. Mitigation recommendations are based on the alignments of the alternative solutions as presented in Figure 4 and described in Table 6. These recommendations focus primarily on impacts related to construction, given that the infrastructure will be buried and result in minimal operational impact to the natural environment.

6.1 GENERAL

Construction related impacts can first be mitigated by minimizing the extent of disturbance wherever possible through coordination of all project related planning, including design, staging and scheduling. Mitigation related to staging of construction includes prioritizing project components in such a way that disturbance within the same construction area would be minimized (i.e. coordination of all disturbance activities in a manner that reduces the impact at these locations). The extent of construction related activity can be effectively isolated and secured from adjacent natural lands through the installation of erosion and sediment control measures to mitigate the potential for silt and sediment entry into surface water features and adjacent lands. To some extent, the isolation of the work area will also discourage the entry of wildlife into the work zone thereby minimizing incidental encounter and the risk of incidental mortality during construction.

6.2 VEGETATION AND VEGETATION COMMUNITIES

Construction mitigation largely relates to the grading and/or removal of vegetation that results in exposed soils. Mitigation strategies include:

- Minimize the construction disturbance area to the extent feasible;
- Any vegetation removals may be limited by seasonal timing and conditions set by the MBCA. A nest search may be required if any vegetation removal is proposed between mid-March and the end of August;
- Ensure that temporarily disturbed areas are adequately restored with native, non-invasive vegetation post-construction, and monitor the effectiveness of restoration making adjustments as necessary, which may include management of nuisance and invasive species;
- Revegetation of new edges to minimize edge effects extending into the adjacent retained vegetation communities;
- During detailed design an arborist assessment is recommended to identify tree impacts and develop a tree preservation plan;
- Maintain existing drainage patterns to avoid changing character of vegetation communities and associated habitat functions; and,

- Divert excess stormwater away from wetlands or sensitive aquatic habitat and provide quality and quantity treatment.

6.3 WILDLIFE AND WILDLIFE HABITAT

Wildlife mitigation measures coincide closely with the vegetation community mitigation measures, as habitat is provided directly by these features. In addition to vegetation community recommendations, the follow recommendations are provided below with respect to management of wildlife habitat during and post construction.

Construction may result in the direct removal of available habitat for local and resident species and disturbance to adjacent habitat/communities. As a result, mitigation recommendations include:

- Minimize habitat removal through minimization of access, staging, storage and grading footprints to the extent feasible;
- Stabilize exposed soils to prevent sediment entrainment, and restore disturbed areas with native and non-invasive vegetation after construction;
- As identified in the vegetation management section, revegetation of new edges with appropriate native seed mixes will help to ensure the creation of new edge habitat; and,
- Adhere to the timing windows for species regulated under the *Migratory Birds Convention Act* to conduct work outside of the sensitive breeding period for migratory birds (identified by Environment Canada as mid-March to end of August for this area).

Construction activities have the potential for incidental killing or harm to local and resident wildlife species. The following mitigation strategies are recommended:

- Where construction is planned to coincide with seasons of wildlife activity (e.g. nesting turtles) ensure the construction areas are delineated by fencing that can serve to exclude wildlife from entering the work areas to the extent possible; and,
- Ensure that an environmental monitor is available in the event that wildlife is encountered in the work zone in order to safely document, handle and remove wildlife at risk of conflict with construction activities.

6.4 AQUATIC HABITAT

Construction activities can increase the potential for silt/sediment and deleterious substances to enter surface water features, thereby impacting fish and fish habitat. The following mitigation measures apply:

- An erosion and sediment control (ESC) site specific plan should be developed that details the ESC plans and responsibilities to include the following, at minimum:
    - Ensure that construction activities are adequately contained with erosion and sediment control (ESC) measures;

  - Intercept sediment laden drainage as close to the source as possible;
  - The contractor should have available on site supplemental ESC measures that can be utilized should additional ESC measures be warranted;
  - Ensure that disturbed soils are stabilized and restored as soon as possible after disturbance; and,
  - Provide construction monitoring on site to ensure that erosion and sediment controls are working effectively.

- Where trenchless technology is employed to install the forcemain across Sixteen Mile Creek, a frac-out plan will be developed to include details of the contingency plans and responsibilities of the contractor;
- Where attachment to an existing bridge structure is used to install the forcemain across Sixteen Mile Creek, a barge or shroud will be used to trap and prevent concrete and other deleterious substances (e.g. salt, paint, oil and grease) from entering the watercourse;
- The operation of machinery from outside of the water (on land) or within the water (i.e. from a barge) shall be done in a manner that minimizes disturbance to the banks and bed of the watercourse;
- Machinery shall be washed, refuelled, serviced and fuel stored away from the waterbody to prevent any deleterious substance from entering the watercourse; and,
- Machinery shall arrive on site in a clean conditions and maintained free of fluid leaks.

