

## 4. STUDY AREA CONDITIONS

The existing environmental conditions described in the 2009 EPR were reviewed for applicability to conditions at the time of this Addendum (2014) and were determined to be unchanged except as specifically stated in the following sections. The following sections provide a summary of the existing conditions as described in the 2009 EPR and an update on existing conditions in the study area considered as part of the EPR Addendum where appropriate. This chapter presents the existing conditions relate to:

- Natural Environment (**Section 4.1**),
- Socio-Economic Environment (**Section 4.2**),
- Cultural Environment (**Section 4.3**),
- Transportation (**Section 4.4**) and
- Utilities (**Section 4.5**).

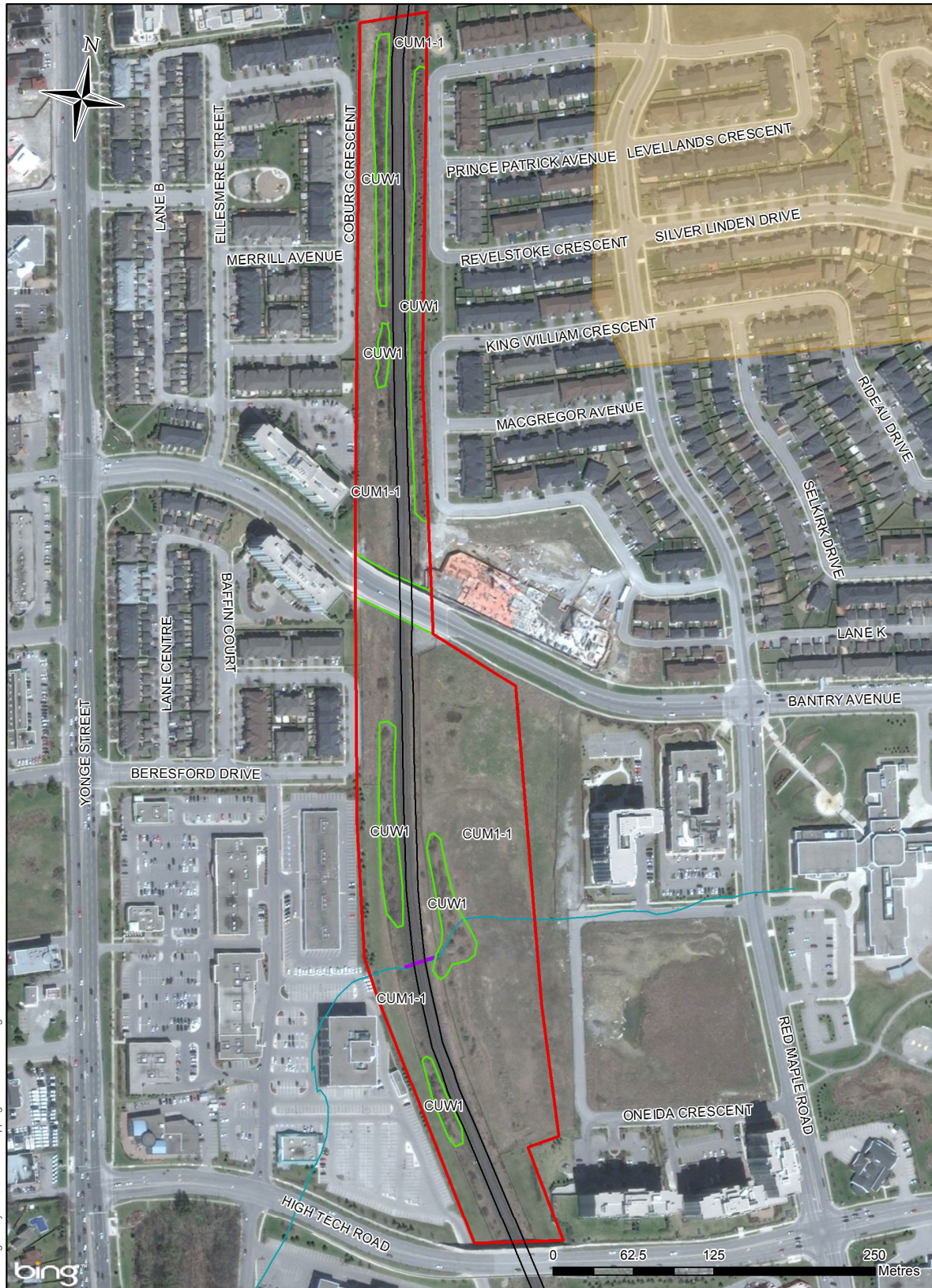
Detailed information for these factors is provided in the specialist and technical reports provided as Appendices to the EPR Addendum.

### 4.1 Natural Environment

A Natural Environment Memorandum was prepared by MMM Group as part of the EPR addendum process to update the natural environment existing conditions and potential impacts of the TSF. A copy of the Natural Environment Memorandum is included in **Appendix A**.

Site-specific field surveys were conducted in 2013, and a review of local, regional, and provincial (MNR Natural Heritage Information Centre database - NHIC), on-line data was undertaken. Updated information on Species at Risk (SAR) and designated natural areas in the vicinity of the Study Area was requested from the Aurora District Office of the Ministry of Natural Resources (now the Ministry of Natural Resources and Forestry) on May 16, 2013.

The study area for the natural environment analysis conducted for the Addendum is a 50 to 100 m wide corridor between High Tech Road and the northern extent of Coburg Crescent (**Figure 4-1**). An effort was made during the 2013 surveys to remain cognizant of uncommon or rare species and species of concern, noted in the 2008 Natural Environment Report prepared by MMM Group (formerly Ecoplans) for the 2009 EPR. Field observations were limited to vegetation discernible when viewed from the edge of the rail right-of-way. Incidental wildlife and wildlife signs seen during the vegetation surveys were noted.



