

NATURAL HERITAGE REPORT

**407 TRANSITWAY FROM EAST OF HIGHWAY 400 TO
KENNEDY ROAD (W.P. 252-96-00)
PLANNING AND PRELIMINARY DESIGN STUDY**

prepared for:



prepared by:

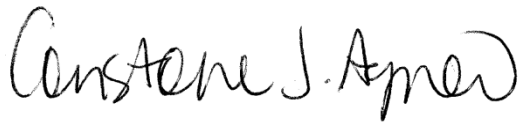


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1.0 INTRODUCTION

The Ministry of Transportation (MTO) has initiated a planning and preliminary design study for the 407 Transitway, a 23 km central segment of a transitway along the Highway 407 corridor through York Region, from east of Highway 400 to Kennedy Road. This transitway segment includes the runningway, transit stations and a maintenance and storage facility. Subject to the outcome of this study, the transitway will be implemented initially as a bus rapid transit (BRT) facility with the opportunity to convert to a light rail transit (LRT) facility in the future.

This 23 km segment is the priority section of the 150 km long high-speed inter-regional facility planned to be ultimately constructed on a separate right-of-way that parallels Highway 407 from Burlington to Oshawa, with stations, parking and access connections. The Transitway is a component of the official plans of the stakeholder municipalities and of the Province's commitment to support transit initiatives in the Greater Golden Horseshoe.

This study was initiated as a Group "A" project in accordance with the *Class Environmental Assessment for Provincial Transportation Facilities* (MTO 2000). Later, a decision was made to transition the environmental assessment process to the Transit Project Assessment Process following the *Transit Projects and Greater Toronto Transportation Authority Undertakings Regulation, Ontario Regulation 231/08*. In December 2008, the Ministry of the Environment was notified of MTO's intention to transition this study to the new Transit Project Assessment Process.

Delcan Corporation is leading the study on behalf of MTO. LGL was retained by Delcan to conduct a natural heritage investigation in support of the environmental assessment for the 407 Transitway.

This report documents the results of the secondary source natural heritage investigation including a description of existing conditions within the study area. This report updates work completed by LGL Limited in 2005 for the Regional Municipality of York as part of the Highway 7 Transit Improvements Individual Environmental Assessment. The report is based on readily available background information and detailed, multi-season field investigations conducted by LGL in 2008 and 2009.

2.0 THE STUDY AREA

The study area is located within the City of Vaughan, Town of Richmond Hill and Town of Markham in the Regional Municipality of York. The study area is also located within the province's Parkway Belt West Plan, which is a multi-purpose corridor providing right-of-way for freeways, regional transit, electric power transmission lines, utilities and public open space. The project limits are presented in **Figure 1**.

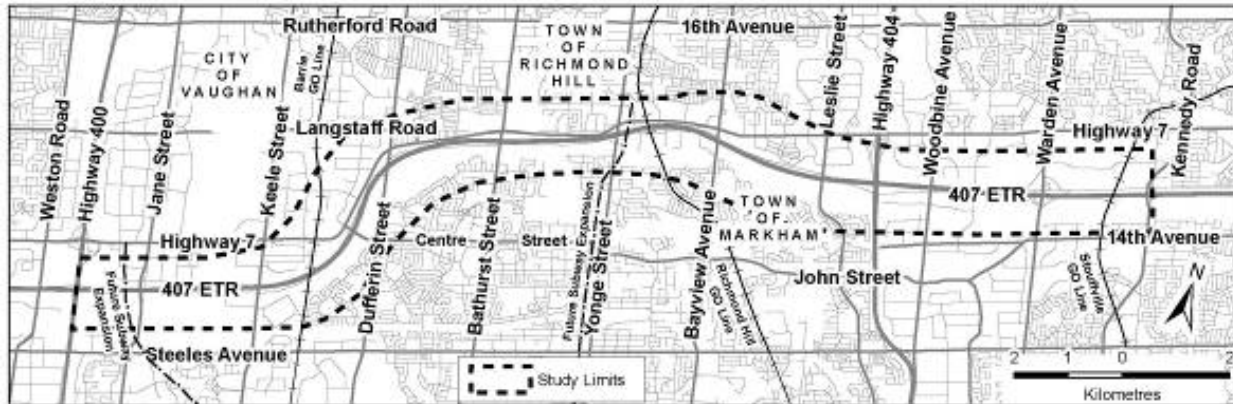


FIGURE 1: KEY PLAN OF THE STUDY AREA.

For convenience in presentation of the information relating to existing conditions, impact assessment and analysis, the study area has been divided into six segments. The segment boundaries are as follows:

- Segment A – Highway 400 to east of Keele Street;
- Segment B – East of Keele Street to west of Yonge Street;
- Segment C – West of Yonge Street to west of Bayview Avenue;
- Segment D – West of Bayview Avenue to west of Leslie Street;
- Segment E – West of Leslie Street to west of Warden Avenue; and,
- Segment F – West of Warden Avenue to east of Kennedy Road.

3.0 EXISTING CONDITIONS

This section describes the existing conditions in the study area related to natural heritage, including physiography and soils, geology/hydrogeology, aquatic habitat and communities, vegetation and vegetation communities, wildlife and wildlife habitat and designated natural areas.

The study area for the natural heritage investigation includes a one kilometre wide corridor centred along Highway 407 from east of Highway 400 in the City of Vaughan to Kennedy Road in the Town of Markham, in the Regional Municipality of York. For the planning stage, data was collected from secondary sources. For the preliminary design stage, the data presented in this report was updated and augmented through detailed, multi-season field investigations conducted along each of the preliminary design alternatives. In some cases more than one alternative was identified per segment of transitway. The results of the natural sciences investigation conducted during the preliminary design stage will be documented in an Environmental Project Report. The location of the study area is presented in **Figure 1**.

3.1 *Physiography and Soils*

The study area is located within the Peel Plain physiographic region, which extends through the central portions of the Regions of Halton, Peel and York. The Peel Plain is a level to undulating tract of clay soils with imperfect drainage, through which the Credit, Humber, Don and Rouge Rivers have carved deep valleys (Chapman and Putnam 1984).

The soils surrounding Highway 407 in the study area are classified as Peel clay, Fox sandy loam, Berrien sandy loam, Malton clay, Chinguacousey clay loam, Jeddo clay loam, Oneida clay loam, Cashel clay, Bookton sandy loam, Brady sandy loam and Bottom Lands. Between Weston Road and Highway 400

soils are predominantly Malton Clay. Between Highway 400 and east of Keele Street soils are predominantly Chinguacousey clay loam with Bottom Lands surrounding one watercourse. From east of Keele Street to Dufferin Street where Highway 407 jogs north, soils are predominantly Peel clay with Jeddo clay loam and Bottom Lands surrounding one watercourse. Between Dufferin Street and Bathurst Street soils are predominantly Chinguacousey clay loam and Oneida clay loam. Between Bathurst Street and Yonge Street soils are predominantly Cashel clay with Peel clay and Bottom Lands surrounding two watercourses. Between Yonge Street and Bayview Avenue soils are predominantly Chinguacousey clay loam. Between Bayview Avenue and Warden Avenue soils are predominantly Peel clay with Bookton sandy loam, Cashel clay, Malton clay, Brady sandy loam, Berrien sandy loam and Bottom Lands surrounding four watercourses. Between Warden Avenue and McCowan Road soils are predominantly Berrien sandy loam with Malton clay, Peel clay and Bottom Lands surrounding two watercourses.

3.1.1 Peel clay

Peel clay soils are imperfectly drained and exhibit a smooth, gently sloping topography. This soil type consists of lacustrine clay over gritty clay, which can be up to one metre deep. Erosion is slight with this soil type.

3.1.2 Berrien sandy loam

Berrien sandy loam soils are imperfectly drained with a smooth, gently sloping topography. This soil type is composed of sandy outwash over calcareous clay till, which can be up to one metre deep. This soil is very friable and erosion prone though run-off is low.

3.1.3 Malton clay

Malton clay soils are poorly drained with a smooth, very gently sloping topography. This soil type is composed of lacustrine clay over gritty clay, which can be up to one metre deep. This soil type is friable, but poor drainage causes erosion to be slight under natural conditions.

3.1.4 Chinguacousey clay loam

Chinguacousey clay loam soils are imperfectly drained with a smooth, gently sloping topography. This soil type consists of shaly, calcareous clay till. Erosion is slight with this soil type as a result of the combination of gently sloping topography and low friability.

3.1.5 Jeddo clay loam

Jeddo clay loam soils are poorly drained with a smooth, gently sloping topography. This soil type consists of lacustrine material, intermixed with till in some areas. Erosion is slight with this soil type as a result of the combination of gently sloping topography and low friability.

3.1.6 Oneida clay loam

Oneida clay loam soils exhibit good drainage with a smooth, moderately sloping topography. This soil type consists of shaly, calcareous clay till. This soil type is susceptible to erosion.

3.1.7 Cashel clay

Cashel clay soils exhibit good drainage with a smooth, moderately sloping topography. This soil type consists of lacustrine clay over gritty clay, which can be up to one metre deep. This soil is highly prone to sheet and gully erosion.

3.1.8 Bookton sandy loam

Bookton sandy loam soils are well drained with smooth, gently to moderately sloping topography. This soil type is composed of sand and sandy loam over calcareous clay till. This soil is friable and semi-prone to erosion.