Potential alterations in groundwater flow as a result of dewatering activities may impact water quantity or quality. Dewatering may cause reduction in baseflow where groundwater contributions are reduced, or conversely, where discharge back to surface features is proposed to result in temperature effects, alter flow regimes and/or result in erosion. In areas where dewatering is proposed, the following mitigation would apply:

- Maintain existing flow patterns to avoid changing character of vegetation communities and habitat function;
- Ensure dewatering activities are addressed in site specific Environmental Management Plans to address alterations to baseflow and discharge of water back to surface features (from both a quantity and quality aspect);
- Provide pre-treatment for discharged water prior to release to existing wetlands or aquatic habitat; and,
- Maintain water balance for the watercourse in the project area.

6.5 SPECIES AT RISK

The *Endangered Species Act*, 2007 (ESA, 2007) and federal *Species at Risk Act* provides the framework for the protection of Ontario's species at risk (SAR). Given that a number of SAR have been identified in the project area, further consultation with MNRF is recommended at detailed design. Areas where mitigation may be necessary are as follows:

- A new crossing of Sixteen Mile Creek (as proposed in Alternatives B and C) would require consultation with MNRF and DFO specific to aquatic SAR (Redside Dace and Silver Shiner). It is understood at the time of reporting that impacts as they relate to a new crossing are to be mitigated through use of trenchless construction and implementation of a coldwater timing window for construction;
- Work within existing restoration areas (planted areas, Barn Swallow nest cups at the Derry Road bridge) may require consultation with MNRF or others to establish who installed the plantings and/or nest cups and whether they are regulated and/or part of an existing compensation plan for SAR;
- Routing of Alterative A would be within 200m of Barn Swallow general habitat as described by MNRF under the Derry Road bridge. Assuming works remain in the existing road right-of-way (i.e. no use of floodplain for construction staging), the employment of timing windows along with other mitigation tools is anticipated to avoid/limit impacts to this species. Consultation with MNRF is recommended to ensure compliance under the ESA specific to this species; and,
- During detailed design an arborist assessment is recommended to identify tree impacts and develop a tree preservation plan. The assessment should include screening for the presence/absence of Butternut trees within 50m of construction limits. Should this SAR tree be located within 50m of project activities, consultation with MNRF is recommended to ensure compliance with the ESA.

7.0 CONCLUSION

The impact assessment and mitigation recommendations included in this report reflect the sensitivity of features in the study area. Generally the area represents a highly urbanized landscape with the natural heritage component comprised of Sixteen Mile Creek and associated riparian vegetation (primarily in the form of woodland and culturally influenced or manicured spaces). A number of SAR were identified for the project areas to include both terrestrial and aquatic species. Accordingly, further consultation with MNRF and DFO would be necessary at detailed design to ensure project compliance under the ESA and SARA. Mitigation measures are anticipated to be further refined at a site specific level during detailed design in order to ensure adequate protection of environmental features. Monitoring during construction is further recommended to ensure mitigation measures are properly implemented and operating as intended to maintain environmental features and functions, particularly in proximity to sensitive habitats such as Sixteen Mile Creek.

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Appendix A
Agency Consultation

Ministry of Natural Resources and Forestry

Aurora District Office
50 Bloomington Road
Aurora, Ontario L4G 0L8

Ministère des ressources naturelles et des forêts

Telephone: (905) 713-7400
Facsimile: (905) 713-7361

Ontario

May 10, 2016

Lynette Renzetti, B.Sc. (Hons.)
Senior Planning Ecologist
LGL Limited
445 Thompson Drive, Unit 2
Cambridge, ON
Email: LRenzetti@lglcambridge.com

Dear Ms. Renzetti,

Re: Milton WWTP Servicing Municipal Class EA

The Ministry of Natural Resources and Forestry (MNRF) understands that you are requesting species at risk information for the above noted project in the Town of Milton. MNRF has records of species at risk within and adjacent to your study area, including:

- **SNAPPING TURTLE (Special Concern)**
- **MILKSNAKE (Special Concern)**
- **SILVER SHINER (Threatened), with general habitat protection**
- **CHIMNEY SWIFT (Threatened), with general habitat protection**
- **BARN SWALLOW (Threatened), with general habitat protection**
- **BOBOLINK (Threatened), with general habitat protection**
- **REDSIDE DACE (Endangered), with regulated habitat protection**
- **BUTTERNUT (Endangered), with general habitat protection**

Additionally, the species listed below have the potential to occur on or adjacent to the property and may require further assessment to determine their presence:

- **BANK SWALLOW** (**Threatened), with general habitat protection**
- **EASTERN MEADOWLARK (Threatened), with general habitat protection**
- **LITTLE BROWN MYOTIS (Endangered), with general habitat protection**

Absence of information provided by MNRF for a given geographic area, or lack of current information for a given area or element, does not categorically mean the absence of sensitive species or features. Many areas in Ontario have never been surveyed and new plant and animal species records are still being discovered for many localities. For these reasons, the MNRF cannot provide a definitive statement on the presence, absence or condition of biological elements in any part of Ontario. Field assessments by a qualified professional may be necessary if there is a high likelihood for species at risk and/or their habitat(s) to occur within the project footprint.