M:\Ecology\_Group\Jobs\2013\277670\_000\_800\_091 - Yonge Hwy 7 Addendum\Mapping\MXD\2013\_05\Figure 1 - ELC Communities.mxd

**Legend**

- ▭ Study Area
- ▭ ELC Communities
- ▭ Floodline (Approximate Location)  
\* based on TRCA Flood Plain Mapping Program - 2010-06-28
- Rail Corridor
- Pomona Mills Creek (Underground Pipe)
- Culvert

**ELC Code**

- CUM1-1 Dry - Moist Old Field Meadow Type
- CUW1 Mineral Cultural Woodland Ecosite

Client: **TORONTO TRANSIT COMMISSION AND  
YORK REGION RAPID TRANSIT CORPORATION**

Title: **Yonge Subway Train Storage TPAP Addendum  
Natural Environment Features**

Prepared by: **MMM GROUP**

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Scale as Shown

Review: PM

Date: May 2013

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**Figure: 4-1**

#### 4.1.1 Terrestrial Habitat

##### 4.1.1.1 Designated Natural Areas

According to the NHIC database, there are no Provincially Significant Wetlands, Areas of Natural and Scientific Interest, Ecologically Sensitive Areas or other designated natural areas within 1 km of the TSF. The Study Area does not fall within the regulated limits of TRCA's Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (TRCA 2010), or within the Greenlands System of York Region (York Region 2013).

##### 4.1.1.2 Vegetation Communities and Species

Vegetation surveys were carried out in the Study Area on May 21 and 22, 2013. The Study Area contains natural habitat within the rail corridor and outside of the rail corridor in the southeast quadrant (where there is open space). Elsewhere outside the rail corridor, private property, including warehouses and commercial properties have some manicured lawn with planted trees. Vegetation communities within the habitat include cultural woodland and cultural meadow. These communities are described below and shown in **Figure 4-1**.

###### CUW1: Mineral Cultural Woodland

This ecosite occurs as a narrow band along the east and west sides of the rail tracks and the dominant species vary. The westerly CUW unit contains a row of Black Walnut (*Juglans nigra*) that dominates the canopy, with occasional Green Ash (*Fraxinus pennsylvanica*) and Manitoba Maple (*Acer negundo*). A species of honeysuckle (*Lonicera sp.*) dominates the understory. The canopy of the easterly CUW unit, is dominated by a row of Black Locust (*Robinia pseudo-acacia*) and Siberian Elm (*Ulmus pumila*), and honeysuckle is dominant in the understory. North of Bantry Avenue, Green Ash is the dominant canopy species on both sides of the track, occurring with an understory of scattered Choke cherry (*Prunus virginiana var. virginiana*) and honeysuckle species on the east side, with abundant English Hawthorn (*Crataegus monogyna*), Buckthorn (*Rhamnus cathartica*) and Green Ash on the west side. Nearing the north end of the Study Area on the west side of the track, American Elm (*Ulmus americana*) becomes abundant in the canopy. The east side of this area contains about 15 Eastern Red Cedar (*Juniperus virginiana*) and one White Spruce (*Picea glauca*). The west side contains another Eastern Red Cedar. Ground flora species in this narrow community are the same as those occurring in the surrounding meadow (described below). There are also scattered Riverbank Grape (*Vitis riparia*), Garlic Mustard (*Alliaria petiolata*) and European Swallow-wort (*Cynanchum rossicum*) in this woodland.

###### CUM1-1: Dry-Moist Old Field Meadow

The cultural meadow is dominated by Reed Canary Grass (*Phalaris arundinacea*) and Kentucky Bluegrass (*Poa pratensis ssp. pratensis*). Canada Goldenrod (*Solidago canadensis*) is scattered through much of this area and in some parts forms large dense patches. Dense European Swallow-wort lines the

rail track north of Bantry Avenue but is not apparent along the track south of Bantry Avenue. Herbaceous species within this ecosite include Canada Thistle (*Cirsium arvense*), Common Milkweed (*Asclepias syriaca*), Tufted Vetch (*Vicia cracca*), Common Mullein (*Verbascum thapsus*), Common Teasel (*Dipsacus fullonum*), Queen Anne's Lace (*Daucus carota*), and Black Medic (*Medicago lupulina*). Trees and shrubs scattered through the cultural meadow in the open space area and the rail corridor right-of-way include Manitoba Maple, Eastern Cottonwood (*Populus deltoides ssp. deltoides*), Staghorn Sumac (*Rhus typhina*), Red-osier Dogwood (*Cornus sericea*), Russian Olive (*Elaeagnus angustifolia*) and species of hawthorn and honeysuckle. Small patches of cattail were observed in the railside ditches.

#### 4.1.1.3 Wildlife and Wildlife Habitat

European Starlings (*Sturnus vulgaris*), Rock Doves (*Columba livia*) and House Sparrows (*Passer domesticus*) were observed possibly nesting under the High Tech Road and Bantry Avenue bridges. Other birds observed and/or heard included Red-winged Blackbird (*Agelaius phoeniceus*), Mourning Dove (*Zenaidura macroura*), American Robin (*Turdus migratorius*), Common Grackle (*Quiscalus quiscula*), Baltimore Oriole (*Icterus galbula*); Mallard (*Anas platyrhynchos*), Northern Mockingbird (*Mimus polyglottos*) and Gray Catbird (*Dumetella carolinensis*). Two common butterfly species, one Spring Azure (*Celastrina lucia*) and one Cabbage White (*Pieris rapae*), were encountered in the cultural meadow. No mammal species were observed during the survey.

#### 4.1.2 Fish and Aquatic Habitat

Pomona Mills Creek crosses the Study Area from east to west before it flows outside of the rail right-of-way to the west and then south to join with the East Don River. The channel is piped through the Study Area. A surficial drainage feature appears to remain on site and may take some local surface runoff, which then flows through a culvert beneath the rail line. This feature does not appear to provide either direct or indirect fish habitat. The creek is designated as coldwater (Ecoplans 2009), but does not provide direct fish habitat. If the piped watercourse still provides coldwater inputs downstream, it may be identified as providing indirect fish habitat.

#### 4.1.3 Species at Risk

No TRCA species of concern were recorded within the Study Area (TRCA 2009). An NHIC search on May 1, 2013 revealed four provincial species records within about 1 km of the Study Area, including one Species at Risk (Redside Dace, Endangered, last observed May 23, 2000) and three provincially rare wildlife species including one salamander and two dragonflies. Two of the three, Jefferson X Blue-spotted Salamander (Jefferson genome dominates) (*Ambystoma hybrid pop.1*), last seen in 1978, and Painted Skimmer (*Libellula semifasciata*) are considered imperiled and the other, Green-striped Darner (*Aeshna verticalis*), is considered vulnerable. During the 2013 surveys, four species of significance were observed including Eastern Red Cedar (uncommon

in Greater Toronto Area and York Region); White Spruce and Gray Catbird (TRCA species of concern); and Northern Mockingbird (Bird Studies Canada species of conservation priority). The Northern Mockingbird is also regarded as provincially uncommon (NHIC 2013).

