APPENDIX E

Natural Science Report

JUNCTION STREET WASTEWATER PUMPING STATION AND FORCEMAIN SCHEDULE B MUNICIPAL CLASS EA

NATURAL SCIENCES REPORT

prepared for

BLACK & VEATCH

by

LGL LIMITED
environmental research associates

Version History:

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April 2017	1	Draft - Existing Conditions - Desktop
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JANUARY 2018
LGL PROJECT TA8699

JUNCTION STREET WASTEWATER PUMPING STATION AND FORCEMAIN SCHEDULE B MUNICIPAL CLASS EA

NATURAL SCIENCES REPORT

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1.0 INTRODUCTION

The Region of Halton (Region) completed a Wastewater Master Plan in 2011 which identified the need for increased pumping capacity at the Junction Street Wastewater Pumping Station (WWPS) in order to service growth in the Burlington area. Accordingly, the Region is undertaking a Schedule B Municipal Class Environmental Assessment (EA) to consider a range of collection system upgrade alternatives to provide additional capacity at the WWPS. LGL has been retained by Black and Veatch on behalf of the Region to provide natural sciences support throughout the EA process.

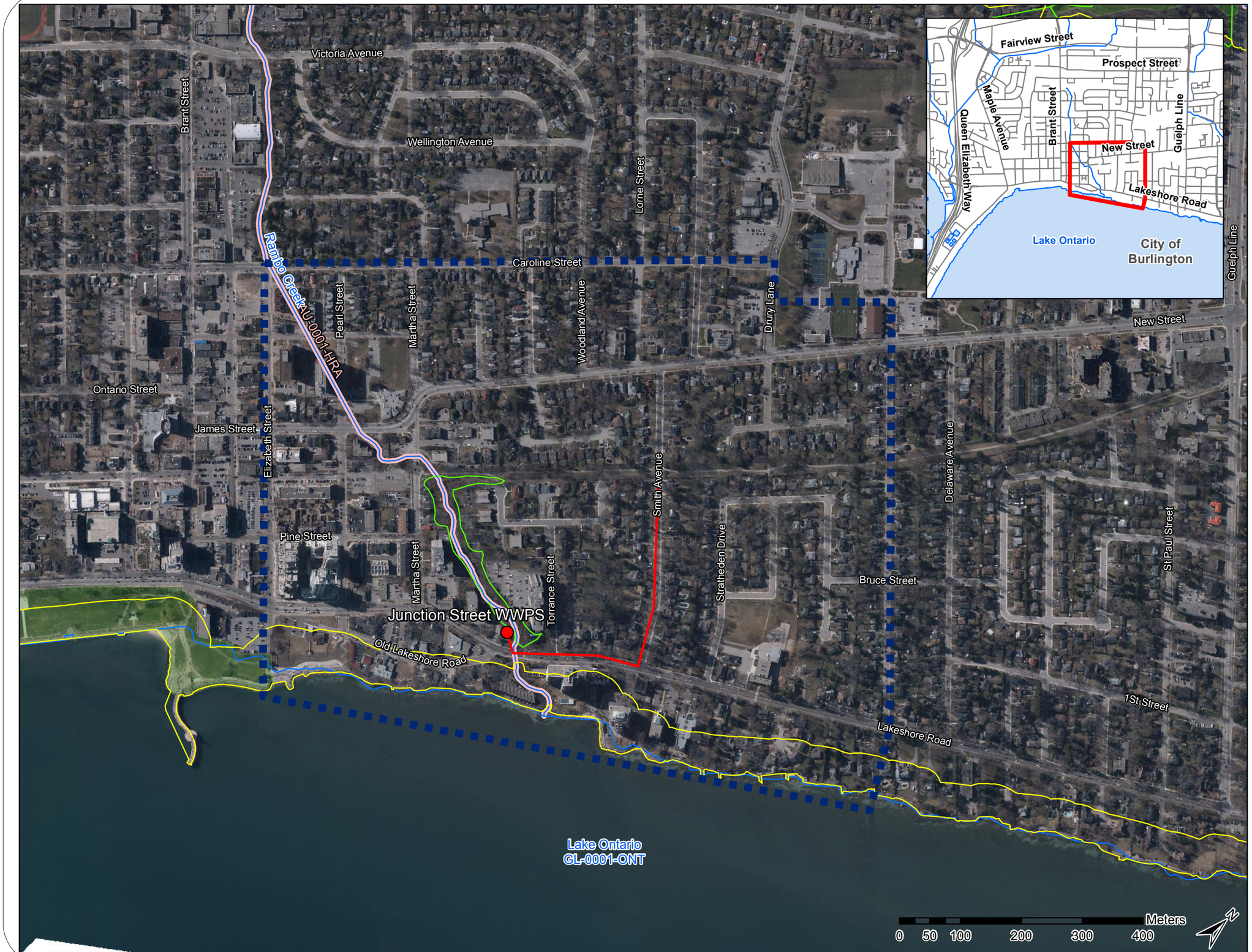
1.1 BACKGROUND

The intent of this Natural Sciences Report (NSR) is to describe existing natural heritage conditions within the study area through a combination of desktop review and field investigation to assess impacts related to the proposed solutions of the EA. With this in mind, a study area was defined for the project to include the geographic extent of area that would be required for implementation of a variety of alternative solutions, as shown in Figure 1. The study area defined for the project is bordered by Mississauga Street to the south, Riverview and Sovereign Streets to the west, Jones Street to the north, and the Lake Ontario shoreline to the east. For the purpose of the NSR, the area was reviewed in the context of the following:

- Designated Natural Areas – Areas of Natural and Scientific Interest (ANSI); significant wetlands, woodlands, and valleylands; Environmentally Sensitive Areas; Key Features as identified under the Region of Halton Official Plan (ROP) to include linkages; and, areas regulated by Conservation Halton under *Ontario Regulation 162/06* ;
- Vegetation Communities;
- Wildlife (birds, herpetofauna, mammals); and,
- Aquatic Habitat and Fisheries.

1.2 STUDY AREA

The WWPS is located on the north side of Lakeshore Road just west of Rambo Creek in the City of Burlington. The area is highly urbanized with a mix of low, medium and high density housing. The catchment area of the WWPS consists mostly of residential lands. Flows are received through a gravity trunk sewer and pumped through an existing forcemain to a larger trunk sewer at the intersection of Smith Avenue and New Street. From there, flows are conveyed to the Burlington Skyway Wastewater Treatment Plant. The WWPS is directly adjacent to Rambo Creek, but outside of the floodplain and Regulation Limit of Conservation Halton (Figure 1). Natural heritage features in the study area are limited to the creek and associated wooded riparian vegetation and residential/street trees. The proximity of the study area to Lake Ontario (approximately 80m) places it within Important Bird Area ON022 which extends around the western end of the lake (Bird Studies Canada/Nature Canada). The Waterfront Trail bisects the study area south of James/New Street.



LEGEND

- Existing Junction Street Wastewater Pumping Station
- Existing Wastewater Forcemain
- Regulation Limits (CH)
- Wooded Area (LIO)
- Greenlands System (OP)
- Watercourse (LIO)
- Waterbody (LIO)

Aquatic Resource Area Summary (LIO)
Thermal Regime
- Warm

Junction Street WWPS and Forcemains

Key Map &
Desktop Review

LGL LIMITED
environmental research associates

Project	TA8699	**Figure**	1
Date	January, 2018	**Prepared By:**	KC
Scale	1:6,000	**Verified By:**	LKR

2.0 EXISTING CONDITIONS – DESKTOP REVIEW

This documentation of existing conditions through desktop review has employed aerial imagery and a review of background data from secondary sources to describe natural heritage conditions within the study area. The review of existing background documentation and GIS data layers, included the following resources:

- Aerial imagery;
- Mapping of physiography and soils;
- MNRF Natural Heritage Information Centre (NHIC) database;
- Land Information Ontario (LIO) MNRF data layers;
- MNRF and Conservation Halton fisheries records;
- Department of Fisheries and Oceans (DFO) mapping for aquatic species at risk (SAR);
- Conservation Halton (CH) GIS Layers;
- Halton Regional Official Plan (ROP);
- Halton Natural Areas Inventory (NAI);
- Town of Oakville Official Plan;
- Halton Region Environmentally Sensitive Areas Consolidation Report; and,
- The Bronte Creek, Urban Creeks and Supplemental Monitoring Long Term Environmental Monitoring Program, Conservation Halton.

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 study area. In addition, MNRF was consulted to obtain any additional information regarding fisheries records and records for species at risk in the study area (MNRF 2017b).

2.1 PHYSIOGRAPHY

The study area is located within the Sand Plains of former glacial Lake Iroquois (Chapman L.J. and D.F. Putnam 1984). The area is highly urbanized – having taken advantage of the flat sandy plains as suitable building sites for a number of land uses including low to high density residential and commercial properties. Lake Iroquois built barrier beaches of sand and gravel at the western limits of this physiographic region across the rivers and creeks flowing into what is now the western basin of Lake Ontario. At the eastern extent of the region (present shoreline of Lake Ontario) the water level gradually rose and cut back into the red shale along the Burlington shoreline. The lands between the old shoreline of Lake Iroquois and the modern shoreline of Lake Ontario are of gradual slope with sandy soils.

2.2 DESIGNATED NATURAL AREAS

Natural areas within the study area in the form of parklands, stream corridors, and woodlands were screened for any designations within various local, regional and provincial policies, the results of which are noted in the following and displayed in Figure 1.

2.2.1 Areas of Natural and Scientific Interest (ANSIs)

Areas of Natural and Scientific Interest (ANSI) are determined by the MNRF. The agency defines ANSIs as "lands and waters with features that are important for natural heritage protection, appreciation, scientific study or education". Records contained within the MNRF's LIO database did not indicate the presence of any Life Science or Earth Science ANSIs within the study area.

2.2.2 Significant Wetlands

The potential occurrence of wetland features were screened through a review of available GIS data layers provided by MNRF. Three types of wetland features are identified in MNRF data layers: provincially significant wetlands (PSWs), unevaluated wetlands and other 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 or as 'other' wetlands are features where an OWES evaluation has been completed and the resulting score was insufficient to qualify as a provincially significant feature. Evaluated/other wetlands may also be considered locally significant wetlands.

No wetland features were identified within the study area through background review of available data.

2.2.3 Significant Woodlands

LIO data layers indicate the presence of a wooded area within the study area, associated with the riparian area of Rambo Creek as it flows west of Lakeshore Road to Martha Street (Figure 1). The feature associated with the creek represents a narrow riparian corridor (30m at most) approximately 320m long bordered by residential development on all sides. The LIO woodland as shown in Figure 1 is not included in the mapping of natural areas within the regional or municipal Official Plans.

2.2.4 Significant Valleyland

No valleylands are found within the Study Area.

2.2.5 Environmentally Sensitive Areas (ESA)

The study area was not found to overlap with any of the ESAs limits as identified in the Halton Region Environmentally Sensitive Areas Consolidation Report (Halton Region and North-South Environmental Inc. 2005) or the Halton Natural Areas Inventory Report (2006).

2.2.6 Conservation Halton Regulated Areas

Figure 1 displays the approximate limits of lands regulated by Conservation Halton under *Ontario Regulation 162/06 Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*. The existing Junction Street WWPS and forcemain are located outside of the Regulation Limit for the Lake Ontario shoreline. There is no identified Regulation Limit for Rambo Creek.

2.2.7 Official Plan

Map 1G Key Features within the Greenbelt and Regional Natural Heritage System (NHS) of the Halton Region Official Plan identifies the narrow shoreline of Lake Ontario along the southern edge of the study area. No other areas within the study area are included in the NHS mapping.

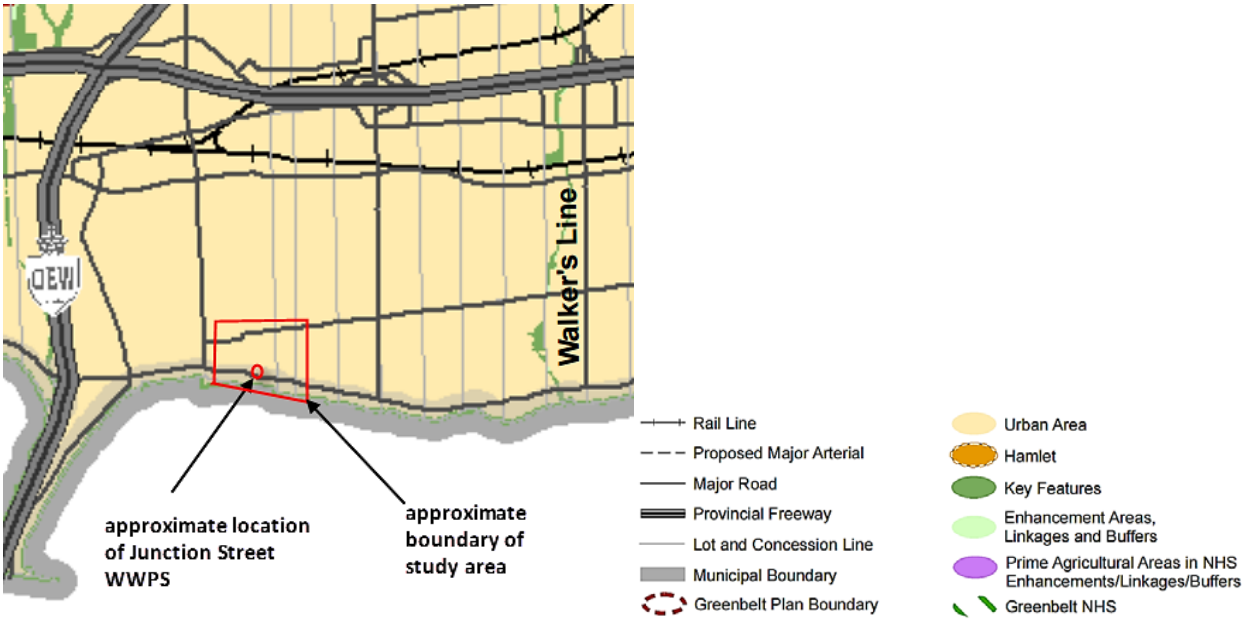


Figure 2: Key Features of the NHS as represented in Map1G of the Halton Region Official Plan.