3.1.9 Brady sandy loam

Brady sandy loam soils are imperfectly drained with smooth, gently sloping topography. This soil type is composed of stonefree sandy loam over coarse sandy outwash material. This soil type is friable and semi-prone to erosion.

3.1.10 Bottom Lands

Bottom Land alluvial soils are comprised of recent alluvial deposits. They have variable drainage, variable to level topography and erosion is variable. This soil type surrounds the watercourses throughout the study area.

3.2 Geology/Hydrogeology

Golder Associates Ltd. (Golder) carried out a Secondary Source Groundwater Investigation for the 407 Transitway. The study area included a 1000 m wide corridor centred on Highway 407. The purpose of this investigation was to characterize the existing groundwater resources and hydrogeology in the study area and to predict potential impacts on groundwater resources which may arise as a result of the proposed construction work (Golder 2007). This review provides a general interpretation of the existing physical setting, based on a secondary source review, including information obtained from the MOE Water Well Database, published geological maps, aerial photography, and, surface topography.

3.2.1 Regional Geology

According to Sharpe *et al.* (1997) the overburden at ground surface within the study area consists of the following soil units:

- Glacial till deposits (Unit 3f), that are comprised of sandy silt to sand, known as Newmarket Till;
- Glacial till deposits that are primarily comprised of clayey silt to silt till with interbedded sand and silt Halton Till (Unit 4b);
- Glacial lake deposits (Unit 7) that are comprised of silt and clay;
- Glacial lake deposits (Unit 8a) that are primarily comprised of sand and gravel; and,
- Alluvial deposits (Unit 10), primarily along existing surface water courses, which are comprised of silt, sand and gravel.

The stratigraphy, as described in the Ministry of the Environment (MOE) well records, indicated the variable geologic conditions ranging from clay to gravel. Deposits that are comprised of relatively coarser grained materials will provide a relatively greater opportunity for groundwater recharge.

3.2.2 Hydrogeology

Hydrogeologic cross-sections were taken based on the analysis of borehole data and/or well elevations and indicate that the study area consists of thick overburden resting on bedrock (Golder 2007). The thickness of overburden varies and is generally undefined as wells do not reach bedrock surface when drilled. The Paleozoic bedrock is primarily Georgian Bay Formation, including shale, siltstone, sandstone

and limestone. Bedrock depths within the study area will likely exceed conventional excavation necessary for construction of the transitway (Golder 2007).

3.2.3 Groundwater

Groundwater conditions are expected to vary considerably within the study area limits. Groundwater levels are generally controlled by the local subsurface stratigraphy, with shallow groundwater flow associated with watercourses and deeper regional groundwater flow expected further south of the study area (Golder 2007).

Groundwater recharge areas relate to local topographic and geologic conditions, with recharge areas located throughout the study area away from watercourses, which are generally associated with areas of discharge. Groundwater discharge areas are associated with the watercourses within the study area, including Black Creek, West Don River, East Don River, German Mills Creek, Apple Creek, and Beaver Creek.

An inventory of the water supply wells that historically have been present in the study area was compiled, based on the MOE database of water supply wells, and verbal reports from municipal public works staff. The MOE database records indicate the historic presence of about 143 water supply wells within the study area. Additional water supply wells may be located in the study area, but their records are not included in the MOE database.

The construction details of supply wells that are still in use are not known from available data. Water wells obtaining water from shallow groundwater, such as dug wells, will be more susceptible to changes in shallow groundwater quality, whereas drilled wells that tap deeper aquifers will be less susceptible. There are at least 44 wells listed as historically located in the study area that are of shallow/dug well construction.

3.3 Aquatic Habitat and Communities

3.3.1 Aquatic Habitat Communities

LGL Limited fisheries biologists reviewed secondary information and conducted a fisheries and aquatic habitat survey in September 2008, to identify and document aquatic habitat of the watersheds along the technically preferred route and station alternative for the 407 Transitway.

Physical features within 50 m of the preferred alternative route were surveyed in sufficient detail to enable mapping and identification of key habitat types. The fisheries investigation by LGL Limited staff was carried out in accordance with the *Ministry of Transportation (MTO)/Department of Fisheries and Oceans Canada (DFO)/Ontario Ministry of Natural Resources (OMNR) Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings* (2009). The physical habitat attributes assessed included: (a) instream cover; (b) bank stability; (c) substrate characteristics; (d) stream dimensions and depths; (e) barriers; (f) stream morphology; (g) terrain characteristics; (h) stream canopy cover; (i) stream gradient; (j) aquatic vegetation; (k) ground water seepage; and (l) general comments.

The study area is located within the Humber River, Don River, and Rouge River watersheds. There are a total of 16 watercourse crossings along the proposed 407 Transitway: three within the Humber River watershed; ten within the Don River watershed; and, three within the Rouge River watershed. A summary of habitat conditions at the watercourses located in the 407 Transitway study area is presented in **Table 1**. The location of the watercourses, proposed transitway routes and sampling stations are presented in **Figures 2A and 2B**. For ease of reference, the sampling stations are labelled by watershed; for example, “H1” represents the first location surveyed within the Humber watershed.

A review of fisheries information provided by the Toronto and Region Conservation Authority (TRCA) within the study area was completed to determine the presence/absence of a fish community, its composition and thermal regime. A summary of fish recorded within the study area is presented in **Table 2**. The locations of TRCA sampling stations are presented in **Figure 2A and 2B**. A review of the DFO/TRCA Aquatic Species at Risk Mapping (May 2010) was also completed to identify areas which are managed for listed species.

Humber River

The western portion of the study area, from Weston Road to immediately east of Jane Street passes through the Humber River watershed. Tributary systems of the Humber River watershed crossed by the proposed 407 Transitway are limited to Black Creek and its tributary. Sampling stations in this portion of the study area are located in Segment A.

Station H1 is a tributary of Black Creek and is designated as a warmwater system by the TRCA. The area affected by the 407 Transitway is found 25 m south of the on-ramp from Highway 400 to Highway 407 and 520 m east of Highway 400. Station H4 is located on Black Creek, approximately 125 m south of Highway 407 and 110 m east of Jane Street. Black Creek is designated as a warmwater system by the TRCA. A tributary of Black Creek, Station H5, is designated as a warmwater system by the TRCA and located approximately 75 m south of Highway 407 and 850 m east of Jane Street.

Don River

The central portion of the study area, from east of Keele Street to Highway 404, passes through the Don River watershed. Tributary systems of the Don River watershed crossed by the proposed 407 Transitway include both the East and West Don River and their tributaries, including German Mills Creek and its tributaries.

Station D1 is found in Segment B approximately 75 m northwest of Highway 407 and 825 m west of Dufferin Street. More specifically they are located at the confluence of the West Don River and a tributary, which are both designated as warmwater systems by the TRCA. From this location, the 407 Transitway is proposed to cross the West Don River (Station D3) for approximately 250 m in a northeast direction. Station D17, along Segment B, is located on Westminster Creek, approximately 30 m northwest of Highway 407 and 185 m west of Dufferin Street. Station D18, a tributary of Westminster Creek, is located approximately 535 m south of Highway 407 and 485 m east of Dufferin Street. This watercourse is disconnected from other watercourses and is now a grassed swale. Station D22, a tributary of the East Don River would be crossed by the 407 Transitway approximately 30 m north of Highway 407 and 460 m west of Bathurst Street. This watercourse has been realigned to flow eastward toward Bathurst Street for approximately 350 m before being piped under Highway 407. This watercourse is designated as a warmwater system by the TRCA.