#### **4.1.4 Soil and Groundwater Conditions**

The following description refers to existing soil and groundwater conditions within the Study Area on the regional scale (i.e. in a broader context) as well as on the local scale (i.e. within the TSF vicinity) and draws on information outlined in the Groundwater Assessment Report provided in **Appendix F** and Contamination Overview Study provided in **Appendix D**.

##### **4.1.4.1 Topography**

The topography within the Study Area is flat to gently sloping. Based on the design drawing (see **Figure 3-5A-C**), the ground surface elevations along the YSE alignment from the Richmond Hill Centre Station (north of High Tech Road) to near Coburg Crescent increases from about 201 meters above sea level (masl) to about 209 masl. In the areas where High Tech Road and Bantry Avenue cross the subway extension line and the existing CN/GO rail tracks, the road embankment surface increases by about 8 m to 10 m to approximately 208 and 215 masl, respectively.

##### **4.1.4.2 Physiography**

According to Chapman and Putnam's "The Physiography of Southern Ontario, Third Edition" (1984), the Study Area is located within the physiographic region known as the Peel Plain. The Peel Plain is a level-to-undulating tract of clay soils and covers an area of 300 square miles across the central portions of the Regional municipalities of York, Peel, and Halton. The ground surface within the Peel Plain slopes toward Lake Ontario with elevations ranging between 152 to 213 metres above sea level. Deep valleys have been cut across this plain by several south flowing rivers and water streams. Much of the Peel Plain has been modified by a veneer of clay that occasionally, when deep enough, have been observed to be varved. The water supply within the plain is generally poor and the high degree of evaporation from the deforested clay surface limits the adequate recharge of groundwater (Chapman and Putnam 1984).

##### **4.1.4.3 Geology**

Preliminary geotechnical and groundwater assessments were undertaken as part of this Transit Project. The detailed reports are provided in **Appendices E** and **F** and existing conditions from these reports are summarized below. It should be noted that the local Study Area of the groundwater assessment included a 250 m buffer zone from the TSF footprint.

#### **4.1.4.3.1 Quaternary Geology**

According to the Ontario Geological Survey (OGS) mapping “The Surficial Geology of Southern Ontario” (OGS, 2003), glaciolacustrine deposits of silt and clay with minor sand content are predominant in the regional Study Area, with Halton Till exposed at the surface in the southern portion (see Figure 4 of **Appendix F**). Urban fill should be expected in the upper 1 m to 5 m below ground surface (mbgs), except for areas where extensive development has taken place (see **Appendix E**).

The glaciolacustrine deposits generally form a thin veneer over the underlying deposits, although they can be several meters thick. The youngest deposits present beneath the glaciolacustrine deposits and sometime exposed at the surface in the watershed of Don River is Halton Till. Halton Till was deposited in the area approximately 13,000 years ago. It is a sandy silt to clayey silt till interbedded with silt, clay, sand and gravel. The Halton Till is a 3 to 6 m thick aquitard unit (TRCA, 2009).

The Oak Ridges Moraine was deposited in the Don River watershed about 13,300 years ago. The Oak Ridges Moraine is a regionally extensive stratified sediment complex, which could be 150 m thick to the north. The Oak Ridges Moraine sediments are arranged from coarse to fine in a down flow direction and vertically up section. Rhythmically interbedded fine sands and silts are the predominant sediments, but coarse, diffusely-bedded sands and gravel may also be present locally. The Oak Ridges Moraine aquifer sits on the Newmarket Till and lower sediments. These deposits are generally encountered only in boreholes.

The Newmarket (Northern) Till is a dense over-consolidated aquitard unit, deposited in the area about 18,000-20,000 years ago. It is a dense silty sand diamicton (glacial till) and has been found beneath the Oak Ridges Moraine unit. It contains interbeds of sand and silt, boulder pavements, fractures and joints. Discontinuous sand beds may also be present in this unit (TRCA, 2009).

Three lower units were deposited during the Wisconsin glacial period in the Study Area. This includes the Thorncliffe Formation aquifer, Sunnybrook Drift aquitard and Scarborough Formation aquifer. The Thorncliffe Formation represents sand and silty sand of glaciofluvial origin deposited approximately 45,000 years ago. The Sunnybrook Drift unit was deposited about 45,000 years ago. It is interpreted to be a clast-poor mud (i.e. silt and clay), which is generally less than 10 to 20 m thick. The Scarborough Formation unit consists of organic-rich (peat) sands deposited over silts and clay, between 70,000 and 90,000 years ago.

#### **4.1.4.3.2 Bedrock Geology**

According to the Ontario Geological Survey “Bedrock Geology of Ontario” (OGS, 1991), the Study Area is mapped as grey to black shale interbedded with limestone and siltstone layers of the Georgian Bay Formation and limestone of the Simcoe Group.

The bedrock has deeply eroded forming valleys which were infilled with sediments. The best documented buried valley is the Laurentian Channel, which extends from Georgian Bay to Lake Ontario, to the west - southwest of the Study Area. It is buried by sediment up to 270 m thick (TRCA, 2009).

The bedrock is interpreted from well records (Table B-1 in Appendix B of **Appendix F**) to be at least 50 m deep in the Study Area.

#### 4.1.4.4 Hydrogeology

The Study Area does not rely on the groundwater supply and is municipally serviced with a lake based supply.

As described in the 2009 EPR, groundwater conditions are expected to vary along the YSE alignment. Based on preliminary geotechnical reports prepared by Golder (December 2013; January 2014 – copies provided in **Appendix E**), several water-bearing geological units are expected to be encountered within the Study Area, depending on the final construction depths. A description of these units is provided below.

The Study Area falls under the jurisdiction of the TRCA. According to “The Hydrogeology of Southern Ontario” (Singer et al, 2003), the overburden is an important source of water supply for areas within the TRCA’s jurisdiction. The aquifers potentially present within the Study Area include the Oak Ridges Moraine or equivalent aquifer, the Thorncliffe Formation and the Scarborough Formation aquifers. The most notable water-bearing units within the Study Area include the Oak Ridges Moraine aquifer and the Thorncliffe Formation aquifer.