This species at risk information is highly sensitive and is not intended for any person or project unrelated to this undertaking. Please do not include any specific information in reports that will be available for public record. As you complete your fieldwork in these areas, please report all information related to any species at risk to our office. This will assist with updating our database and facilitate early consultation regarding your project.

If you have any questions or comments, please do not hesitate to contact ESA.Aurora@ontario.ca.

Sincerely,

Aurora McAllister
Management Biologist, Aurora District
Ministry of Natural Resources and Forestry

Appendix B
Vascular Plant List

	Common Name	G-Rank	S-Rank	SARO	COSEWIC	ELC Community				Halton - Varga[1]	Halton NAI[2]
						CUM1-1	FOD5-2	FOD5-3	FOD7		
	PINE FAMILY										
	Austrian pine	G?	SE2					X			
	eastern white pine	G5	S5				X			X	C
	eastern hemlock	G5	S5				X			X	C
	BARBERRY FAMILY										
	may-apple	G5	S5				X			X	C
	POPPY FAMILY										
	bloodroot	G5	S5					X		X	C
	MULBERRY FAMILY										
	white mulberry	G?	SE5				X			X	I
	WALNUT FAMILY										
	bitternut hickory	G5	S5				X			X	C
	shagbark hickory	G5	S5					X		U	C
	black walnut	G5	S4				X			X	C
	BEECH FAMILY										
	American beech	G5	S5				X			X	C
	bur oak	G5	S5					X		X	C
	red oak	G5	S5					X		X	C
	BIRCH FAMILY										
	ironwood	G5	S5					X		X	C
	LINDEN FAMILY										
	basswood	G5	S5				X	X		X	C
	WILLOW FAMILY										
	willow		?						X		
	MUSTARD FAMILY										
	garlic mustard	G5	SE5			X	X			X	I
	dame's rocket	G4G5	SE5				X			X	I
	ROSE FAMILY										
	strawberry						X				
	sweet cherry	G?	SE4				X			X	I
	black cherry	G5	S5				X			X	C
	choke cherry	G5T?	S5				X	X		X	C
	wild red raspberry	G5T	S5				X			X	C
	raspberry							X			
	PEA FAMILY										
	black locust	G5	SE5				X			X	I
	OLEASTER FAMILY										
	Russian olive	G?	SE3				X			X	I
	BUCKTHORN FAMILY										

	Common Name	G-Rank	S-Rank	SARO	COSEWIC	ELC Community				Halton - Varga[1]	Halton NAI[2]
						CUM1-1	FOD5-2	FOD5-3	FOD7		
	common buckthorn	G?	SE5			X	X			X	I
	GRAPE FAMILY										
	inserted Virginia-creeper	G5	S5				X	X		X	C
	riverbank grape	G5	S5				X		X	X	C
	MAPLE FAMILY										
	manitoba maple	G5	S5				X		X	X	C
	norway maple	G?	SE5				X	X		X	I
	red maple	G5	S5				X			X	C
	silver maple	G5	S5				X			X	C
	sugar maple	G5T?	S5				X	X		X	C
	SUMAC FAMILY										
	staghorn sumac	G5	S5			X	X			X	C
	GERANIUM FAMILY										
	herb-robert	G5	SE5				X			X	I
	PARSLEY FAMILY										
	wild carrot	G?	SE5			X				X	I
	POTATO FAMILY										
	bitter nightshade	G?	SE5				X	X		X	I
	OLIVE FAMILY										
	red ash	G5	S5			X	X	X	X	X	C
	HONEYSUCKLE FAMILY										
	tartarian honeysuckle	G?	SE5				X	X		X	I
	ASTER FAMILY										
	common burdock	G?T?	SE5				X	X		X	I
lphicus	Philadelphia fleabane	G5T?	S5				X			X	C
	canada goldenrod	G5	S5			X	X		X	X	C
	ARUM FAMILY										
	small jack-in-the-pulpit	G5T5	S5				X			X	C
	GRASS FAMILY										
	awnless brome	G4G5T?	SE5			X				X	I
	Kentucky bluegrass	G5T	S5			X				X	I
	blue grass					X	X				
	LILY FAMILY										
emosum	false Solomon's seal	G5T	S5				X			X	C
	star-flowered Solomon's seal	G5	S5				X			X	C
	white trillium	G5	S5				X			X	C