2.3 TERRESTRIAL ECOSYSTEMS

The lack of open space and designated natural areas within the study area as documented above limits the availability of background data pertaining to vegetation and wildlife records. Generally, the background information compiled to characterize existing conditions covers a broader geographic area within which the study area is located.

Areas within the study area, particularly in the south western quadrant, are highly urbanized. Vegetation in the study area is primarily associated with residential and street trees. Remnant woodlands are rare and small in size; the most notable being the wooded riparian area of Rambo Creek directly adjacent to the WWPS site. Based on the extent of development and urbanization, wildlife expected to be found within the study area limits include wildlife species that exhibit a tolerance for human activity. Many species are highly adapted to human landscapes and disturbance and may be found in urban settings, where a variety of habitat such as small woodlots, brushy thickets, small patches of edge or riparian habitat and old fields are present. The shoreline of Lake Ontario and narrow riparian habitat of Rambo Creek represent the most natural and contiguous features for wildlife habitat and linkage.

Nature Canada and Bird Studies Canada began the Canadian Important Bird Area (IBA) Program in 1996 to identify sites that provide critical habitat for birds across the country. The Junction Street WWPS site lies within 80m of the shoreline of Lake Ontario and within Important Bird and Biodiversity Area ON022. The IBA extends around the west end of Lake Ontario from Port Credit on the north shore to the mouth of the Niagara River. Its significance is defined by the impressive congregations of waterfowl which have gathered there annually since about 1990, primarily in late winter and early spring (Bird Studies Canada/Nature Canada). Flocks of ducks that use this area number in the thousands or tens of thousands. The locations in which they congregate appears to be weather dependent; that is, strong winds cause the flocks to shift locations, likely in response to demands for shelter and feeding opportunities. The large numbers of waterfowl (Greater Scaup (*Aythya marila*), White-winged Scoter (*Melanitta deglandi*), and Long-tailed Ducks (*Clangula hyemalis*) are most abundant) that gather are most likely taking advantage of the invasion and colonization of the shallow waters of the lake by dreissenid mussels which the birds utilize as a food source.

Ontario Partners in Flight (OPIF) has identified a list of priority species for southern Ontario with data provided by the Canadian Wildlife Service, the Breeding Bird Survey, the Ontario Breeding Bird Atlas, Christmas Bird Counts, and others. The listing is part of the Landbird Conservation Plan within the North American Bird Conservation Initiative Bird Conservation Region (BCR) planning framework where southern Ontario is identified as BCR 13. OPIF identifies 168 species to regularly breed and/or winter in BCR13. Of those, six are considered introduced species and 42 (25% of the total) are identified as priority species. Data retrieved from the Ontario Breeding Bird Atlas (2001-2005) documents a total of 111 bird species within the 10x10km area (17NH99) that includes the project area. Of those, 24 are identified as priority species for BCR-13. Regionally, 9 of the species listed in Table 1 are considered rare (R) and an additional 25 are identified as uncommon to the area.

The Study Area is not anticipated to provide habitat for all of the species listed in Table 1; however the list serves as a screening tool for consideration of species of local or regional significance and to identify species with specific habitat requirements. For example, the study area is not likely to support bird species identified in Table 1 as area sensitive. These species generally will not breed in what appears to be suitable habitat if it is not part of a much larger contiguous feature, irrespective of their home range which can be quite small. For example, species that require large grasslands (such as Bobolink) or interior forest habitat (such as Ovenbird) are not likely to be found breeding within the limits of the study area. However, the proximity of the site to the Lake Ontario shoreline, which can be used as stopover habitat for migratory birds, results in the potential for incidental observations of a high diversity of species.

Table 1: Records of wildlife for the Study Area.

Type	Common Name	Scientific Name	OBBA (2001-2005) 17NH99	S-Rank	SARA	SARO	FWCA	MBCA	SWH-TG Area Sensitive Species	Interior Species	Halton Region	BCR-13 Priority Species
Bird	Alder Flycatcher	*Empidonax alnorum*	X	S5B				X				
Bird	American Black Duck	*Anas rubripes*	X	S4				X			U	
Bird	American Crow	*Corvus brachyhrynchos*	X	S5B								
Bird	American Goldfinch	*Carduelis tristis*	X	S5B				X				
Bird	American Kestrel	*Falco sparverius*	X	S4			P					X
Bird	American Redstart	*Setophaga ruticilla*	X	S5B				X	>100ha forest			
Bird	American Robin	*Turdus migratorius*	X	S5B				X				
Bird	American Woodcock	*Scolopax minor*	X	S4B				X				
Bird	Bald Eagle	*Haliaeetus leucocephalus*	X	S2N,S4B		SC	P		large, continuous, open forest around lakes, rivers 255ha			X
Bird	Baltimore Oriole	*Icterus galbula*	X	S4B				X				X
Bird	Barn Swallow	*Hirundo rustica*	X	S4B		THR		X				
Bird	Belted Kingfisher	*Ceryle alcyon*	X	S4B			P					X
Bird	Black-billed Cuckoo	*Coccyzus erythropthalmus*	X	S5B				X			U	X
Bird	Black-capped Chickadee	*Poecile atricapillus*	X	S5				X				
Bird	Black-crowned Night Heron	*Nycticorax nycticorax*	X	S3B,S3N				X			U	
Bird	Blue Jay	*Cyanocitta cristata*	X	S5			P					
Bird	Blue-gray Gnatcatcher	*Polioptila caerulea*	X	S4B				X	30ha forest	X	U	
Bird	Blue-winged Warbler	*Vermivora pinus*	X	S4B				X			U	X
Bird	Bobolink	*Dolichonyx oryzivorus*	X	S4B		THR		X	>50ha dense grassland			X
Bird	Brewster's Warbler	*Vermivora leucobronchialis*	X					X			R	
Bird	Brown Creeper	*Certhia americana*	X	S5B				X	30ha mature forest	X	U	
Bird	Brown Thrasher	*Toxostoma rufum*	X	S4B				X				X
Bird	Brown-headed Cowbird	*Molothrus ater*	X	S4B								
Bird	Canada Goose	*Branta canadensis*	X	S5				X			I	
Bird	Carolina Wren	*Thryothorus ludovicianus*	X	S4				X			R	
Bird	Caspian Tern	*Sterna caspia*	X	S3B				X				
Bird	Cedar Waxwing	*Bombycilla cedrorum*	X	S5B				X				
Bird	Chestnut-sided Warbler	*Dendroica pensylvanica*	X	S5B				X			U	
Bird	Chimney Swift	*Chaetura pelagica*	X	S4B,S4N	THR	THR		X			U	X
Bird	Chipping Sparrow	*Spizella passerina*	X	S5B				X				
Bird	Clay-colored Sparrow	*Spizella pallida*	X	S4B				X				
Bird	Common Grackle	*Quiscalus quiscula*	X	S5B								
Bird	Common Moorhen	*Gallinula chloropus*	X	S4B				X			R	
Bird	Common Nighthawk	*Chordeiles minor*	X	S4B	THR	SC		X			R	
Bird	Common Tern	*Sterna hirundo*	X	S4B				X				
Bird	Common Yellowthroat	*Geothlypis trichas*	X	S5B				X				
Bird	Cooper's Hawk	*Accipiter cooperii*	X	S4			P		dense Carolinian forest habitat >50ha	X	U	
Bird	Double-crested Cormorant	*Phalacrocorax auritus*	X	S5B								
Bird	Downy Woodpecker	*Picoides pubescens*	X	S5				X				
Bird	Eastern Kingbird	*Tyrannus tyrannus*	X	S4B				X				X
Bird	Eastern Meadowlark	*Sturnella magna*	X	S4B		THR		X	open grasslands >10ha			X
Bird	Eastern Phoebe	*Sayornis phoebe*	X	S5B				X				
Bird	Eastern Screech-Owl	*Megascops asio*	X	S4			P					
Bird	Eastern Towhee	*Pipilo erythrophthalmus*	X	S4B				X			U	X
Bird	Eastern Wood Pewee	*Contopus virens*	X	S4B		SC		X				X
Bird	European Starling	*Sturnus vulgaris*	X	SNA							I	
Bird	Field Sparrow	*Spizella pusilla*	X	S4B				X				X
Bird	Gadwall	*Anas strepera*	X	S4				X			U	
Bird	Golden-winged Warbler	*Vermivora chrysoptera*	X	S4B	THR	SC		X			R	X

Type	Common Name	Scientific Name	OBBA (2001-2005) 17NH99	S-Rank	SARA	SARO	FWCA	MBCA	SWH-TG Area Sensitive Species	Interior Species	Halton Region	BCR-13 Priority Species
Bird	Gray Catbird	*Dumetella carolinensis*	X	S4B				X				
Bird	Great Black-backed Gull	*Larus marinus*	X	S2B				X				
Bird	Great Crested Flycatcher	*Myiarchus crinitus*	X	S4B				X				
Bird	Great Horned Owl	*Bubo virginianus*	X	S4			P					
Bird	Green Heron	*Butorides virescens*	X	S4B							U	
Bird	Green-winged Teal	*Anas crecca*	X	S4				X				
Bird	Hairy Woodpecker	*Picoides villosus*	X	S5				X	forests with tall trees/snags >25cm			
Bird	Herring Gull	*Larus argentatus*	X	S5B, S5N				X				
Bird	Horned Lark	*Eremophila alpestris*	X	S5B				X			U	
Bird	House Finch	*Carpodacus mexicanus*	X	SNA				X			I	
Bird	House Sparrow	*Passer domesticus*	X	SNA							I	
Bird	House Wren	*Troglodytes aedon*	X	S5B				X				
Bird	Indigo Bunting	*Passerina cyanea*	X	S4B				X				
Bird	Killdeer	*Charadrius vociferus*	X	S5B,S5N				X				
Bird	Least Bittern	*Ixobrychus exilis*	X	S4B	THR	THR		X	habitat loss, human disturbance		R	
Bird	Louisiana Waterthrush	*Seiurus motacilla*	X	S3B	SC	SC		X			R	X
Bird	Mallard	*Anas platyrhynchos*	X	S5				X				
Bird	Marsh Wren	*Cistothorus palustris*	X	S4B				X			U	
Bird	Mourning Dove	*Zenaida macroura*	X	S5				X				
Bird	Mourning Warbler	*Oporornis philadelphia*	X	S4B				X			U	
Bird	Mute Swan	*Cygnus olor*	X	SNA				X			I; U	
Bird	Northern Cardinal	*Cardinalis cardinalis*	X	S5				X				
Bird	Northern Flicker	*Colaptes auratus*	X	S4B				X				X
Bird	Northern Mockingbird	*Mimus polyglottos*	X	S4				X			U	
Bird	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	X	S4B				X			U	
Bird	Orchard Oriole	*Icterus spurius*	X	S4B				X				
Bird	Ovenbird	*Seiurus aurocapilla*	X	S4B				X	>70ha continuous forest	X		
Bird	Peregrine Falcon	*Falco peregrinus anatum*	X	S3B	THR	SC	P					X
Bird	Pileated Woodpecker	*Dryocopus pileatus*	X	S5				X	40-260ha mature FOD/FOM with large diameter trees	X	U	
Bird	Pine Warbler	*Dendroica pinus*	X	S5B				X	15-30ha white pine forest	X	U	
Bird	Purple Martin	*Progne subis*	X	S4B				X			U	
Bird	Red-bellied Woodpecker	*Melanerpes carolinus*	X	S4				X			R	
Bird	Red-eyed Vireo	*Vireo olivaceus*	X	S5B				X		X		
Bird	Redhead	*Aythya americana*	X	S2B,S4N				X	breeding habitat			
Bird	Red-headed Woodpecker	*Melanerpes erythrocephalus*	X	S4B	THR	SC		X				X
Bird	Red-necked Grebe	*Podiceps grisegena*	X	S3B,S4N				X	>4 ha of open water, wave disturbance		U	
Bird	Red-tailed Hawk	*Buteo jamaicensis*	X	S5			P					
Bird	Red-winged Blackbird	*Agelaius phoeniceus*	X	S4								
Bird	Ring-billed Gull	*Larus delawarensis*	X	S5B,S4N				X				
Bird	Rock Dove (Pigeon)	*Columba livia*	X	SNA							I	
Bird	Rose-breasted Grosbeak	*Pheucticus ludovicianus*	X	S4B				X				X
Bird	Ruby-throated Hummingbird	*Archilochus colubris*	X	S5B				X				
Bird	Ruddy Duck	*Oxyura jamaicensis*	X	S4B,S4N				X				
Bird	Savannah Sparrow	*Passerculus sandwichensis*	X	S4B				X	>50ha grassland			X
Bird	Scarlet Tanager	*Piranga olivacea*	X	S4B				X	20ha mature forest	X		
Bird	Song Sparrow	*Melospiza melodia*	X	S5B				X				
Bird	Sora	*Porzana carolina*	X	S4B				X			U	
Bird	Spotted Sandpiper	*Actitis macularius*	X	S5				X				
Bird	Swamp Sparrow	*Melospiza georgiana*	X	S5B				X				
Bird	Tree Swallow	*Tachycineta bicolor*	X	S4B				X				
Bird	Trumpeter Swan	*Cygnus buccinator*	X	S4				X			I	

Type	Common Name	Scientific Name	OBBA (2001-2005) 17NH99	S-Rank	SARA	SARO	FWCA	MBCA	SWH-TG Area Sensitive Species	Interior Species	Halton Region	BCR-13 Priority Species
Bird	Turkey Vulture	*Cathartes aura*	X	S5B			P					
Bird	Vesper Sparrow	*Pooecetes gramineus*	X	S4B				X			U	X
Bird	Virginia Rail	*Rallus limicola*	X	S5B				X				
Bird	Warbling Vireo	*Vireo gilvus*	X	S5B				X				
Bird	White-breasted Nuthatch	*Sitta carolinensis*	X	S5				X	10ha continuous forest			
Bird	Willow Flycatcher	*Empidonax traillii*	X	S5B				X			U	X
Bird	Winter Wren	*Troglodytes troglodytes*	X	S5B				X	30ha coniferous forest	X	U	
Bird	Wood Duck	*Aix sponsa*	X	S5				X				
Bird	Wood Thrush	*Hylocichla mustelina*	X	S4B		SC		X		X		X
Bird	Yellow Warbler	*Dendroica petechia*	X	S5B				X				
Bird	Yellow-throated Vireo	*Vireo flavifrons*	X	S4B				X	30ha of open deciduous forest		R	

Table 1 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
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-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 species requires interior habitat

Halton Region
Species of conservation concern as identified in Halton Natural Areas Inventory 2006: Volume 2 Species Checklists

BCR-13 Priority Species
Source: Ontario Partners in Flight (OPIF). 2008. Ontario Landbird Conservation Plan : Lower Great Lakes/St. Lawrence Plain, North American Bird Conservation Region 13, Ontario Ministry of Natural Resources, Bird Studies Canada, Environment Canada. Draft Version 2.0

2.4 AQUATIC HABITAT AND FISHERIES

Aquatic habitat in the study area is associated with Rambo Creek and the Lake Ontario shoreline. The channel of Rambo Creek has been intermittently hardened, buried and/or diverted. Interpretation of air photos and available LIO data indicates that the creek originates in the area of Rambo Crescent approximately 800m northwest of the northern extent of the study area. The creek has been confined between residential developments and intermittently hardened with armour stone and other means as it flows in the southeast direction to Lake Ontario. The creek has been realigned and buried south of Blairholm Avenue under a church and school yard property and again south of Caroline Street as it enters the study area. However, the downstream reach of the creek below the Waterfront Trail and within the lower portion of the study area has retained a more natural form. This reach is approximately 400 m long and comprised of a shallow, tree-covered ravine from south of James Street to the lake, running between low and high density residential housing and passing directly east of the Junction Street WWPS property. The mouth of the creek is often covered in freshwater mollusc shells washed in from the lake's offshore shoals and picked over by waterbirds. Rambo Creek is identified as having a warmwater thermal regime in MNRF's LIO data layer for Aquatic Resource Area (Figure 1).