Based on Golder’s report (December 2013 – copy provided in **Appendix E**), the Oak Ridges Moraine or equivalent aquifer is present at elevations ranging between approximately 192 and 202 masl in along the YSE alignment near Beresford Drive (borehole 126 A/B) and is present at elevations of 189 to 197 masl in to the south of High Tech Road east of Yonge Street (monitoring well 14). A deep groundwater unit containing silty sand to sandy silt appears to be present at elevations 181 masl and 179 masl in the central and southern portions of the Study Area, respectively (see Figure 3-1 of **Appendix F**).

Static groundwater levels were measured as part of the Contaminant Investigation (see **Section 4.1.7** and **Appendix D**). Measurements were taken at monitoring wells MW4 and MW5 located along the alignment north of Bantry Avenue (see Figure 2 of **Appendix D**). Those measurements indicate that shallow groundwater is present at depths of 7.6 to 8.3 mbgs.

A deep groundwater unit of silty sand to sandy silt equivalent to Thorncliffe Formation is present at least in the area of Beresford Drive at elevations ranging between below 173 and 181 masl. Additional geotechnical and/or hydrogeological investigations are required to delineate the extent of this aquifer in the Study Area. According to Singer et al (2003), well yields within the Thorncliffe Aquifer range from about 10.0 to 275.0 L/min, which indicates the presence of significant groundwater resources in this unit.

The Georgian Bay hydrogeologic unit is the main bedrock aquifer within the Study Area. This unit consists of shale interbedded with limestone and siltstone and is generally regarded as a poor source of groundwater due to relatively poor interconnections of pore space in shale (Singer et al, 2003).

#### **4.1.5 Drainage and Stormwater Management**

The Study Area is located within the Don River Watershed. The East Don River crosses Yonge Street approximately 1.5 km south of the Highway 407 interchange, with a tributary crossing directly through (underneath) the interchange.

Stormwater run-off within the Study Area is from both urban areas and natural areas in transition to urban land use. Stormwater is conveyed through storm sewers in the urban areas, and ditches in the natural areas. All stormwater is eventually discharged into surface water courses draining into the East Don River. On the regional scale, water from the Don River is eventually discharged into Lake Ontario.

#### **4.1.6 Air Quality**

An Air Quality Analysis Report was prepared as part of the original Transit Project Assessment for the proposed extension of the Yonge Subway. Existing ambient air quality conditions are documented in the 2009 EPR.

A Construction Air Quality Assessment was conducted by Novus Environmental Inc. in 2013 to assess the potential air quality impacts related to the proposed construction of the TSF. Findings from this report are discussed in **Section 5.1.6**. A copy of this report is included in **Appendix B**.

#### **4.1.7 Contaminated Properties**

MMM Group conducted a Contamination Overview Study in support of the EPR Addendum study in 2013. The Contaminant Overview Study focused on identifying and reviewing actual or potential contaminated areas and properties that could affect/be affected by the TSF, and identify appropriate future environmental work and mitigation measures. For the purposes of the Contaminant Overview Study, a 250 m buffer zone was added to either side of the train storage facility (herein referred to as the Study Area) to account for contamination migration from properties and areas surrounding the facility. A copy of this report is included in **Appendix D**.

An inspection of the Study Area was carried out on April 15, 2013. The purpose of the inspection was to document land uses and/or business operations which may represent a potential source of contamination within the Study Area.

The inspection completed for the Contamination Overview Study did not include any building inspections or comprehensive exterior inspections of any of the properties in the Study Area. Therefore, any interferences regarding the



presence or absence of site contamination is strictly based on visual observations made from the roadside.

The land use activities noted within the Study Area include:

- Retail Commercial (Shopping plazas, cafes, restaurants, etc.)
- Office Commercial (office buildings, financial institutions)
- Medical offices
- One theatre
- Two car dealerships
- One motorcycle dealership
- One centre for truck sales
- One gas station
- One dry cleaning facility
- Residential developments
- One CN/GO railway line
- One construction site
- Vacant/undeveloped land

### **Actual Sources of Contamination**

Based on the information collected through the Contamination Overview Study, no areas of actual site contamination are within the Study Area. However, Areas of Potential Environmental Concern (APECs) were noted.

### **Potential Sources of Contamination**

Potential soil and groundwater contamination may exist within the Study Area as a result of current and historical commercial/industrial land uses. Due to the typical activities and operations associated with the land uses there is potential that some or any of their products and wastes may have been released into the environment, impacting the soil and groundwater. Potential sources of contamination are described below.

### **Fuel Storage Tanks**

Automotive centres, maintenance facilities and gas stations may operate pump islands (underground storage tanks for storing fuel), small storage areas, and service areas for changing engine oil. Gasoline and diesel fuel are transferred from bulk container trucks to large underground storage tanks. Spills at transfer areas and pumps, along with overfilling of and leakage from the underground storage tanks, are potential sources of site contamination.

## **Manufacturing Facilities, Registered Waste Generators and Polychlorinated Biphenyl Storage Sites**

A wide range of chemicals are used at facilities that manufacture and distribute parts/products for industrial and commercial use. These chemical products may include acids and bases, dyes and pigments, polymers, plastics, surfactants, solvents, soaps, and waxes. These manufacturing processes are highly variable, depending on the product being produced. There are however, certain types of process components that are frequently encountered in these facilities, including bulk storage for gaseous, liquid and solid materials, blending and packaging equipment, storage areas for drums, Polychlorinated Biphenyl storage areas, waste piles and disposal pits.

## **Existing Railway Lines and Rail Yard**

Several factors associated with railways including brake dust, cargo spills, oils and lubricants, and diesel fuels can cause potential environmental concern. Soil contamination may exist within the land on or adjacent to railway tracks as railways are often developed on poor quality fill and ballast material in addition to railway ties being impregnated with creosote compounds.

## **Vehicular Traffic and Road Debris**

The cumulative effects of many years of heavy road traffic within the Study Area may have resulted in soil contamination. This contamination, typically resulting from vehicle exhaust (e.g., lead and other metals), general wear and tear (e.g., heavy metals, oils and lubricants), and winter road maintenance activities (e.g., de-icing salt) is probably most prevalent on the road shoulders and roadside drainage ditches in areas of high traffic volume.

