

Appendix **B-1**

Natural Heritage Report

NATURAL HERITAGE REPORT

SCARBOROUGH SUBWAY EXTENSION FROM
KENNEDY STATION TO SCARBOROUGH CENTRE

prepared for:

AECOM

prepared by:

LGL
LIMITED
environmental research associates

APRIL 2017

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KENNEDY STATION TO SCARBOROUGH CENTRE

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LGL PROJECT # TA8480

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1.0 Introduction

The Scarborough RT (Line 3) opened for service in 1985, providing rapid transit service in a fully exclusive right-of-way between Kennedy Station – the terminus of the Bloor-Danforth Subway (Line 2) - and McCowan Road, north of Ellesmere Road. After 30 years of continuous operation, Line 3's vehicles are reaching the end of their normal lifespan. There has been considerable study and discussion in recent years about the best way to address the problems on the aging Line 3 and support further economic development in Scarborough.

In 2006, the TTC evaluated options to upgrade or replace Line 3, completing the Scarborough Rapid Transit Strategic Plan. This plan was a comprehensive study of options for replacing the aging vehicles, upgrading the system's infrastructure as necessary, and potentially expanding the line. The conclusion of the study was to purchase larger, new generation Line 3 vehicles, and make the necessary physical modifications at stations to accommodate the new, longer vehicles.

In 2007, one year after the Scarborough Rapid Transit Strategic Plan – the Transit City Light Rail Plan was introduced. This plan called for the implementation of seven light rail lines throughout the City of Toronto. In that context, it was recommended that the Line 3 rehabilitation adopt light-rail technology in order to take advantage of the economies-of-scale cost savings which would result from the acquisition of a large fleet of light-rail vehicles to operate on the proposed City-wide network.

An Environmental Assessment (EA) for the replacement of Line 3 with light rail technology, including a complete rehabilitation/reconstruction of the existing elevated structure, was completed in 2010. The recommended route extended the line beyond its current terminus – at McCowan Station – to Centennial College and then north to Sheppard Avenue in the vicinity of Markham Road. The EA also addressed a second, future extension north of Sheppard Avenue, to the Malvern Town Centre.

In 2013, the TTC Board and subsequently, City Council, approved replacing Line 3 with an extension of the Line 2 Bloor-Danforth subway. Council's decision to extend Line 2 north and east into Scarborough was based on the following benefits:

- Higher speed;
- Most-reliable, highest-quality rapid transit service;
- Elimination of the transfer at Kennedy Station;
- Higher ridership; and,
- Consideration of alignments other than the existing Line 3 routing, which would then not require shutting down Line 3 during construction of a subway extension.

On January 28, 2016, the City's Executive Committee directed staff to continue studying an optimized transit network for Scarborough that would include:

- An extension of Line 2 (Bloor-Danforth Subway) express to Scarborough Centre;
- An extension of Line 5 (Eglinton Crosstown LRT) to the University of Toronto, Scarborough Campus;
- SmartTrack, including additional stations on the Stouffville corridor; and,
- A short-term rapid transit solution on the Sheppard East Corridor.

In this network, the primary purpose of the Scarborough Subway Extension is to improve service and access to Scarborough Centre, which is identified as a growth centre by the City and Province. Scarborough Centre

has been envisioned as a vibrant urban node in the City's Official Plans since 1968, and it is recognized that excellent transit service that increases accessibility of Scarborough Centre is a key component of realizing that vision.

In this network, SmartTrack functions as a north-south spine where bus passengers on busy east-west routes can transfer to the regional transit network (i.e. at Lawrence Avenue East, Ellesmere Road, Sheppard Avenue East, Finch Avenue East and Steeles Avenue East). Transfers between the Lawrence Avenue East and Ellesmere Road corridors and the regional transit system are currently made onto Line 3.

The Scarborough Subway Extension is being carried out using the Transit Project Assessment Process (TPAP), which satisfies the *Environmental Assessment Act* under Ontario Regulation 231/08, the Transit Project Regulation (Transit Projects and Metrolinx Undertakings). This Regulation was made in June 2008. AECOM was retained by the City of Toronto/TTC to lead the TPAP and LGL Limited was retained by AECOM to provide natural heritage services. This Natural Heritage Report presents the results of the natural heritage investigation carried out for the Scarborough Subway Extension from Kennedy Station to Scarborough Centre.

2.0 Study Area

The secondary study area for the section from Kennedy Station to the Scarborough Centre is bounded by the existing Scarborough RT corridor to the west and north, Eglinton Avenue to the south, and east of Markham Road to the east. For the section from the Scarborough Centre to Sheppard Avenue, the secondary study area is bounded by Brimley Road to the west, Progress Avenue to the south and east, and approximately one kilometer beyond Sheppard Avenue to the north. The secondary study area is presented in **Figure 1**.

The primary study area includes the footprint of the technically preferred alignment and stations and adjacent lands within 30 m. The primary study area (technically preferred alignment and stations) is presented in **Figures 2a to 2c**.

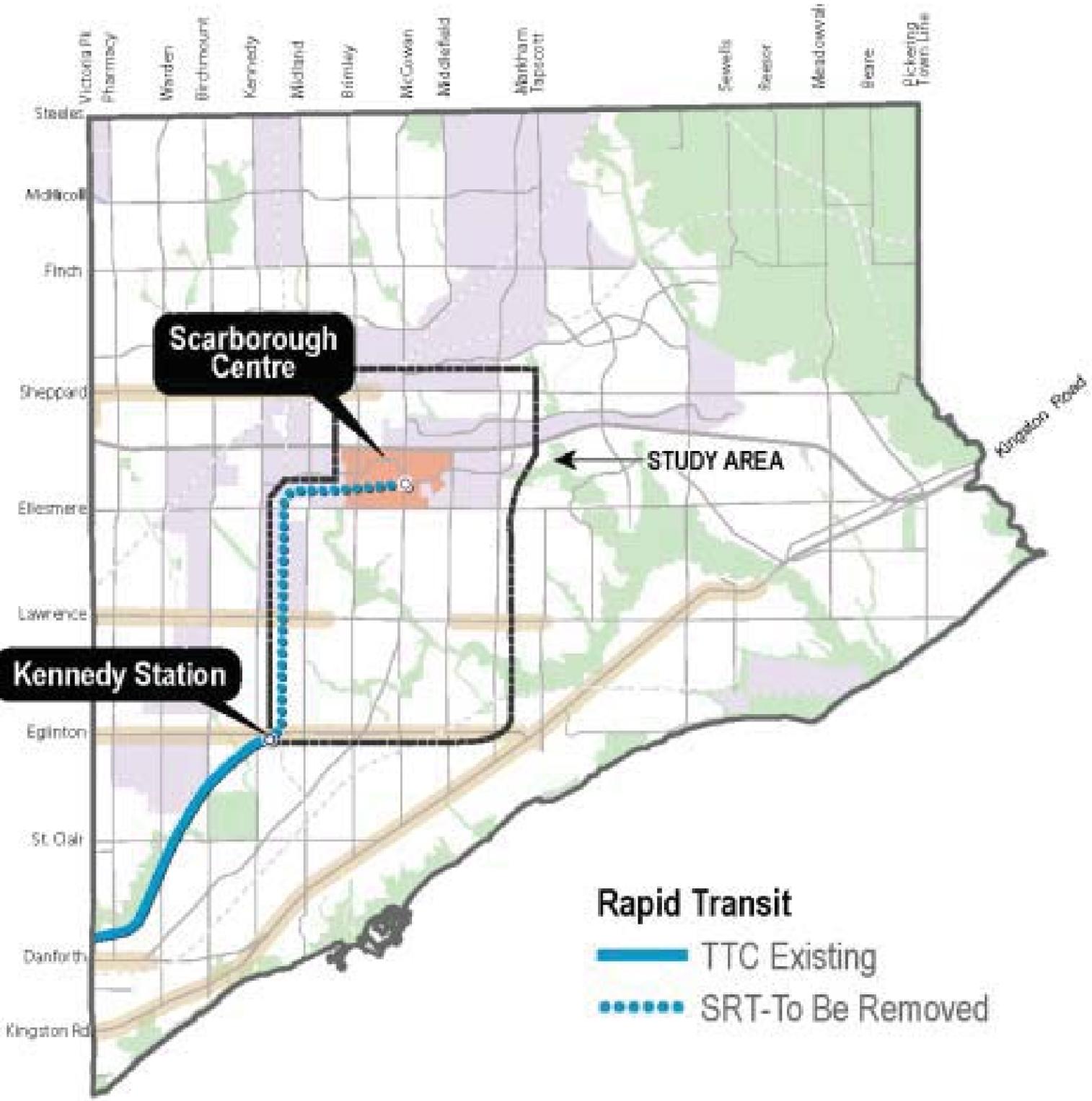
3.0 Data Collection

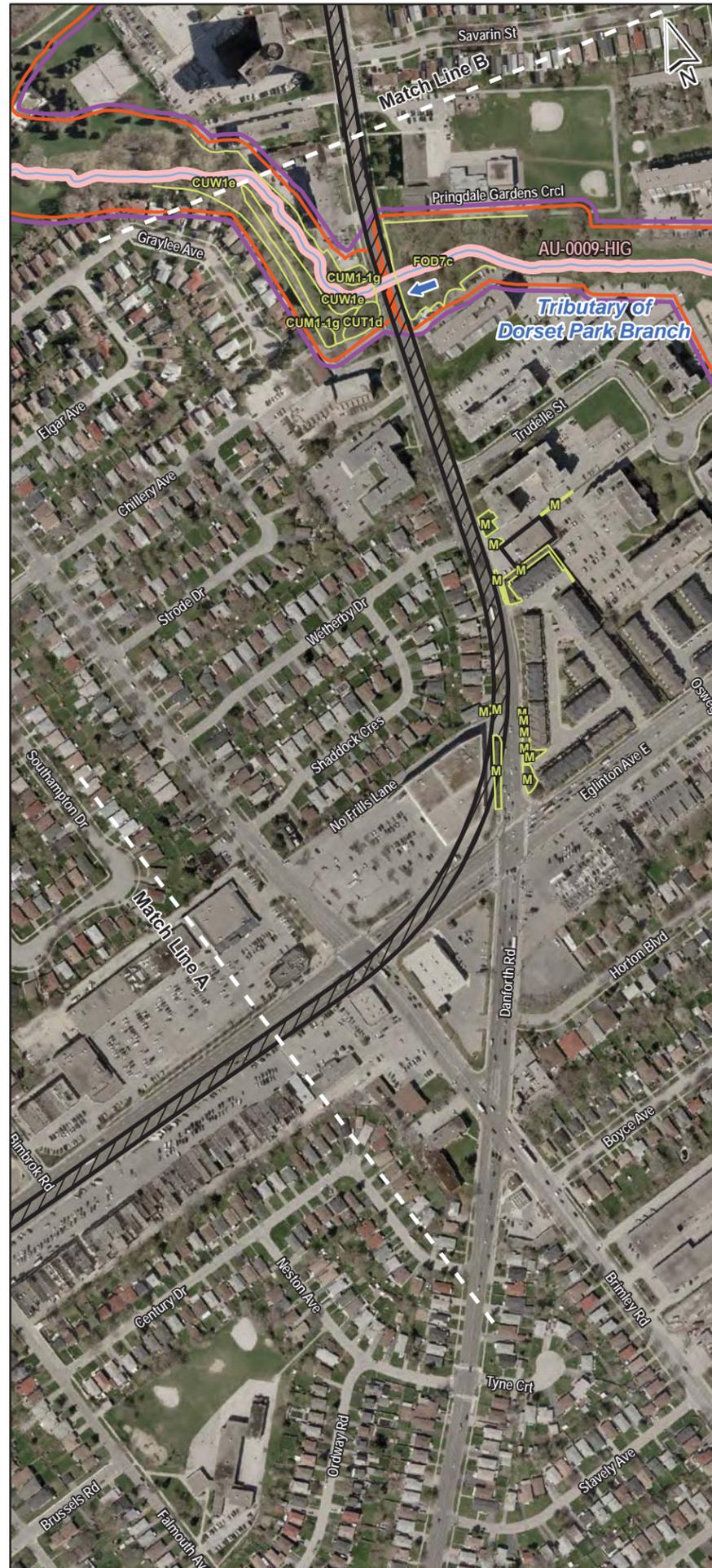
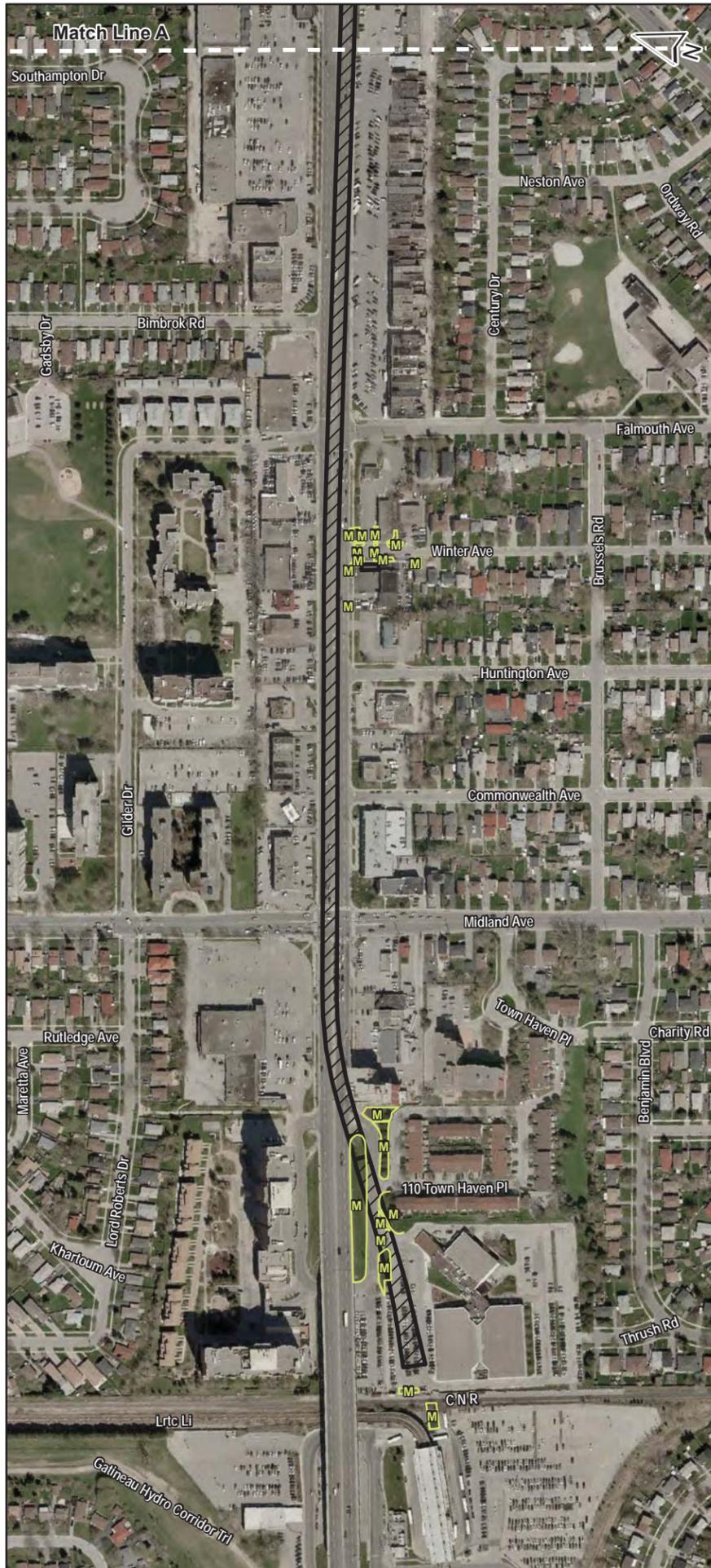
Natural heritage information was collected within the secondary study area using existing data sources. This data was then reviewed to identify gaps and deficiencies, and to scope the type, location and level of detail for field investigations. Information collected and reviewed within the secondary study area included:

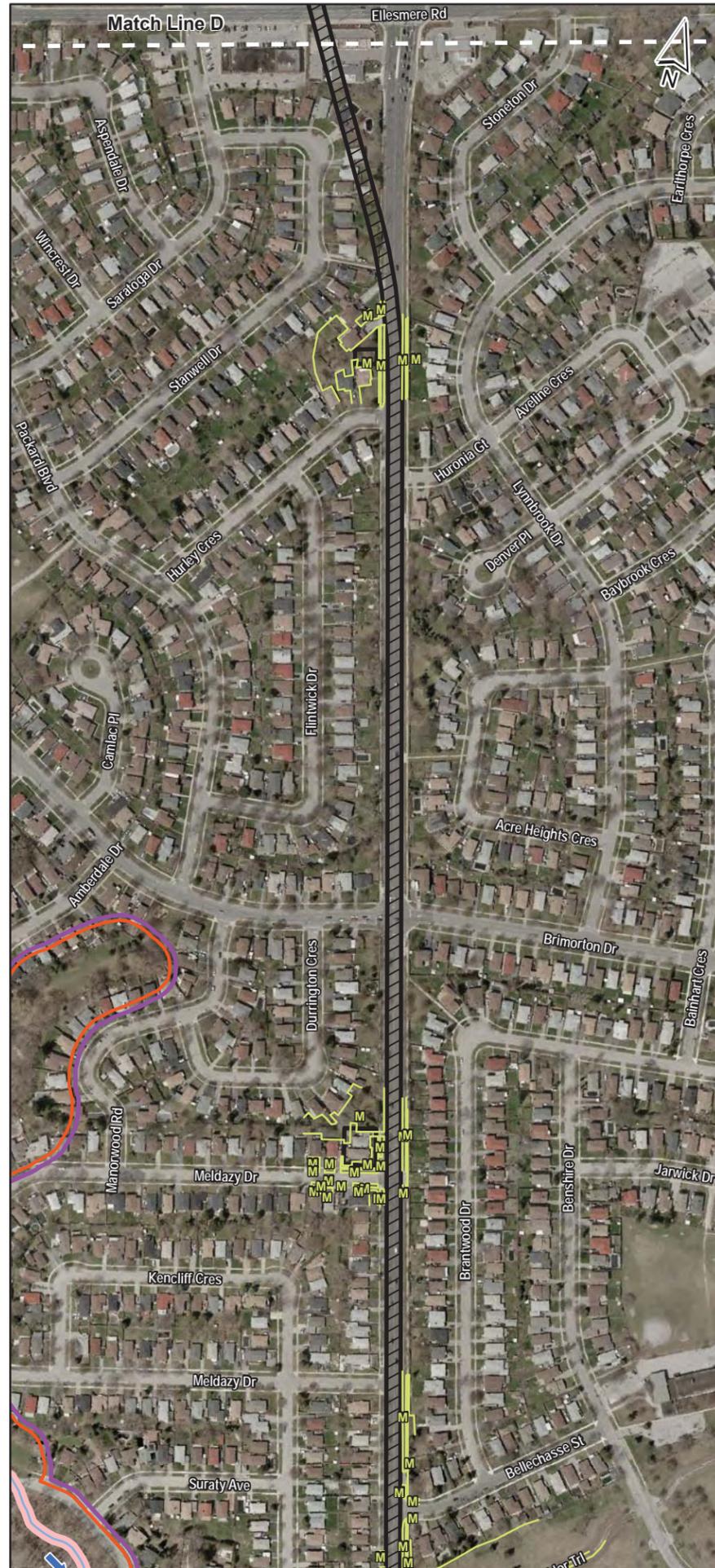
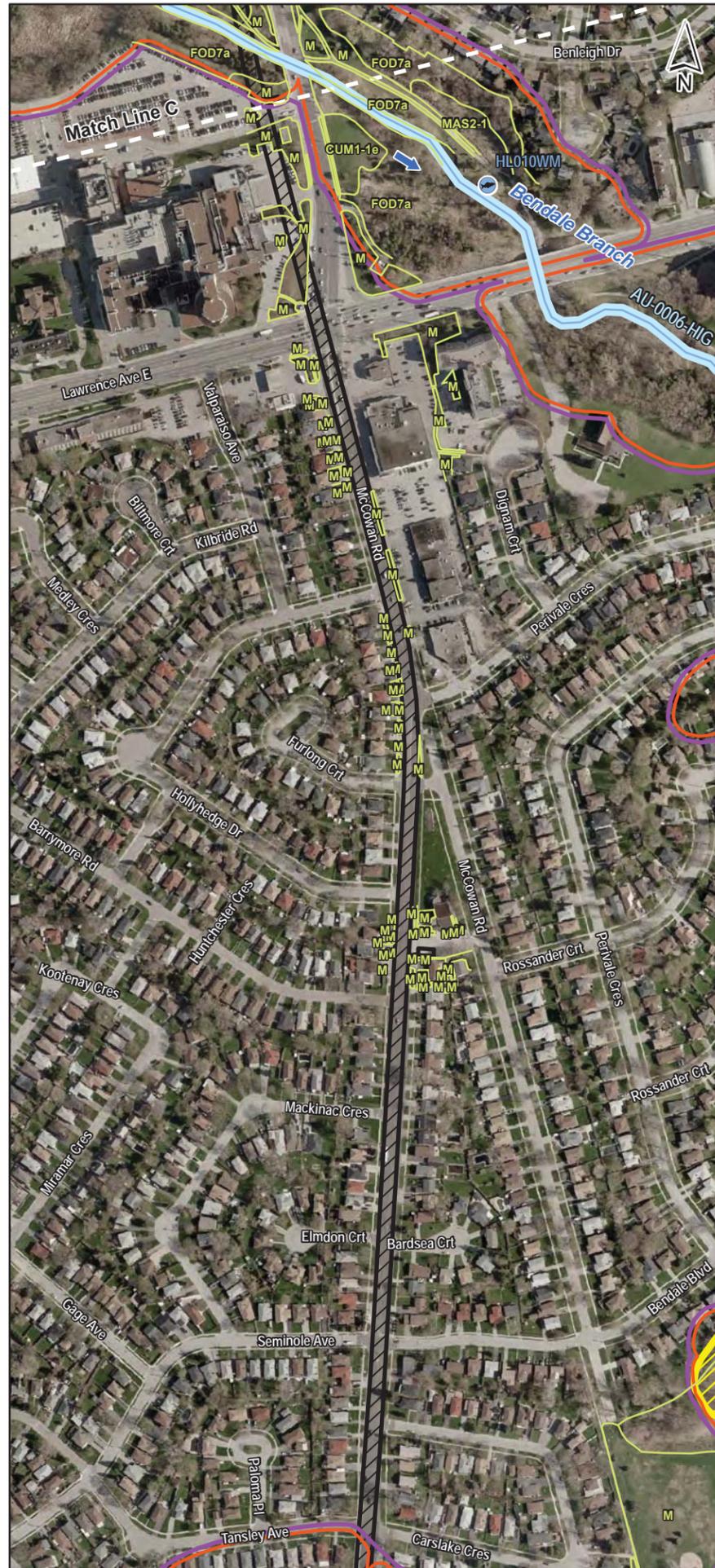
- Aerial photography;
- GIS data layers obtained from the Ontario Ministry of Natural Resources and Forestry (OMNRF), Lands Information Ontario (LIO), City of Toronto (City) and the Toronto and Region Conservation Authority (TRCA);
- The Natural Heritage Information Centre (NHIC) database;
- The Department of Fisheries and Oceans database;
- City of Toronto Official Plan;
- Background watershed and sub-watershed studies;
- E-mail correspondence with OMNRF and a meeting with TRCA; and,
- Mapping of physiography and soils.

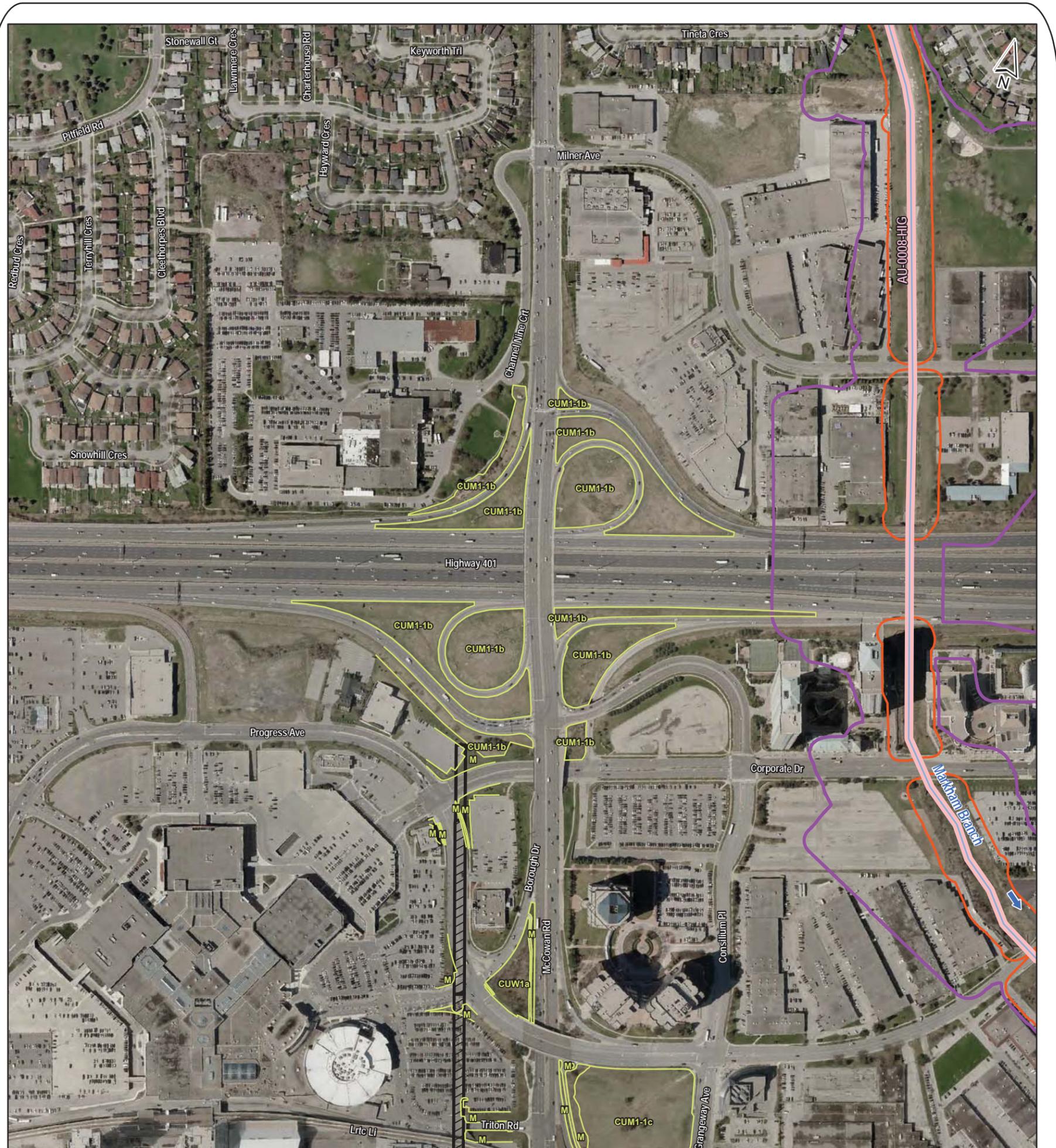
Once a technically preferred alignment and stations were identified, detailed, multi-season field investigations were undertaken in 2015 within the primary study area.