Figure 3: Rambo Creek alignment upstream and within the Study Area.

Conservation Halton's long term environmental monitoring program includes surface water quality and biomonitoring of urban creeks in the City of Burlington; however, no data specific to Rambo Creek was found in CH's 2013 report. Data pertaining to fish communities in Rambo Creek and the shoreline of Lake Ontario in the vicinity of the Brant Street pier was provided by CH as shown in Table 2. Data is provided for a number of stations as described in the legend following Table 2, to include two sources of information (Department of Fisheries and Oceans – DFO and CH). A total of 17 species are documented in the table, most of which are associated with shoreline sampling of Lake Ontario. Data was available for two stations sampled in Rambo Creek within the study area by Conservation Halton in 2001. Fish collection at station RAM1 was limited to one species (White Sucker - *Catostomus commersoni*) caught near the mouth of the creek below the intersection of Lakeshore Road and Old Lakeshore Road. The other station sampled downstream of James Street just east of Pearl Street (RAM2) resulted in no catch.

As well, one of the fish species included in Table 2 is afforded protection under the *Endangered Species Act, 2007*; American Eel (*Anguilla rostrata*) is listed provincially as Endangered and further considered in Section 2.5.

Table 2: Fish Occurrence Data for Rambo Creek and the nearshore area of Lake Ontario in the vicinity of the Study Area.

Common Name	Scientific Name	Station Location	G Rank	S Rank	COSEWIC	SARO Status	Thermal Regime	Tolerance
Alewife	*Alosa pseudoharengus*	LON1, LON4, LON5, LON6	G5	SNA	none	none	coldwater	intermediate
American Eel	*Anguilla rostrata*	LON4	G4	S1?	THR	END	coolwater	intermediate
Brook Silverside	*Labidesthes sicculus*	LON10	G5	S4	NAR	NAR	warmwater	intermediate
Chinook Salmon	*Oncorhynchus tshawytscha*	LON6	G5	SNA	none	none	coldwater	intolerant
Common Carp	*Cyprinus carpio*	LON4, LON11	G5	SNA	none	none	warmwater	tolerant of turbidity
Emerald Shiner	*Notropis atherinoides*	LON1, LON4, LON10, LON11	G5	S5	none	none	coolwater	moderately tolerant
Freshwater Drum	*Aplodinotus grunniens*	LON11	G5	S5	none	none	warmwater	tolerant
Gizzard Shad	*Dorosoma cepedianum*	LON10, LON11	G5	S4	none	none	coolwater	tolerant
Lake Trout	*Salvelinus namaycush*	LON6, LON10	G5	S5	none	none	coldwater	intolerant
Rainbow Smelt	*Osmerus mordax*	LON5, LON6, LON11	G5	S5	none	none	coldwater	intermediate
Round Goby	*Neogobius melanostomus*	LON10, LON11	G5	SNA	none	none	coolwater	intermediate
Shorthead Redhorse	*Moxostoma macrolepidotum*	LON11	G5	S5	none	none	warmwater	intermediate
Spotfin Shiner	*Cyprinella spiloptera*	LON11	G5	S4	none	none	warmwater	intermediate
Trout-perch	*Percopsis omiscomaycus*	LON4	G5	S5	none	none	coldwater	intermediate
White Perch	*Morone americana*	LON5, LON11	G5	S5	none	none	warmwater	intermediate
White Sucker	*Catostomus commersonii*	LON4, LON5, LON6, LON10, LON11, RAM1	G5	S5	none	none	coolwater	generally tolerant, but moderately tolerant of turbidity
Yellow Perch	*Perca flavescens*	LON4, LON5, LON10	G5	S5	none	none	coolwater	moderately tolerant

Species Information Source: Eakins, R. J. 2014. Ontario Freshwater Fishes Life History Database. Version 4.53. On-line database. (http://www.ontariofishes.ca)

Data Sources:

Station ID	RAM1	RAM2	LON1	LON4	LON5	LON6	LON10	LON11
Station Location	Downstream of Lakeshore Road and Old Lakeshore Road intersection	Downstream of James Street just east of Pearl Street	Northwest corner of Lake Ontario Shoreline by the Burlington Canal-transect closest to canal	Northwest corner of Lake Ontario Shoreline east of the Burlington Canal-furthest transect west	Northwest corner of Lake Ontario Shoreline east of the Burlington Canal-mid transect	Northwest corner of Lake Ontario Shoreline east of the Burlington Canal-furthest transect east	Around entire Brant Street pier	Adjacent to Old Lakeshore Road
Data Source	CH	CH	DFO	DFO	DFO	DFO	CH	CH
Date of Collection	2001	2001 - **No Catch**	1995	1995	1995	1995	2011, 2012, 2014, 2015, 2016	2011, 2012, 2014, 2015, 2016

2.5 SPECIES AT RISK

A review of the MNRF's NHIC database was conducted in March 2017 to search for records for provincially tracked species, including SAR, in the vicinity of the study area. For this purpose data was retrieved for four 1x1km square areas that overlap with the study area (Table 3). Dates of some of the records returned were considered historical (late 1800s/early 1900s). Given the changes that have occurred across the landscape since those 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 is currently available for all of the SAR for which records exist. Of the species listed in Table 3, three are afforded protection under the *Endangered Species Act, 2007;* Spotted Wintergreen (*Chimaphila maculate*), Rusty-patched Bumble Bee (*Bombus affinis*), and Shortnose Cisco (*Coregonus reighardi*). The occurrence records for all three of these species are more than 30 years old.

Table 3: NHIC Search Results for the Study Area, March 2017.

Group	Common Name	Scientific Name	S Rank	COSEWIC	SARO	Last Observation
Plant	Bowman's-root	*Gillenia trifoliata*	SX			
Plant	Brainerd's Hawthorn	*Crataegus brainerdii*	S2			1981
Plant	Cut-leaved Goldenrod	*Solidago arguta*	S4			1989
Plant	Downy Yellow False Foxglove	*Aureolaria virginica*	S1			1957
Plant	Eastern Burning Bush	*Euonymus atropurpureus*	S3			1973
Plant	Fern-leaved Yellow False Foxglove	*Aureolaria pedicularia*	S2?			1888
Plant	Large Yellow Pond-lily	*Nuphar advena*	S3			1952
Plant	Northern Hawthorn	*Crataegus pruinosa var. dissona*	S3			1981
Plant	Panicled Hawkweed	*Hieracium paniculatum*	S2			1956
Plant	Perfoliate Bellwort	*Uvularia perfoliata*	S1S2			2001
Plant	Puttyroot	*Aplectrum hyemale*	S2			1889
Plant	Shiny Wedge Grass	*Sphenopholis nitida*	S1			1988
Plant	Slender Wood Sedge	*Carex gracilescens*	S4			1981
Plant	Soft-hairy False Gromwell	*Lithospermum parviflorum*	S2			
Plant	Spotted Wintergreen	*Chimaphila maculata*	S2	END	END	1886
Plant	Square-stemmed Rose Pink	*Sabatia angularis*	SX			
Plant	Trailing Wild Bean	*Strophostyles helvola*	S4			1903
Plant	Virginia Bluebells	*Mertensia virginica*	S3			1982
Plant	White Milkweed	*Asclepias variegata*	SX			1870
Plant	Yellow Pond-lily	*Nuphar advena*	S3			1952
Plant	Yellow Stargrass	*Hypoxis hirsuta*	S2S3			1898
Bird	Black-crowned Night-heron	*Nycticorax nycticorax*	S3B, S3N			1936
Invertebrate	Arrowhead Spiketail	*Cordulegaster obliqua*	S2			1931
Invertebrate	Rusty Snaketail	*Ophiogomphus rupinsulensis*	S4			

Group	Common Name	Scientific Name	S Rank	COSEWIC	SARO	Last Observation
Invertebrate	Rusty-patched Bumble Bee	*Bombus affinis*	S1	END	END	1984
Fish	Bloater	*Coregonus hoyi*	S4	NAR	NAR	1919
Fish	Shortnose Cisco	*Coregonus reighardi*	SH	END	END	1915
Mussel	Zebra Mussel	*Dreissena polymorpha*	SNA			1990

Table 3 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
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 a combination of biological characteristics and identified threats
DD-data deficient; a wildlife species for which there is in adequate information to make a direct, or indirect, assessment of its risk of extinction
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
EX-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

In an attempt to get an indication of SAR with potential to occur under the current conditions LGL consulted with the MNRF Aurora District office. A response to our data request identified records for the following 4 species at risk within and adjacent to the Study Area (A. McAllister, Management Biologist MNRF Aurora District - January 4, 2017):

- American Eel (Threatened), with general habitat protection
- Chimney Swift (Threatened), with general habitat protection
- Lake Sturgeon (Threatened), with general habitat protection
- Bank Swallow (Threatened), with general habitat protection

In addition the following species were identified as having the potential to occur:

- Monarch (Special Concern)
- Barn Swallow (Threatened), with general habitat protection
- Little Brown Myotis (Endangered), with general habitat protection
- Northern Myotis (Endangered), with general habitat protection
- Eastern Small-footed Myotis (Endangered), with general habitat protection
- Tri-colored Bat (Endangered), with general habitat protection

All of the SAR identified through consultation with MNRF and searches of existing records will be further considered in the context of site conditions documented during the 2017 field investigation once a preferred design solution has been identified.

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 field investigations on April 11 and May 31, 2017. Efforts were made to confirm conditions in proximity to the routing of the preferred alternative for forcemain routing and within the pumping station site on Lakeshore Road on the west bank of Rambo Creek. Results of the field investigation are shown in the context of the proposed forcemain alignment alternatives in Figure 4. A closer look of the WWPS property along with the proposed pumping station alternatives are provided in Figure 5.

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; however, upon review it was found that there was no ELC or flora data for areas within or directly adjacent to the study area. Field investigation was then conducted on May 31, 2017 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 classify the natural vegetation communities and acquire a flora species inventory within the study area 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 May 31, 2017 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 on April 11, 2017 focused on the reaches of Rambo Creek in proximity to project works, particularly where works adjacent to the creek for pumping station works 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.