TABLE 1.
FISH HABITAT ASSESSMENT SUMMARY

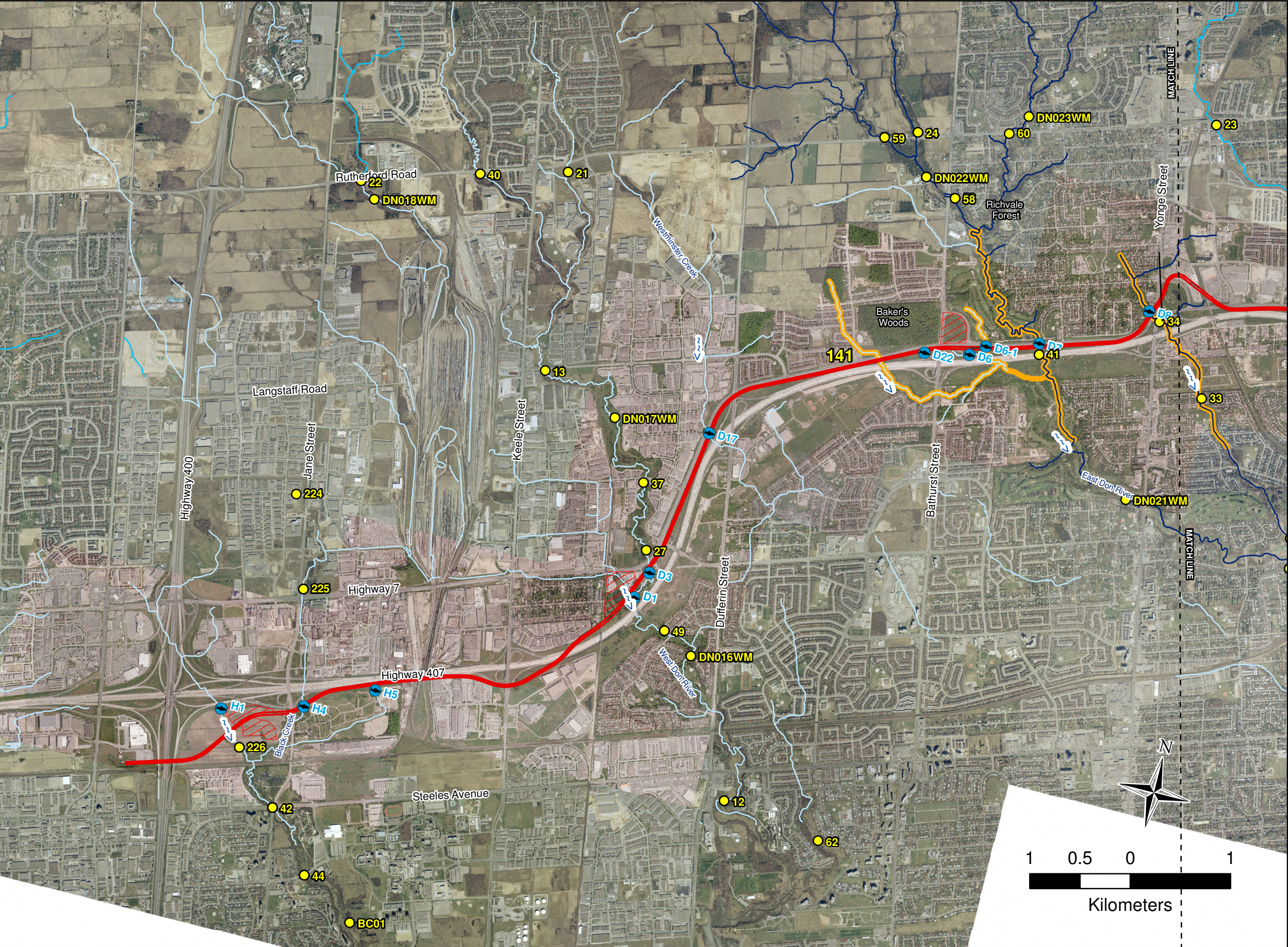
Reference Number	Waterbody Name	GPS Locati on	Type of Crossing	Fish Community	Habitat Summary		Flow Conditions	Drainage Connectivity	Comments
					Upstream	Downstream			
H1	Tributary 1 of Black Creek	0618202 4848830	concrete box culvert	warmwater	<ul style="list-style-type: none">• Channelized• poor morphology – run• riparian vegetation – cattail and grasses• little shade – plants and a few trees• instream cover – cobble, emergent vegetation• substrate – cobble to sand• limited erosion	<ul style="list-style-type: none">• channelized• poor morphology – run• riparian vegetation – cattails and grasses• little shade – cattails• instream cover – cobble, emergent vegetation• substrate – cobble to gravel• limited erosion	permanent	good	<ul style="list-style-type: none">• year round flow• flows through agrilcutural area• piped for a long distance under 400 and 407 upstream of this site.
H4	Black Creek	0619035 4849052	concrete box culvert	warmwater	<ul style="list-style-type: none">• natural channel• morphology – runs, pools, and riffles• riparian vegetation – grasses, shrubs, trees• 0-30% shade• instream cover – cobbles, submerged grasses• substrate – cobble, gravel, snd• little erosion	<ul style="list-style-type: none">• natural channel• morphology – mainly run, one riffle• riparian vegetation – grasses, shrubs trees• 0-30% shade• instream cover – large cobble, submerged grasses• substrate – cobble and gravel• little erosion – vegetation and cobble stabilized	permanent	good	<ul style="list-style-type: none">• year round flow• cemetery just downstream with a pond connectd to the stream
H5	Tributary 2 of Black Creek	0619683 4849347	concrete box culvert	warmwater	<ul style="list-style-type: none">• channelized – ditched• poor morphology – straight• riparian vegetation – grasses and trees• poor shading – few trees and shrubs• instream cover – emergent vegetation• substrate – gravel, silt, sand• some erosion, banks unstable	<ul style="list-style-type: none">• channelized – ditched• poor morphology – straight• riparian vegetation – grasses and cattails• poor shading – few tree and shrubs• instream cover – cattails• substrate – gravel, silt, sand• some erosion, unstable banks	intermittent	poor	<ul style="list-style-type: none">• construction on either side of the watercourse• prone to drying up
D1	Tributary 1 of West Don River and	0621938 4850882	bridge	warmwater	<ul style="list-style-type: none">• good morphology• riparian vegetation – trees, shrubs, grasses• well shaded from trees – 60 – 90 %• instream cover – rocks, emergent vegetation, undercut banks, woody debris• substrate – rock, cobble, gravel and sand• little erosion – lots of vegetation support	<ul style="list-style-type: none">• good morphology• riparian vegetation – trees, shrubs, grasses• well shaded from tress – 60 – 90 %• instream cover – emergent vegetation, cobble and undercut banks• substrate – rocks, cobble, gravel and sand• little erosion – stabilized by vegetation	permanent	good	<ul style="list-style-type: none">• year round flow• banks under the bridge are supported by boulders• asphalt pedestrian walkway runs alongside stream on east side• good mammal and bird migration corridor• tributary D1 converges with main channel of West Don River here
D3	West Don River	0622049 4850714	bridge	warmwater	<ul style="list-style-type: none">• morphology – mainly runs and flats• riparian vegetation – grasses, shrubs, trees• 30 – 60 % shade• instream cover – undercut banks, woody debris, submerged grasses• substrate – cobble and gravel• very little erosion – banks stable	<ul style="list-style-type: none">• poor morphology – mainly a run, odd riffle• riparian vegetation – grasses, shrubs, trees• 30 – 60 % shade• some instream cover – undercut banks, woody debris, submerged grasses• substrate – cobble, gravel, sand• little to no erosion - banks stable	permanent	good	<ul style="list-style-type: none">• year round flow• small inflow on west bank• just downstream of 407• walking path 10 – 15 m from east bank

TABLE 1.
FISH HABITAT ASSESSMENT SUMMARY

Reference Number	Waterbody Name	GPS Location	Type of Crossing	Fish Community	Habitat Summary		Flow Conditions	Drainage Connectivity	Comments
					Upstream	Downstream			
D17	Westminster Creek	06222074852615	pipd	warmwater	<ul style="list-style-type: none">channelized upstream of Highway 7pipd underground	<ul style="list-style-type: none">swalecattails0 – 30 % shadedisconnected from the rest of the water course	ephemeral	poor	<ul style="list-style-type: none">portion directly in transitway route disscconnected from upstream channel which is pipd underground
D22	Tributary 1 of the East Don River	06241734853916	upstream: concrete box culvert downstream: concrete box culvert	warmwater	<ul style="list-style-type: none">storm water pond drainlittle to no shadeemergent vegetation, cattailsbarrier to upstream migration	<ul style="list-style-type: none">partly channelizedpoor morphology – all runriparian vegetation – trees, shrubs and grassessome shade 0 – 30 %instream cover – cobble, emergent plants and watercresssubstrate – cobble, gravel, sand and siltlittle erosion	permanent	good	<ul style="list-style-type: none">watercourse realigned eastward between Hwy 7 and Hwy 407south of 407 empties into stormwater pond with structures that act as a barrierfish observed
D6	Tributary 2 of the East Don River	06246074854013	storm water drain	warmwater	<ul style="list-style-type: none">dry ditch	<ul style="list-style-type: none">dry ditch	ephemeral	none	<ul style="list-style-type: none">dry ditch, not fish habitat
D6-1	Tributary 2 of the East Don River	06247194854208	concrete box culvert	warmwater	<ul style="list-style-type: none">channelizedriparian vegetation – grassesno shadeinstream cover – cobblessubstrate – large cobbleno erosion – riprap for banks	<ul style="list-style-type: none">channelizedpoor morphology – run and large pondriparian vegetation – grasses and cattailslittle shade – cattailsinstream cover – cobbles, emergent vegetation /submergent vegetationsubstrate – cobble, muck, detrituslittle erosion	intermittent	good	<ul style="list-style-type: none">potential seasonal flowupstream nearly dryupstream re-routed around golf coursedownstream runs into storm water management pondlots of minnows in pondstormwater management structres make migration up or downstream impossible
D7	East Don River	06252214854358	twin culvert	coldwater	<ul style="list-style-type: none">channelizedpoor morphology – all runriparian vegetation – grasses and willow trees40% shadeinstream cover – large cobblesubstrate – cobblelittle erosion – banks supported with large boulders	<ul style="list-style-type: none">channelizedmorphology – runs and riffles (50:50)riparian vegetation – grassesno shadeinstream cover – cobblessubstrate – cobblesno erosion	permanent	good	<ul style="list-style-type: none">year round flowupstream re-routed around golf course greensminnows instream
D8	Pomona Creek	06262264854908	concrete box culvert	coldwater	<ul style="list-style-type: none">channelizedpoor morphologyriparian vegetation – grasses and trees0 – 30 % shade – more dense upstream of right-of-wayinstream cover – undercut bankssubstrate – gravel, silt and sand	<ul style="list-style-type: none">channelizedpoor morphologyriparian vegetation – grasses and trees0 – 30 % shade – more dense upstream of right-of-wayinstream cover – undercut bankssubstrate – gravel, silt and sand	permanent	good	<ul style="list-style-type: none">year round flowconcrete culvert runs approx. 175 m under Yonge Street and Hwy 7