Scarborough Subway Extension from Kennedy Station to Scarborough Centre
Natural Heritage Report









AU-0008-HIG

CUM1-1b

CUM1-1b

CUM1-1b

CUM1-1b

CUM1-1b

CUW1a

CUM1-1c

Markham Branch



4.0 Existing Conditions

The description of existing conditions is based on the primary and secondary study areas.

4.1 Physiography and Soils

The secondary study area lies within the South Slope physiographic region which is characterized by Chapman and Putnam (1984) as a drumlinized area consisting of areas of thin (<1 m thick) aeolian sand deposits underlain by glacial deposits, mainly till. The slope is characterized by southerly trending drainage with sharply incised valleys and numerous gullies that have been cut by rapid streams.

Soils found in the secondary study area are primarily sandy silt to sand glacial till. Gravel and sand river deposits are located along Highland Creek and its tributaries. There are also several small pockets of sand and silty sand glacial lake deposits and organic deposits. A silt and clay glacial lake deposit is located south of Highway 401, east of Markham Road.

4.2 Vegetation and Vegetation Communities

The secondary study area is located in a transition zone between the Carolinian (deciduous forest) and Great Lakes-St. Lawrence (mixed forest) regions, but features species and communities more typical of the latter. The secondary study area is highly urbanized with most remaining terrestrial natural heritage features associated with valleylands and hydro corridors.

The geographical extent, composition, structure and function of vegetation communities were identified through air photo interpretation and field investigations carried out within the primary study area. Air photos were interpreted to determine the limits and characteristics of vegetation communities. Field investigations of the vegetation communities were conducted on June 12 and 17, July 21, and September 21, 2015. Field investigations were carried out to ground truth the boundaries of the vegetation communities and to conduct a botanical survey.

Vegetation communities were classified according to the Ecological Land Classification for Southern Ontario: First Approximation and Its Application (Lee et al. 1998). The communities were sampled using a plotless method for the purpose of determining general composition and structure of the vegetation. Plant species status was reviewed for Ontario (Oldham 2009), City of Toronto (Varga 2000), and the Toronto and Region Conservation Authority (2009). Vascular plant nomenclature follows Newmaster et al. (1998) with a few exceptions that have been updated to Newmaster et al. (2005).

4.2.1 Vegetation Communities

Vegetation communities located within the primary study area consist of a mixture of cultural and forest communities. Most of the lands have been cleared for urban development, with the exception of valleylands and isolated tableland woodlots. Vegetation communities have varying degrees of colonization and disturbance. Evidence of disturbance includes a high proportion of non-native plant species that are well adapted to persist in areas that are regularly disturbed including species that are adapted to high light conditions, limited soil moisture, and species that are tolerant of salt spray.

Anthropogenic/cultural communities within the primary study area consist of cultural meadow (CUM1-1), cultural woodland (CUW1), and cultural thicket (CUT1). The natural/semi-natural heritage features within the primary study area are restricted mostly to the valleylands associated with Highland Creek and its tributaries. Natural/semi-natural communities consist of lowland deciduous forest (FOD7). In addition, the

Frank Faubert Woods, a large remnant sugar maple dominant woodlot (FOD5), is located within the primary study area at Ellesmere Road and McCowan Road.

A total of six Ecological Land Classification (ELC) vegetation community types were identified by LGL Limited during botanical surveys. All of the vegetation communities identified within the primary study area are considered widespread and common in Ontario and are secure globally. These communities are delineated in **Figures 2a to 2c** and are described in **Table 1**.

There are several areas that are not identified by an ELC classification such as areas of manicured grass (M) which include lawns, gardens and planted trees. These are also shown in **Figures 2a to 2c**.

4.2.2 Flora

A total of 163 plant species have been recorded within the primary study area. One of these plants could only be identified to genus and is not included in the following calculations. Of the 162 plants identified to species, 78 (48%) plant species identified are native to Ontario and 84 (52%) plant species are considered introduced and non-native to Ontario. A list of vascular plants is presented in **Appendix A**.

4.2.3 Species at Risk

Two plant species that are regulated under the Ontario *Endangered Species Act* and the Canada *Species at Risk Act* were encountered during LGL's botanical investigation beyond areas affected by the subway extension. Butternut (*Juglans cinerea*) and Kentucky coffee tree (*Gymnocladus dioica*) are regulated as Endangered and Threatened under the Ontario *Endangered Species Act*, respectively. A total of five butternut trees and one Kentucky coffee tree were identified along the Bendale Branch of Highland Creek upstream of the subway extension. The location of the butternuts and Kentucky coffee tree are presented in **Figure 2b**. The Kentucky coffee tree is located at least 100 m from the subway alignment and it has been planted for amenity purposes. The butternuts are located at least 100 m from the subway alignment and appear to be naturally occurring. A review of the MNRF NHIC (2015) for plant species at risk within the primary study area was conducted. No historic records of plant species at risk were identified.

A total of nine TRCA plant species of concern (L1 to L3) were identified within the primary study area. **Table 2** presents the list of rare species and in which vegetation community each species was identified. A description of TRCA plant species rank is presented at the end of the plant species list in **Appendix C**.

TABLE 1.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Comments
TERRESTRIAL – NATURAL/SEMI-NATURAL			
FOD	DECIDUOUS FOREST		
FOD5	Dry-Fresh Sugar Maple Deciduous Forest	<p>Canopy: includes sugar maple (<i>Acer saccharum</i> ssp. <i>saccharum</i>), white elm (<i>Ulmus americana</i>), white ash (<i>Fraxinus americana</i>), and eastern white cedar (<i>Thuja occidentalis</i>).</p> <p>Understory: includes sugar maple, ironwood (<i>Ostrya virginiana</i>), choke cherry (<i>Prunus virginiana</i> var. <i>virginiana</i>), common buckthorn (<i>Rhamnus cathartica</i>), and alternate-leaved dogwood (<i>Cornus alternifolia</i>).</p> <p>Ground cover: includes may-apple (<i>Podophyllum peltatum</i>), garlic mustard (<i>Alliaria petiolata</i>), Virginia water-leaf (<i>Hydrophyllum virginianum</i>), and smooth gooseberry (<i>Ribes hirtellum</i>).</p>	<ul style="list-style-type: none"> • Tree cover > 60 % (FO). • Deciduous trees > 75 % of canopy cover (D). • Moderately dry to fresh moisture regime, sugar maple dominant (5).
FOD7	Fresh-Moist Lowland Deciduous Forest	<p>Canopy: includes black walnut (<i>Juglans nigra</i>), white willow (<i>Salix alba</i>), red oak (<i>Quercus rubra</i>), Manitoba maple (<i>Acer negundo</i>), and trembling aspen (<i>Populus tremuloides</i>).</p> <p>Understory: includes black walnut, choke cherry, riverbank grape (<i>Vitis riparia</i>), and staghorn sumac (<i>Rhus hirta</i>).</p> <p>Ground cover: includes yellowish enchanter's nightshade (<i>Circaea lutetiana</i> ssp. <i>canadensis</i>), yellow avens (<i>Geum aleppicum</i>), dame's rocket (<i>Hesperis matronalis</i>), and reed canary grass (<i>Phalaris arundinacea</i>).</p>	<ul style="list-style-type: none"> • Tree cover > 60 % (FO). • Deciduous trees > 75 % of canopy cover (D). • Middle to lower slopes, seepage areas and bottomlands topographic positions (7).
TERRESTRIAL-CULTURAL			
CUM	CULTURAL MEADOW		
CUM1-1	Dry-Moist Old Field Meadow	<p>Emergent Trees/Shrubs: includes staghorn sumac (<i>Rhus hirta</i>).</p> <p>Ground cover: includes white sweet-clover (<i>Melilotus alba</i>), tufted vetch (<i>Vicia cracca</i>), wild carrot (<i>Daucus carota</i>), awnless brome (<i>Bromus inermis</i> ssp. <i>inermis</i>), and chicory (<i>Cichorium intybus</i>).</p>	<ul style="list-style-type: none"> • Cultural communities (CU). • Tree cover and shrub cover < 25 % (M).

TABLE 1.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

			<ul style="list-style-type: none"> • This community can occur on a wide range of soil moisture regimes (Dry-Moist) (-1). • Pioneer community resulting from, or maintained by, anthropogenic-based influences.
CUT	CULTURAL THICKET		
CUT1	Mineral Thicket	Cultural	<p>Canopy: includes staghorn sumac, Siberian elm (<i>Ulmus pumila</i>), black walnut, white willow, and Manitoba maple.</p> <p>Ground cover: includes dame’s rocket, garlic mustard, black medick (<i>Medicago lupulina</i>), orchard grass (<i>Dactylis glomerata</i>), and swallow-wort (<i>Cynanchum rossicum</i>).</p> <ul style="list-style-type: none"> • Cultural community (CU). • Tree cover <25 %; shrub cover >25% (T). • This community can occur on a wide range of soil moisture regimes (Dry-Moist) (-1).
CUW	CULTURAL WOODLAND		
CUW1	Mineral Woodland	Cultural	<p>Canopy: includes black walnut, Colorado spruce (<i>Picea pungens</i>), eastern white cedar, and red ash (<i>Fraxinus pennsylvanica</i>).</p> <p>Understory: includes choke cherry, multiflora rose (<i>Rosa multiflora</i>), red ash, common buckthorn (<i>Rhamnus cathartica</i>).</p> <p>Groud cover: includes yellow avens, black medick, common plantain (<i>Plantago major</i>), and swallow-wort.</p> <ul style="list-style-type: none"> • Cultural communities (CU). • 25 % < tree cover < 35 % (W). • Mineral Soil (1).
OTHER			
M	Manicured and planted grasses and shrubs and/or trees		Areas where large expanses of grass/shrubs/trees are maintained and/or planted.

TABLE 2.
SUMMARY OF REGIONALLY RARE PLANT SPECIES

Scientific Name	Common Name	TRCA	Toronto	CUT1	CUW1a	CUW1b	CUW1c	FOD5a	FOD7a	FOD7b	FOD7c
<i>Equisetum pratense</i>	meadow horsetail	L3	R1						X	X	
<i>Picea glauca</i>	white spruce	L3					X		X		
<i>Caulophyllum thalictroides</i>	blue cohosh	L2						X			
<i>Ulmus rubra</i>	slippery elm	L2	R4	X		X				X	X
<i>Juglans cinerea</i>	butternut	L3				X					
<i>Quercus alba</i>	white oak	L2							X		
<i>Ribes hirtellum</i>	smooth gooseberry	L3	R2					X		X	
<i>Cornus rugosa</i>	round-leaved dogwood	L3			X						
<i>Trillium erectum</i>	purple trillium	L3						X			

4.3 Wildlife and Wildlife Habitat

This assessment of wildlife and wildlife habitat in the primary study area is based on field surveys, and a review of secondary data sources. Field surveys were undertaken on June 3, 4, 5, 18, and 20, 2015. These surveys focused on breeding birds, but observations of other wildlife species were also recorded. The primary study area is predominantly urban and suburban so surveys were concentrated in the few natural heritage features present.

The collection of secondary source data consisted of data requests to MNRF Aurora District (letter dated May 7, 2015) and TRCA, and reviews of the Ontario Breeding Bird Atlas (Cadman et al. 2007) and Atlas of the Mammals of Ontario (Dobbyn 1994). Species at risk occurrence records were obtained from the Natural Heritage Information Centre – Biodiversity Explorer (NHIC). The local (Toronto-area) status of wildlife was provided by Bird Studies Canada. Very little information regarding wildlife that was specific to the primary study area was found. Most secondary source data applied to a larger area, such as an atlas square, and could not be assigned specifically to the primary study area. A list of wildlife species recorded within the primary study area is presented in **Table 3**.

4.3.1 Wildlife Habitat

The primary study area has few natural heritage features that provide habitat for wildlife. Field surveys were limited to these pockets of wildlife habitat. These features occur in small patches scattered along the length of the subway extension, separated by stretches of urban, suburban, and industrial/commercial development. The quality of habitat for wildlife within the primary study area is generally low. Nevertheless, the streams and hydro corridor likely serve as travel routes for wildlife. Wildlife habitat generally consists of riparian habitats, fields (including a hydro transmission corridor), parks with manicured lawns and landscaped gardens, a small cattail marsh, and a small mature deciduous woodlot.