3.2 FIELD INVESTIGATION RESULTS

3.2.1 Vegetation and Vegetation Communities

3.2.1.1 Vegetation Communities

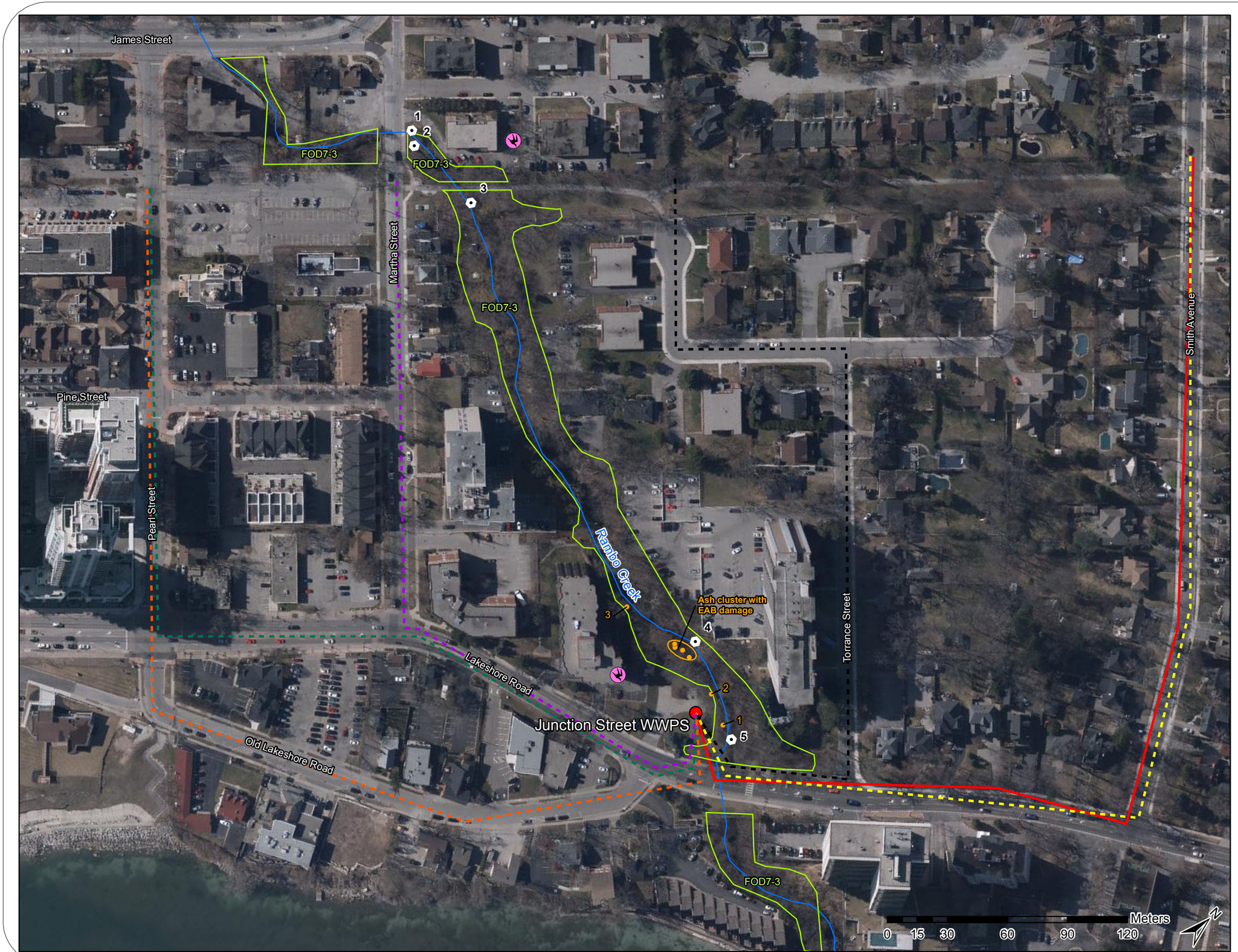
Table 4 provides a summary of the vegetation communities documented within the study area. Given the highly urban and residential nature of the study area, only one community type was documented, which was also fragmented by existing roads. The semi-natural forest community (FOD7-3) that was found within the study area was situated around the riparian floodplain of Rambo Creek. Remaining areas include manicured or anthropogenic community types and amenity features.

3.2.1.2 Vegetation

A total of 25 species were inventoried within the FOD7-3 vegetation community displayed in Figure 4 and summarized in Table 4. A complete list of vascular plant species documented can be found in Appendix B. A total of 48% of the plant species identified on site are considered native to Ontario while the remaining 52% are considered introduced and non-native to the province. All of the species found are considered either locally common or introduced within Halton Region. No federally or provincially listed plant species at risk were documented within the study area. The highly urban nature of the areas surrounding the feature are likely a contributing factor to the high level of invasive species and reduced diversity documented. It was also noted that a number of Red Ash (*Fraxinus pennsylvanica*) trees within the study area have become infested with the Emerald Ash Borer (*Agrilus planipennis*) (Appendix C, Photo 9). Most of these trees were either in poor condition, or standing dead.

Table 4: 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		
FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest	**Canopy:** Red Ash (*Fraxinus pennsylvanica*), Black Walnut (*Juglans nigra*), Maple (*Acer* spp.), White Elm (*Ulmus americana*) **Under storey:** Choke Cherry (*Prunus virginiana var. virginiana*), Red Ash, Staghorn Sumac (*Rhus hirta*), Common Buckthorn (*Rhamnus cathartica*) **Ground Cover:** Canada Goldenrod (*Solidago canadensis*), Celandine (*Chelidonium majus*), Riverbank Grape (*Vitis riparia*)	• Urban encroachment visible with yard waste dumping, disturbance, high number of exotic species, etc. • Includes some large diameter dead standing trees (Ash) • Semi-natural community that follows the reaches of Rambo Creek through a highly urbanized neighbourhood. • Manicured grass buffers the existing pumping station along Lakeshore Road.



LEGEND

- Existing Junction Street Wastewater Pumping Station
- Existing Wastewater Forcemain
- Stormsewer

Forcemain Alignment Alternatives

- Alt B - Smith Ave
- Alt C - Martha St (Preferred)
- Alt D - Pearl St (via Lakeshore)
- Alt E - Pearl St (via Old Lakeshore)
- Alt F - Torrance St

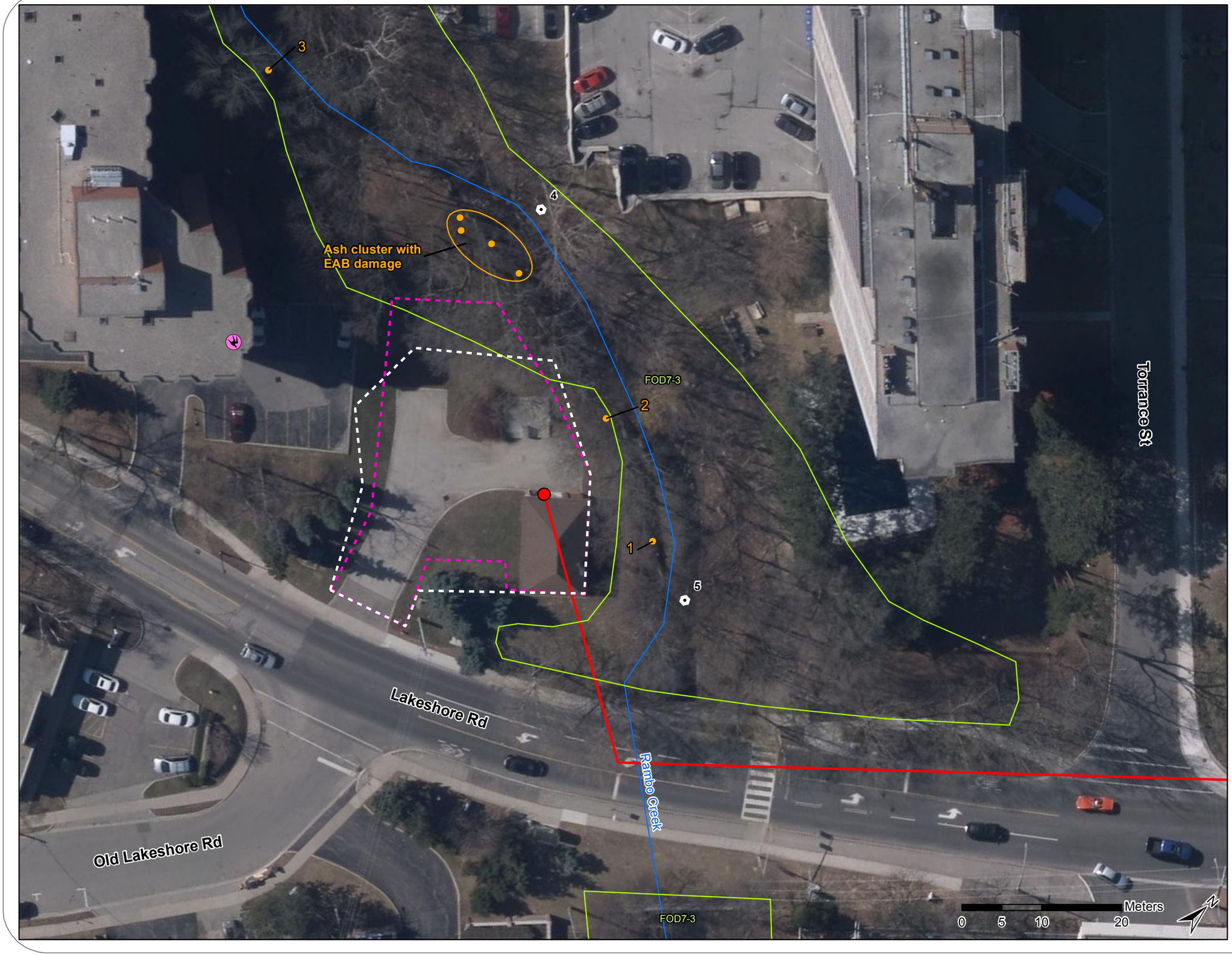
- Watercourse (LIO)
- ELC Boundary
- FOD7-3 — Fresh-Moist Ash Lowland Deciduous Forest
- 2 — Potential Wildlife Habitat Tree
- Chimney Swift (Chaetura pelagica - THR) Observation

Junction Street WWPS and Forcemains

Field Investigation Results & Forcemain Alternatives

LGL LIMITED
environmental research associates

Project	TA8699	**Figure**	4
Date	January, 2018	**Prepared By:**	KC
Scale	1:1,800	**Verified By:**	LKR



LEGEND

- Existing Junction Street Wastewater Pumping Station
- Existing Wastewater Forcemain
- Stormsewer

WWPS Construction Footprint Alternatives

- Alt PS-4 - Replace WWPS
- Alt PS-3 - Upgrade WWPS

- Watercourse (LIO)
- ELC Boundary
- FOD7-3 Fresh-Moist Ash Lowland Deciduous Forest
- 2 Potential Wildlife Habitat Tree
- Chimney Swift (Chaetura pelagica - THR) Observation

Junction Street WWPS and Forcemains

Field Investigation Results & WWPS Alternatives

LGL LIMITED
environmental research associates

Project	TA8699	**Figure**	5
Date	January, 2018	**Prepared By:**	KC
Scale	1:450	**Verified By:**	LKR

3.2.2 Wildlife and Wildlife Habitat

3.2.2.1 Wildlife

A total of 12 wildlife species were documented within the study area, all of which were bird species. A complete list of wildlife is shown in Table 5. The majority of the species observed are considered secure and common to the community types found on site, including primarily urban tolerant species. Approximately 67% of the bird species observed are considered migratory and are regulated under the *Migratory Birds Convention Act* (MBCA), while one additional species (Blue Jay (*Cyanocitta cristata*)) is protected under the *Fish and Wildlife Conventions Act*. Only three of the observed bird species are not under any legislative protection: American Crow (*Corvus brachyhrynchos*); European Starling (*Sturnus vulgaris*); and, House Sparrow (*Passer domesticus*). One of the species observed is considered area sensitive according to the *Significant Wildlife Habitat Technical Guide* (SWHTG, 2000), White-breasted Nuthatch (*Sitta carolinensis*), which was heard calling within the ravine areas in the north end of the study area. None of the species observed were confirmed to be breeding within the study area and only one was documented as a probable breeder; Chimney Swift (*Chaetura pelagica*). The Chimney Swift is currently listed as a Threatened species both provincially and federally and was observed in two different locations within the study area, with 2-4 individuals identified at each location. No active nesting was detected for this species. An old, inactive American Robin (*Turdus migratorius*) nest was also observed on the existing pumping station building beneath the roof overhang. No nests were observed within the creek culverts.

3.2.2.2 Wildlife Habitat

Within the study area, the forested community (FOD7-2) along Rambo Creek represents the only semi-natural habitat available for wildlife. This narrow stretch of forested land provides marginal, fragmented habitat, which is most suitable for urban-tolerant species. The fragmentation and small patch size of the FOD limits its function as a linkage opportunity for plants and wildlife. Several large diameter dead, or dying trees were documented within the forested area close to the pumping station and were noted as having small cavities or sloughing bark (Figures 4 and 5). During the field investigation of the site, no wildlife (birds, mammals) were observed to use these trees; however, they may afford shelter, habitat, and food opportunities for wildlife. Large diameter trees with sloughing bark or cavities have the potential to act as maternal roosting sites for bats. Bat maternal roosting is identified as a type of significant wildlife habitat (SWH) to be considered in Ecoregion 7E (MNRF 2015). MNRF's standard for significance require that a minimum of 10 cavity/snag trees per hectare of wooded habitat be present. Although trees in various stages of decay and with peeling bark were observed on the WWPS property, a full cavity/snag assessment was not completed for the entire feature as portions extend into private property. For the purpose of the impact assessment of proposed works, the FOD7-3 feature has been treated as Candidate Significant Wildlife Habitat for Bat Maternal Roosting. There is also potential that if bats are using the trees for roosting, some may be species that are afforded protection under the Endangered Species Act (2007), such as Little Brown Myotis (*Myotis lucifugus*).

Table 5: Wildlife Species Documented within the Study Area, May 2017.

Scientific Name	Common Name	LGL Species (May 31, 2017)	OBBA Code	Breeding Evidence	G-Rank	S-Rank	COSEWIC	SARA	SARO	FWCA	MBCA	SWH-TG Area Sensitive Species	Interior Species	Halton Region NAI	Priority Species (Halton)
Corvus brachyhrynchos	American Crow	X	H	Possible	G5	S5B									
Carduelis tristis	American Goldfinch	X	S	Possible	G5	S5B					X				level 3
Turdus migratorius	American Robin	X	S	Possible	G5	S5B					X				
Cyanocitta cristata	Blue Jay	X	S	Possible	G5	S5				P					
Chaetura pelagica	Chimney Swift	X	P	Probable	G5	S4B,S4N	THR	THR	THR		X			U	
Sturnus vulgaris	European Starling	X	S	Possible	G5	SNA								I	
Passer domesticus	House Sparrow	X	S	Possible	G5	SNA								I	
Charadrius vociferus	Killdeer	X	S	Possible	G5	S5B,S5N					X				
Cardinalis cardinalis	Northern Cardinal	X	S	Possible	G5	S5					X				
Vireo olivaceus	Red-eyed Vireo	X	S	Possible	G5	S5B					X		X		
Melospiza melodia	Song Sparrow	X	S	Possible	G5	S5B					X				
Sitta carolinensis	White-breasted Nuthatch	X	S	Possible	G5	S5					X	X			

Table 5 Legend:

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

Rambo Creek flows through the highly urbanized study area in a southeasterly direction to Lake Ontario. The creek was observed on April 11, 2017 from upstream of the WWPS site, at James Street (where it daylights), to the mouth of the creek downstream of Lakeshore Road (Figure 4; representative photos provide in Appendix C).