TABLE 1.
FISH HABITAT ASSESSMENT SUMMARY

Reference Number	Waterbody Name	GPS Location	Type of Crossing	Fish Community	Habitat Summary		Flow Conditions	Drainage Connectivity	Comments
					Upstream	Downstream			
D12	German Mills Creek	0628433 4855296	large CSP under Hwy 7 and bridge under Hwy 407	coldwater	<ul style="list-style-type: none">natural channelgood morphology - rifflesriparian vegetation - trees and shrubs of maple, willow, sumac and poplarwell shaded with mature trees and shrubssubstrate - cobble, concrete rubble and debrisflood debris and bank erosion	<ul style="list-style-type: none">natural channelgood morphology - riffles and runsriparian vegetation - grasses, willow and lilac shrubsmoderate shading - treessubstrate - silt, fine gravel and cobbleno erosion - banks stabilized with boulders/rock protection	permanent	good	<ul style="list-style-type: none">year round flow
D14	Tributary 1 of German Mills Creek	0630039 4854838	open bottom concrete culvert; backfilled	warmwater	<ul style="list-style-type: none">channelizedriparian vegetation – trees, shrubs and grassesshade 30 - 60 %substrate - cobble and gravelno erosion - banks stabilized	<ul style="list-style-type: none">channelizedriparian vegetation - grasses, shrubs and cattailssome shade 0 – 30 %substrate - gravel and cobbleno erosion – banks stabilized	permanent	good	<ul style="list-style-type: none">year round flowfish observedcattail marsh downstream near proposed station location
D15	Tributary 2 of German Mills Creek	0631739 4855062	concrete box culvert	warmwater	<ul style="list-style-type: none">cattail swale	<ul style="list-style-type: none">cattail swale	intermittent	poor	<ul style="list-style-type: none">channel is choked with cattails upstream and downstreamseasonal swalegolf course upstream has interrupted flow
R8	Tributary of Beaver Creek	0633530 4855652	culvert	warmwater	<ul style="list-style-type: none">good morphology, runs, flats and poolssome shade 0 – 30 %instream cover – undercut banks, submerged grasses, woody debrissubstrate – mud and siltriparian vegetation – grasses, shrubs and some treesbanks slightly unstable	<ul style="list-style-type: none">good morphology, runs, flats and poolslittle shade, overhanging grassesinstream cover – undercut banks, submerged grassessubstrate – mud and siltriparian vegetation – grasses and shrubsbanks slightly unstable	permanent	good	<ul style="list-style-type: none">small stream flowing in from southwestchannel realigned from east (upstream) around hydro facility
R6	Markham Centre Tributary of the Lower Rouge River	0635023 4856614	concrete box culvert	warmwater	<ul style="list-style-type: none">channelized; poor morphologyriparian vegetation – sparse grasses and herbsno shade substrate – muckrock gabion weir just downstream of Hwy 407, acting as a permanent barrier to migration	<ul style="list-style-type: none">channelized; poor morphologyriparian vegetation - sparse grasses and herbsno shade substrate - muckcattail and filamentous green algae in storm water pond	permanent	good	<ul style="list-style-type: none">stream realigned eastwardfish observedweir acting as migration barrier
R7	Kennedy Tributary of the Lower Rouge River	0635626 4856859	twin-CSP	warmwater	<ul style="list-style-type: none">no defined channelriparian vegetation – sparse grasses and cattailsno shade	<ul style="list-style-type: none">no defined channelriparian vegetation – sparse grasses and cattailsno shade	ephemeral		
R7-1	Kennedy Tributary of the Lower Rouge River	0635729 4856605	CSP	warmwater	<ul style="list-style-type: none">no defined channelriparian vegetation – grasses and cattailmeadow marsh type ecology	<ul style="list-style-type: none">no defined channelriparian vegetation – grasses and cattailmeadow marsh type ecology	ephemeral	low	



LEGEND

- Coldwater
- Coolwater
- Warmwater
- *Watercourse May Support Redside Dace
- Fish Habitat Station (TRCA)
- Location of Fish Habitat Investigation
- Proposed Transitway Route
- Proposed Station

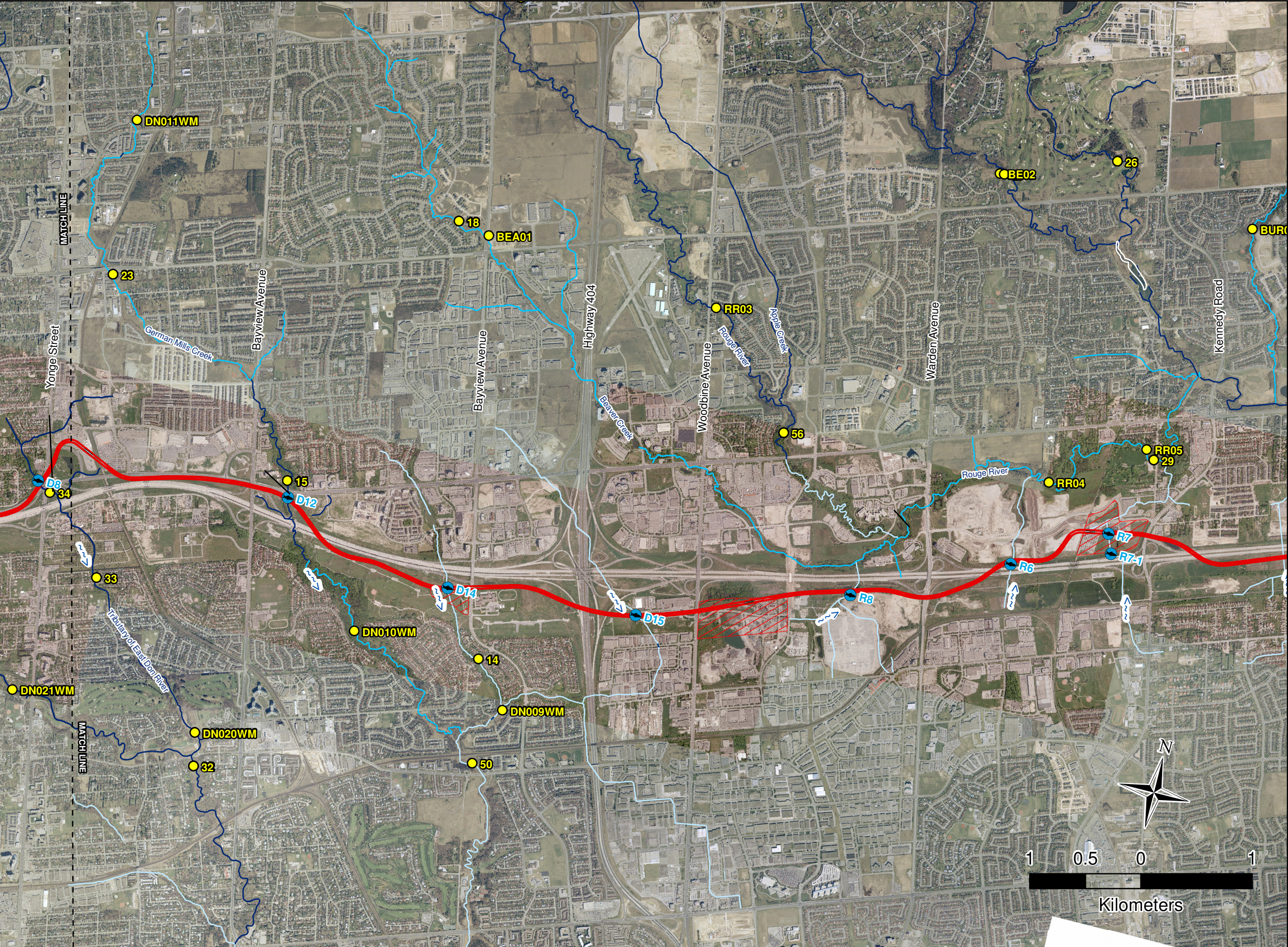
* DFO/TRCA Aquatic SAR Mapping, May 2010

Data Source: LGL Limited field surveys, Ontario Ministry of Natural Resources.

407 TRANSITWAY
(WEST END)
FISHERIES



Project: TA4485	Figure: 2A
Date: August 2010	Prepared By: KDT
Scale: 1 : 35000	Checked By: CJA



LEGEND

- Coldwater
- Coolwater
- Warmwater
- Fish Habitat Station (TRCA)
- Location of Fish Habitat Investigation
- Proposed Transitway Route
- Proposed Station

Data Source: LGL Limited field surveys, Ontario Ministry of Natural Resources.

407 TRANSITWAY
(EAST END)
FISHERIES



Project: TA4485	Figure: 2B
Date: December 2010	Prepared By: KDT
Scale: 1 : 35000	Checked By: CJA

TABLE 2A.
FISH COLLECTED BY TRCA AT INVENTORIED STREAMS IN THE HUMBER RIVER WATERSHED

Species			Watercourse Sampling Stations
Scientific Name	Common Name	Status	Black Creek
<i>Rhinichthys atratulus</i>	Blacknose Dace		42
<i>Culaea inconstans</i>	Brook Stickleback		42, 225
<i>Cyprinus carpio</i>	Common Carp		42
<i>Luxilus cornutus</i>	Common Shiner		42, 225, 226
<i>Semotilus atromaculatus</i>	Creek Chub		42, 224, 225, 226
<i>Pimephales promelas</i>	Fathead Minnow		42
<i>Carassius auratus</i>	Goldfish		42
<i>Lepomis gibbosus</i>	Pumpkinseed		42
<i>Catostomus commersoni</i>	White Sucker		42, 226

Source: Toronto and Region Conservation Authority (TRCA) fisheries data from fish collection stations; Received 2003, updated 2007.