**TABLE 3.
WILDLIFE SPECIES DOCUMENTED WITHIN OR ADJACENT TO THE PRIMARY STUDY AREA**

Wildlife	Scientific Name	Common Name	SARA ¹	ESA ¹	Legal Status ¹	Local Status ²
Birds ³	<i>Branta canadensis</i>	Canada Goose			MBCA	
	<i>Anas platyrhynchos</i>	Mallard			MBCA	
	<i>Buteo jamaicensis</i>	Red-tailed Hawk			FWCA(P)	
	<i>Charadrius vociferus</i>	Killdeer			MBCA	
	<i>Columba livia</i>	Rock Pigeon				
	<i>Zenaida macroura</i>	Mourning Dove			MBCA	
	<i>Picoides pubescens</i>	Downy Woodpecker			MBCA	
	<i>Picoides villosus</i>	Hairy Woodpecker			MBCA	
	<i>Empidonax traillii</i>	Willow Flycatcher			MBCA	
	<i>Tyrannus tyrannus</i>	Eastern Kingbird			MBCA	BSC
	<i>Vireo gilvus</i>	Warbling Vireo			MBCA	
	<i>Vireo olivaceus</i>	Red-eyed Vireo			MBCA	
	<i>Corvus brachyrhynchos</i>	American Crow				
	<i>Hirundo rustica</i>	Barn Swallow	(Threatened)	Threatened	MBCA	BSC
	<i>Poecile atricapillus</i>	Black-capped Chickadee			MBCA	
	<i>Hylocichla mustelina</i>	Wood Thrush	(Threatened)	Special Concern	MBCA	
	<i>Turdus migratorius</i>	American Robin			MBCA	
	<i>Dumetella carolinensis</i>	Gray Catbird			MBCA	
	<i>Toxostoma rufum</i>	Brown Thrasher			MBCA	BSC
	<i>Sturnus vulgaris</i>	European Starling				
<i>Bombcilla cedrorum</i>	Cedar Waxwing			MBCA		
<i>Geothlypis trichas</i>	Common Yellowthroat			MBCA		
<i>Setophaga petechia</i>	Yellow Warbler			MBCA		
<i>Spizella passerina</i>	Chipping Sparrow			MBCA		
<i>Passerculus sandwichensis</i>	Savannah Sparrow			MBCA	BSC	

**TABLE 3.
WILDLIFE SPECIES DOCUMENTED WITHIN OR ADJACENT TO THE PRIMARY STUDY AREA**

Wildlife	Scientific Name	Common Name	SARA ¹	ESA ¹	Legal Status ¹	Local Status ²
	<i>Melospiza melodia</i>	Song Sparrow			MBCA	
	<i>Cardinalis cardinalis</i>	Northern Cardinal			MBCA	
	<i>Passerina cyanea</i>	Indigo Bunting			MBCA	
	<i>Agelaius phoeniceus</i>	Red-winged Blackbird				
	<i>Quiscalus quiscula</i>	Common Grackle				
	<i>Molothrus ater</i>	Brown-headed Cowbird				
	<i>Icterus galbula</i>	Baltimore Oriole			MBCA	
	<i>Haemorhous mexicanus</i>	House Finch			MBCA	
	<i>Spinus tristis</i>	American Goldfinch			MBCA	
	<i>Passer domesticus</i>	House Sparrow				
Mammals	<i>Sciurus carolinensis</i>	Gray Squirrel			FWCA(G)	
	<i>Procyon lotor</i>	Raccoon			FWCA(F)	

¹Federal and Provincial Legislation:

SARA: *Species at Risk Act* (Federal). (Barn Swallow and Wood Thrush are both ranked Threatened by COSEWIC, but are not listed under SARA.)

ESA: *Endangered Species Act* (Ontario)

MBCA: *Migratory Birds Convention Act* (Federal)

FWCA: *Fish and Wildlife Conservation Act* (Ontario)

Refer to **Appendix D** for further information on federal and provincial species ranks.

²Local Status:

BSC: Bird Studies Canada Species of Conservation Priority for Toronto.

³ The list of birds includes only species documented in the primary study area during the wildlife surveys; i.e., species that likely are nesting.

The subway extension crosses several tributaries of Highland Creek including a tributary of the Dorset Park Branch, the Dorset Park Branch and the Bendale Branch. Typical species encountered in these areas were Downy Woodpecker, Warbling Vireo, American Robin, Gray Catbird, Cedar Waxwing, Yellow Warbler, Northern Cardinal, Red-winged Blackbird, American Goldfinch, and Gray Squirrel. A brood of Mallards was seen along the Dorset Park Branch. No nest structures, other than those of Rock Pigeon, were detected in the culverts along the stream crossings (for example, no nests of swallows or Eastern Phoebe [*Sayornis phoebe*]). It is possible that some widespread species of amphibians and reptiles occur in the riparian patches, such as Common Gartersnake (*Thamnophis sirtalis*), Dekay's Brownsnake (*Storeria dekayi*), and American Toad (*Anaxyrus americanus*). Eastern Cottontail (*Sylvilagus floridanus*), Coyote (*Canis latrans*), Red Fox (*Vulpes vulpes*), American Mink (*Neovison vison*), Striped Skunk (*Mephitis mephitis*), Northern Raccoon (*Procyon lotor*), and White-tailed Deer (*Odocoileus virginianus*) may use the valleylands for foraging and as travel corridors.

Fields were in varying stages of succession, including those predominantly composed of grasses and herbs, and others had scattered coverage of woody shrubs and trees. Fewer wildlife species were recorded in these areas than along the riparian crossings. Eastern Kingbird, American Robin, European Starling, Yellow Warbler, Song Sparrow, and Red-winged Blackbirds were regularly seen in these habitats. The two sightings of Barn Swallows occurred in field habitats as well (see details below).

The mature deciduous woodlot at the northwest corner of McCowan Road and Ellesmere Road (Frank Faubert Woods) is likely too small in size to support woodland species on a sustaining basis. However, it might provide suitable foraging habitat on occasion for woodland species such as Pileated Woodpecker (*Dryocopus pileatus*), Eastern Wood-Pewee (*Contopus virens*), or Ovenbird (*Seiurus aurocapilla*). A Wood Thrush was recorded singing here during the field survey on the 4th of June, 2015 (but not during the second site visit on the 18th of June, 2015), along with a Hairy Woodpecker, whose behaviour suggested nesting in the woodlot.

4.3.2 Fauna

A total of 37 species of wildlife (birds and mammals) were recorded within the primary study area during field surveys (**Table 3**). No additional species were documented based on the review of secondary data sources. This is not considered a complete list of all species that nest, or otherwise occur in the primary study area. Some other species may occur, based on the habitat, and many other bird species will occur during migration and winter.

The 35 species of birds recorded were likely breeding adjacent to the primary study area, although few are expected to have been nesting specifically within the primary study area itself. Nonetheless, all species likely foraged within or adjacent to the primary study area. Almost all species observed are typical of the natural, suburban, and urban habitats of the Greater Toronto Area.

Two species of birds recorded during the fieldwork — Barn Swallow and Wood Thrush — are species of conservation concern. These are addressed below under species at risk. Four bird species identified during field investigations are designated as species of conservation priority by Bird Studies Canada (**Table 3**).

Only one mammal species (Gray Squirrel) was observed directly during the field surveys, while tracks along several stream banks provided evidence of the occurrence of Raccoon (**Table 3**). An old burrow may have been used by Woodchuck (*Marmota monax*). There were also some runways under a board in a field that may have been made by Meadow Voles (*Microtus pennsylvanicus*). It is likely that other species of mammals may be present within the primary study area, as noted above. The mammal species documented represent an assemblage that readily uses human-influenced landscapes.

No amphibians or reptiles were observed in the primary study area during field investigations. The habitats in the primary study area are not expected to provide suitable habitat for many species of herpetofauna; however, common and widespread species such as those listed above may occur.

4.3.3 Species at Risk

A search of the NHIC database for observations within the primary study area and its vicinity resulted in records for three species at risk (**Table 4**): Spiny Softshell (*Apalone spinifera*), Eastern Musk Turtle (*Sternotherus odoratus*), and Queensnake (*Regina septemvittata*). The records have been assigned to almost all 1-km squares in the primary study area, suggesting that the original location description was general and not site-specific. Also, the records are not recent and considered historic in nature; the Queensnake record dates from 1958, and the two turtle records from 1982. Based on these data limitations, and the current apparent lack of suitable habitat for these species along the subway extension, it is our opinion that these species no longer occur. The Spiny Softshell, Eastern Musk Turtle and Queensnake are listed/regulated as Threatened, Special Concern and Endangered, respectively.

The MNR has records of three wildlife species at risk: Eastern Meadowlark (*Sturnella magna*), Bank Swallow (*Riparia riparia*), and Blanding's Turtle (*Emydoidea blandingii*). None of these species were recorded during the field surveys. The habitats within and adjacent to the primary study area do not appear suitable for nesting Bank Swallow (no bluffs) or Blanding's Turtle. It is possible, however, that there may be suitable nesting habitat for Eastern Meadowlark. The most likely location is in an area of meadow restoration within the hydro transmission corridor, on the east side of McCowan Road north of Lawrence Avenue East.

Two species at risk, Barn Swallow and Wood Thrush were confirmed to be present within the primary study area during field investigations. The Barn Swallow is ranked Threatened by COSEWIC and it is regulated as Threatened under the ESA. Barn Swallow is not listed under SARA. Wood Thrush also is ranked Threatened by COSEWIC but not listed under SARA; it is a species of Special Concern in Ontario (not regulated under the ESA). Twenty-seven (27) of the 35 bird species recorded are protected under the *Migratory Birds Convention Act* (MBCA). Both recorded mammal species are protected under the *Fish and Wildlife Conservation Act* (FWCA).

Barn Swallow

Two sightings of Barn Swallows were made during the field surveys: (1) two individuals flying low back and forth (presumably foraging) over the field between Eglinton Avenue East and Trudelle Street, west of McCowan Road (3 June 2015); and (2) a flock of five low over the ground, also presumably foraging, in the hydro transmission corridor along the west side of McCowan Road north of Lawrence Avenue East (June 4, 2015). The evidence suggests that these Barn Swallows were not nesting in the immediate area of either sighting. No Barn Swallows were seen at either site, or elsewhere in the primary study area, during the second set of surveys (June 18 and 20, 2015). As well, no nests were found.

Wood Thrush

Wood Thrush was recorded once, on June 4, 2015, singing repeatedly in the small deciduous woodlot at the northwest corner of McCowan Road and Ellesmere Road (Frank Faubert Woods). It was not seen or heard there during the second visit on June 18, 2015. Because the bird was recorded only during one visit, and the habitat is marginal because of its small size and high level of disturbance, it is likely that Wood Thrush did not nest in the area.

TABLE 4.
SUMMARY OF WILDLIFE ELEMENT OCCURRENCE RECORDS

1 Km Square	Scientific Name	Common Name	1 Km Square Approximate Location	Date Last Observed
17PJ4048	<i>Apalone spinifera</i>	Spiny Softshell	Quadrant southwest of Highway 401 and McCowan Road	1982
17PJ4048	<i>Sternotherus odoratus</i>	Eastern Musk Turtle	Quadrant southwest of Highway 401 and McCowan Road	1982
17PJ4047	<i>Apalone spinifera</i>	Spiny Softshell	Quadrant southwest of Ellesmere Road and McCowan Road	1982
17PJ4047	<i>Sternotherus odoratus</i>	Eastern Musk Turtle	Quadrant southwest of Ellesmere Road and McCowan Road	1982
17PJ4147	<i>Apalone spinifera</i>	Spiny Softshell	Between McCowan Road and Bellamy Road N, north of Lawrence Avenue	1982
17PJ4147	<i>Sternotherus odoratus</i>	Eastern Musk Turtle	Between McCowan Road and Bellamy Road N, north of Lawrence Avenue	1982
17PJ4146	<i>Apalone spinifera</i>	Spiny Softshell	Quadrant northeast of McCowan Road and Lawrence Avenue	1982
17PJ4146	<i>Sternotherus odoratus</i>	Eastern Musk Turtle	Quadrant northeast of McCowan Road and Lawrence Avenue	1982
17PJ4145	<i>Apalone spinifera</i>	Spiny Softshell	East of McCowan Road and Danforth Avenue, north of Eglinton Avenue	1982
17PJ4145	<i>Sternotherus odoratus</i>	Eastern Musk Turtle	East of McCowan Road and Danforth Avenue, north of Eglinton Avenue	1982
17PJ4144	<i>Apalone spinifera</i>	Spiny Softshell	Quadrant encompassing Danforth Road, McCowan Road, and Eglinton Avenue	1982
17PJ4144	<i>Sternotherus odoratus</i>	Eastern Musk Turtle	Quadrant encompassing Danforth Road, McCowan Road, and Eglinton Avenue	1982
17PJ4044	<i>Apalone spinifera</i>	Spiny Softshell	Quadrant northwest of Brimley Road and Eglinton Avenue	1982
17PJ4044	<i>Sternotherus odoratus</i>	Eastern Musk Turtle	Quadrant northwest of Brimley Road and Eglinton Avenue	1982
17PJ4043	<i>Apalone spinifera</i>	Spiny Softshell	Quadrant around intersection of Eglinton Avenue and Midland Avenue	1982
17PJ4043	<i>Sternotherus odoratus</i>	Eastern Musk Turtle	Quadrant around intersection of Eglinton Avenue and Midland Avenue	1982
17PJ4043	<i>Regina septemvittata</i>	Queensnake	Quadrant around intersection of Eglinton Avenue and Midland Avenue	1958

4.4 Aquatic Ecosystems

The secondary study area lies within the Highland Creek watershed. The Dorset Park Branch and the Bendale Branch connect south of Lawrence Avenue to form West Highland Creek. The Markham Branch and the Malvern Branch connect south of Highway 401 to form East Highland Creek. West Highland Creek and East Highland Creek connect upstream of Morningside Avenue to form the Main Highland Creek.

The resident fish community of Highland Creek is typical of a degraded urban stream and supports a warmwater and a migratory coldwater fish community. The upper reaches of Highland Creek are generally highly degraded by channelization and enclosure, although the City of Toronto and TRCA are making extensive efforts to rehabilitate several of these tributaries. Brown Trout and Chinook Salmon are known to use reaches downstream of Morningside Avenue, and it is likely that the barrier (weir) observed upstream of Morningside Avenue, would limit this migratory species from accessing upstream areas.