A high volume of traffic was observed during the site inspection along Yonge Street, High Tech Road, and Bantry Road. There is the potential for residual salt impacts, metals and Petroleum Hydrocarbons to be present in the shallow soil and groundwater resulting from winter road salting operations along the right-of-way, vehicular exhausts, transportation accidents and spills.

## **Contaminant Mobility**

Contaminants on or in the soils may move within and beyond the Study Area through a number of different routes. The soils themselves retain contaminants through adsorption. The movement of contaminants from soil occurs through evaporation and dust generation, intake into plants through their roots, and by flushing or dissolution by water seeping into the soil. Water transport of chemicals will usually result in contamination of surface water bodies through surface water drainage, and by way of groundwater aquifers.

In general, contaminant mobility will be greatest when:

- Overburden deposits consist of sand and gravel, or other permeable deposits;
- Fractured bedrock is located at or near the surface, or is overlain by a thin layer of permeable deposits;
- Distance to surface water courses is less than 50 m;
- Water table is less than 5 mbgs;
- Preferential flow pathways (e.g., trenches, tree roots, ditches) exist in the soils above the water table.

The surficial geology within the Study Area is composed of soils with variable permeability. Deposits of silt and clay of glaciolacustrine origin and sandy silt to clayey silt till deposits are present within the upper portion of the Study Area. Other deeper deposits may include fine sand and silts (Oak Ridges Moraine), dense silty sand till (Newmarket Till), sand and silty sand (Thornccliffe Formation), and at greater depth, silt and clay of the Sunnybrook Drift Formation and silt and clay of the Scarborough Formation.

Heterogeneities exist in the various overburden units that will inhibit or allow the lateral and vertical movement of contaminants adding to the potential complexity of contaminant movement.

Deposits of clay and sand and till deposits present within the upper portion of Study Area will inhibit the movement of contamination within the overburden. Therefore, contamination mobility within the Study Area is expected to be low.

As discussed in **Section 4.1.4**, the Georgian Bay formation is a poor source of groundwater. The water well information presented in the Ecolog ERIS report confirms that the bedrock within the Study Area is fairly deep, on the order of 50 mbgs. Therefore, it can be concluded that contamination is unlikely to reach the bedrock that the contamination transport will be limited in the bedrock.

### **Contaminant Investigation**

Subsequent to the Contamination Overview Study a Contaminant Investigation was completed. The Contaminant Investigation focused on a Study Area along the proposed alignment is an area within a 250 m radius of the proposed northern portion of the TSF, located approximately 0.2 m south of Bantry Avenue extending northerly alongside Coburg Crescent.

The purpose of the Contaminant Investigation was to assess soil and groundwater quality within the upper 10 m of the Study Area and to provide recommendations for additional contaminant investigations. A copy of the Contaminant Investigation Report is provided in **Appendix D**.

Investigations were not completed south of Bantry Avenue due to difficulties in locating a storm sewer. Future assessment related to this area is discussed in **Section 5.1.7**.

Soil samples collected within five boreholes (BH4, MW4, BH5, MW5 and BH6 – see Figure 2 of **Appendix D**) were tested for Total Organic Vapours. Groundwater samples collected from two monitoring wells (MW4 and MW5 – see Figure 2 of **Appendix D**) were analyzed for concentrations of metals/ inorganic parameters, Petroleum Hydrocarbons and Volatile Organic Compounds.

Generic site condition standards established by the MOE (now MOECC) in the document titled “Soil, Groundwater and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act” (MOE, April 2011) (the “Standards”) were used to assess soil and groundwater quality in the Study Area. Those Standards are often referred to by the associated Tables within the Standards document. The Study Area is not a sensitive site as defined in O. Reg. 153/04 and is municipally serviced. Therefore, Table 3 Standards established for non-potable groundwater conditions for industrial/commercial/community land uses with fine-textured soil were considered to be applicable for the Study Area. For comparison purposes, results were also compared to Table 1 Standards, since soils that meet Table 1 Standards have no off-site disposal/re-use restrictions.

All samples taken met the Table 3 Standards; however, some samples did not meet the Table 1 Standards:

- The soil sample at MW4 showed concentration of Petroleum Hydrocarbon F4 of 180 µg/g exceeding the Table 1 Standard of 120 µg/g but below the Table 3 Standard of 6,600 µg/g
- The groundwater samples showed:
  - Concentrations of molybdenum of 150 and 27 µg/L in MW4 and MW5 exceeded the Table 1 Standard of 23 µg/L but were below the Table 3 Standard of 9,200 µg/L
  - Concentration of uranium of 58 µg/L in MW4 exceeded the Table 1 Standard of 8.9 µg/L but was below the Table 3 Standard of 420 µg/L
  - Concentration of vanadium of 5.2 µg/L in MW5 was above the Table 1 Standard of 3.9 µg/L but was below Table 3 Standard of 250 µg/L

It is believed that elevated concentrations of molybdenum, uranium and vanadium in shallow groundwater may be naturally occurring.

## 4.2 Socio-Economic Environment

### 4.2.1 Noise and Vibration

The TSF will extend approximately 20 m underground, just to the west of the existing CN / GO Richmond Hill rail line. Noise sensitive receptors are present within the study area, including residential properties on Cobourg Crescent, Merrill Avenue, Bantry Avenue and west of the CN / GO Richmond Hill rail line. Novus Environmental Inc. (Novus) was retained by MMM Group to assess the

potential for noise and vibration impacts from construction and operation of the TSF. Findings from this report are discussed in **Sections 5.2.2**. A copy of this report is included in **Appendix C**.

#### **4.2.2 Land Use**

Current surrounding land use within the Study Area is predominantly residential and commercial. Low-density with occasional high-density residential land use is present primarily in the central and northern portions of the Study Area, to the north of Beresford Drive and Bantry Road. Commercial land use is present as businesses in the southwestern portion and along the western boundary of the Study Area. Medical offices can be found in the southeastern portion of the Study Area. Office buildings are present in the southwestern portion of the Study Area.

Several land use planning studies along the Corridor are currently underway or will commence upon completion of this study. The Richmond Hill Official Plan (2010) was adopted by the Council of the Town of Richmond Hill on July 12, 2010. The Plan was endorsed, as modified, by York Region on May 19, 2011. The Official Plan has been partially approved by orders from the Ontario Municipal Board, which brings specific policies of the new Official Plan into effect, save and except those policies which have been deferred and which remain under town-wide, site or area-specific appeal (Town of Richmond Hill, 2014).