TABLE 2B.
FISH COLLECTED BY TRCA AT INVENTORIED STREAMS IN THE DON RIVER WATERSHED

Species			Watercourse Sampling Stations		
Scientific Name	Common Name	Status	West Don River	East Don River	German Mills Creek
<i>Lampetra appendix</i>	American Brook Lamprey	S3		24, DN022WM	
<i>Rhinichthys atratulus</i>	Blacknose Dace		13, 21, 22, 40, 49, DN016WM, DN017WM, DN018WM	24, '32, 41, 58, 59, 60, DN021WM, DN023WM	14, 15, 50, DN009WM, DN010WM
<i>Pimephales notatus</i>	Bluntnose Minnow		21	24	
<i>Culaea inconstans</i>	Brook Stickleback			32, 41, 58	
<i>Salmo trutta</i>	Brown Trout			24, 58, 59, 60, DN023WM	
<i>Cyprinus carpio</i>	Common Carp		DN018WM		
<i>Luxilus cornutus</i>	Common Shiner		13, 21, 22, 40, DN018WM	24, 41, 58	
<i>Semotilus atromaculatus</i>	Creek Chub		21, 22, 27, 37, 40, 49, DN016WM, DN018WM	24, 32, 41, 58, 59, 60, DN022WM, DN023WM	14, 15, 23, 50, DN009WM, DN010WM, DN011WM
	Etheostoma sp.		DN018WM	DN022WM	
<i>Pimephales promelas</i>	Fathead Minnow		13, 22, 40, 49, DN016WM, DN017WM, DN018WM	32, 41, 58, 59, DN011WM, DW022WM	14, 15, 23, DN009WM, DN011WM
<i>Carassius auratus</i>	Goldfish			32	
<i>Etheostoma nigrum</i>	Johnny Darter		13, 21, 22, 37, 40, 49	32, 41, 58, 59	
<i>Micropterus salmoides</i>	Largemouth Bass		22	58	
<i>Rhinichthys cataractae</i>	Longnose Dace			24, 32, 41, 58, 59, 60, DN021WM, DN022WM	50, DN010WM
<i>Cottus bairdi</i>	Mottled Sculpin			24, 32, 41, 58, DN021WM, DN022WM	15
<i>Phoxinus eos</i>	Northern Redbelly Dace			24, 59	
	Pimephales sp.		DN016WM		
<i>Lepomis gibbosus</i>	Pumpkinseed		69	24, 58	14
<i>Oncorhynchus mykiss</i>	Rainbow Trout			24, 58, 59, 60	
<i>Clinostomus elongatus</i>	Redside Dace	S3, THR, SC	22, 40	24, 58	
<i>Catostomus commersoni</i>	White Sucker		13, 21, 22, 27, 37, 40, 49, DN016WM, DN018WM	24, 32, 41, 58, 59, 60, DN022WM	14, 50, DN009WM, DN010WM

Source: Toronto and Region Conservation Authority (TRCA) fisheries data from fish collection stations; Received 2003, Updated 2007.

TABLE 2C.
FISH COLLECTED BY TRCA AT INVENTORIED STREAMS IN THE ROUGE RIVER WATERSHED

Species			Watercourse Sampling Stations					
Scientific Name	Common Name	Status	Beaver Creek	Upper Rouge River	Berczy Creek	Bruce Creek	Burndenet Creek	Lower Rouge River
<i>Lampetra appendix</i>	American Brook Lamprey	S3			27	26, BRU02		
<i>Pomoxis nigromaculatus</i>	Black Crappie			38				RR06
<i>Rhinichthys atratulus</i>	Blacknose Dace		18, BEA01	29, 56, RR03, RR04, RR05	27, 33, BE02	26, BRU02	BUR01	28, 36, RR06
<i>Pimephales notatus</i>	Bluntnose Minnow		18	29, 56, RR03	27, 33	26		28, 36, 37, RR06
<i>Hybognathus hankinsoni</i>	Brassy Minnow				27			
<i>Culaea inconstans</i>	Brook Stickleback		BEA01		33			
<i>Ameiurus nebulosus</i>	Brown Bullhead			38				
<i>Salmo trutta</i>	Brown Trout			RR03	BE02		BUR01	
<i>Campostoma anomalum</i>	Central Stoneroller	S3		RR03				
<i>Cyprinus carpio</i>	Common Carp			29, 38, 56				28, 36, 37
<i>Luxilus cornutus</i>	Common Shiner			29, 56, RR03, RR04, RR05	27, 33	26		28, 36, 37
<i>Semotilus atromaculatus</i>	Creek Chub		18, BEA01	29, 56, RR03, RR04, RR05	27, 33, BE02	26, BRU02	BUR01	36, 37, RR06
<i>Notropis atherinoides</i>	Emerald Shiner			38				
<i>Pimephales promelas</i>	Fathead Minnow		18, BEA01	29	27, 33			28, 36, 37
<i>Dorosoma cepedianum</i>	Gizzard Shad			38				
<i>Notemigonus crysoleucas</i>	Golden Shiner			38				
<i>Carassius auratus</i>	Goldfish							28, 36, RR06
<i>Etheostoma nigrum</i>	Johnny Darter			29, 56, RR03	27, 33, BE02	26, BRU02	BUR01	28, 36, 37, RR06
<i>Micropterus salmoides</i>	Largemouth Bass			38, RR03		26		28, 36, 37, RR06
<i>Rhinichthys cataractae</i>	Longnose Dace			29, 56, RR03, RR04, RR05	27, 33	26		28, 36, 37, RR06

TABLE 2C.
FISH COLLECTED BY TRCA AT INVENTORIED STREAMS IN THE ROUGE RIVER WATERSHED

Species			Watercourse Sampling Stations					
Scientific Name	Common Name	Status	Beaver Creek	Upper Rouge River	Berczy Creek	Bruce Creek	Burndenet Creek	Lower Rouge River
<i>Notropis volucellus</i>	Mimic Shiner			38				
<i>Esox lucius</i>	Northern Pike			38				
<i>Lepomis gibbosus</i>	Pumpkinseed			38, 56, RR03		26		28, 36, 37, RR06
<i>Etheostoma caeruleum</i>	Rainbow Darter			29, 56, RR03, RR04, RR05	27, 33	26, BRU02		28, RR06
<i>Oncorhynchus mykiss</i>	Rainbow Trout			RR03, RR05	BE02	BRU02		37
<i>Clinostomus elongatus</i>	Redside Dace	S3, THR, SC		RR03	27, 33	26		
<i>Ambloplites rupestris</i>	Rock Bass			29, 38, 56, RR05	27	26		28, 36, 37, RR06
	Semotilus sp.							37
<i>Micropterus dolomieu</i>	Smallmouth Bass							37
<i>Notropis hudsonius</i>	Spottail Shiner			38				
	Stickleback sp.		18		27			
<i>Noturus flavus</i>	Stonecat			RR04	33	26		28, 37, RR06
<i>Noturus gyrinus</i>	Tadpole MadTom			38				
<i>Etheostoma olmstedii</i>	Tesselated Darter			38				
<i>Catostomus commersoni</i>	White Sucker		18, BEA01	29, 56, RR03, RR04, RR05	27, 33, BE02	26, BRU02		28, 36, 37, RR06
<i>Perca flavescens</i>	Yellow Perch			38				

Source: Toronto and Region Conservation Authority (TRCA) fisheries data from fish collection stations; Received 2003, Updated 2007.

Station D6 is crossed by the proposed 407 Transitway, approximately 85 m north of Highway 407 and 135 m east of Bathurst Street. This station is a now a drainage ditch that is connected to the next fisheries station via a pipe. Station 6-1 is a Tributary of the East Don River and is located approximately 65 m north of Highway 407 and 440 m east of Bathurst Street. This tributary also has an associated storm water pond and is classified as a warmwater system by the TRCA. The East Don River is crossed by the 407 Transitway, at Station D7, between Highway 407 and Highway 7 approximately 975 m east of the Bathurst Street. The East Don River is classified as a coldwater system by the TRCA. Pomona Creek located in Segment C, is crossed by the proposed 407 Transitway (Station D8) at the northwest corner of Yonge Street and Highway 7. Pomona Creek is designated a coldwater system by the TRCA. There is also a large storm water pond located adjacent to Station D11. German Mills Creek at Station D12 is located in Segment D and is crossed by the 407 Transitway just south of Highway 7, approximately 315 m east of Bayview Avenue. German Mills Creek is a tributary of the East Don River and is designated as a coldwater system by the TRCA.

Station D13, a tributary of German Mills Creek in Segment D, is located approximately 150 m north of Highway 407 and 580 m east of Bayview Avenue. This tributary was previously designated as a coolwater system by the TRCA, but only a grassy swale now exists at this station as it has been disconnected. Station D14 is located approximately 90 m south of Highway 407 and 200 m east of Leslie Street. This tributary of German Mills Creek is designated as a warmwater system by the TRCA. Station D15 is located in Segment E and crossed by the 407 Transitway approximately 390 m south of Highway 407 and 445 m east of Highway 404. This watercourse is also a tributary of German Mills Creek and is designated as a warmwater system by the TRCA. During the site investigation only a swale containing cattails (*Typha* sp.) was present.