Lands Information Ontario (LIO) indicates that West Highland Creek supports a coldwater thermal regime (based on water temperature) and East Highland Creek supports a warmwater thermal regime (based on fish species present). The Dorset Park Branch, Bendale Branch, Markham Branch and Malvern Branch all support warmwater fish communities.

Consultation with MNRF indicates that a warmwater timing window would apply for all Highland Creek reaches, defined as July 1 to March 31 (MNRF Aurora District, M. Heaton, pers. comm. Sept. 2014).

Aquatic field investigations were conducted by LGL Limited on June 17, 2015 at three watercourse crossings located along the proposed alignment for the Scarborough Subway Extension. The purpose of this survey was to provide a detailed characterization of aquatic habitat conditions at watercourse crossings. The aquatic habitat investigation generally followed procedures outlined in the Ministry of Transportation *Environmental Guide to Fish and Fish Habitat* (MTO 2009). Assessments were conducted within 50 m upstream and downstream of proposed watercourse crossings. No formal fish collections were performed, although observations of fish presence/absence were recorded. A photographic record of the watercourse crossings is provided in **Appendix B**.

Secondary source information review was undertaken to identify the fisheries resources and associated aquatic habitat within the primary study area. The secondary source review included TRCA fish collection records as well as Aquatic Resource Area information available via the Land Information Ontario (LIO) database.

Watercourses investigated included:

- Tributary of Dorset Park Branch of West Highland Creek, crossing under Danforth Road north of Eglinton Avenue;
- Dorset Park Branch of West Highland Creek, crossing under Danforth Road north of Providence Street; and,
- Bendale Branch of West Highland Creek, crossing under McCowan Road north of Lawrence Avenue.

4.4.1 Tributary of Dorset Park Branch

This short tributary measuring approximately 800 m long, originates upstream of Trudelle Street, within approximately 350 m upstream of Danforth Road. This watercourse crosses under Danforth Road via a closed bottom concrete culvert measuring approximately 2.75 m wide. This tributary appears channelized

and likely conveys mainly stormwater flows, based on its origin and evidence of supporting flashy flows on a regular basis. Wetted dimensions averaged 3 m wide at the time of survey and the high water mark measured up to 4.5 m wide. Water depths measured 8 cm deep in riffles, 25 cm deep in flats and up to 65 cm deep in pools. Morphology is comprised of mainly riffles and flats, with some pool habitat also present downstream of Danforth Road.

The Danforth Road culvert supported up to 23 cm deep water at the time of survey. A storm outfall (small csp) outlets to the channel from the concrete wingwalls of the Danforth Road culvert (**Photos 1, 2**). Upstream of Danforth Road, sand substrates are dominant along with some gravel and cobble substrates, and at the culvert inlet, a 4.5 m long concrete bottom exists (**Photo 2**). Riparian habitat accounts for approximately 60-70% cover, comprised of mostly Norway maple, ash and Siberian elm. Areas of organic and sand deposition (**Photo 3**) are prevalent in-stream as well as woody debris jams. Eroded 2 m high banks are present along outer bends, and undercut banks are present throughout the reach.

Downstream of Danforth Road, both banks are lined with boulders (**Photo 5**). Morphology is comprised of mostly flats and pools, with one riffle present within the assessment reach. The channel bottom appears to be bedrock for a portion of the reach, or dominated by boulders, with some gravel and sand substrates also present. Riparian cover constitutes approximately 70 percent by Norway maple, white elm, Manitoba maple and buckthorn. An invasive undergrowth of dog strangling vine is prevalent. Sand deposition as well as woody and anthropogenic debris is common in-stream. The stream corridor is forested, however cultural meadow vegetation exists within the south floodplain, downstream of Danforth Road.

No formal fish collection was undertaken at this location during the June 17, 2015 survey. No fish were observed during this survey and no TRCA fish station information was available for this tributary. The ARA summary for this tributary indicates that similar species as captured in the main Dorset Park Branch could be expected.

4.4.2 Dorset Park Branch of West Highland Creek

This tributary was assessed from both the McCowan Road easement (pedestrian bridge crossing) and within the vicinity of Danforth Road. Under Danforth Road (proposed subway crossing), flow is directed through a twin cell culvert measuring approximately 3.1 m wide by 2.3 m high (**Photo 8**). Concrete wingwalls are present, supporting one storm outfall on the downstream side. Upstream of Danforth Road, a large pool exists, with riffle habitat present in between. Wetted channel dimensions measured 4.5 to 5.2 m wide and 20 cm deep in the riffles and up to 70 cm deep in the pool. Bankfull dimensions were estimated to be 6.5 m wide. Substrates are comprised of boulder, cobble, sand and gravel, with sand dominant on the inside of bends and within the pool. Some in-stream vegetation (rushes) are present. The riparian community provided approximately 50 percent cover of crack willow, Manitoba maple and Norway maple. Herbaceous species included brome grass, garlic mustard, buttercup and goldenrod, which also provide some overhanging cover.

Downstream of Danforth Road, wetted dimensions measure 2 to 3 m wide and 18 to 32 cm deep in riffles. Two small pools exist near the culvert outlet, with a larger pool present at the downstream limit of the reach, measuring approximately 7.5 m wide and 75 cm deep. Bankfull dimensions within the downstream reach average approximately 4.5 to 5 m wide in riffles. Substrates are dominated by boulders and cobble, with sand deposition prominent within the pools. Gabion and placed boulders are present on the outside bends throughout the reach, with tolerant trees (i.e. Manitoba maple) growing in between the gabion (**Photos 10, 12**). This reach is fairly well forested with white elm, Norway maple, ash and Manitoba maple, in addition to invasive dog strangling vine in the understory.

No formal fish collection was undertaken at this location during the June 17, 2015 survey. TRCA fish station (2002-2011) information for West Highland Creek is found within **Table 5** which indicates that warmwater and coolwater baitfish species inhabit this stream reach.

4.4.3 Bendale Branch of West Highland Creek

The Bendale Branch crosses underneath McCowan Road in a northwesterly direction, through a bridge structure. The creek flows through Bendale Park upstream and downstream of McCowan Road, and a pedestrian trail parallels the watercourse, along the north side and under the bridge (**Photo 16**). A weir is present within 190 m upstream of McCowan Road. Underneath the McCowan Road bridge, the banks have been armoured with a mixture of gabion and asphalt along the north bank and an interconnected concrete block treatment along the south bank (**Photo 17**). The channel extends to the edge of these treatments and some of the asphalt has fallen in-stream (**Photo 16**). Riffle habitat is present underneath the bridge, measuring approximately 7 m wide and 22 cm deep at the time of survey (**Photo 17**). Substrates within the riffles are comprised mostly of cobble and gravel as well as some boulders.

The channel reach within 50 m upstream of the bridge is comprised of uniform morphology; mostly deep flat/shallow pool habitat, measuring between 7 to 8 m wide and 35 to 50 cm deep at the time of survey. Bankfull dimensions measure approximately 9 m wide and 90 cm deep. Substrates are comprised of mainly sand and cobble, with some boulders and gravel. A large sand bar is present in the upstream end of the reach, extending laterally over half the channel width. The stream is fairly open, with riparian cover measuring approximately 30 percent. A forested riparian community includes white elm, Manitoba maple, willow, spruce, Norway maple and silver maple. Three storm outfalls enter the channel upstream of the bridge, two from the south bank and one from the north bank. One of the outfall's armouring extends along the edges of the wetted channel (**Photo 15**).

Downstream of the bridge, two more storm outlets enter channel from both banks, and the south bank outfall armouring extends into the wetted channel. A riffle and pool is located in the vicinity of the bridge, with flats dominant downstream of this point. Channel dimensions average approximately 8 to 10 m wide (wetted) and up to 11 m bankfull wide. Water depth measured approximately 35 cm deep in flats, with deep (1m+) depths in pool. Substrates are composed mostly of sand (70 percent) as well as some gravel substrates present. Riparian cover is provided by crack willow, white elm, Manitoba maple, basswood, with an understory of grasses, goldenrod, avens, viburnum sp., young sumac and Manitoba maple. Overhead cover ranges between 30 to 60 percent in the downstream reach.

No formal fish collection was undertaken at this location during the June 17, 2015 survey. However, abundant numbers of baitfish, including Longnose Dace, were observed within riffle zones downstream as well as throughout the upstream reach. TRCA fish station (2002-2011) information for West Highland Creek is found within **Table 5**. Warmwater and coolwater baitfish species inhabit this stream reach.

4.5 Designated Natural Areas

Designated natural areas include areas that have been identified for protection by the Ontario Ministry of Natural Resources and Forestry (OMNRF), Toronto and Region Conservation Authority (TRCA) and the City of Toronto. The location of designated natural areas is presented in **Figure 2a to 2c**.

4.5.1 Areas of Natural and Scientific Interest (ANSIs)

There are no ANSIs identified by OMNRF located along the Scarborough Subway Extension or within the broader study area.

TABLE 5. FISH SPECIES DOCUMENTED IN THE SECONDARY STUDY AREA

Species Name	Thermal Regime ¹	Tolerance ¹	HL009WM Dorset Park Branch	HL010WM Bendale Branch	ARA ² Fish Species Summary (West Highland Creek- DS of hydro corridor) AU-0006-HIG	ARA Fish Species Summary (Dorset Park Branch) AU-009-HIG
Blacknose Dace <i>(Rhinichthys obtusus)</i>	coolwater	intermediate	x	x	x	x
Bluntnose Minnow <i>(Pimephales notatus)</i>	warmwater	intermediate				x
Common Carp <i>(Cyprinus carpio)</i>	warmwater	tolerant				
Common Shiner <i>(Luxilus cornutus)</i>	coolwater	intermediate but tolerant of turbidity				x
Creek Chub <i>(Semotilus atromaculatus)</i>	coolwater	intermediate	x	x	x	x
Goldfish <i>(Carassius auratus)</i>	warmwater	tolerant				x
Fathead Minnow <i>(Pimephales promelas)</i>	warmwater	tolerant, but moderately tolerant of turbidity	x	x	x	x
Longnose Dace <i>(Rhinichthys cataractae)</i>	coolwater	intermediate	x	x	x	x
Rainbow Trout <i>(Oncorhynchus mykiss)</i>	coldwater	intolerant				x
White Sucker <i>(Catostomus commersonii)</i>	coolwater	tolerant but moderately tolerant of turbidity	x	x	x	x

Notes:

Bolded records (ARA summary) are not included in TRCA species list for watercourse

¹ Thermal Regime and Tolerance information referenced in Ontario Freshwater Fisheries Database, <http://www.ontariofishes.ca/home.htm>

² LIO database, accessed in 2014.

4.5.2 Provincially Significant Wetlands (PSWs)

There are no PSWs identified by OMNRF located along the Scarborough Subway Extension or within the broader study area.

4.5.3 Environmentally Sensitive Areas (ESAs)

Two ESAs identified by the City of Toronto are located within the broader study area - ESA #36 Hague Park and ESA #39 Highland Forest/Morningside Park and Highland Creek - West.

Hague Park is located south of Lawrence Avenue East between McCowan Road and Bellamy Road North. Hague Park is comprised of 10.1 ha located along the Dorset Park Branch upstream of its confluence with the Bendale Branch of West Highland Creek. The area is characterized by mixed forest on valley slopes and lowland forest and swamp on the floodplain (North-South et al. 2012). Four significant flora species have been recorded and seepage areas support a diversity of wetland communities.

Highland Forest/Morningside Park and Highland Creek – West is located west of Morningside Avenue between Lawrence Avenue and Ellesmere Road. The ESA is comprised of 242 ha located upstream and downstream of the confluence of the West Branch and East Branch of Highland Creek. The area is characterised by steep valley walls with high quality deciduous and mixed forested slopes, coniferous forest and bottomlands, younger forest, tamarack swamp, meadow marsh, swamp thicket and shallow marsh communities (North-South et al. 2012). The area is documented to provide habitat for 54 significant flora and 4 significant fauna species, as well as 22 significant vegetation communities. Wetlands within the ESA are identified to provide a water storage function.

4.5.4 City of Toronto Official Plan

A review of the City of Toronto Official Plan (2010) indicates that most of the valleylands associated with Highland Creek and its tributaries form a component of the Natural Heritage System of the City of Toronto.

4.5.5 City of Toronto Ravine and Natural Feature Protection By-law

The valleylands associated with Highland Creek and its tributaries are identified as protected areas under the City of Toronto's Ravine and Natural Feature Protection By-law. A tree removal permit will be required from City of Toronto Urban Forestry for any tree removals undertaken within the Ravine and Natural Feature Protection By-law protected area. The protected area is identified in **Figure 2a to 2c**.

4.5.6 Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario Regulation 166/06)

The valleylands associated with Highland Creek and its tributaries are regulated areas under Ontario Regulation 166/06. A permit will be required from TRCA for development or site alteration within the regulated areas. The regulated area is identified in **Figure 2a to 2c**.