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Appendix C
Instream Mapping

TMS619 Fulton WWTP
pg 1 of 4

Verification Habitat Map

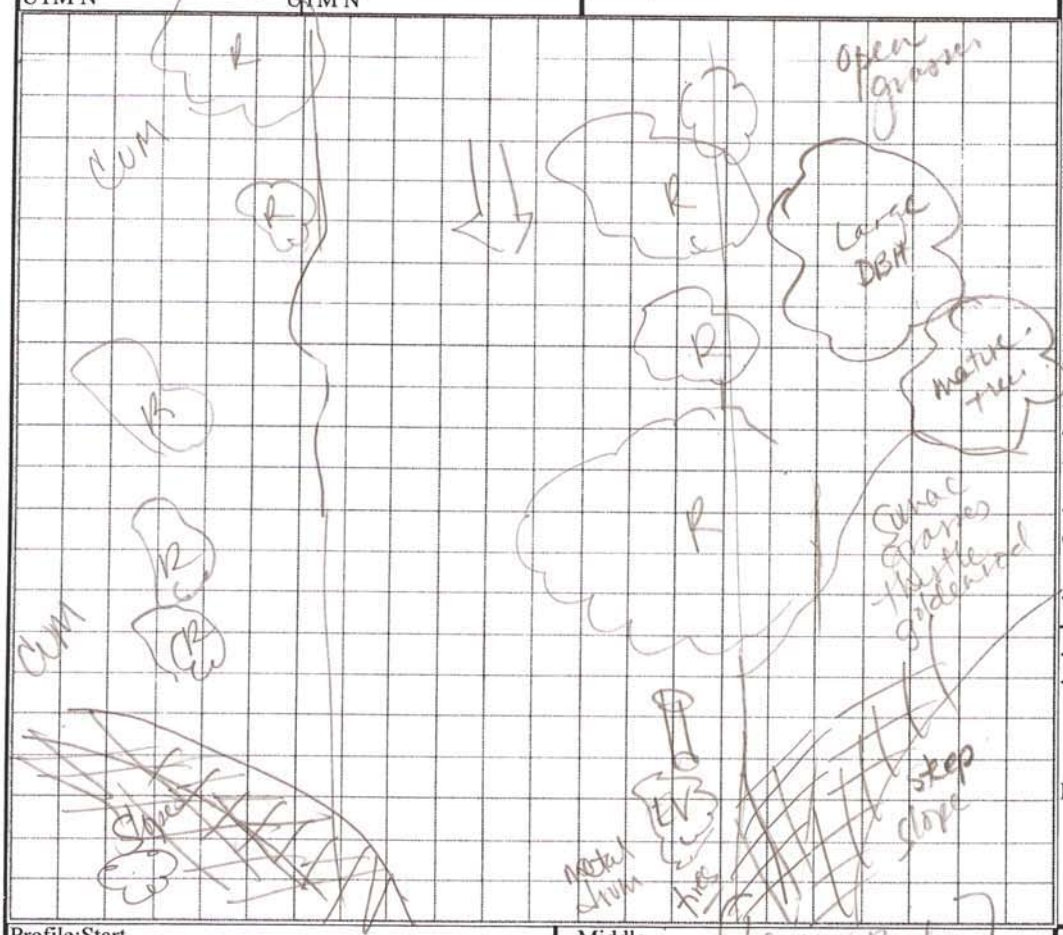
Name of Watercourse: Sixteen Mile Creek	Mappers: LKR

Date dd/mm/yyyy: 28-06-2016	Section #:	Section Length (m):	Scale (cm/m):
Upstream of Lawrence Rd	Pic#1US:	Pic#2DS:	

Section Location

Start:	End:
UTM E	UTM E
UTM N	UTM N

North Arrow:



LEGEND

10d	Depth(m)
6w	Width(m)
➡	Riffle
⇨	Run/Glide
⬭	Pool
■	Island/Bar
▒	Fine Substrate
###	Gravel Substrate
oOooO	Cobble/ Boulder
* * *	Debris
CT	Cattail
SV/FV	Submerg/Floating Veg
EV	Emergent Vegitation
W	Watercress
Fe	Iron Staining
///////	Eroded Bank
xxx	Riprap/ Other Stabilization
⬭	Instream Log/ Tree
^ ^ ^	Dam/ Weir/ Obstruction
®	Riparian Tree
⊢➡	Seep/ Spring
-------	Undercut Bank
–	Barrier to Fish Movement
-S-	Seasonal Barrier
-x—x	Fence Line
⌊	Culvert
⊡	Picture
⊗	Stormdrain
BR	Bedrock