The creek flows from underground just south of James Street. At the time of survey, surface water was coloured a brownish-orange as it flowed between James Street and Martha Street (Appendix C, Photo 1). The creek then flows under the Martha Street bridge and the Waterfront Trail. The portion of the creek between Martha Street and the trail receives stormwater runoff from a small 30 cm diameter perched culvert and a larger 1500 cm outfall (Appendix C, Photo 2). The channel is hardened with rip rap on the south side and a concrete retaining wall (approximately 5-6 m in height) on the north bank. Riparian vegetation is limited to a few mature trees and manicured trailside grasses. Woody debris, concrete slabs and large boulders dominate the instream substrate of the creek (Appendix C, Photo 2). The channel takes on a more natural form downstream of the Waterfront Trail and continues south to the lake (Appendix C, Photo 5). Immediately downstream of the trail crossing, the channel is approximately 7m wide and up to 50cm deep (Appendix C, Photo 4), beyond which the channel narrows (2-5m wetted width). Riparian vegetation is limited from downstream of the trail crossing to the lakeshore (maximum 30m across) as residential buildings (houses, mid to high density apartments) and manicured lawns are in close proximity to the creek. Riparian is characterized as Fresh-Moist Ash Lowland Deciduous Forest (FOD7-3), as is further described in Section 3.2.1 and Table 4. Portions of the stream bank are reinforced with gabion riprap, boulder and concrete; however, areas of bank erosion persist outside of those hardened portions. Exposed bars of cobble and deposition of fine sediments were noted during the April 2017 survey. Habitat included a mix of riffle/run/pool with instream substrates dominated by boulder/cobble and gravel in the section upstream of the Lakeshore Road bridge, and increasingly sandy downstream.

3.3 SPECIES AT RISK

Only one species at risk was documented within the study area; the Chimney Swift. This bird is currently listed as a Threatened species both provincially and federally and was observed in two different locations within the study area (Figure 4), with 2 to 4 individuals observed at each location. No active nesting was detected for this species and appropriate breeding structures (i.e. old buildings with open chimneys) do not exist within the riparian zone of Rambo Creek. The chimney on the existing WWPS is capped and not considered suitable for the species. Given the highly urban nature of the surrounding area and variable age of buildings within downtown Burlington, it is much more likely that these birds are using buildings within the area, but not actively breeding within areas proposed for disturbance.

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 6 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 6: Screening for Species at Risk Habitat with Potential to Occur in the Study Area (MNRF Consultation, Appendix A).

Species	SARO Status	ESA Protection (MNRF, 2016a)	Habitat Description (MNRF, 2017a)	Habitat Potential/Results of Field Investigation	Further Effort Recommended in Detail Design
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.	No suitable habitat was observed along the banks of Rambo Creek in vicinity of the site. Pedestrian surveys were conducted in natural areas where access was provided to document birds during the breeding season. No individuals of this species or evidence of nest cavities in streambanks were observed during survey.	None recommended.
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 project works. No nests were observed in 2017.	No nests were observed in 2017; however, this species often makes use of anthropogenic structures (box culverts, bridges, buildings, etc.). A follow up screening of built structures should be completed at detail design before beginning any project works. Habitat up to 200m from the nesting site is identified as Category 1 to 3 habitat. Should Barn Swallow or active nests of the species be found to occur, further consultation with MNRF will be required to ensure compliance under the Endangered Species Act.

Species	SARO Status	ESA Protection (MNRF, 2016a)	Habitat Description (MNRF, 2017a)	Habitat Potential/Results of Field Investigation	Further Effort Recommended in Detail Design
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 multiple areas. Potential habitat is in the form of residential and industrial chimneys. The chimney on the existing WWPS is capped and not considered suitable for the species. No other removal of buildings is anticipated as a part of project works.	None recommended.
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) with suitable cavities or sloughing bark.	Potential habitat within the study area is associated with mature trees and the use of manmade structures as indicated under the habitat description. Mature trees along the creek edge with suitable cavities and/or sloughing bark and buildings (e.g. WWPS) represent candidate roosting habitat.	Where any works propose tree or building removal, a screening for suitable maternity roosting habitat and individuals of this species should be completed during the month of June according to MNRF protocol for Species at Risk Bat Surveys for Buildings and Isolated Trees. Should this species be found to occur, further consultation with MNRF will be required to ensure compliance under the Endangered Species Act.

Species	SARO Status	ESA Protection (MNRF, 2016a)	Habitat Description (MNRF, 2017a)	Habitat Potential/Results of Field Investigation	Further Effort Recommended in Detail Design
Northern Myotis (*Myotis septentrionalis*)	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) with suitable cavities or sloughing bark.	Potential habitat within the study area is associated with mature trees and the use of manmade structures as indicated under the habitat description. Mature trees along the creek edge with suitable cavities and/or sloughing bark and buildings (e.g. WWPS) represent candidate roosting habitat.	Where any works propose tree or building removal, a screening for suitable maternity roosting habitat and individuals of this species should be completed during the month of June according to MNRF protocol for Species at Risk Bat Surveys for Buildings and Isolated Trees. Should this species be found to occur, further consultation with MNRF will be required to ensure compliance under the Endangered Species Act.
Eastern Small-footed Myotis (*Myotis leibii*)	END	Species and general habitat protection.	Like other *Myotis* bats, this species hibernates overwinter in caves. During spring and summer this species will roost in or under rocks, buildings, bridges, caves, mines and hollow trees. This species may change its roost sites frequently or daily.	Potential habitat within the study area is associated with mature trees and the use of manmade structures as indicated under the habitat description. Mature trees along the creek edge with suitable cavities and/or sloughing bark and buildings (e.g. WWPS) represent candidate roosting habitat.	Where any works propose tree or building removal, a screening for suitable maternity roosting habitat and individuals of this species should be completed during the month of June according to MNRF protocol for Species at Risk Bat Surveys for Buildings and Isolated Trees. Should this species be found to occur, further consultation with MNRF will be required to ensure compliance under the Endangered Species Act.

Species	SARO Status	ESA Protection (MNRF, 2016a)	Habitat Description (MNRF, 2017a)	Habitat Potential/Results of Field Investigation	Further Effort Recommended in Detail Design
Tri-colored Bat (*Perimyotis subflavus*)	END	Species and general habitat protection.	The Tri-colored Bat is less frequently encountered compared to Little Brown Myotis and Northern Myotis. Tri-coloured Bat establishes maternity roosts within live and dead foliage within or below the canopy. Oak is the preferred roost tree species, however maples are also thought to be important. Some studies show that this species prefers dead leaves over live leaves, especially if the dead leaves are situated on a live tree (i.e., along a broken branch). Other documented roost sites include dogwood leaves, squirrel nests and tree cavities. Although Tri-colored Bat switches roosts over the summer, it has very high site fidelity to particular leaf clusters within a season. Foraging occurs along forested riparian corridors, over water (e.g., ponds and rivers) and within gaps in forest canopies. This species is an insect generalist, feeding on leafhoppers, ground beetles, flies, moths and flying ants. At the end of the summer they travel to a location where they swarm which is generally near the cave or underground location where they will overwinter.	Potential roosting habitat on site is limited to individual mature maple trees along the creek edge. Unlike other SAR bats, Tri-colored Bat rarely roosts in buildings, and therefore relies heavily on treed areas for rearing its young (MNRF 2017c).	Where any works propose removal of candidate roost trees additional survey should be completed during the leaf on period to document foliage conditions and during the month of June (if suitable habitat conditions are found) according to the MNRF protocol for Species at Risk Bat Surveys for Buildings and Isolated Trees. Should this species be found to occur, further consultation with MNRF will be required to ensure compliance under the Endangered Species Act.
Lake Sturgeon (*Acipenser fulvescens*)	THR	Species and general habitat protection.	The Lake Sturgeon lives almost exclusively in freshwater lakes and rivers with soft bottoms of mud, sand or gravel. They are usually found at depths of five to 20 metres. They spawn in relatively shallow, fast-flowing water (usually below waterfalls, rapids, or dams) with gravel and boulders at the bottom. However, they will spawn in deeper water where habitat is available. They also are known to spawn on open shoals in large rivers with strong currents. Preferred water temperature ranges from 15-17°C. In Ontario, the Lake Sturgeon is found in the rivers of the Hudson Bay basin, the Great Lakes basin and their major connecting waterways, including the St. Lawrence River.	Rambo Creek does not provide suitable habitat for this species. Local records are associated with Lake Ontario. No in-water work is planned as part as part of project works. Best management practices (erosion and sediment controls, spills contingency planning, etc.) will be employed to protect water quality of the creek and the lake.	None recommended.

Species	SARO Status	ESA Protection (MNRF, 2016a)	Habitat Description (MNRF, 2017a)	Habitat Potential/Results of Field Investigation	Further Effort Recommended in Detail Design
American Eel (*Anguilla rostrata*)	END	Species and general habitat protection.	The American Eel starts life in the Sargasso Sea in the North Atlantic Ocean and migrates along the east coast of North America. In Canada, it is found in fresh water and salt water areas that are accessible from the Atlantic Ocean. This area extends from Niagara Falls in the Great Lakes up to the mid-Labrador coast. In Ontario, American Eels can be found as far inland as Algonquin Park. Once the eels mature (10-25 years) they return to the Sargasso Sea to spawn. Although eels have virtually disappeared from many inland waters of Ontario, they are still present provincially, primarily in the downstream reaches of some watersheds (lower Ottawa River and its tributaries, lower Trent River, the upper St. Lawrence River, and in Lake Ontario). Growing eels are primarily benthic, utilizing substrate (rock, sand and mud), bottom and woody debris, and submerged vegetation for protection and cover.	Local records are associated with Lake Ontario and its tributaries. Rambo Creek represents potential habitat for the species. The species may use the sandy, soft bottomed mouth of the creek at the lake. No in-water work is planned as part of project works. Best management practices (erosion and sediment controls, spills contingency planning, etc.) will be employed to protect water quality of the creek and the lake.	None recommended.
Monarch (*Danaus plexippus*)	SC	Not applicable	Throughout their life cycle, Monarchs use three different types of habitat. Only the caterpillars feed on milkweed plants and are confined to meadows and open areas where milkweed grows. Adult butterflies can be found in more diverse habitats where they feed on nectar from a variety of wildflowers. Monarchs spend the winter in Oyamel Fir forests found in central Mexico.	No host plants for the caterpillar (milkweed) or large clusters of nectar producing plants were found during field surveys.	None recommended.

4.0 SUMMARY OF CONSTRAINTS & PROPOSED ALTERNATIVES

4.1 SUMMARY OF EXISTING CONDITIONS

Natural vegetation in the project area is generally limited to the treed riparian corridor of Rambo Creek from James Street south to the lakefront. The corridor is restricted by existing development resulting in a relatively narrow patch of deciduous forest (FOD7-3). Several Ash trees within the FOD7-3 in proximity to the WWPS were infested with Emerald Ash Borer and in poor health, or standing dead. A high proportion of non-native species were also found to occur in the FOD. Although the quality and function of the feature are limited by the highly urbanized setting and lack of connectivity to other natural habitats, the feature contains tree resources and woodland habitat that are otherwise limited in the project area. The un-fragmented portion of FOD7-3 between the Waterfront Trail and Lakeshore Road is 0.8ha in size which meets the minimum size requirement (0.5ha) of a woodland in the context of Key Features as described in the Region's Official Plan (ROP) in Section 4.3. The woodland represents habitat for breeding birds and large diameter trees with sloughing bark and/or cavities represent candidate significant wildlife habitat for bat maternal roosting and SAR bats.

In general, Rambo Creek represents a highly altered watercourse with portions of it piped below grade, limiting its function as a linkage opportunity for fish and wildlife. However, as it flows through the project area the creek takes on a natural channel form that provides fish habitat and connectivity to the Lake Ontario shoreline. The creek is not regulated by Conservation Halton; however, it does represent a Key Feature (fish habitat) under the ROP and is also subject to the protection provided in the Fisheries Act. The creek and its riparian vegetation represent the most sensitive feature in the project area from a natural heritage perspective.

Tree resources on the WWPS property are subject to the Region's Tree Canopy Replacement Policy on Regionally Owned Lands. The remainder of the project area identified for forcemain routing is comprised of city streets through residential and commercial areas where natural vegetation communities are lacking. Mature, private and/or publicly owned tree resources are identified along the city streetscapes and project planning will need to consider any potential impacts to those trees in the context of municipal and regional tree bylaws and protection policies.

4.2 SUMMARY OF PROPOSED ALTERNATIVES

As part of the Junction Street WWPS and Forcemain Schedule B Class EA, the existing WWPS is to be upgraded and the existing forcemain along Lakeshore Road and Smith Road is to be twinned. Beyond the 'do nothing' approach there are two alternatives for the WWPS and five routings for installation of a new forcemain under consideration (Figures 4 and 5). The routing of alternatives generally utilizes existing road rights of way. The most sensitive aspects from a natural heritage perspective are the crossing of Rambo Creek (associated with Forcemain Alternatives B and F) and the potential for removal of street trees, or vegetation within the deciduous forest community on the WWPS property. For the purposes of evaluating the proposed alternatives, impacts to street and residential trees were assumed to be similar across all five of the alternative alignments for the forcemain routing, given that they all follow within road rights of way

of treed city streets. Upgrading or replacing the existing WWPS would entail construction activity within the limits of the Region's property, as shown in Figure 5. Given the proximity of project works to Rambo Creek, mitigation to ensure the protection of water quality and fish habitat is necessary. As well, tree resources in proximity to the proposed WWPS construction footprints will required further investigation to confirm their function with respect to wildlife habitat and habitat for SAR bats.

4.3 SUMMARY OF CONSTRAINTS

'Constraints' as they are identified here relate to natural features subject to policies and/or regulations and other natural heritage components of terrestrial and aquatic environments that will guide the placement of infrastructure and be considered as part of the evaluation of alternative solutions. The following are considered potential constraints for the project based on the existing conditions of the project area determined through background review, field investigation, and consultation with MNRF and Region staff:

- Regional Natural Heritage System (NHS)
- Key Features found in the project area to support the NHS:
    - Candidate Significant Habitat of Endangered and Threatened Species (SAR bats, American Eel)
    - Candidate Significant Woodland
    - Candidate Significant Wildlife Habitat (Bat Maternal Roosting)
    - Fish Habitat
- Tree Resources

4.3.1 Regional Natural Heritage System (NHS)

The Regional Natural Heritage System is identified in the ROP to include the Lake Ontario shoreline that borders the project area (Section 2.7.7.). No intrusion into the mapped NHS is proposed as part of project works.