5.0 Project Description

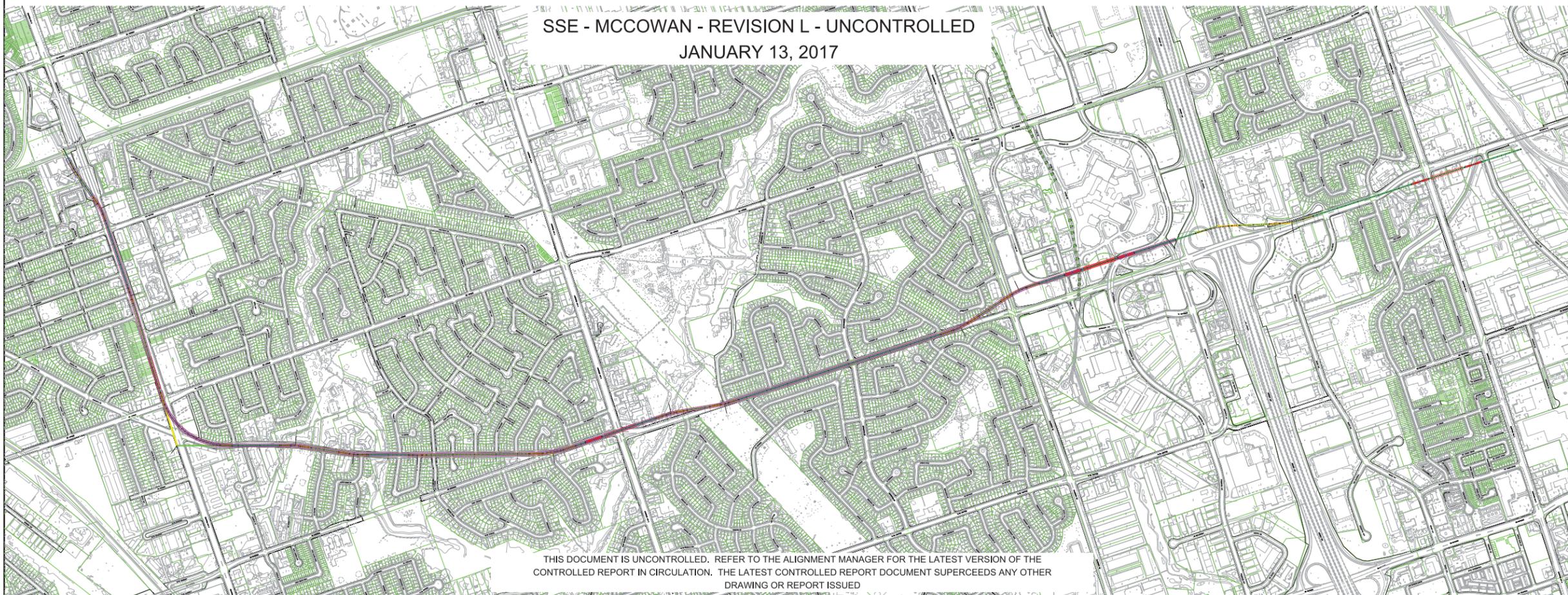
The Scarborough Subway Extension will extend the Bloor-Danforth Subway (Line 2) from Kennedy Road to Scarborough Centre, with stations located at Kennedy Road and Scarborough Centre. The subway extension will travel east from the Kennedy Station along Eglinton Avenue to Danforth Road and then swing north on Danforth Road to McCowan Road, then continue north on McCowan Road to the Scarborough Centre Station. The conceptual design of the subway extension is presented in **Figure 3**.

The Scarborough Subway Extension will be built using the tunneling construction method along much of its length. A single, large bore earth pressure balanced tunnel boring machine (TBM) will be launched at one station and extracted at the other station. The use of an earth pressure balanced TBM reduces the requirement for dewatering within the tunnel. The tunnel will be reinforced with a concrete liner as the TBM advances.

The cut and cover construction method will be used at the Kennedy and Scarborough Centre stations. Dewatering may be required during cut and cover construction depending on soil and groundwater conditions, including the height of the water table. Cut and cover segments will be reinforced with a concrete floor, walls and ceiling following excavation.

Along the tunneled segment, it is predicted that there will be no negative effects on natural heritage features since no development or site alteration (activities such as clearing, grubbing, grading, excavating, filling, construction, etc.) or dewatering (removal of water from excavations or trenches to stabilize soils or lower the groundwater table) will occur. At cut and cover locations, it is predicted that there may be negative effects on natural heritage features as a result of site alteration and dewatering activities. For this reason, the impact assessment focusses on areas where cut and cover construction is required.

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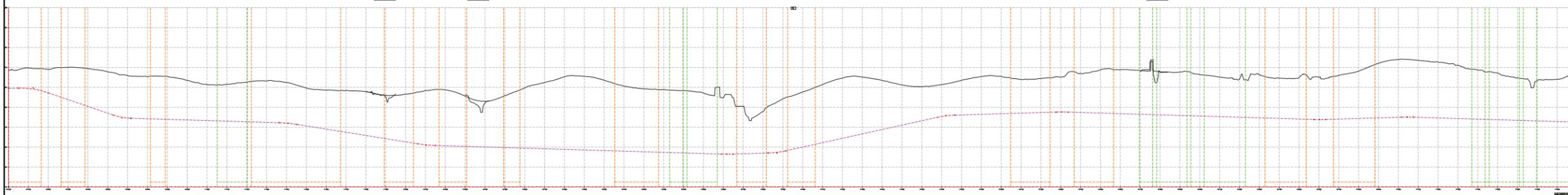
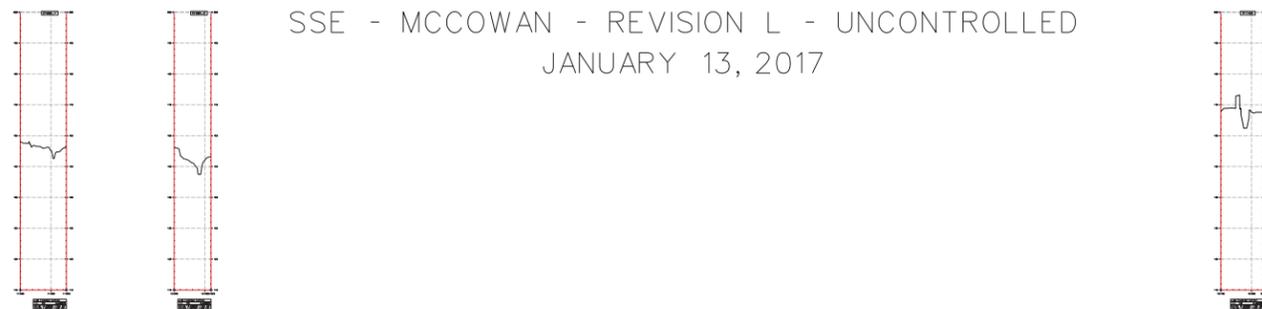
SCARBOROUGH SUBWAY EXTENSION
CONCEPTUAL DESIGN
PLAN VIEW



Project: TA8480	Figure: 3a
Date: April, 2017	Prepared By: MWF
	Checked By: GNK

LEGEND

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LEGEND

- VERTICAL TANGENT
- VERTICAL CURVE
- "AVOID VERTICAL CURVE" ZONES (TIGHT HORIZONTAL CURVES/STATIONS/ETC)
- NO VERTICAL CURVE ZONE (CROSSOVERS AND STATION PLATFORM)

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SCARBOROUGH SUBWAY EXTENSION
 CONCEPTUAL DESIGN
 PROFILE VIEW



Project: TA8480	Figure: 3b
Date: April, 2017	Prepared By: MWF
	Checked By: GNK

6.0 Impact Assessment and Mitigation

6.1 Soils

Soils found along the subway extension consist of a mixture of sandy silt to sand glacial till. Excavation activities associated with the construction of station boxes, TBM launch and extraction sites, emergency exit buildings, etc. have the potential to expose soils to the elements. As a result, erosion may occur within the work zone and sediment may be transported to adjacent property, watercourses or catchbasins. Erosion and sedimentation control measures will be implemented prior to construction, maintained during construction and removed post-construction. These control measures will include:

- limiting the geographical extent and duration that soils are exposed to the elements;
- implementing erosion and sedimentation control measures in accordance with Ontario Provincial Standard Specification (OPSS) 805 Construction Specification for Temporary Erosion and Sediment Control Measures and the Erosion and Sediment Control Guideline for Urban Construction (Greater Golden Horseshoe Area Conservation Authorities 2006); and,
- managing surface water outside of work areas to prevent water from coming into contact with exposed soils.

Monitoring of these erosion and sedimentation control measures will be carried out in accordance with the Erosion and Sediment Control Inspection Guide (Greater Golden Horseshoe Area Conservation Authorities 2008). These best management practices will greatly reduce/minimize the potential for erosion of soils and sedimentation of adjacent property, watercourses and catchbasins.

6.2 Vegetation and Vegetation Communities

Excavation activities associated with the construction of station boxes, TBM launch and extraction sites, emergency exit buildings, etc. have the potential to displace or disturb vegetation and vegetation communities. Effects on vegetation related to excavation activities may include:

- displacement of vegetation and vegetation communities;
- disturbance to vegetation through edge effects (windthrow, sunscald, changes in light conditions and invasion by exotic species) and drainage modifications; and,
- displacement of rare, threatened or endangered vegetation or significant vegetation communities.

Over time these disturbances may alter community structure, composition and function. Effects are most prominent in areas that have not been previously disturbed.

6.2.1 Displacement of Vegetation and Vegetation Communities

No vegetation communities will be cleared to develop the Scarborough Subway Extension. All areas to be excavated for subway facilities have been previously developed or consist of manicured lawns and streetscapes.

6.2.2 Disturbance to Vegetation and Vegetation Communities

One deciduous forest (FOD7a) is located approximately 15 m from Emergency Exit Building 5. The deciduous forest is located in the Bendale Creek valleyland north of Lawrence Avenue and south of Bendale

Creek. Based on the distance of the deciduous forest from Emergency Exit Building 5, no negative effect on the deciduous forest will occur.

The subway extension will be tunneled under the easternmost woodlot associated with Frank Faubert Woods at the northwest corner of Ellesmere Road and McCowan Road (FOD5a) and adjacent to the woodlot north of Borough Drive (FOD5b). The subway tunnel will be approximately 15 m below ground level at this location, a sufficient depth to avoid all root structures as well as the surface drainage regime. The subway tunnels will also be lined, so there will be no long-term loss of groundwater to the tunnels or migration laterally along the tunnel. The tunnel boring machine will advance at a rate of approximately 15 m per day. As a result, tunneling will only occur in the vicinity of the woodlots for several weeks.

TTC proposes to use earth pressure balanced (EPB) tunneling technology so that the face of the tunnel boring machine (TBM) remains pressurized at all times and no dewatering will be required. Given the depth of the tunnel, the short duration of tunneling activities in the vicinity of the woodlots and the use of an earth pressure balanced TBM, potential effects on the woodlots as a result of tunneling activities are considered negligible.

6.2.3 Displacement of Rare, Threatened or Endangered Vegetation and Vegetation Communities

All of the vegetation communities identified along the subway extension are considered to be widespread and common in Ontario and secure globally. As noted in **Section 4.2.1.3**, two tree species regulated by the Ontario *Endangered Species at Risk* were identified within the primary study area. No impacts are anticipated to the butternuts and Kentucky coffee tree identified during LGL's botanical investigation since these trees are located at least 100 m from the tunneled segment of the subway extension. In addition, no plant species that are provincially ranked as "critically imperiled" to "vulnerable" (S1 to S3) were observed along the Scarborough Subway Extension. As a result, there will be no impacts on rare, threatened or endangered vegetation and vegetation communities.

As noted in **Section 4.2.3**, a total of nine TRCA species of concern were identified along the Scarborough Subway Extension. None of these species of concern are located within or adjacent to areas of excavation activities.

6.2.4 Ornamental Trees and Shrubs

During detail design a tree inventory will be undertaken to document impacts to trees within excavation areas in accordance with the City of Toronto Urban Forestry requirements. In addition, a tree preservation plan will be prepared to document tree protection and mitigation measures. Tree protection measures will follow the City of Toronto *Tree Protection Policy and Specifications for Construction Near Trees Guidelines* (2013) and will include:

- Creation of a tree protection zone delineated by tree protection fencing in accordance with the City of Toronto specifications;
- Any area inside the TPZ must be left undisturbed (including overhead), no altering of grade, excavating, trenching, scraping, dumping or disturbance of any kind shall occur within this zone;
- If extensive soil compaction has occurred, the contractor will be responsible for aerating the area once construction is completed and fertilizing in the following year;
- Construction materials, equipment, soil, construction waste or debris are not to be stored within the TPZ or dripline of the trees identified for protection;

- There should be no movement or parking of vehicles, placement of equipment or pedestrian traffic within the TPZ; and,
- If the TPZ needs to be reduced to facilitate construction access, the tree protection barrier must be maintained at a lesser distance and the exposed TPZ protected with plywood and wood chips.

6.3 Wildlife and Wildlife Habitat

Excavation activities associated with the construction of station boxes, TBM launch and extraction sites, emergency exit buildings, etc. have the potential to displace or disturb wildlife and wildlife habitat. Effects on wildlife related to these improvements may include:

- displacement of wildlife and wildlife habitat;
- barrier effects on wildlife passage;
- wildlife/vehicle conflicts;
- disturbance to wildlife from noise, light and visual intrusion;
- potential impacts to migratory birds; and,
- displacement of rare, threatened or endangered wildlife and significant wildlife habitat.

6.3.1 Displacement of Wildlife and Wildlife Habitat

No wildlife habitat will be removed to develop the Scarborough Subway Extension. All areas to be excavated for subway facilities have been previously developed or consist of manicured lawns and streetscapes, which provide limited habitat capability.

6.3.2 Barrier Effects on Wildlife Passage

No new barriers to wildlife passage will be created as a result of development of the Scarborough Subway Extension.

6.3.3 Wildlife/Vehicle Conflicts

No wildlife/vehicle conflicts are anticipated as a result of development of the Scarborough Subway Extension.

6.3.4 Disturbance to Wildlife from Noise, Light and Visual Intrusion

Noise, light and visual intrusion may alter wildlife activities and patterns. In residential/urban, commercial, industrial and institutional settings, such as the primary study area, wildlife has become acclimatized to the surrounding conditions and only those fauna that are tolerant of human activities remain. Given that wildlife are acclimatized to the presence of the network of City of Toronto streets in the primary study area, the tolerance of the wildlife assemblage to human activities and the limited zone of influence of the subway extension, disturbance to wildlife from noise, light and visual intrusion will have no negative effects.