Rouge River

The middle and eastern portions of the study area, between Highway 404 and Kennedy Road, pass through the Lower Rouge River watershed.

Station R8, a tributary of Beaver Creek, is located in Segment E, and is crossed by the proposed 407 Transitway approximately 115 m south of Highway 407 and 620 m west of Warden Avenue. This tributary is designated as a warmwater system by the TRCA. Station R6, located in Segment F is crossed by the proposed 407 Transitway just north of Highway 407, approximately 720 m east of Warden Avenue. This tributary of the Lower Rouge River, known as the Markham Centre Tributary, is designated as a warmwater system by the TRCA. Station R7, the Kennedy Tributary of the Lower Rouge River in Segment F, is crossed by the proposed 407 Transitway approximately 210 m north of Highway 407 and 260 m west of Kennedy Road. The Kennedy Tributary is designated as a warmwater system by the TRCA, and during a site investigation in September 2008, it appeared to be a seasonal system.

3.3.2 Rare, Threatened or Endangered Species

Humber River

One rare, threatened or endangered species has been recorded within Black Creek or tributaries of Black Creek. Redside Dace (*Clinostomus elongatus*) is designated Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and by Committee on the Status of Species at Risk in Ontario (COSSARO).

Don River

Redside Dace was collected by the TRCA in the main branch of the West Don River within the study limits. Redside Dace and American Brook Lamprey (*Ichthyomyzon fossor*) were collected by the TRCA

in the main branch of the East Don River within the study limits. American Brook Lamprey has a SRank of S3 (Rare to Uncommon), but it is not listed by COSEWIC or COSSARO.

Rouge River

Redside Dace and American Brook Lamprey were collected by the TRCA in the main branch of the Upper Rouge River within the study limits.

3.3.3 Sensitivity/Significance

The watercourses in the study area support a diversity of warmwater and coldwater fish communities. Many of the aquatic habitats have been altered and degraded by historical and recent urban development activities resulting in poor quality habitat throughout the much of the study area. The larger watercourse systems generally support healthy populations of native and non-native species including many which are migratory from Lake Ontario (i.e. salmonids). However all of the watercourses in the study area have experienced some type of impact from urbanization. The highly altered hydrology of the watercourses resulting from the surrounding urbanization has caused widespread degradation to the natural channel form and function. Barriers in the form of weirs and lengthy enclosures have created impassable structures to upstream fish migration, further leading to a loss in aquatic productivity and natural function.

Redside Dace is listed provincially as an Endangered species and is regulated by the provincial *Endangered Species Act, 2007*, administered by the MNR. This species is listed federally as Endangered under Schedule 3 and is therefore not regulated by the federal *Species at Risk Act*. The watercourses which support this species will require specialized mitigation measure to prevent negative impacts to the species or its habitat, and may also require permits under the ESA, 2007 from the MNR Aurora District office depending on the activities proposed.

3.4 Vegetation and Vegetation Communities

The geographical extent, composition, structure and function of vegetation communities were identified through air photo interpretation and field investigations. Air photos were interpreted to determine the limits and characteristics of vegetation communities. A field investigation of natural/semi-natural vegetation was conducted within the study area by LGL Limited between September 22 and October 3, 2008 and May 3 and June 18, 2009.

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 1999), Toronto and Region Conservation Authority (TRCA 2003) and Regional Municipality of York (Varga *et al.* 2000 & Riley *et al.* 1989). Vascular plant nomenclature follows FOIBIS (Newmaster 2005).

3.4.1 Vegetation Communities

Vegetation communities along the proposed 407 Transitway alignment consist of a mix of forest, cultural and wetland communities. The forests in the study area are typical of those arising from secondary growth on previously disturbed/cleared areas. One high quality swamp community is found near Woodbine Avenue along the proposed 407 Transitway. Bordering the natural vegetation communities the land has been cleared of all original forest cover to accommodate industrial, commercial and residential land use.

The study area is dominated by disturbed cultural communities including meadows, thickets, savannah and woodlands with few occurrences of mixed and deciduous forests. Natural areas are relatively narrow and disturbed due to the anthropogenic influence of hydro corridors. Along the hydro corridor, located south of Highway 407 between Keele Street and Centre Street, there is a narrow wetland pocket which is significant for the native riparian species and wildlife. One good quality swamp community is located near Woodbine Avenue in the area of the proposed transit station.

Community Summary

A total of twenty-six ELC communities have been identified by LGL Limited within the study limits. These communities include: mixed forest (FOM3-2, FOM5 and FOM6-2); deciduous forest (FOD5-1, FOD7, FOD7-1 and FOD7-3); cultural plantation (CUP1- 7); cultural meadow (CUM1-1); cultural thicket (CUT1 and CUT1-1), cultural savannah (CUS1); cultural woodland (CUW1); deciduous swamp (SWD2-2, SWD4 and SWD6-1); mixed swamp (SWM), thicket swamp (SWT2, SWT2-2 and SWT2-5); meadow marsh (MAM2, MAM2-2 and MAM2-10), shallow marsh (MAS2 and MAS2-1), and submerged shallow aquatic (SAS).

The above vegetation communities are considered widespread and common in Ontario and secure globally. However, the FOM5 and FOM6-2 vegetation communities are considered locally rare (L3) in the TRCA watershed. FOM5 is located adjacent to the riparian area north of Highway 407 near Bayview Avenue FOM6-2 is located in the riparian area along Bathurst Street, south of Highway 407.

These communities are delineated in **Figures 3A and 3B** and described in **Table 3**.

3.4.2 Flora

A total of one-hundred and sixty-eight vascular plant taxa have been recorded within the study area. Due to the early season, sixteen of these taxa were identified up to genus level only. Of the remaining one hundred and fifty-two (152) species, sixty seven species, or 44 percent of the recorded flora, are considered introduced and non-native to Ontario. Introduced species were dominant within the existing right-of-way and in cultural communities. Native species were mostly confined to natural and forested areas.

A working vascular plant checklist is presented in **Appendix A**.

3.4.3 Species at Risk

No plant species that are regulated under the provincial *Endangered Species Act* or the federal *Species at Risk Act* were encountered during LGL's botanical investigation.

The study area contains eleven plant species that are regionally and/or locally rare (TRCA and York Region).

All of the plant species listed in **Table 4** have populations that are apparently secure or secure (S4 or S5) within Ontario.



LEGEND

- 407 Transitway
- 407 Transitway Station
- Waterbody
- Unevaluated Wetland
- Environmentally Significant Area
- Provincially Significant Life Science ANSI
- Cold Watercourse
- Cool Watercourse
- Warm Watercourse
- Flow Direction
- Vegetation Community Boundary

Vegetation Communities

- CUM1-1** Dry-Moist Old Field Meadow Type
- CUP1-7** Green Ash Deciduous Plantation Type
- CUS1** Mineral Cultural Savannah Ecosite
- CUT1** Mineral Cultural Thicket Ecosite
- CUT1-1** Sumac Cultural Thicket Type
- CUW1** Mineral Cultural Woodland Ecosite
- FOD5-1** Dry-Fresh Sugar Maple Deciduous Forest Type
- FOD7** Fresh-Moist Lowland Deciduous Forest Ecosite
- FOD7-1** Fresh-Moist White Elm Lowland Deciduous Forest Type
- FOD7-3** Fresh-Moist Willow Lowland Deciduous Forest Type
- FOM3-2** Dry-Fresh Sugar Maple-Hemlock Mixed Forest Type
- FOM5** Dry-Fresh White Birch-Poplar-Conifer Mixed Forest Ecosite
- FOM6-2** Fresh-Moist Hemlock-Hardwood Mixed Forest Type
- MAM2** Mineral Meadow Marsh Ecosite
- MAM2-2** Reed-canary Grass Mineral Meadow Marsh Type
- MAM2-10** Forb Mineral Meadow Marsh Type
- MAS2** Mineral Shallow Marsh Ecosite
- MAS2-1** Cattail Mineral Shallow Marsh Type
- QAO** Open Aquatic
- SAS** Submerged Shallow Aquatic
- SWD2-2** Green Ash Mineral Deciduous Swamp Type
- SWD4** Mineral Deciduous Swamp Ecosite
- SWD6-1** Red Maple Organic Deciduous Swamp Type
- SWM** Mixed Swamp
- SWT2** Mineral Thicket Swamp Ecosite
- SWT2-2** Willow Mineral Thicket Swamp Type
- SWT2-5** Red-osier Mineral Thicket Swamp Type
- Ag** Agricultural
- H** Hedgerow

Data Source: LGL Limited field surveys, Ontario Ministry of Natural Resources.