4.3.2 Key Features of the NHS

LGL's field investigation results indicate that, in addition to the Lake Ontario shoreline, additional candidate Key Features are found within the study area, to include: candidate significant woodland (FOD7-3); candidate significant habitat for endangered and threated (SAR bats, American Eel); candidate significant wildlife habitat (Bat Maternal Roosting); and, fish habitat. Each of these features is considered in more detail below.

4.3.2.1 Candidate Significant Woodland

Despite the high density urbanized setting, the FOD community adjacent to Rambo Creek is considered a sensitive feature given the limited quantity of woodland observed in the project area. The feature as delineated within the study area exceeds 0.5ha (the minimum size to be considered for significance as a woodland under the ROP). To meet the definition of woodlands, the feature must meet a minimum number of trees of specific size. At this point in the project, a tree inventory has not been completed within the polygon to determine if the feature meets the minimums as defined in the ROP. For the purpose of the evaluation of alternative solutions and recommendation of mitigation, the FOD7-3 feature was treated as candidate significant woodland.

4.3.2.2 Significant Habitat of Endangered and Threatened Species

Although no fish surveys were conducted to confirm American Eel (Endangered) in Rambo Creek, an aquatic habitat assessment indicates that the creek and the Lake Ontario shoreline represent suitable habitat for the species. Large diameter, mature trees with suitable conditions for bat maternal roosting (peeling/sloughing bark and/or cavities) were observed during leaf off condition within the WWPS property. No field investigation to determine presence/absence for SAR bats has been completed to date. Where tree (or building) removals are proposed, surveys for SAR bats should be conducted in suitable habitat.

As a result of the background review and field investigation, LGL identifies Candidate Significant Habitat of Endangered and Threatened Species in the project area for the following:

- American Eel
- SAR bats

During the 2017 field investigation in the project area, buildings and bridge structures in proximity to proposed project works were screened for Barn Swallow activity. No active nests of the species were found; however, this bird SAR (Threatened) is known to use buildings and bridge structures as nest building sites and structures should be screened again during detail design/prior to construction to confirm no impact to the species will result from project works.

4.3.2.3 Candidate Significant Wildlife Habitat

The FOD7-3 community includes a number of Ash trees in various stages of decay and with sloughing bark with potential to serve as bat maternal roost sites. Although a full cavity/snag tree assessment has not been completed for the FOD7-3 (due to lack of property access) the feature is identified as Candidate Significant Wildlife Habitat (Bat Maternal Roosting).

4.3.2.4 Fish Habitat

Rambo Creek is connected to the Lake Ontario shoreline downstream and represents warmwater fish habitat. The creek is directly adjacent to the existing WWPS and crossings of the creek are proposed as part of the alternative alignments under consideration for a new forcemain. Installation of the forcemain across the creek will be completed using trenchless construction methods. For the purpose of evaluating the alternative solutions, it has been assumed that no in-water work is proposed; therefore potential impacts as they relate to fish habitat in Rambo Creek and Lake Ontario are considered indirect. It is anticipated that all project works can adhere to the DFO's 'Measures to avoid causing harm to fish and fish habitat including aquatic species at risk', in compliance with the Fisheries Act.

5.0 EVALUATION OF ALTERNATIVE SOLUTIONS

LGL has reviewed the alternative solutions proposed by the project team (as presented in Figures 4 and 5) against the natural heritage constraints and summarized potential impacts as provided in Tables 7 and 8.

5.1 IMPACT ASSESSMENT OF FORCEMAIN ALTERNATIVES

In summary, Forcemain Alternatives C, D and E are considered preferred from a natural environment perspective (Table 7). These three alignments utilize manicured or previously disturbed areas within road rights of way along city streets, thereby avoiding impacts to natural vegetation communities. As well, no crossing of Rambo Creek is required as part Alternatives C, D or E. Impacts as they relate to natural environment are limited to individual tree impacts (residential/street trees). Tree impacts will be addressed and mitigated through the provision of tree protection and compensation as warranted and outlined in the municipal and regional tree bylaws.

Forcemain Alternatives B and F also utilize manicured or previously disturbed areas within road rights of way along city streets. Impacts related to individual residential/street trees are considered to be similar to those outlined for the other three forcemain alternatives. However, Alternatives B and F also require a crossing of Rambo Creek which represents habitat for American Eel (Endangered), a species afforded protection under the Endangered Species Act, 2007. The potential for impacts to the habitat of this species, and fish habitat in general, can be greatly reduced by installing the forcemain under Rambo Creek using trenchless methods. The impact analysis completed for these alternatives assumes that trenchless construction methods will be used (Table 7). The anticipated construction timing window for Rambo Creek is July 1- March 31, when work in or near a stream can be conducted with reduced risk to warmwater fish and fish habitat. Implementation of an Erosion and Sediment Control Plan, restoration of any vegetation disturbance, and stabilization of soils in proximity to the creek during construction will further mitigate potential impacts to water quality and fish habitat associated with Rambo Creek. Fencing to delineate the construction zone and prevent wildlife movement, particularly in the vicinity of the creek, is also recommended. Where Alternatives B or F are identified as part of the preferred solution, further consultation with MNRF and the completion of a DFO screening/self-assessment or review is recommended to address the crossing of Rambo Creek and ensure no impacts to fish and fish habitat, including aquatic species at risk (American Eel).

Table 7: Natural Environment Impact Assessment of Alternative Forcemain Alignments (as shown in Figure 4).

Impact	Alternative A Do Nothing	Alternative B Smith Avenue	Alternative C Martha Street	Alternative D Pearl Street (via Lakeshore)	Alternative E Pearl Street (via Old Lakeshore)	Alternative E Torrance Street
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.		Alignment heads east along Lakeshore Rd. to Smith Avenue and then north to the Waterfront Trail utilizing the road rights of way. Impacts to the creek are greatly reduced through use of trenchless construction for forcemain installation. Routing is well treed; therefore the potential for impacts to city/privately owned trees is identified. The level of impact associated with this alternative is similar to Alternative B; however this alignment is much longer than Alternative B therefore the potential for impacts to city/privately owned trees is increased compared to that alignment. This alternative is the least preferred from the perspective of natural environment.	Alignment heads west along Lakeshore Rd. to Martha Street and then north to the Waterfront Trail utilizing the road rights of way. Impacts to city/privately owned trees. This alignment avoids the need to install the forcemain across Rambo Creek and associated fish habitat. It is among the preferred alternatives from an environmental perspective.	Alignment heads west along Lakeshore Rd. to Pearl Street and then north to the Waterfront Trail utilizing the road rights of way. Impacts to city/privately owned trees. This alignment avoids the need to install the forcemain across Rambo Creek and associated fish habitat. It is among the preferred alternatives from an environmental perspective.	Alignment heads west along Old Lakeshore Rd. to Pearl Street and then north to the Waterfront Trail utilizing the road rights of way. Impacts to city/privately owned trees. This alignment avoids the need to install the forcemain across Rambo Creek and associated fish habitat. It is among the preferred alternatives from an environmental perspective.	Alignment heads east along Lakeshore Rd. to Torrance Street and then north to Harris Crescent where it continues west and north to the Waterfront Trail utilizing the road rights of way. Routing requires a crossing of Rambo Creek and is well treed (similar to Alternative B). Impacts to the creek are greatly reduced through use of trenchless construction for forcemain installation. This alignment is much shorter than Alternative B, therefore the potential for impacts to city/ privately owned trees is reduced compared to Alternative B. This alternative is less preferred than Alternatives C, D, and E, but more preferred than Alternative B.
Impact to Surface Water and Aquatic Habitat	Potential impact to water quality and associated fish habitat in Rambo Creek as a result of the anticipated increased frequency of WWPS overflows.	No in water work is required for the Rambo Creek crossing. The potential for indirect impact to water quality in Rambo Creek is identified but considered minor in that mitigation will follow the DFO's 'Measures to avoid causing harm to fish and fish habitat including aquatic species at risk'.	None identified.	None identified.	None identified.	No in water work is required for the Rambo Creek crossing. The potential for indirect impact to water quality in Rambo Creek is identified but considered minor in that mitigation will follow the DFO's 'Measures to avoid causing harm to fish and fish habitat including aquatic species at risk'.
Impact to Regional NHS Key Features (not already included elsewhere in criteria) • **Key Features on Map 1G of ROP** • **Significant wetland/ coastal wetland** • **Significant woodland** • **Significant valleylands** • **Significant wildlife habitat** • **Significant Areas of Natural and Scientific Interest**	No change from existing conditions. None identified.	None identified.	None identified.	None identified.	None identified.	None identified.
Impact to Regulated Areas (e.g. flood plains, erosion hazards)	No Conservation Halton Regulated Areas identified for the study area.	No Conservation Halton Regulated Areas identified for the study area.	No Conservation Halton Regulated Areas identified for the study area.	No Conservation Halton Regulated Areas identified for the study area.	No Conservation Halton Regulated Areas identified for the study area.	No Conservation Halton Regulated Areas identified for the study area.

Impact	Alternative A Do Nothing	Alternative B Smith Avenue	Alternative C Martha Street	Alternative D Pearl Street (via Lakeshore)	Alternative E Pearl Street (via Old Lakeshore)	Alternative E Torrance Street
Impact to Vegetation and Vegetation Communities	No change from existing conditions. None identified.	Potential impact to city/privately owned trees is identified where alignment within road rights of way conflicts with tree resources. Works will be completed in accordance with tree bylaws to provide tree protection and compensation as warranted. The remainder of the vegetation in proximity to this alignment is manicured grass. No naturalized vegetation communities are identified as impacted. Impact is identified as minor.	Potential impact to city/privately owned trees is identified where alignment within road rights of way conflicts with tree resources. Works will be completed in accordance with tree bylaws to provide tree protection and compensation as warranted. The remainder of the vegetation in proximity to this alignment is manicured grass. No naturalized vegetation communities are identified as impacted. Impact is identified as minor.	Potential impact to city/privately owned trees is identified where alignment within road rights of way conflicts with tree resources. Works will be completed in accordance with tree bylaws to provide tree protection and compensation as warranted. The remainder of the vegetation in proximity to this alignment is manicured grass. No naturalized vegetation communities are identified as impacted. Impact is identified as minor.	Potential impact to city/privately owned trees is identified where alignment within road rights of way conflicts with tree resources. Works will be completed in accordance with tree bylaws to provide tree protection and compensation as warranted. The remainder of the vegetation in proximity to this alignment is manicured grass. No naturalized vegetation communities are identified as impacted. Impact is identified as minor.	Potential impact to city/privately owned trees is identified where alignment within road rights of way conflicts with tree resources. Works will be completed in accordance with tree bylaws to provide tree protection and compensation as warranted. The remainder of the vegetation in proximity to this alignment is manicured grass. No naturalized vegetation communities are identified as impacted. Impact is identified as minor.
Impact to Wildlife and Wildlife Habitat	No change from existing conditions. None identified.	No significant wildlife habitat is identified in proximity to project works. Tree resources along city streetscapes and on residential properties represent nesting opportunities for breeding birds. Removal of vegetation will occur outside of the breeding bird season to avoid impacts.	No significant wildlife habitat is identified in proximity to project works. Tree resources along city streetscapes and on residential properties represent nesting opportunities for breeding birds. Removal of vegetation will occur outside of the breeding bird season to avoid impacts.	No significant wildlife habitat is identified in proximity to project works. Tree resources along city streetscapes and on residential properties represent nesting opportunities for breeding birds. Removal of vegetation will occur outside of the breeding bird season to avoid impacts.	No significant wildlife habitat is identified in proximity to project works. Tree resources along city streetscapes and on residential properties represent nesting opportunities for breeding birds. Removal of vegetation will occur outside of the breeding bird season to avoid impacts.	No significant wildlife habitat is identified in proximity to project works. Tree resources along city streetscapes and on residential properties represent nesting opportunities for breeding birds. Removal of vegetation will occur outside of the breeding bird season to avoid impacts.
Impact to Species at Risk	Potential impact to habitat of American Eel associated with degraded water quality resulting from increased overflow to Rambo Creek.	Candidate habitat is identified in the project area for SAR bats (mature trees on WWPS property), and American Eel (Rambo Creek). No impacts to these habitats are associated with this alignment.	Candidate habitat is identified in the project area for SAR bats (mature trees on WWPS property), and American Eel (Rambo Creek). No impacts to these habitats are associated with this alignment.	Candidate habitat is identified in the project area for SAR bats (mature trees on WWPS property), and American Eel (Rambo Creek). No impacts to these habitats are associated with this alignment.	Candidate habitat is identified in the project area for SAR bats (mature trees on WWPS property), and American Eel (Rambo Creek). No impacts to these habitats are associated with this alignment.	Candidate habitat is identified in the project area for SAR bats (mature trees on WWPS property), and American Eel (Rambo Creek). No impacts to these habitats are associated with this alignment.

5.2 IMPACT ASSESSMENT OF WWPS ALTERNATIVE SOLUTIONS

The impact assessment for the WWPS alternative design solutions is provided in Table 8. The proposed alternatives for the WWPS upgrade (PS-3) and replacement (PS-4) utilize paved access or manicured lawn within the regionally owned lands. Manicured areas host mature coniferous and deciduous amenity trees that may be impacted by proposed project works. The footprints of both alternatives are of similar sizes (PS-3 = 846m^2; PS-4 = 848m^2) and lie within 10m of Rambo Creek (PS-3 = 7m; PS-4 = 8m). The main difference between the two from a natural environment perspective is the degree of encroachment into the adjacent candidate significant woodland which also represents candidate SWH for bats, candidate habitat for SAR bats, and breeding bird habitat. The area of overlap between Alternative PS-3 and the woodland feature is approximately 9m^2. In the case of Alternative PS-4 the encroachment is approximately 64 m^2. Alternative PS-3 is considered to result in fewer impacts to natural heritage and is therefore identified by LGL as the preferred alternative.