6.3.5 Potential Impacts to Migratory Birds

Twenty seven bird species recorded (based on field observations, secondary sources and/or habitats present) are protected under the *Migratory Bird Convention Act* (MBCA). However, no nests of migratory birds were documented on/under any of the watercourse crossing structures/culverts located along the Scarborough Subway Extension. The MBCA prohibits the killing, capturing, injuring, taking or disturbing

of migratory birds (including eggs) or damaging, destroying, removing or disturbing of nests. Although no nests of migratory birds were documented along the Scarborough Subway Extension, evidence of breeding birds having the potential to nest within the vicinity of the subway extension was observed. All construction activities associated with the Scarborough Subway Extension must be in compliance with the MBCA.

The subject lands fall within Environment Canada's Nesting Zone C2 (Nesting Period: end of March – end of August). Consequently, to comply with the requirements of the MBCA, clearing or disruption of vegetation where birds may be nesting should be completed outside the window of April 1 to August 31 to avoid the breeding bird season for the majority of the bird species protected under the act. In the event that these activities must be undertaken from April 1 to August 31, a nest screening survey must be conducted by a qualified avian biologist to identify and locate active nests of species covered under the MBCA. If an active nest is located, a mitigation plan shall be developed and provided to Environment Canada – Ontario Region for review prior to implementation.

6.3.6 Displacement of Rare, Threatened or Endangered Wildlife or Significant Wildlife Habitat

No significant wildlife habitat is found in areas to be excavated for subway facilities; therefore, there will be no displacement of significant wildlife habitat.

The Scarborough Subway Extension has been screened for potential wildlife species at risk. Two wildlife species that are listed/regulated under the Ontario ESA were confirmed to be present along the subway extension during LGL's 2015 field investigations, including Barn Swallow and Wood Thrush. The Barn Swallow is regulated as 'Threatened' under the Ontario ESA but is not regulated under the Canada SARA. The Wood Thrush is ranked Threatened by COSEWIC but not listed under SARA; it is listed as Special Concern under the ESA (i.e. not regulated under the ESA). None of the excavation activities associated with the Scarborough Subway Extension will affect habitat for these two species; therefore, there will be no negative effect on species at risk.

None of the remaining six wildlife species at risk historically recorded within the vicinity of the subway extension (i.e. Spiny Softshell, Eastern Musk Turtle, Queen Snake, Eastern Meadowlark, Bank Swallow and Blanding's Turtle) were documented by LGL during field investigations. Furthermore, by comparing the natural heritage features found along the Scarborough Subway Extension with secondary source information that describes wildlife previously recorded within this region, no habitat suitable to support these six species was identified. As a result, there will be no impacts to the six species identified above.

6.4 Aquatic Ecosystems

6.4.1 Watercourse Crossings

The Scarborough Subway Extension will cross a total of three watercourses including:

- Tributary of Dorset Park Branch of West Highland Creek;
- Dorset Park Branch of West Highland Creek; and,
- Bendale Branch of West Highland Creek

At each of these locations, the subway extension will be tunneled at least 10 m below the stream bed; therefore, no serious harm to fish or fish habitat will occur. A DFO review will be required during detail design because all watercourses support direct fish habitat and the project activity is not covered under DFO's self-assessment process.

6.5 Designated Natural Areas

As noted in **Section 4.5**, no ANSIs, PSWs or ESAs are located within 120 m of the subway extension; therefore, no negative impacts to these designated natural heritage areas will occur.

The valleylands associated with Highland Creek and its tributaries are protected by the City of Toronto Ravine and Natural Feature Protection By-law and TRCA Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (O. Reg. 166/06). Given that the subway extension will be tunneled in areas regulated by the City of Toronto and TRCA, it is unlikely that these designated natural areas will be affected. Discussions with the City of Toronto and TRCA will occur during detail design to determine if permits are required.

7.0 Monitoring

The use of an earth pressure balanced TBM will avoid any adverse environmental effects on the Frank Faubert Woods and valleylands located along the subway extension. As a precaution, a monitoring program is proposed at the Frank Faubert Woods to confirm the accuracy of impact predictions and to respond to any unforeseen events. The monitoring program includes the use of visual inspection of vegetation health during tunneling activities to determine evidence of stress on vegetation and soil moisture measurements prior to, during and following tunneling activities to measure for drought conditions. Monitoring will also include measurement of groundwater levels. The monitoring program will be implemented one year prior to tunneling, during tunneling, and for one year following completion of the tunneling contract and/or dewatering at the Scarborough Centre Station, if required. The monitoring period may be reduced or extended based on the results of monitoring.

Measurements of soil moisture will be taken in the easternmost woodlot of Frank Faubert Woods (FOD5a) using moisture probes located at various depths in the soil. A nearby control plot located beyond the zone of influence of the subway extension will also be established. When compared to the control plot, these measures will help to determine if soil moisture in the rooting zone of vegetation is impacted by tunneling and possible relationships with vegetation growth.

If it is determined that tunneling activities are having an adverse effect on the easternmost woodlot of Frank Faubert Woods (FOD5a), a corrective course of action will be taken. The appropriate course of action will be determined at that time in response to the specific observed effects. TTC will consult with the TRCA prior to implementing any contingency measures.

8.0 References

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APPENDIX A
VASCULAR PLANT LIST

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Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	TRCA	Toronto	CUM1-1a	CUM1-1b	CUM1-1c	CUM1-1e	CUM1-1f	CUM1-1g	CUM1-1h	CUT1a	CUT1b	CUT1c	CUT1d	CUW1a	CUW1b	CUW1c	CUW1d	CUW1e	FOD5a	FOD5b	FOD7a	FOD7b	FOD7c	MAS2-1
<i>Carya cordiformis</i>	bitternut hickory	G5	S5			L4	X																	x					
<i>Juglans cinerea</i>	butternut	G3G4	S3?	END	END	L3	X													x									
<i>Juglans nigra</i>	black walnut	G5	S4			L5	X									x				x		x		x	x				
FAGACEAE	BEECH FAMILY																												
<i>Fagus grandifolia</i>	American beech	G5	S5			L4	X																	x	x		x		
<i>Quercus alba</i>	white oak	G5	S5			L2	X																			x			
<i>Quercus macrocarpa</i>	bur oak	G5	S5			L4	X												x					x		x			
<i>Quercus rubra</i>	red oak	G5	S5			L4	X										x							x					
BETULACEAE	BIRCH FAMILY																												
<i>Betula papyrifera</i>	white birch	G5	S5			L4	X																				x		
<i>Corylus cornuta</i> ssp. <i>cornuta</i>	beaked hazel	G5T	S5			L4	X					x															x	x	
<i>Ostrya virginiana</i>	ironwood	G5	S5			L5	X																	x	x				
CHENOPODIACEAE	GOOSEFOOT FAMILY																												
* <i>Chenopodium album</i> var. <i>album</i>	lamb's quarters	G5T5	SE5			L+	+		x				x		x	x			x						x				
CARYOPHYLLACEAE	PINK FAMILY																												
* <i>Dianthus armeria</i>	deptford pink	G?	SE5			L+	+																			x			
* <i>Silene vulgaris</i>	catchfly	G?	SE5			L+	+					x	x								x						x		
POLYGONACEAE	SMARTWEED FAMILY																												
* <i>Polygonum cuspidatum</i>	Japanese knotweed	G?	SE4			L+	+																					x	
* <i>Rumex crispus</i>	curly-leaf dock	G?	SE5			L+	+			x		x	x	x	x						x				x		x		
GUTTIFERAE	ST. JOHN'S-WORT FAMILY																												
* <i>Hypericum perforatum</i>	common St. John's-wort	G?	SE5			L+	+												x										
TILIACEAE	LINDEN FAMILY																												
<i>Tilia americana</i>	basswood	G5	S5			L5	X				x								x		x			x	x		x		
VIOLACEAE	VIOLET FAMILY																												
<i>Viola pubescens</i>	downy yellow violet	G5	S5			L5	X																			x	x		
CUCURBITACEAE	GOURD FAMILY																												
<i>Echinocystis lobata</i>	prickly cucumber	G5	S5			L5	X													x		x				x	x		
SALICACEAE	WILLOW FAMILY																												
<i>Populus balsamifera</i> ssp. <i>balsamifera</i>	balsam poplar	G5T?	S5			L5	X																				x		
<i>Populus deltoides</i> ssp. <i>deltoides</i>	eastern cottonwood	G5T?	SU			L5	X							x					x		x								
<i>Populus tremuloides</i>	trembling aspen	G5	S5			L5	X				x						x				x					x	x		
* <i>Salix alba</i>	white willow	G5	SE4			L+	+									x						x				x	x		
* <i>Salix X sepulcralis</i>	hybrid willow	HYB	SE2			L+	+															x							x

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* <i>Trifolium repens</i>	white clover	G?	SE5			L+	+	x	x		x		x								x								
* <i>Vicia cracca</i>	tufted vetch	G?	SE5			L+	+	x	x		x		x	x	x	x					x								
ELAEAGNACEAE	OLEASTER FAMILY																												
* <i>Elaeagnus angustifolia</i>	Russian olive	G?	SE3			L+	+	x							x				x							x			
LYTHRACEAE	LOOSESTRIFE FAMILY																												
* <i>Lythrum salicaria</i>	purple loosestrife	G5	SE5			L+	+	x																					
ONAGRACEAE	EVENING-PRIMROSE FAMILY																												
<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	yellowish enchanter's nightshade	G5T5	S5			L5	X																	x					
CORNACEAE	DOGWOOD FAMILY																												
<i>Cornus alternifolia</i>	alternate-leaved dogwood	G5	S5			L5	X																	x			x		
<i>Cornus racemosa</i>	red paniced dogwood	G5?	S5			L4	X														x								
<i>Cornus rugosa</i>	round-leaved dogwood	G5	S5			L3	X												x										
<i>Cornus sericea</i> ssp. <i>sericea</i>	red-osier dogwood	G5	S5			L5	X														x								
CELASTRACEAE	STAFF-TREE FAMILY																												
* <i>Euonymus europaea</i>	spindle tree	G?	SE2			L+	+															x							
RHAMNACEAE	BUCKTHORN FAMILY																												
* <i>Rhamnus cathartica</i>	common buckthorn	G?	SE5			L+	+	x				x			x	x				x	x	x		x			x		
VITACEAE	GRAPE FAMILY																												
<i>Parthenocissus vitacea</i>	inserted Virginia-creeper	G5	S5			L5	X															x		x		x	x		
<i>Vitis riparia</i>	riverbank grape	G5	S5			L5	X	x				x			x	x			x	x		x	x	x	x	x		x	
ACERACEAE	MAPLE FAMILY																												
* <i>Acer ginnala</i>	amur maple	G?	SE1			L+	+																		x				
<i>Acer negundo</i>	manitoba maple	G5	S5			L+?	+?	x				x		x	x	x		x		x	x	x	x		x	x	x	x	
<i>Acer nigrum</i>	black maple	G5Q	S4?			L4	X																	x					
* <i>Acer platanoides</i>	norway maple	G?	SE5			L+	+									x		x				x	x				x	x	
<i>Acer saccharinum</i>	silver maple	G5	S5			L4	X					x					x			x	x	x	x			x	x		x
<i>Acer saccharum</i> var. <i>saccharum</i>	sugar maple	G5T?	S5			L5	X													x				x	x		x	x	
ANACARDIACEAE	SUMAC FAMILY																												
* <i>Cotinus coggygria</i>	smoke-tree	G?	SE1																		x								
<i>Rhus hirta</i>	staghorn sumac	G5	S5			L5	X	x			x				x		x		x	x		x				x		x	
<i>Toxicodendron radicans</i> ssp. <i>negundo</i>	poison-ivy	G5T	S5			L4	R													x				x	x				
BALSAMINACEAE	TOUCH-ME-NOT FAMILY																												
<i>Impatiens capensis</i>	spotted touch-me-not	G5	S5			L5	X					x										x				x	x		x