NATURAL HERITAGE FEATURES

Project: TA4485	Figure: 3a
Date: August 2010	Prepared By: MWF
Scale: 1 : 18,000	Checked By: NMF

TABLE 3.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES POTENTIALLY IMPACTED

ELC Code	Vegetation Type	Species Association	Comments
Terrestrial-Natural/Semi-Natural			
FOM	MIXED FOREST		
FOM5	Dry-Fresh White Birch-Poplar-Conifer Mixed Forest	<p>Canopy: Carolina poplar (<i>Populus X canadensis</i>) and Freeman's maple (<i>Acer X freemanii</i>) are co-dominant with abundant spruce (<i>Picea sp.</i>).</p> <p>Understorey: Chokecherry (<i>Prunus virginiana</i> var. <i>virginiana</i>) is dominant with abundant common buckthorn (<i>Rhamnus cathartica</i>). Manitoba maple (<i>Acer negundo</i>) is occasional.</p> <p>Ground Cover: Garlic mustard (<i>Alliaria petiolata</i>), wood avens (<i>Geum urbanum</i>) and red currant (<i>Ribes rubrum</i>) are dominant.</p>	<ul style="list-style-type: none"> • Tree cover > 60 % (FO). • Conifer trees > 25 % and deciduous trees > 25% of canopy cover (M). • Dry to fresh soils on slopes with adequate moisture and good drainage. • Communities resulting from disturbance or management (5).
FOD	DECIDUOUS FOREST		
FOD7	Fresh-Moist Lowland Deciduous Forest	<p>Canopy: Manitoba maple and black locust (<i>Robinia pseudo-acacia</i>) are dominant with abundant Carolina poplar. Red ash (<i>Fraxinus pennsylvanica</i>) is occasional.</p> <p>Sub Canopy: Red ash is occasional.</p> <p>Understorey: Common buckthorn and manitoba maple are dominant with abundant tartarian honeysuckle (<i>Lonicera tatarica</i>). Red ash and white elm (<i>Ulmus americana</i>) are occasional.</p> <p>Ground Cover: Garlic mustard, spotted touch-me-not (<i>Impatiens capensis</i>), tall goldenrod (<i>Solidago canadensis</i> var. <i>scabra</i>) and large-leaved aster (<i>Eurybia macrophylla</i>) are dominant.</p>	<ul style="list-style-type: none"> • Tree cover > 60 % (FO). • Deciduous trees > 75 % of canopy cover (D). • Soils with coarse and fine loams, and well to poor drainage on lower slopes and bottomlands. • Communities which are associated with floodplains (7).

TABLE 3.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES POTENTIALLY IMPACTED

ELC Code	Vegetation Type	Species Association	Comments
Terrestrial/Cultural			
CUM	CULTURAL MEADOW		
CUM1-1	Dry-Moist Old Field Meadow	<p>Ground Cover: Wild carrot (<i>Daucus carota</i>), kentucky bluegrass (<i>Poa pratensis</i>), awnless brome (<i>Bromus inermis</i>), Canada thistle (<i>Cirsium arvense</i>), tall goldenrod, tufted vetch (<i>Vicia cracca</i>), variable crown-vetch (<i>Coronilla varia</i>), white sweet-clover (<i>Melilotus alba</i>), wild teasel (<i>Dipsacus fullonum</i> ssp. <i>sylvestris</i>), butter-and-eggs (<i>Linaria vulgaris</i>), quack grass (<i>Elymus repens</i>), bird's foot trefoil (<i>Lotus corniculatus</i>), common milkweed (<i>Asclepias syriaca</i>), white heath aster (<i>Aster ericoides</i> var. <i>ericoides</i>), tall white aster (<i>Aster lanceolatus</i> ssp. <i>lanceolatus</i>) and New England aster (<i>Symphyotricum nova-angliae</i>) are abundant.</p>	<ul style="list-style-type: none"> • Cultural communities (CU). • Tree cover and shrub cover < 25 % (M). • This community can occur on a wide range of soil moisture regimes (Dry-Moist). • Pioneer community resulting from, or maintained by, anthropogenic-based influences (1-1).
CUT	CULTURAL THICKET		
CUT1	Mineral Cultural Thicket	<p>Canopy: Red-osier dogwood (<i>Cornus sericea</i> ssp. <i>sericea</i>), common buckthorn (<i>Rhamnus cathartica</i>), manitoba maple and thimble-berry (<i>Rubus occidentalis</i>), are dominant with occasional freeman's maple, English hawthorn (<i>Crataegus monogyna</i>) and red ash.</p> <p>Ground Cover: Tall goldenrod, New England aster, white heath aster, wild carrot and purple loosestrife (<i>Lythrum salicaria</i>) are abundant.</p>	<ul style="list-style-type: none"> • Cultural communities (CU). • Tree cover < 25%, Shrub cover > 25% (T). • This community occurs on mineral parent material or soils (1). • Community maintained by anthropogenic-based disturbance.
CUS	CULTURAL SAVANNAH		
CUS1	Mineral Cultural Savannah	<p>Canopy: Black locust, Freeman's maple, white elm, Carolina poplar, Siberian elm (<i>Ulmus pumila</i>) and willows (<i>Salix</i> sp.) are occasional in the canopy.</p> <p>Understorey: Manitoba maple and common buckthorn are dominant with abundant staghorn sumac (<i>Rhus hirta</i>) and red ash. Tartarian honeysuckle is occasional.</p> <p>Ground Cover: Swallow-wort (<i>Cynanchum rossicum</i>), New England aster, inserted Virginia-creeper (<i>Parthenocissus vitacea</i>), tufted vetch, black medick (<i>Medicago lupulina</i>), white heath aster, wild carrot, awnless</p>	<ul style="list-style-type: none"> • Cultural communities (CU). • 25% < Tree cover ≤ 35% (S). • This community occurs on mineral parent material or soils (1). • Pioneer community resulting from, or maintained by, anthropogenic-based influences.

TABLE 3.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES POTENTIALLY IMPACTED

ELC Code	Vegetation Type	Species Association	Comments
		brome and tall goldenrod are dominant.	
CUW	CULTURAL WOODLAND		
CUW1	Mineral Cultural Woodland	<p>Canopy: Black locust, willows and red ash are dominant with abundant trembling aspen (<i>Populus tremuloides</i>). Black walnut (<i>Juglans nigra</i>), basswood (<i>Tilia americana</i>) and bur oak (<i>Quercus macrocarpa</i>) are occasional.</p> <p>Understorey: Manitoba maple is dominant with abundant staghorn sumac and tartarian honeysuckle. Basswood, English hawthorn, bur oak and red-osier dogwood are occasional.</p> <p>Ground Cover: Garlic mustard, inserted Virginia-creeper, swallow-wort (<i>Cynanchum rossicum</i>), tall goldenrod and variable crown-vetch are dominant.</p>	<ul style="list-style-type: none"> • Cultural communities (CU). • Tree cover between 35% and 60% (W). • Mineral soil (1). • Siberian elm, Manitoba maple, Norway maple, black locust, red oak, red ash and trembling aspen are dominant.
Wetland			
SWD	DECIDUOUS SWAMP		
SWD2-2	Green Ash Mineral Deciduous Swamp	<p>Canopy: Red ash is dominant.</p> <p>Understorey: Red ash is dominant.</p> <p>Ground Cover: Broad-leaved cattail (<i>Typha latifolia</i>) is dominant.</p>	<ul style="list-style-type: none"> • Standing water >20% of ground coverage dominated by hydrophytic shrub and tree species (SW). • Tree cover > 25 %, trees > 5m in height and deciduous tree species > 75 % of canopy cover (D). • Mineral soil dominated by Red Ash (2-2).
SWT	THICKET SWAMP		
SWT2	Mineral Thicket Swamp	<p>Canopy: Red-osier dogwood and willows are dominant with abundant common buckthorn. Tartarian honeysuckle is occasional.</p> <p>Ground Cover: Reed canary grass (<i>Phalaris arundinacea</i>), sedges (<i>Carex sp.</i>), purple loosestrife, devil's beggar-ticks (<i>Bidens frondosa</i>), tall goldenrod, New England aster, wild carrot and tall white aster are dominant.</p>	<ul style="list-style-type: none"> • Standing water >20% of ground coverage dominated by hydrophytic shrub and tree species (SW). • Tree cover < 25 %, hydrophytic shrubs > 25% (T). • Communities with mineral soil (2).
MAM	MEADOW MARSH		

TABLE 3.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES POTENTIALLY IMPACTED

ELC Code	Vegetation Type	Species Association	Comments
MAM2-2	Reed-canary Grass Mineral Meadow Marsh	Ground Cover: Reed canary grass is dominant. Tall white aster, purple loosestrife, flat-topped bushy goldenrod (<i>Euthamia graminifolia</i>) and common tansy (<i>Tanacetum vulgare</i>) are occasional.	<ul style="list-style-type: none"> Seasonally flooded and dominated by emergent hydrophytic macrophytes (MAM). Represents the wetland – terrestrial interface. Tree and shrub cover <= 25%. Mineral soil (2). Reed canary grass is dominant (-2). Community age is pioneer.
MAM2-10	Forb Mineral Meadow Marsh	Ground Cover: Purple loosestrife and tall white aster are dominant with abundant spotted touch-me-not and New England aster. Reed canary grass, American stinging nettle (<i>Urtica dioica</i> ssp. <i>gracilis</i>) and tall goldenrod are occasional.	<ul style="list-style-type: none"> Seasonally flooded and dominated by emergent hydrophytic macrophytes (MAM). Represents the wetland – terrestrial interface. Tree and shrub cover <= 25%. Mineral soil (2). Forbs like purple loosestrife, and sedges and narrow-leaved cattail are dominant (-10). Community age is pioneer.
MAS	SHALLOW MARSH		
MAS2	Mineral Shallow Marsh	Ground Cover: Common reed (<i>Phragmites australis</i>) is dominant with abundant broad-leaved cattail (<i>Typha latifolia</i>). Tall goldenrod and New England aster are occasional.	<ul style="list-style-type: none"> Tree and shrub cover <= 25%, Hydrophytic emergent macrophyte > 25%. Standing or flowing water for much or all of season (MAS). Parent mineral material (2).
MAS2-1	Cattail Mineral Shallow Marsh	Ground Cover: Narrow-leaved cattail (<i>Typha angustifolia</i>) is dominant with abundant reed canary grass. Purple loosestrife and devil's beggar-ticks are occasional.	<ul style="list-style-type: none"> Tree and shrub cover <= 25%, Hydrophytic emergent macrophyte > 25%. Standing or flowing water for much or all of season (MAS). Parent mineral material (2). Broad-leaved cattail is dominant (-1).