Table 8: Natural Environment Impact Assessment of Alternative WWPS Solutions (as shown in Figure 5).

Impact	Alternative PS-1 Do Nothing	Alternative PS-3 Upgrade WWPS	Alternative PS-4 Replace WWPS
Overview of Natural Environment Impacts The comparative operational footprints of the WWPS upgrade (Alt PS-3), and installation of a new WWPS (Alt PS-4) are approximately as follows: Upgraded WWPS - 846m^2 New WWPS - 848m^2	The 'do nothing' alternative is predicted to result in increased frequency of overflow to Rambo Creek.	Footprint of construction is occupies approximately 846m^2. Construction limits are within disturbed areas (paved, manicured lawn), with some potential to impact edge of FOD7-3. Proposed WWPS footprint is approximately 7m from Rambo Creek at its closest point.	Footprint of construction is occupies approximately 848m^2. Construction limits extend beyond disturbed areas (paved, manicured lawn) into woody riparian edge of Rambo Creek and FOD7-3. Proposed WWPS footprint is approximately 8m from Rambo Creek at its closest point.
Impact to Surface Water and Aquatic Habitat	Potential impact to water quality and associated fish habitat in Rambo Creek as a result of the anticipated increased frequency of WWPS overflows.	Footprint of this alternative lies within approximately 7m of the creek. No in-water works are proposed. Indirect impacts as they relate to aquatic habitat include the potential for water quality effects (erosion and sediment and other deleterious substances related to construction) and bank slumping.	Footprint of this alternative lies within approximately 8m of the creek. No in-water works are proposed. Indirect impacts as they relate to aquatic habitat include the potential for water quality effects (erosion and sediment and other deleterious substances related to construction) and bank slumping.
Impact to Regional NHS Key Features (not already included elsewhere in criteria) • **Key Features on Map 1G of ROP** • **Significant wetland/ coastal wetland** • **Significant woodland** • **Significant valleylands** • **Significant wildlife habitat** • **Significant Areas of Natural and Scientific Interest**	No change from existing.	Encroachment of approximately 9m^2 into candidate significant woodland which also represents candidate significant wildlife habitat (SWH) for bat maternal roosting.	Encroachment of approximately 64m^2 into candidate significant woodland which also represents candidate significant wildlife habitat (SWH) for bat maternal roosting.
Impact to Regulated Areas (e.g. flood plains, erosion hazards)	No Conservation Halton Regulated Areas identified for the study area.	No Conservation Halton Regulated Areas identified for the study area.	No Conservation Halton Regulated Areas identified for the study area.

Impact	Alternative PS-1 Do Nothing	Alternative PS-3 Upgrade WWPS	Alternative PS-4 Replace WWPS
Impact to Vegetation and Vegetation Communities	No change from existing.	Results in removal of 328m^2 of manicured lawn and associated amenity trees and 9m^2 of FOD7-3.	Results in removal of 275m^2 of manicured lawn and associated amenity trees and 64m^2 of FOD7-3.
Impact to Wildlife and Wildlife Habitat	No change from existing.	Opportunities for wildlife habitat are limited within the manicured areas to amenity trees with the potential to function as breeding bird habitat. Removal of 9m^2 of Candidate SWH for Bat Maternal Roosting and breeding bird habitat associated with FOD7-3. Indirect impacts to adjacent woodland habitat are related to noise and general disturbance/human activity.	Opportunities for wildlife habitat are limited within the manicured areas to amenity trees with the potential to function as breeding bird habitat. Removal of 64m^2 of Candidate SWH for Bat Maternal Roosting and breeding bird habitat associated with FOD7-3. Indirect impacts to adjacent woodland habitat are related to noise and general disturbance/human activity.
Impact to Species at Risk	No change from existing.	Removal of 9m^2 of Candidate habitat for SAR bats. Rambo Creek functions as candidate habitat for American Eel. The riparian edge of the creek is largely avoided by this alternative; however, proximity to creek has the potential to result in indirect impacts to habitat (water quality, erosion, bank stability).	Encroachment into woodland represents removal of 64m^2 of Candidate habitat for SAR bats. Rambo Creek functions as candidate habitat for American Eel. The riparian edge of the creek is largely avoided by this alternative; however, proximity to creek has the potential to result in indirect impacts to habitat (water quality, erosion, bank stability).

6.0 MITIGATION RECOMMENDATIONS

The project team evaluated each of the alternatives for the WWPS and forcemain alignment against a wide variety of criteria (social, natural environment, technical, legal/jurisdictional, and economic) to determine the forcemain alignment utilizing Martha Street (Alternative C) and replacement of the WWPS (Alternative PS-4) as the most preferred. This preferred solution avoids the need for a forcemain crossing of Rambo Creek, minimizes impact to street/residential trees by utilizing the road rights of way of a highly urbanized street in the downtown core, and proposes a new WWPS to make use of the existing WWPS, paved driveway and manicured lawn. Impacts to natural environment associated with the preferred alternative relate to the proximity of the WWPS to Rambo Creek (fish habitat and candidate habitat for American Eel), and encroachment into the edge of the deciduous forest (candidate significant woodland, candidate significant wildlife habitat for Bat Maternity Roosting (including SAR bats), and breeding bird habitat). Limits of construction currently lie within 7m of the creek through an area with limited vegetative cover.

LGL has provided mitigation recommendations to protect natural heritage features. 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 sections and summarized in Table 9. With respect to forcemain construction, no operational impacts are identified as infrastructure will remain below grade and is not anticipated to impact natural heritage. Construction impacts in that case are considered temporary. For the replacement of the WWPS, both construction and operational impacts are anticipated. Where impacts cannot be fully mitigated, residual impacts are identified along with compensatory measures.

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-April and the end of July;
- Ensure that temporarily disturbed areas are adequately restored post-construction with native seed or nursery stock, and conditions are monitored for effectiveness of restoration and 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 detail design an arborist assessment is recommended to identify tree impacts and develop a tree preservation plan with appropriate protection measures for tree resources; and,
- Maintain existing drainage patterns to avoid changing character of vegetation communities and associated habitat functions.

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 following recommendations are provided below with respect to management of wildlife habitat during and post construction.

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

- Minimize habitat removal through reduction of access, staging, storage and grading footprints to the extent feasible, and strategic placement of these footprints within manicured or previously paved/disturbed areas;
- Stabilize exposed soils to prevent sediment entrainment, and restore disturbed areas with native and non-invasive vegetation after construction;
- Limit tree removal wherever possible, including dead-standing trees that may provide additional wildlife habitat, in order to maintain the existing dripline and amount of shelter/cover within the forested areas;
- 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 listed under the *Migratory Birds Convention Act* and conduct work outside of the sensitive breeding period for migratory birds (identified by Environment Canada as mid-April to mid-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 ensure the construction areas are delineated by fencing that can serve to exclude wildlife from entering the work areas to the extent possible;
- Any work that includes vegetation removal during the breeding bird window should not be completed unless a qualified avian biologist has conducted a nest search to determine that no birds are actively nesting within the area; 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 through drainage and overland transport. Mitigation recommendations include:

- 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.

Construction activities may impact water quantity or quality, including potential alterations in groundwater flow as a result of dewatering activities. Dewatering may cause reduction in baseflow where groundwater contributions are reduced, or conversely, where discharge back to surface features may cause temperature effects, alter flow regimes and result in erosion. The following mitigation recommendations are provided where dewatering is proposed:

- 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.

The potential for impacts to the habitat of this species, and fish habitat in general, can be greatly reduced by installing the forcemain under Rambo Creek using trenchless methods. The anticipated construction timing window for Rambo Creek is July 1- March 31, when work in or near a stream can be conducted with reduced risk to warmwater fish and fish habitat. Implementation of an Erosion and Sediment Control Plan, restoration of any vegetation disturbance, and stabilization of soils in proximity to the creek during construction will further mitigate potential impacts to water quality and fish habitat associated with Rambo Creek.

6.5 SPECIES AT RISK

The *Endangered Species Act*, 2007 (ESA, 2007) provides the framework for the protection of Ontario's species at risk (SAR). Given that candidate habitat has been identified for SAR (bats, American Eel), where any intrusion into the FOD7-3 habitat or works in the vicinity of Rambo Creek are proposed, further consultation with MNRF is recommended at detail design.

Table 9: Impacts, Mitigation and Monitoring Recommendations for Preferred Alternative.

Impact	Mitigation	Construction Monitoring	Residual Impacts Identified	Compensation Measures
Soil contamination by oils, gasoline, grease and other materials from construction equipment, materials storage and handling.	Ensure machinery is maintained free of fluid leaks. Locate site maintenance, vehicle washing and refuelling stations where contaminants are handled at least 30 m away from natural features and give consideration to locating these types of facilities outside of the floodplain. Vehicle refuelling and maintenance should be done on spill collection pads. Develop a spill response plan and train staff on associated procedures. Maintain emergency spill kits on site. Control soil contamination through best management practices. Dispose of any chemical waste materials generated from construction activities through authorized and approved off-site vendors.	Conduct daily inspections of construction equipment for leaks/spills. Implement contingency measures in the event of a spill. Contingency Measures: In the event of a spill, immediately stop all work until the spill is cleaned up; Notify MOECC's Spills Action Centre of any leaks or spills; Assess and remediate affected soils and water by using spill kit kept on site; and, Monitor daily to ensure proper clean-up is completed.	None identified.	None identified.
Vegetation Removal (excluding trees)	Re-vegetate and restore disturbed areas immediately after construction to return to pre-construction condition. Restoration plans for naturally vegetated areas (FOD7-3) should include the use of native plant species in order to improve vegetation quality of the area. Use fencing to demark construction zone to avoid accidental intrusion into natural features.	Provide construction monitoring on site by an independent environmental monitor to ensure that demarcation fencing is in place prior to construction and functioning effectively.	None identified.	None identified.

Impact	Mitigation	Construction Monitoring	Residual Impacts Identified	Compensation Measures
General Tree Removal (street/residential/ privately owned trees)	Complete a tree inventory (ISA Certified Arborist) and tree protection plan to comply with municipal and/or regional by-laws. Tree protection fencing should comply with municipal and regional by-laws.	Provide construction monitoring on site by an independent environmental monitor to ensure that tree protection fencing is in place prior to construction and functioning effectively.	None identified.	None identified.
Tree Removal/ Pruning within Candidate Significant Woodland (FOD7-3)	Minimize vegetation clearing along the forest edge to the extent possible through development of a tree preservation plan. Use fencing to demark construction zone and tree protection fencing to avoid accidental damage to trees. Care should be taken when removing and disposing of Ash trees. Consult the Canadian Food Inspection Agency and Conservation Halton for the appropriate protocol for their disposal. Stake dripline of FOD7-3 during detail design in consultation with Conservation Halton and refine design where possible to further avoid the feature. Where impacts are limited to tree pruning, works will be completed under the supervision of an Arborist or Forester and tree health monitored post-construction. Where tree removal is proposed, the Region's Tree Canopy Replacement Policy on Regionally Owned Lands will be implemented with subsequent post-construction monitoring.	Provide construction monitoring on site by an independent environmental monitor to ensure that demarcation fencing and tree protection fencing is in place prior to construction and functioning effectively.	Tree removal in the candidate significant woodland represents a relatively minor (0.8%) permanent loss of FOD7-3 along the feature's edge, in an area that currently has little to no understory.	Where edge restoration or tree replacement is required a monitoring plan will be developed in consultation with Region staff to include care and maintenance of plantings, and replacement of any dead stock. Compensation measures will follow the Region's Tree Canopy Replacement Policy on Regionally Owned Lands. Consideration to enhancing the understorey is recommended as part of compensation.

Impact	Mitigation	Construction Monitoring	Residual Impacts Identified	Compensation Measures
Accidental damage to adjacent vegetation communities and associated wildlife habitat due to unintentional vehicle intrusions.	Clearly delineate work area using erosion fencing, or similar barrier, to avoid accidental damage to candidate significant wildlife habitat. Damaged tree roots should be cut clean as soon as possible and exposed roots covered in approved topsoil. This work to be carried out under supervision of an Arborist or Forester.	Provide construction monitoring on site by an independent environmental monitor to ensure that demarcation fencing is in place and functioning effectively.	None identified.	None identified.
Disturbance to woodland functioning as habitat for local and resident wildlife (non-SWH function).	Perform vegetation clearing outside of the breeding bird season (generally mid-April to end of July) and outside of sensitive timing windows for Bat Maternity Roosting (as confirmed by MNRF). If clearing is to occur during the sensitive nesting periods, nest searches must be conducted by a qualified biologist prior to the start of construction activities.	Have an environmental monitor available in the event of animal-construction conflicts.	None identified.	None identified.
Alteration to surface water drainage.	Minimize changes in land contours and natural drainage; maintain timing and quantity of flows. Any grading of lands adjacent to natural features should match existing grades at the identified set-back, or buffer from the features. Avoid the movement of heavy machinery on areas with sensitive slopes.	Provide construction monitoring on site by an independent environmental monitor to monitor for impacts to drainage.	None identified.	None identified.

Impact	Mitigation	Construction Monitoring	Residual Impacts Identified	Compensation Measures
Impairment of water quality and/or physical damage to available habitat in the watercourse resulting from overland transport of sediment-laden runoff from the construction area.	Heavy equipment will avoid creek and its banks. Locate all construction storage, staging, and refuelling areas at least 30m away from all watercourses. Divert excess stormwater away from aquatic habitat and provide quality and quantity treatment. Intercept sediment laden drainage as close to the source as possible. Provide construction monitoring on site by an independent environmental monitor to ensure that erosion and sediment controls are working effectively. An erosion and sediment control contingency site specific plan should be developed that details the ESC plans and responsibilities to ensure that construction activities are adequately contained with erosion and sediment control (ESC) measures (such as erosion blankets, erosion control fencing, straw bales, siltation bags, etc.). The contractor should have supplemental ESC materials available on site that can be utilized should additional ESC measures be warranted. Maintain all sediment and erosion control measures until disturbed areas have been replanted and stabilized. Re-vegetate disturbed areas to pre-construction conditions as soon as possible after construction activities are complete.	Provide construction monitoring on site by an independent environmental monitor to ensure that ESC measures are in place and functioning effectively. Temporarily suspend work if excessive flow of sediment discharge occurs until additional mitigation measures are in place.	None identified.	None identified.