Profile: Start	Middle	End
Instream cover in form of boulders, limited woody debris Veg habitat not a lot of vegetation		

West bank: grasses overhanging
East bank largely treed - Large DBH trees overhanging providing good shading

Little 700m us of bridge

wide floodplain to west - (Commercial St)

debris in creek (drum, tires, shopping carts)

mallards, Bees foraging

TABOG Fulton WWTP
pg 2 of 4

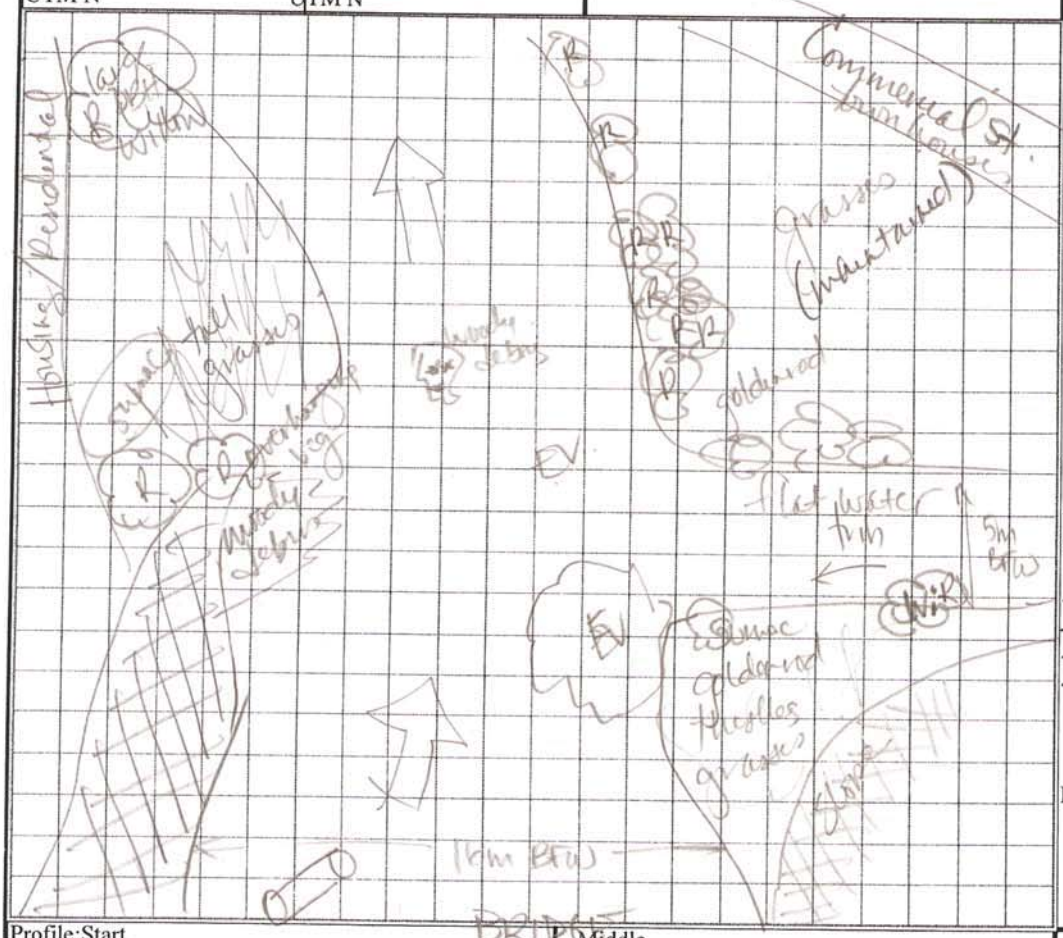
Habitat Map

Name of Watercourse:	Hewick @ Laurier Ave	Mappers:

Date dd/mm/yyyy:	Section #:	Section Length (m):	Scale (cm/m):
Unnamed stream of Laurier Ave bridge	Pic#1US:	Pic#2DS:	

Section Location	
Start:	**End:**
UTM E	UTM E
UTM N	UTM N

North Arrow:



LEGEND

10d	Depth(m)
6w	Width(m)
➡	Riffle
⇨	Run/Glide
⬭	Pool
■	Island/Bar
▒	Fine Substrate
###	Gravel Substrate
oOooO	Cobble/ Boulder
*** * ***	Debris
CT	Cattail
SV/FV	Submerg/Floating Veg
EV	Emergent Vegitation
W	Watercress
Fe	Iron Staining
///////	Eroded Bank
xxx	Riprap/ Other Stabilization
⊂⊃	Instream Log/ Tree
^ ^ ^	Dam/ Weir/ Obstruction
®	Riparian Tree
⊢➡	Seep/ Spring
-------	Undercut Bank
–	Barrier to Fish Movement
-S-	Seasonal Barrier
-x—x	Fence Line
⊔	Culvert
⊏⊐	Picture
⊗	Stormdrain
BR	Bedrock