The Richmond Hill Regional Centre Design and Land Use Study (2010) was undertaken for the Town of Richmond Hill by Urban Strategies Inc., iTrans and Morrison Hershfield. The purpose of the study was to provide background information for the Official Plan, to guide future development in the Richmond Hill Regional Centre area as an inter-modal transit hub and Urban Growth Centre (Town of Richmond Hill, 2014).

### **4.3 Cultural Environment**

#### **4.3.1 Built Heritage and Cultural Heritage Landscapes**

A cultural heritage resource survey of built heritage resources and cultural heritage landscapes older than 40 years of age was undertaken along Yonge Street within the study corridor for the 2009 EPR. An updated Cultural Heritage Assessment Memo was prepared by Unterman McPhail Associates to support of the EPR Addendum to address areas within Study Area not previously assessed. A copy of that Memo can be found in **Appendix H**. No cultural heritage resources, including provincially or federally designated properties, will be impacted by the proposed works.

#### **4.3.2 Archaeological Resources**

Stage 1-2 Archaeological Assessment Reports were prepared by Archaeological Services Inc. for the 2009 EPR. It was ultimately found that with the exception of the East Don River crossing, no additional archaeological assessment was required and the Ministry of Culture (now the Ministry of Tourism, Culture and Sport) concurred with the findings of the reports.

A subsequent Stage 1-2 Archaeological Assessment was carried out in 2012 by New Directions Archaeology, in support of the EPR Addendum to address areas within Study Area not previously assessed. A copy of that report can be found in **Appendix G**. The majority of the study corridor lies within the existing right-of-way and is generally disturbed due to roadway construction and surrounding residential and commercial land uses and utilities.

A search of the Ministry of Tourism, Culture and Sport's archaeological site registry database identified seven registered archaeological sites within one kilometre of the Study Area. Due to the high number of sites in close proximity to the Study Area, topography suitable for habitation, and historic transportation routes, the potential for finding archaeologically significant materials is high. During field investigations the Study Area was visually determined to be disturbed by roadway, parking lot, building, and railroad track construction and subsequent berming and was therefore not subject to test pit survey. No cultural material was recovered during the assessment. As a result, the Stage 1-2 Archaeological Assessment Report (**Appendix G**) recommended that no further archaeological assessment is required. Should the boundaries of the Study Area change to include lands outside the current plan, further Stage 2 archaeological assessment is recommended.

#### **4.4 Transportation Network**

This section summarizes aspects of the existing transportation environment in which the Transit Project is proposed to take place.

##### **4.4.1 Transit Network**

In the vicinity of the Study Area, there are both local and regional transit operating on surface routes and commuter rail (see **Figure 4-2**). Presently YRT operates 9 regular bus services within the Study Area. In addition there are 3 Viva Bus Rapid Transit routes operating out of the Richmond Hill Centre Terminal. Existing service levels are described in the original EPR and are assumed to be similar. No Brampton Transit or Toronto Transit Commission (TTC) routes operate within the Study Area.

The key operations in the vicinity of the Study Area include:

##### **VIVA & YRT**

- Viva Blue (Yonge North & South)
- Viva Purple (Hwy 7 West & East)
- Viva Pink (Yonge North & South, turning onto Hwy 7 and continuing East)
- Route 16 (16th Avenue West & East)
- Route 85 & 85C (16th Avenue West & East)
- Route 86 (Red Maple Road North & South)

- Route 1 (High Tech Road East & West)
- Route 99 (Yonge North & South)
- Route 83 (Garden Avenue East & West)
- Route 87 (Garden Avenue East & West)
- Route 91B (Hwy 7 East & West)
- Route 91 & 91A (Bayview Avenue North & South)

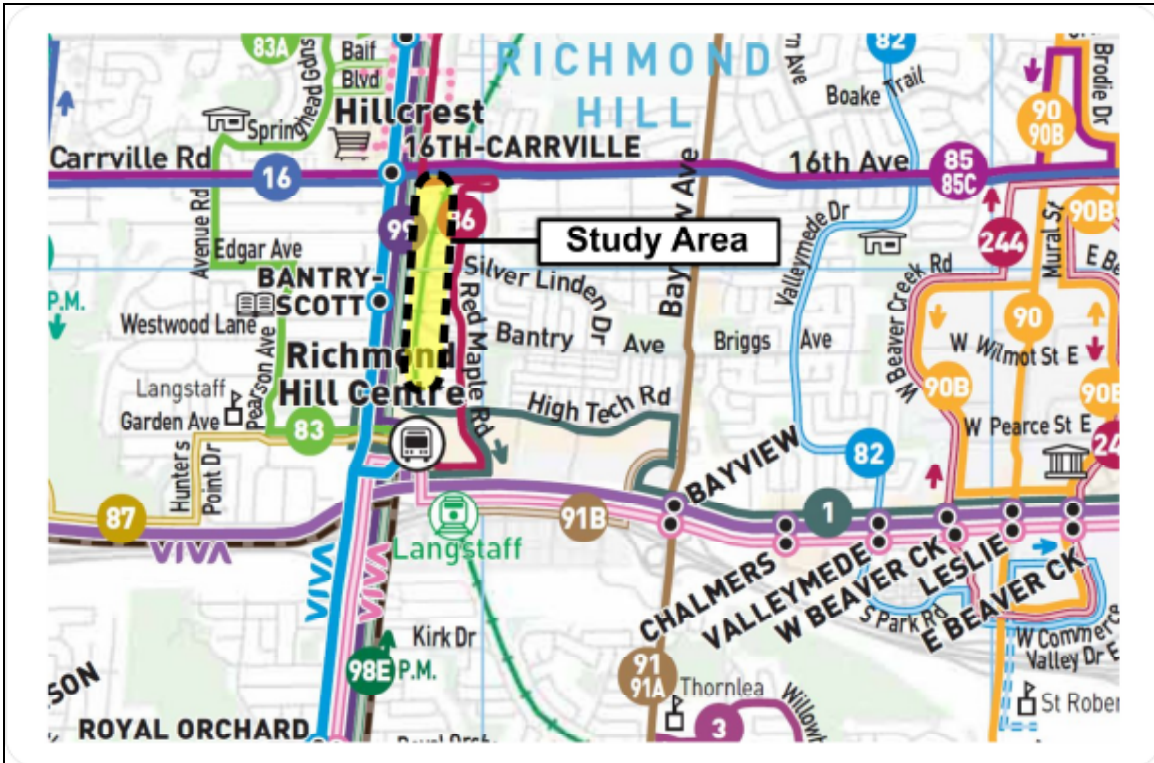


Figure 4-2: Local Transit Network<sup>2</sup>

### Commuter Rail<sup>3</sup>

Presently GO Transit operates commuter peak-only commuter rail service on the Richmond Hill Line (CN Bala Subdivision) between Union Station and Richmond Hill GO Station as described below and shown in **Figure 4-3**:

- Richmond Hill Rail Line – stops at Richmond Hill Centre Terminal. There are 5 southbound trains during the AM Peak and 6 northbound during the PM Peak.
- GO Bus<sup>4</sup>

<sup>2</sup> From YRT/viva - [http://www.yrt.ca/en/schedulesmaps/resources/YRT-ShelterMap\\_Dec2013\\_web.pdf](http://www.yrt.ca/en/schedulesmaps/resources/YRT-ShelterMap_Dec2013_web.pdf)

<sup>3</sup> From GO Transit - <http://www.gotransit.com/timetables/en/schedules/maps.aspx#>

<sup>4</sup> From GO Transit - <http://www.gotransit.com/timetables/en/schedules/maps.aspx#>



**Figure 4-3: Regional Transit Network**

Bus Routes provide service to Richmond Hill Centre Terminal (via Yonge Street) during off-peak hours (when trains are not in service) at 60 minute headways and 30 minute headways closer to the AM and PM peak start times (Bus route #61). The following express GO bus services operated along Highway 407, also stop at Richmond Hill Centre:



- #51 Pickering – York University
- #52 Oshawa – York University
- #54 Markham - York University

#### Pedestrian and Cycling Network

The Study Area is mainly residential and commercial with sidewalks on one or both sides of the street for pedestrian use. There is a multi-use trail that connects Duncan Road to Red Maple Road along the river just east of the Study Area.

The following is a description of sidewalk locations for key streets in the vicinity of the Study Area:

- Bantry Avenue; sidewalks on both the north and south sides throughout the Study Area;
- Coburg Crescent; sidewalk on the west side of the road only through the north-south segment of the roadway;
- Beresford Drive; sidewalk on the west side of the road only through the north-south segment of the roadway; and
- 16th Avenue; sidewalk on both the north and south sides through the Study Area;

The following is a list of designated cycling routes in the vicinity of the Study Area (see **Figure 4-4**):

- High Tech Road Signed Route (Runs from Yonge Street to Bayview Avenue);
- Bantry Avenue Signed Route (Runs between Yonge Street and Bayview Avenue and beyond);
- Red Maple Road Signed Route (Runs from 16th Avenue to Highway 7);
- Silver Linden Drive Signed Route (Runs from Red maple Road to High Tech Road);
- Elm Avenue Signed Route (Runs from 16th Avenue to Springbrook Drive);
- Springbrook Drive Signed Route (Runs from Elm Avenue to Bayview Avenue and beyond); and,
- Fern Avenue Signed route (Runs from Springbrook Drive to 16th Avenue and beyond).

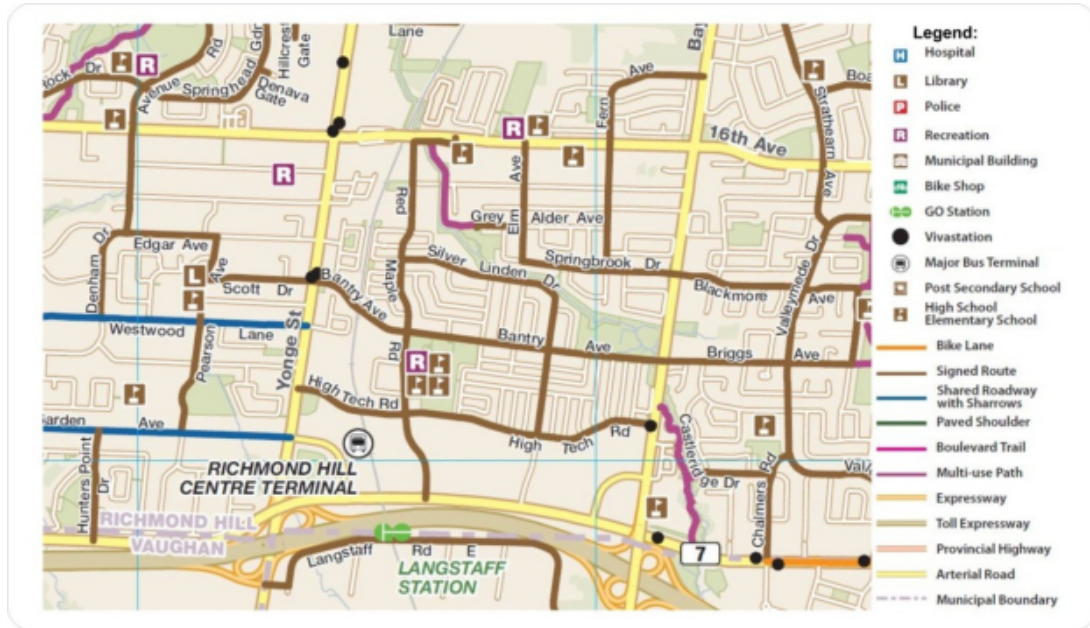


Figure 4-4: Cycling Routes within Study Area<sup>5</sup>

#### 4.4.2 Existing Roadway Network

The road network in the vicinity of the Study Area has not notably changed since the 2009 EPR for the YSE.

As described in the 2009 EPR, Yonge Street operates as a six lane facility from the 407 to High Tech Road where it narrows to four basic lanes. The other arterial roadways are Highway 7 which operates six basic lanes and 16th Avenue which operates 4 basic lanes. York Region’s VivaNext project will begin construction in 2014, and will result in the implementation of two additional dedicated bus lanes on Yonge Street from approximately Garden Avenue northerly, resulting in a 6-lane cross-section.