Impact	Mitigation	Construction Monitoring	Residual Impacts Identified	Compensation Measures
Alteration/loss of riparian vegetation resulting in stream bank instability and erosion.	It is recommended that the limits along this edge be refined to match the distance of the existing WWPS and paved access and/or achieve a setback of 10 m from the creek's top of bank where possible. Clearly delineate work area using erosion fencing, or similar barrier, to avoid accidental intrusion into riparian edges.	Provide construction monitoring on site by an independent environmental monitor to ensure that demarcation fencing and ESC measures are in place and functioning effectively.	None identified.	None identified.
Water contamination by oils, gasoline, grease and other materials from construction equipment, materials storage and handling.	Ensure machinery is maintained free of fluid leaks. Locate site maintenance, vehicle washing and refuelling stations where contaminants are handled should at least 30 m away from water bodies. Vehicle refuelling and maintenance should be done on spill collection pads. Store any stockpiled materials at least 30 m away from a water body to prevent deleterious substances from inadvertently discharging to the environment. Develop a spill response plan and train staff on associated procedures. Maintain emergency spill kits on site. Control soil/water contamination through best management practices. Dispose of any chemical waste materials generated from construction activities through authorized and approved off-site vendors.	Conduct daily inspections of construction equipment for leaks/spills. Implement contingency measures in the event of a spill. <u>Contingency Measures:</u> In the event of a spill, immediately stop all work until the spill is cleaned up. Notify MOECC's Spills Action Centre of any leaks or spills. Assess and remediate affected soils and water by using spill kit kept on site. Monitor daily to ensure proper clean-up is completed.	None identified.	None identified.
Sediment entrainment into adjacent areas functioning as habitat for local and resident wildlife (non-SWH function).	Stabilize exposed soils to prevent sediment entrainment, and restore disturbed areas with native and non-invasive vegetation after construction.	Periodic inspection and maintenance of erosion and sediment control fencing structures will be included as part of the Sediment and Erosion Control Plan for the site.	None identified.	None identified.

Impact	Mitigation	Construction Monitoring	Residual Impacts Identified	Compensation Measures
Entrapment of wildlife using the adjacent creek.	Ensure the construction area is delineated by fencing (such as silt fencing installed for erosion and sediment control) that can serve to exclude wildlife from entering the work area. 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.	Periodic inspection and maintenance of erosion and sediment control fencing structures recommended as part of the environmental monitoring to ensure protection of water quality in the nearby creek should include inspection of any additional fencing installed for this purpose.	None identified.	None identified.

7.0 CONCLUSION

This report is intended to represent natural heritage existing conditions within the Study Area. The geographical extent of the study area reflects the extent of alternative solutions for increased capacity at the WWPS. Environmental constraints have been summarized to guide the designs of alternative solutions. The background information and field investigation demonstrates that the areas of highest natural heritage sensitivity include Rambo Creek and the adjacent woodland community.

Given the nature of works related to improvements or construction of a new WWPS and associated twinning of the existing forcemain, the potential to impact the urban forest canopy including candidate significant woodlands, as well as private, park or City owned trees is identified. The woodland adjacent to the WWPS also represents candidate habitat for SAR bats. As well, the creek and shoreline of Lake Ontario are identified to provide habitat for aquatic SAR (American Eel). Accordingly, further consultation with MNRF would be necessary at detail design to ensure project compliance under the ESA. It is anticipated that the forcemain crossing of Rambo Creek will be constructed using trenchless methods and can adhere to the DFO's 'Measures to avoid causing harm to fish and fish habitat including aquatic species at risk'. This should be confirmed during detail design to ensure project compliance under the Fisheries Act.

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 Rambo Creek and associated riparian vegetation (primarily in the form of woodland and manicured spaces). 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.

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Appendix A
Agency Consultation

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

Ministère des
Richesses naturelles
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Ontario

January 4, 2017

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: Junction Street Wastewater Pumping Station EA

You have requested species at risk information for the above noted project within the Regional Municipality of Halton. As of the date of this letter, the Ministry of Natural Resources and Forestry (MNRF) has records of the following species within and adjacent to your study area:

- **Chimney Swift (Threatened)**, with general habitat protection
- **Lake Sturgeon (Threatened)**, with general habitat protection
- **Bank Swallow (Threatened),** with general habitat protection
- **American Eel (Endangered)**, with general habitat protection

Additionally, the species listed below have the potential to occur in your study and may require further assessment or field studies to determine presence:

- **Monarch (Special Concern)**
- **Barn Swallow (Threatened),** with general habitat protection
- **Little Brown Myotis (Endangered),** with general habitat protection
- **Northern Mytois (Endangered),** with general habitat protection
- **Eastern Small-footed Myotis (Endangered),** with general habitat protection
- **Tri-colored Bat (Endangered),** with general habitat protection

Additional natural heritage information including information on wetlands and Areas of Natural and Scientific Interest (ANSIs) can be obtained through Land Information Ontario (LIO).

These species may receive protection under the *Endangered Species Act, 2007* (ESA) and thus, an authorization from MNRF may be required if the work you are proposing could cause harm to these species or their habitats. If the Species at Risk in Ontario List is amended, additional species may be listed and protected under the ESA or the status and protection levels of currently listed species may change.

Please note that absence of information 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. If development or site alternation is proposed, surveys by a qualified professional may need to be undertaken in the future to confirm presence or absence of sensitive species or features.

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 me at 905-713-7732 or at aurora.mcallister@ontario.ca.

Sincerely,

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

Appendix B
Vascular Plant List

Appendix B: Vascular Plant List - Junction Street WWPS Study Area

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Halton NAI
	ACERACEAE	**MAPLE FAMILY**					
	Acer negundo	manitoba maple	G5	S5			C
*	*Acer platanoides*	norway maple	G?	SE5			I
	Acer saccharinum	silver maple	G5	S5			C
	Acer saccharum var. saccharum	sugar maple	G5T?	S5			C
	ANACARDIACEAE	**SUMAC FAMILY**					
	Rhus hirta	staghorn sumac	G5	S5			C
	ASTERACEAE	**ASTER FAMILY**					
*	*Arctium minus*	common burdock	G?T?	SE5			I
	Solidago canadensis	canada goldenrod	G5	S5			C
*	*Taraxacum officinale*	common dandelion	G5	SE5			I
	BRASSICACEAE	**MUSTARD FAMILY**					
*	*Alliaria petiolata*	garlic mustard	G5	SE5			I
*	*Hesperis matronalis*	dame's rocket	G4G5	SE5			I
	CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**					
*	*Lonicera tatarica*	tartarian honeysuckle	G?	SE5			I
	Viburnum rafinesquianum	downy arrow-wood	G5	S5			C
	LAMIACEAE	**MINT FAMILY**					
	Mentha arvensis	American wild mint	G5T5	S5			C
	MORACEAE	**MULBERRY FAMILY**					
*	*Morus alba*	white mulberry	G?	SE5			I
	OLEACEAE	**OLIVE FAMILY**					
	Fraxinus pennsylvanica	red ash	G5	S5			C
	PAPAVERACEAE	**POPPY FAMILY**					
*	*Chelidonium majus*	celandine	G?	SE5			I
	POACEAE	**GRASS FAMILY**					
*	*Dactylis glomerata*	orchard grass	G?	SE5			I
	POLYGONACEAE	**SMARTWEED FAMILY**					
*	*Fallopia japonica*	knotweed	G?	S?			
	RHAMNACEAE	**BUCKTHORN FAMILY**					
*	*Rhamnus cathartica*	common buckthorn	G?	SE5			I
	ROSACEAE	**ROSE FAMILY**					
	Prunus virginiana var. virginiana	choke cherry	G5T?	S5			C
	SALICACEAE	**WILLOW FAMILY**					
*	*Populus alba*	silver poplar	G5	SE5			I
	Populus deltoides	cottonwood					
	Salix discolor	pussy willow	G5	S5			C
	SIMAROUBACEAE	**AILANTHUS FAMILY**					
*	*Ailanthus altissima*	tree-of-heaven	G?	SE5			I
	ULMACEAE	**ELM FAMILY**					
	Ulmus americana	white elm	G5?	S5			C
	VITACEAE	**GRAPE FAMILY**					
	Vitis riparia	riverbank grape	G5	S5			C

1) G-Rank Global Rank

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

The most important factors considered in assigning global ranks are the total number of known, extant sites world-wide, and the degree to which they are potentially or actively threatened with destruction. Other criteria the number of known populations considered to be securely protected, the size of the various populations, and the ability of the taxon to persist at its known sites. The taxonomic distinctness of each taxon has also been considered. Hybrids, introduced species, and taxonomically dubious species, subspecies and varieties have not been included.

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

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

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

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

G5 = Very common; demonstrably secure under present conditions.

GH = Historic, no records in the past 20 years.

GU = Status uncertain, often because of low search effort or cryptic nature of the species; more data needed.

GX = Globally extinct. No recent records despite specific searches.

? = Denotes inexact numeric rank (i.e. G4?).

G" " = A "G" (or "T") followed by a blank space means that the NHIC has not yet obtained the Global Rank from The Nature Conservancy.

G? = Unranked, or, if following a ranking, rank tentatively assigned (e.g. G3?).

Q = Denotes that the taxonomic status of the species, subspecies, or variety is questionable.

T = Denotes that the rank applies to a subspecies or variety.

2) S-Rank Provincial Rank

Provincial (or Sub-national) ranks are used by the Ontario Ministry of Natural Resources Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for the global ranks, but consider only those factors within the political boundaries of Ontario. By comparing the global and provincial ranks, the status, rarity, and the urgency of conservation needs can be ascertained. The NHIC evaluates provincial ranks on a continual basis and produces updated list at least annually.

S1 = Critically imperiled in Ontario because of extreme rarity (often 5 or fewer occurrences) or because of some factor (s) such as very steep declines making it especially vulnerable to extirpation.

S2 = Imperiled in Ontario because of rarity due to very restricted range, very few populations (often 20 or fewer occurrences) steep declines or other factors making it very vulnerable to extirpation.

S3 = Vulnerable in Ontario due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 = Apparently secure - uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 = Secure - common, widespread, and abundant in Ontario.

SX = Presumed Extirpated - specie or community is believed to be extirpated from Ontario.

SNR = Unranked - conservation status in Ontario not yet assessed

SU = Unrankable - currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

SNA = Not applicable - a conservation status rank is not applicable because the species is not a suitable target for conservation activities.

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

3) COSEWIC Committee On The Status Of Endangered Wildlife in Canada

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species that are considered to be at risk in Canada.

Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)	A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.

4) COSSARO/OMNR Committee On The Status Of Species At Risk In Ontario/Ontario Ministry Of Natural Resources

The Committee on the Status of Species at Risk in Ontario (COSSARO)/Ontario Ministry of Natural Resources (OMNR) assess the provincial status of wild species that are considered to be at risk in Ontario.

Extinct (EXT)	A species that no longer exists anywhere.
Extirpated (EXP)	A species that no longer exist in the wild in Ontario but still occurs elsewhere.
Endangered (Regulated) (END-R)	A species facing imminent extinction or extirpation in Ontario which has been regulated under Ontario's *Endangered Species Act*.
Endangered (END)	A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's Endangered Species Act.
Threatened (THR)	A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.
Special Concern (SC)	A species with characteristics that make it sensitive to human activities or natural events.
Not at Risk (NAR)	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)	A species for which there is insufficient information for a provincial status recommendations.

5) Local Status - Halton Region

x Species status within the Halton Region was used to determine local vascular plant status for the study area.

Plant rarity is based on the number of occurrences within the physiographic region. The following species status was taken from Halton Natural Areas Inventory. Crins et al. 2006.

Appendix C
Photo Appendix

Project #TA8699
Junction St. WWPS

Photo Appendix

LGL LIMITED
environmental research associates

Photo 1: Rambo Creek downstream of James St.

Photo 2: Rambo Creek downstream of Martha Street bridge.

Photo 3: Example of tree with potential for wildlife use at the Waterfront Trail.

Photo 4: Streambed condition downstream of waterfront trail.

Photo 5: Rambo Creek facing southeast from Waterfront Trail.

Photo 6 Rambo Creek facing west from WWPS, narrow riparian, high density residential buildings along creek.

Project #TA8699
Junction St. WWPS

Photo Appendix

Photo 7: Rambo Creek (on right), facing upstream/west from Junction Street WWPS on Lakeshore Rd. Cluster of large DBH trees.

Photo 8: Rambo Creek (on left), facing downstream/east toward Junction Street WWPS on Lakeshore Rd.

Photo 9: Example of EAB activity at large DBH ash trees on the WWPS property.

Photo 10: Existing WWPS

Photo 11: Rambo Creek facing upstream/west from Lakeshore Rd. bridge, directly adjacent to WWPS.

Photo 12: Rambo Creek downstream/east of Lakeshore Rd. bridge.

Photo Appendix

Photo 13: Mouth of Rambo Creek at Lake Ontario, reinforced/hardened banks.

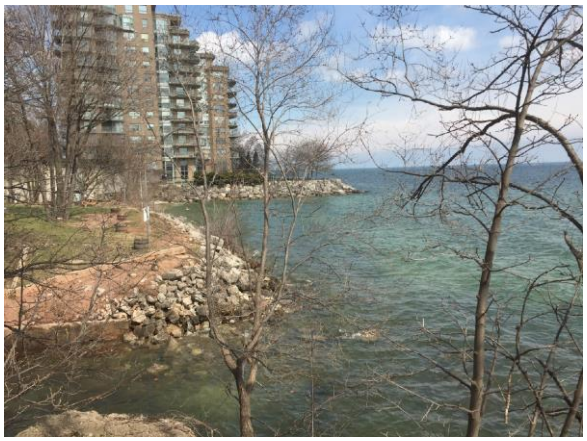

Photo 14: Reinforced banks along Lake Ontario shoreline facing northeast from mouth of Rambo Creek.

Photo 15: Reinforced banks along Lake Ontario shoreline facing southwest from mouth of Rambo Creek.