Deciduous trees

Profile: Start	Middle	End

trib that runs along Laurier

riffle/run US near outfall at Pumping Station

TA8619 Fulton WWTP
Pg 3 of 4

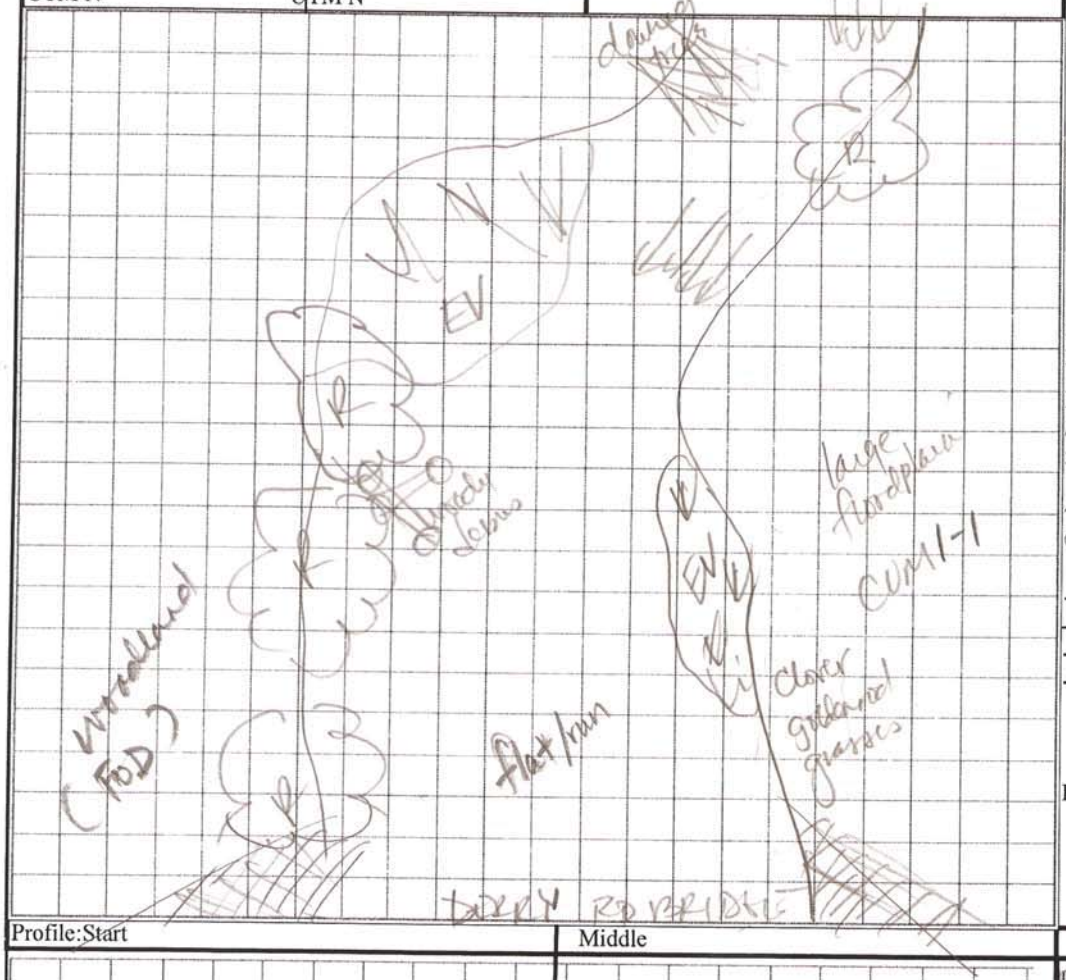
Habitat Map

Name of Watercourse: Sixteen Mile Creek @ Derry Rd (us)		Mappers: LKR	
Date dd/mm/yyyy: 08-06-2016	Section #:	Section Length (m):	Scale (cm/m):
	Pic#1US:	Pic#2DS:	

Section Location as viewed from Derry
Start: **End:** Red Bridge

UTM E	UTM E
UTM N	UTM N

North Arrow:



LEGEND

10d	Depth(m)
6w	Width(m)
➡	Riffle
⇨	Run/Glide
⬭	Pool
▮	Island/Bar
▒	Fine Substrate
###	Gravel Substrate
oOooO	Cobble/ Boulder
* * *	Debris
CT	Cattail
SV/FV	Submerg/Floating Veg
EV	Emergent Vegitation
W	Watercress
Fe	Iron Staining
///////	Eroded Bank
xxx	Riprap/ Other Stabilization
⬭	Instream Log/ Tree
^ ^ ^	Dam/ Weir/ Obstruction
®	Riparian Tree
⊢➡	Seep/ Spring
-------	Undercut Bank
–	Barrier to Fish Movement
-S-	Seasonal Barrier
-x—x	Fence Line
⊔	Culvert
⧈	Picture
⊗	Stormdrain
BR	Bedrock