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APIACEAE	PARSLEY FAMILY																												
* <i>Daucus carota</i>	wild carrot	G?	SE5			L+	+	x		x				x	x						x								
APOCYNACEAE	DOGBANE FAMILY																												
* <i>Vinca minor</i>	periwinkle	G?	SE5			L+	+														x								
ASCLEPIADACEAE	MILKWEED FAMILY																												
<i>Asclepias syriaca</i>	common milkweed	G5	S5			L5	X								x	x				x									
* <i>Cynanchum rossicum</i>	swallow-wort	G?	SE5			L+	+	x			x	x		x	x	x	x		x	x	x	x	x	x	x	x	x	x	x
SOLANACEAE	POTATO FAMILY																												
* <i>Solanum dulcamara</i>	bitter nightshade	G?	SE5			L+	+						x		x				x	x		x	x	x		x	x	x	
CONVOLVULACEAE	MORNING-GLORY FAMILY																												
* <i>Convolvulus arvensis</i>	field bindweed	G?	SE5			L+	+					x		x															
HYDROPHYLLACEAE	WATER-LEAF FAMILY																												
<i>Hydrophyllum virginianum</i>	Virginia water-leaf	G5	S5			L5	X																	x			x		
BORAGINACEAE	BORAGE FAMILY																												
* <i>Echium vulgare</i>	blueweed	G?	SE5			L+	+	x	x																				
* <i>Myosotis scorpioides</i>	mouse-ear scorpion-grass	G5	SE5			L+	+															x							
LAMIACEAE	MINT FAMILY																												
* <i>Glechoma hederacea</i>	creeping Charlie	G?	SE5			L+	+						x														x		
* <i>Leonurus cardiaca</i> ssp. <i>cardiaca</i>	common motherwort	G?T?	SE5			L+	+													x		x	x	x			x		
<i>Mentha arvensis</i>	American wild mint	G5T5	S5			L5	X																				x		
PLANTAGINACEAE	PLANTAIN FAMILY																												
* <i>Plantago lanceolata</i>	ribgrass	G5	SE5			L+	+					x		x													x		
* <i>Plantago major</i>	common plantain	G5	SE5			L+	+					x	x	x							x	x				x		x	
OLEACEAE	OLIVE FAMILY																												
<i>Fraxinus americana</i>	white ash	G5	S5			L5	X																	x	x				
<i>Fraxinus pennsylvanica</i>	red ash	G5	S5			L5	X								x			x	x		x	x	x	x		x	x	x	
* <i>Syringa vulgaris</i>	common lilac	G?	SE5			L+	+														x								
SCROPHULARIACEAE	FIGWORT FAMILY																												
* <i>Verbascum thapsus</i>	common mullein	G?	SE5			L+	+	x			x	x									x								
CAMPANULACEAE	BLUEBELL FAMILY																												
* <i>Campanula rapunculoides</i>	creeping bellflower	G?	SE5			L+	+																				x		
RUBIACEAE	MADDER FAMILY																												
* <i>Galium mollugo</i>	white bedstraw	G?	SE5			L+	+													x						x			
CAPRIFOLIACEAE	HONEYSUCKLE FAMILY																												
* <i>Lonicera tatarica</i>	tartarian honeysuckle	G?	SE5			L+	+	x							x	x		x	x	x		x		x		x	x		

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<i>Sambucus nigra</i> ssp. <i>canadensis</i>	common elderberry	G5	S5			L5	U														x								
<i>Sambucus racemosa</i> var. <i>racemosa</i>	red-berried elderberry	G5T4T5	S5			L5	X																x						
* <i>Viburnum lantana</i>	bending wayfaring-tree	G?	SE2			L+	+												x										
ASTERACEAE	ASTER FAMILY																												
* <i>Achillea millefolium</i> var. <i>millefolium</i>	common yarrow	G5T?	SE?			L+	+?	x	x		x																		
* <i>Arctium minus</i>	common burdock	G?T?	SE5			L+	+					x		x		x		x	x	x	x	x				x		x	
<i>Aster ericoides</i> var. <i>ericoides</i>	white heath aster	G5T?	S5			L5	X								x														
<i>Aster lanceolatus</i> ssp. <i>lanceolatus</i>	tall white aster	G5T?	S5			L5	X			x																			
<i>Aster lateriflorus</i> var. <i>lateriflorus</i>	calico aster	G5T5	S5				X														x								
<i>Bidens frondosa</i>	devil's beggar-ticks	G5	S5			L5	X															x				x	x		
* <i>Cichorium intybus</i>	chicory	G?	SE5			L+	+	x	x	x		x	x	x															
* <i>Cirsium arvense</i>	Canada thistle	G?	SE5			L+	+		x	x	x		x	x	x	x					x	x				x	x		
* <i>Cirsium vulgare</i>	bull thistle	G5	SE5			L+	+					x									x					x	x		
<i>Erigeron annuus</i>	daisy fleabane	G5	S5			L5	X					x				x					x	x							x
<i>Erigeron philadelphicus</i> var. <i>philadelphicus</i>	Philadelphia fleabane	G5T?	S5			L5	X					x														x	x		
<i>Eurybia macrophylla</i>	large-leaved aster	G5	S5			L5	X													x				x					x
<i>Euthamia graminifolia</i>	flat-topped bushy goldenrod	G5	S5				X													x									
* <i>Leucanthemum vulgare</i>	ox-eye daisy	G?	SE5			L+	+	x	x		x	x	x			x			x	x						x		x	
* <i>Matricaria discoidea</i>	pineapple-weed	G5	SE5			L+	+			x				x															
* <i>Matricaria maritima</i> ssp. <i>maritima</i>	seaside camomile	G5T?	SE?					x					x																
<i>Solidago caesia</i>	blue-stem goldenrod	G5	S5			L5	X																x						
<i>Solidago canadensis</i>	canada goldenrod	G5	S5			L5	X			x																			x
<i>Solidago canadensis</i> var. <i>scabra</i>	tall goldenrod		S5			L5	X	x				x			x	x			x	x	x				x	x			
<i>Solidago flexicaulis</i>	zig-zag goldenrod	G5	S5			L5	X																x			x	x		
* <i>Sonchus arvensis</i> ssp. <i>arvensis</i>	field sow-thistle	G?T?	SE5			L+	+								x														
<i>Symphyotrichum novae-angliae</i>	New England aster	G5	S5			L5	C			x					x														
* <i>Taraxacum officinale</i>	common dandelion	G5	SE5			L+	+	x	x		x		x	x		x			x			x		x		x		x	
* <i>Tragopogon pratensis</i> ssp. <i>pratensis</i>	meadow goat's-beard	G?T?	SE5			L+	+				x	x		x							x								x
ARACEAE	ARUM FAMILY																												
<i>Arisaema triphyllum</i> ssp. <i>triphyllum</i>	small jack-in-the-pulpit	G5T5	S5			L4	X																x						
POACEAE	GRASS FAMILY																												
* <i>Bromus inermis</i> ssp. <i>inermis</i>	awnless brome	G4G5T?	SE5			L+	+	x		x		x	x	x	x					x		x							

APPENDIX B
PHOTOGRAPHIC RECORD

Project TA8480
June 2015 photos

Photo Appendix
Dorset Park Branch Tributary

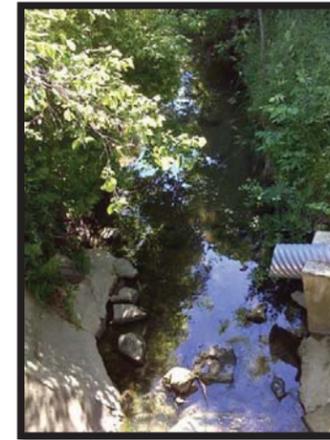


Photo 1: Upstream view from McCowan Road.

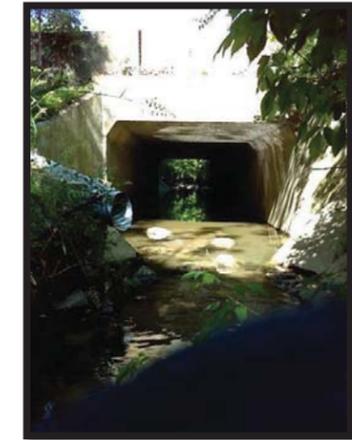


Photo 2: Culvert inlet



Photo 3: Habitat upstream of McCowan Road.



Photo 4: Typical habitat within 50m downstream of road.

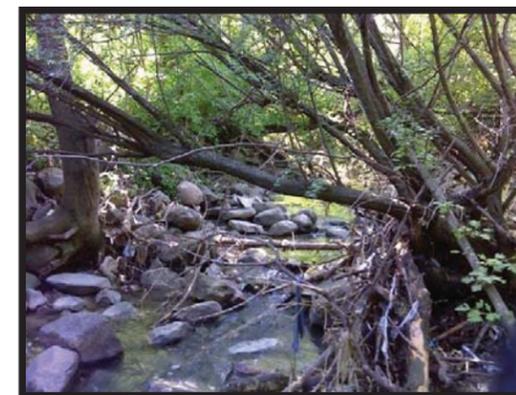


Photo 5: Showing prevalent woody debris and boulders in channel.

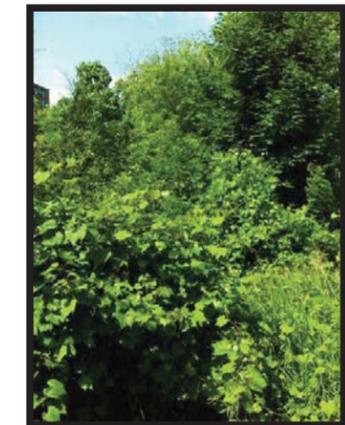


Photo 6: Riparian habitat downstream of McCowan Road.

Project TA8480
June 2015 photos

Photo Appendix Dorset Park Branch West Highland Creek



Photo 7: Upstream habitat, within approximately 40m upstream of McCowan Road.



Photo 8: McCowan Road Twin culvert inlet.

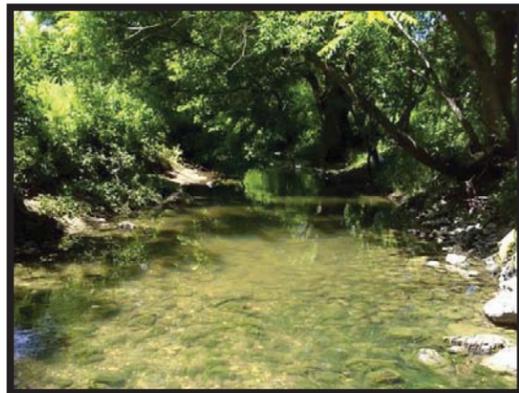


Photo 9: Habitat immediately upstream of McCowan Road (upstream view).



Photo 10: Gabion banks with Manitoba Maple trees growing through rock.



Photo 11: Riffle habitat downstream of twin culvert inlet.

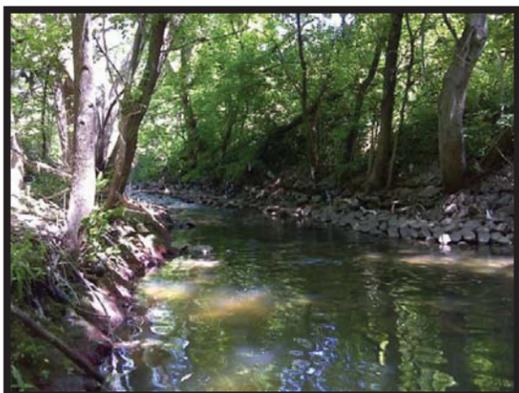


Photo 12: Upstream view of flat habitat in downstream reach, showing gabion along northern bank.

Project TA8480
June 2015 photos

Photo Appendix Bendale Branch West Highland Creek

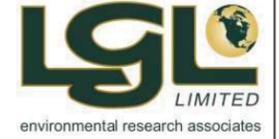


Photo 13: : Habitat upstream of the McCowan Bridge, within the vicinity of the Scarborough Subway crossing.



Photo 14: Northern bank and floodplain habitat within the vicinity of the Scarborough Subway crossing.



Photo 15: Storm outfall along the west bank, upstream of bridge.



Photo 16: Pedestrian Trail under the north side of the McCowan Road Bridge.



Photo 17: Riffle habitat within the vicinity of the McCowan Bridge, upstream view.

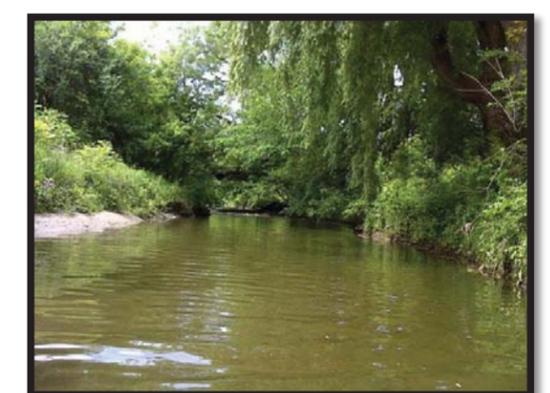


Photo 18: Habitat downstream of McCowan Road, upstream view.

APPENDIX C
ACRONYMS AND DEFINITIONS USED IN SPECIES LISTS

ACRONYMS AND DEFINITIONS USED IN SPECIES LISTS

G-Rank Global Rank

Global ranks are assigned by a consensus of the network of Conservation Data Centres, scientific experts, and the Nature Conservancy 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. |

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.
- Unranked - conservation status in Ontario not yet assessed
- SNR = Unrankable - currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
- SU =

- 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).

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.

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.

Local Status Toronto (Varga 2000)

Species status within the Toronto was used to determine local vascular plant status for the primary study area.

- R-# = R- Native species present and rare; # - number of stations at which the species has been identified.
- U = Uncommon
- X = Not classified as rare or uncommon within Durham

TRCA Toronto and Region Conservation Authority

The TRCA assigns a level of conservation concern for flora and fauna (L1 to L5) in its watersheds (TRCA 2003). The L Rank is determined based on four factors: local occurrence, population trend, habitat dependence, and sensitivity to development.

L-Rank	Definition
L5	Able to withstand high levels of disturbance; generally secure throughout the jurisdiction, including the urban matrix. May be of very localized concern in highly degraded areas.
L4	Able to withstand some disturbance; generally secure in rural matrix; of concern in urban matrix.
L3	Able to withstand minor disturbance; generally secure in natural matrix; considered to be of regional concern.
L2	Unable to withstand disturbance; some criteria are very limiting factors; generally occur in high-quality natural areas, in natural matrix; probably rare in the TRCA jurisdiction; of concern regionally.
L1	Unable to withstand disturbance; many criteria are limiting factors; generally occur in high-quality natural areas in natural matrix; almost certainly rare in the TRCA jurisdiction; of concern regionally.
LX	Extirpated from our region with remote chance of rediscovery. Presumably highly sensitive.
LH	Hybrid between two native species. Usually not scored unless highly stable and behaves like a species (e.g. <i>Equisetum x nelsonii</i>)
L+	Exotic. Not native to TRCA jurisdiction. Includes hybrids between a native species and an exotic
L+?	Origin uncertain or disputed, i.e. may or may not be native.