Bantry Avenue and High Tech Road are collector roadways operating in the east-west direction that cross over the railway corridor. Bantry Avenue operates 2 basic lanes with 2 cycling lanes over the railway corridor and expands to 4 basic lanes with 2 cycling lanes as it approaches Yonge Street. High Tech Road operates with 4 basic lanes. Red Maple Road is the only notable north-south collector roadway which operates with 4 basic lanes.

Minor residential roadways in close proximity to the proposed works include Coburg Crescent, Ellesmere Street, Merrill Avenue, Beresford Drive and Baffin Court. These roadways are generally two-lane cross-sections with at least one sidewalk.

<sup>5</sup> From 2013-2014 York Region Bike Map - [http://www.york.ca/wps/wcm/connect/yorkpublic/695f3394-71af-4f81-9ff8-01659b6fa9eb/York\\_Bike\\_Map\\_MS.pdf?MOD=AJPERES](http://www.york.ca/wps/wcm/connect/yorkpublic/695f3394-71af-4f81-9ff8-01659b6fa9eb/York_Bike_Map_MS.pdf?MOD=AJPERES)

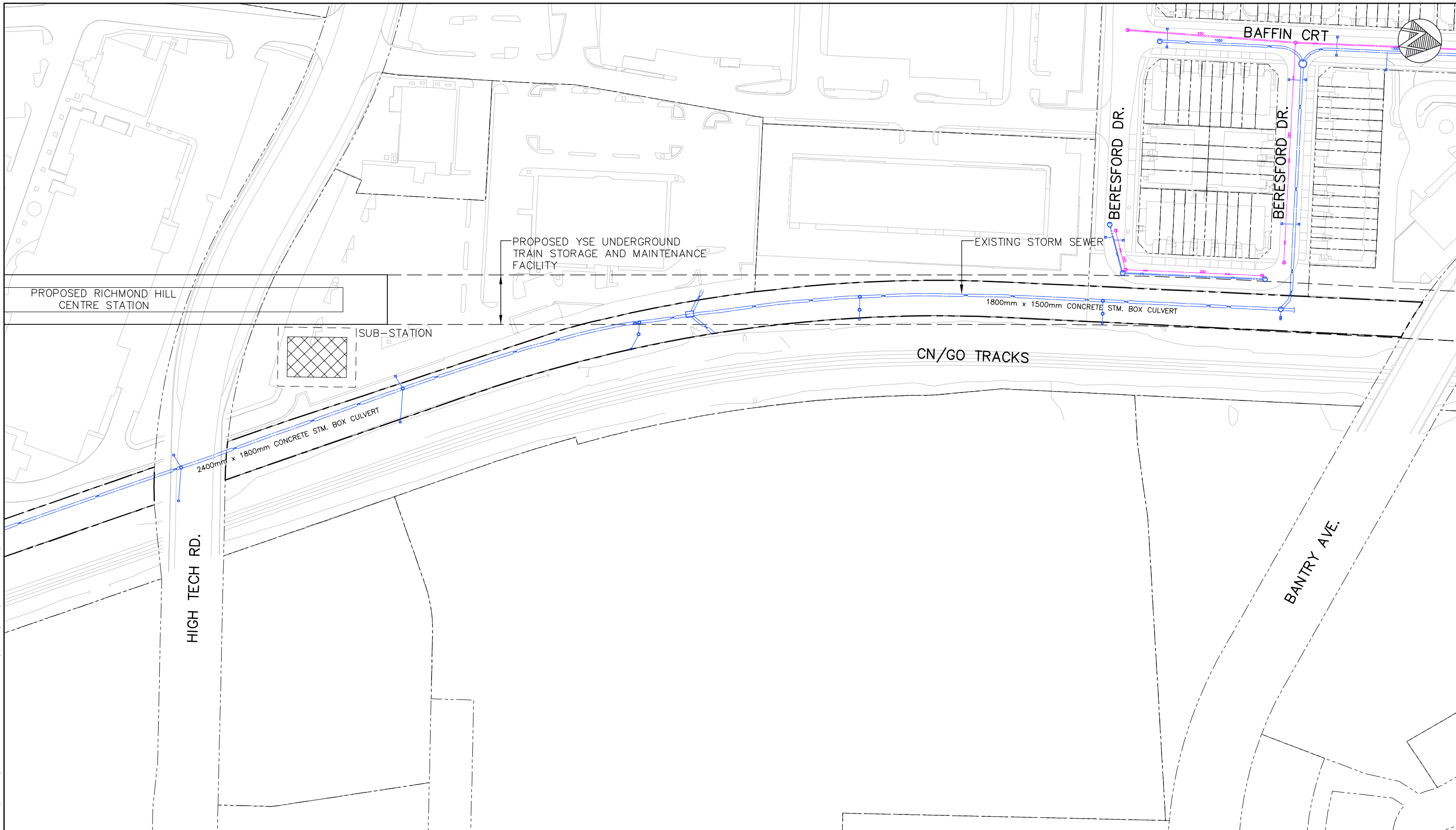
## 4.5 Utilities

There is an existing, large, trunk storm sewer system that runs within the proposed YSE corridor approximately 8m below existing grade (**see Figure 4-5**). A 975mm diameter concrete pipe runs along the north portion of Beresford Drive and connects to a 1.8m x 1.5m concrete box trunk sewer within the Town of Richmond Hill right-of-way that drains southerly. North of Richmond Hill Centre Station, the trunk sewer converges with a 3.0m x 2.1m concrete box culvert storm sewer from Red Maple Road that crosses under the CN railway corridor. The twin sewer system then outlets under Richmond Hill Centre Station in twin 3.0m x 2.4m concrete box culverts into a stormwater detention pond located in the north east quadrant of Yonge Street and Highway 7.

A watermain running along Coburg Crescent crosses easterly through the Study Area, under the railway corridor and continues along King William Crescent.

Residential services (hydro, gas, watermain, sewers, etc.) exist throughout the local road network. A thorough review of existing and proposed future utilities plans, as well as all necessary relocations or modifications will be undertaken during detailed design of this Transit Project.

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LEGEND:

- EXISTING SANITARY SEWER
- EXISTING STORM SEWER

DATE:

JANUARY 2014

SCALE:

1:1500

**YONGE SUBWAY EXTENSION  
ENVIRONMENTAL PROJECT REPORT ADDENDUM**

EXISTING UTILITIES

FIGURE

**4-5**