Profile: Start	Middle	End

West bank overhanging trees/cover/shade

Habitat Map

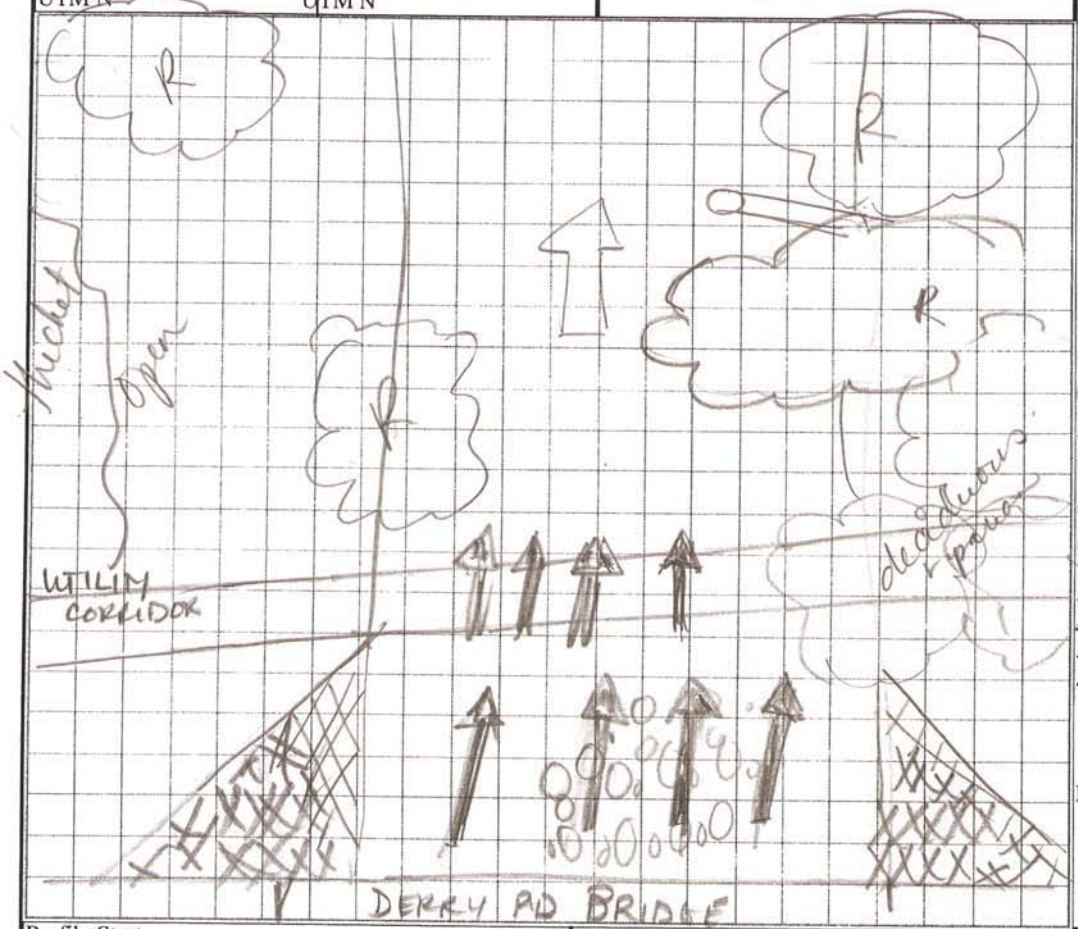
Name of Watercourse: Sixteen Mile Creek DS of Derry Rd US of meander	Mappers: LKR		
Date dd/mm/yyyy: 08-06-2016	Section #:	Section Length (m):	Scale (cm/m):
	Pic#1US:	Pic#2DS:	

Section Location

Start: UTM E / UTM N

End: UTM E / UTM N

North Arrow:



LEGEND

10d	Depth(m)
6w	Width(m)
➡	Riffle
⇨	Run/Glide
⬭	Pool
■	Island/Bar
▒	Fine Substrate
###	Gravel Substrate
oOooO	Cobble/ Boulder
* * *	Debris
CT	Cattail
SV/FV	Submerg/Floating Veg
EV	Emergent Vegitation
W	Watercress
Fe	Iron Staining
///////	Eroded Bank
xxx	Riprap/ Other Stabilization
⊂⊃	Instream Log/ Tree
^^^	Dam/ Weir/ Obstruction
®	Riparian Tree
⊢➡	Seep/ Spring
-------	Undercut Bank
–	Barrier to Fish Movement
-S-	Seasonal Barrier
-x—x	Fence Line
⊔	Culvert
⊠	Picture
⊗	Stormdrain
BR	Bedrock

Profile: Start	Middle	End
Instream cover + Good riparian cover	Cobble/boulder ds of bridge on SW side	

large riffle under bridge + DS for 10+ metres.
Bars nests/nest cups under bridge
Bald eagle passing overhead
extensive gabion/riprap under bridge - failing in many places

meander DS approx 80m from Derry
NE bank more open/grassy
SW bank narrow riparian/treed veg

Narrow treed riparian edge to SW, open thicketed bank to NE

Appendix D
Photo Appendix

Project #TA8619
June 8, 2016

Photo Appendix

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Photo 1: Sixteen Mile Creek as observed from edge of Fulton WWPS and Milton WWTP property.

Photo 2: Riparian vegetation on north side of creek at the Fulton WWPS.

Photo 3: Sixteen Mile Creek at outfall of Milton WWTP.

Photo 4: Aquatic habitat and riparian vegetation conditions near Eagle Bridge at base of Parkway Drive.

Photo 5: Manicured area of cemetery and WWTP in foreground, FOD5-2 on south side of creek in background.

Photo 6: Young trees in FOD5-2 part of cemetery property with interspersed large diameter maples.

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Photo 7: Example of cavity trees present in FOD5-2 at base of Donald Campbell Avenue.

Photo 8: Residential dumping of yard waste down steep slope of FOD5-2 at Donald Campbell Avenue.

Photo 9: Sixteen Mile Creek at Laurier Avenue.

Photo 10: Steep banks, rip-rap at Laurier Avenue crossing.

Photo 11: Riparian vegetation at north side of Derry Road bridge.

Photo 12: Restoration area within CUM1-1 community on floodplain, north side of Derry Road bridge.

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Photo 13: slumping rip-rap under Derry Road bridge.

Photo 14: Aquatic habitat conditions in Sixteen Mile Creek at Derry Road.

Photo 15: Cliff swallow nest on underside of Derry Road bridge.

Photo 16: Barn swallow nesting cup installed under Derry Road bridge.

Photo 17: Conditions at FOD5-2 on south side of Sixteen Mile Creek, located north of Heslop Road.

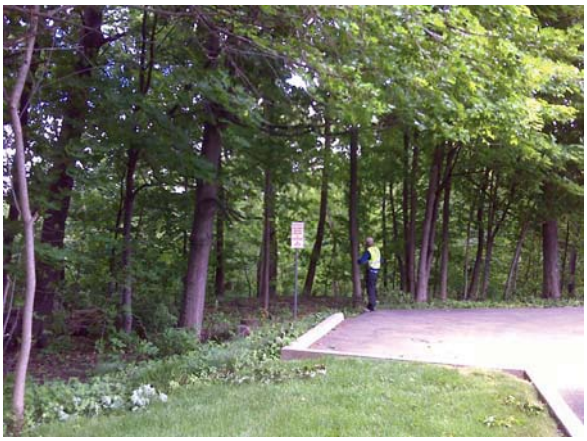

Photo 18: Conditions at FOD5-2 located north of Heslop Road adjacent to parking lot and manicured property of office building (no trespassing beyond parking area).

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Photo 19: Several parks, schools and recreational areas (manicured vegetation) comprise much of the natural areas along Commercial Drive north of Laurier Avenue.

Photo 20: Conditions along Commercial Drive north of Laurier Avenue.

Photo 21: Disturbed area surrounded by fencing north of Sydney Street and Commercial Street intersection in area of potential creek crossing.

Photo 22: Disturbed area surrounded by fencing between Commercial Street and Sixteen Mile Creek in area of potential creek crossing.

Photo 23: Stormwater passage and retaining wall adjacent to hardened creek channel in area of potential creek crossing.

Photo 24: Dense vegetation and retaining wall adjacent to hardened creek channel in area of potential creek crossing.

Photo Appendix

Photo 25: Example of areas where municipally owned or private trees may be impacted by works in road rights of way.

Photo 26: FOD5-3 on Bell Street leading into parklands and recreational trail part of the John Tonelli Sports Centre fronting Laurier Avenue.

Photo 27: FOD5-3 edge along Bell Street.

Photo 28: Tributary AU-0022-SIX (Figure 1) continues underground from John Tonelli Sports Complex to outlet at Sixteen Mile Creek at Laurier Avenue bridge.

Photo 29: Tributary AU-0022-SIX (Figure 1) upstream of sports centre property as it flows through FOD5-3.

Photo 30: Wide boulevards available along Derry Road, limited impacts to natural areas identified.