TABLE 4.
PLANT SPECIES LISTED AS REGIONALLY OR LOCALLY SIGNIFICANT

Scientific Name	Common Name	Vegetation Community	Status		
			SRank	TRCA*	York Riley/Varga
<i>Pinus resinosa</i>	red pine	CUW1F	S5	L2	R-4/X+
<i>Picea glauca</i>	white spruce	CUM1-1 and CUS1E	S5	L3	
<i>Juglans nigra</i>	black walnut	FOD7A and B, CUM1-1, CUT1B and C, CUS1B and E, CUW1B, C, F and G, MAM2-10	S4		R-1 Nat/R
<i>Juniperus virginiana</i> var. <i>virginiana</i>	red cedar	CUM1-1 and CUT1H	S5		R-2/U
<i>Cephalanthus occidentalis</i>	eastern buttonbush	MAS2-1C	S5	L3	R-1/R1
<i>Physocarpus opulifolius</i>	ninebark	CUM1-1, CUT1F, CUS1E, CUW1D, MAS2	S5	L3	R-3
<i>Rosa carolina</i>	swamp rose	CUM1-1, CUS1A, CUW1D	S4	L2	R-1/R2
<i>Aster pilosus</i> var. <i>pilosus</i>	hairy aster	CUM1-1, CUT1C	S5	L3	/R3
<i>Hackelia virginiana</i>	Virginia stickweed	FOM5A, CUW1G	S5		/R5
<i>Sicyos angulatus</i>	one-seeded bur-cucumber	FOM5A, FOD7B, CUT1C, CUW1D, G, and J, MAM2-2A and MAM2-10	S5	L3	/R1SR
<i>Spartina pectinata</i>	tall cord grass	MAS2-1C	S4	L3	R-1

*TRCA L1 to L3 Species of Concern

A review of the Ministry of Natural Resources' Natural Heritage Information Centre database (2009), indicates that there are a total of four plant species, one of which is a moss (*Plagiothecium latebricola*), whose populations are critically imperiled to vulnerable (S1 to S3) located variably along the proposed transit route or within one kilometre of this route.

All of the plant species noted in **Table 5** have not been observed in over 60 years, except for lurking leskea (*Plagiothecium latebricola*) which was last observed over 20 years ago. None of these plant species were identified during the LGL plant surveys. With the concentrated development that has occurred from Vaughan through to Markham over the last 20 years, it is unlikely that those plant species noted in **Table 5** persist within the study area.

TABLE 5.
PLANT SPECIES NOTED BY THE NATURAL HERITAGE INFORMATION CENTRE

Scientific Name	Common Name	Status			Date Last Observed
		SRank	TRCA*	York	
<i>Lithospermum latifolium</i>	American Gromwell	S3	LX	R-1	7/8/1904
<i>Monarda didyma</i>	Scarlet Beebalm	S3	L3	R1	8/4/1948
<i>Gaura biennis</i>	Biennial Gaura	S2	LX	R-0	9/16/1905
<i>Plagiothecium latebricola</i>	Lurking Leskea	S2			5/11/1983

3.4.4 Sensitivity/Significance

The proposed Highway 407 Transitway from Jane Street to Kennedy Road may affect 12 vegetation communities FOM5, FOD7, CUM1-1, CUT1, CUS1, CUW1, SWD2-2, SWT2, MAM2-2, MAM2-10, MAS2 and MAS2-1.

The FOD7 vegetation community was a young to mid-aged succession community which was dominated by invasive Manitoba maple (*Acer negundo*) and black locust (*Robinia pseudo-acacia*) trees. This was a relatively natural vegetation community. The CUM1-1, CUT1, CUS1 and CUW1 were vegetation communities dominated by non-native plant species. These disturbed vegetation communities had low plant diversity likely related to the disturbances caused by the presence of a hydro corridor and the surrounding industrial land uses. However, locally rare and uncommon plant species including swamp rose (*Rosa carolina*), hairy aster (*Aster pilosus* var. *pilosus*), ninebark (*Physocarpus opulifolius*), white spruce (*Picea glauca*) and red cedar (*Juniperus virginiana* var. *virginiana*) will be affected in the CUM1-1 communities near Jane Street, Keele Street, Dufferin Street, southwest of Centre Street, Bayview Avenue, and Kennedy Road. Similarly, hairy aster, ninebark and narrow-leaved meadow-sweet (*Spiraea alba*) will be affected in CUT1 communities near Leslie Street, southwest of Centre Street. Swamp rose, ninebark and white spruce will be affected in the CUS1 communities near Keele Street and Leslie Street. The locally rare and uncommon species including red pine, swamp rose, ninebark and red cedar will be affected in CUW1 communities located near Centre Street and Yonge Street, and near the Don River.

Wetland communities including SWT2, SWD2-2, MAM2-10, MAS2 and MAS2-1 were mostly associated with watercourse or culvert based drainage. These wetland vegetation communities were narrow and disturbed due to the surrounding land uses including agriculture, industry and hydro corridors. Locally rare and uncommon plant species including eastern buttonbush, ninebark and tall cord grass will be affected in the MAS2 and MAS2-1 communities near Jane Street and Warden Avenue. The SWD2-2 vegetation community located east of Woodbine Avenue was the best quality forest/swamp in the study area, dominated by red ash (*Fraxinus pennsylvanica*) trees. This young to mid-aged succession community is significant for wildlife due to its relatively large forest cover and a high water table. The proposed Transitway station in the SWD2-2 community will result in fragmentation and displacement of native wetland species present in this community. The potential impact to the SWD2-2 community by the proposed Transitway station in the southeast quadrant of Highway 407/Woodbine Avenue should be given consideration when evaluating the location and design of the station.

Efforts should be taken during construction to minimize impacts to existing wetland vegetation communities including swamps, meadow marsh and shallow marsh communities located within the study area. Wherever possible, locally rare and uncommon species should be avoided. Mitigation measures such as transplanting locally rare and uncommon plant species in adjacent communities should be taken into consideration.

3.5 Wildlife and Wildlife Habitat

A review of secondary source data was undertaken in 2007 to document wildlife habitat and wildlife occupation and to characterize the nature, extent and significance of animal usage within the project limits. Field investigations were undertaken by LGL Limited for the 407 Transitway alternatives between November 25 and 27, 2008. The purpose of these field investigations were to confirm background information, characterize natural heritage conditions, document natural heritage features and functions, and confirm the nature, extent and significance of animal usage.

The study area investigated included all habitats within 50 meters on each side of the proposed alternatives from Jane Street to approximately 0.5 km east of Kennedy Road. Due to the time of year field investigations were undertaken, most of the wildlife were in hibernation or had migrated from the habitats

along the proposed routes. Some remaining wildlife signs such as tracks, nests, den sites, or territorial markings were used to determine what species were in these habitats at this time of year.

Information relating to wildlife and wildlife habitat was obtained through the following published and non-published sources:

- Breeding Bird Atlas Database. 2005. www.birdsontario.org/atlas/atlasmain.html
- Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Courtutier (eds). 2007. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources and Ontario Nature, Toronto, xxii + 706 pp.
- Committee on the Status of Endangered Wildlife in Canada. 2002. *Species at Risk*. Ottawa;
- Dobbyn, J.S. 1994. *Atlas of the Mammals of Ontario*. Federation of Ontario Naturalists. Toronto.
- Natural Heritage Information Center. 2002. Working Lists of Ontario Amphibians, Birds, Mammals, and Reptiles. Peterborough;
- Ontario Ministry of Natural Resources. 2000. *Significant Wildlife Habitat Technical Guide*. Fish and Wildlife Branch, Wildlife Section. Peterborough; and,
- Ontario Ministry of Natural Resources. 2001. Index List of Vulnerable, Threatened, Endangered, Extirpated or Extinct Species of Ontario. Wildlife Section, Peterborough.

3.5.1 Wildlife Habitat

The dominant habitat-type found along the 407 Transitway alternatives consisted of cultural meadows. Areas that contained natural fauna of some diversity were limited and usually located adjacent to the rivers and creeks within the watersheds crossing Highway 407. A summary of the wildlife habitat conditions within the study area is presented in **Table 6**.

Segment A

A large section of this alternative, between Highway 400 and Jane Street, consisted of agricultural land uses. Most of the area surrounding the CNR tracks between Jane Street and Keele Street were industrial buildings. A small watercourse flowing through the margins of Beechwood Cemetery east of Jane Street has been channelized. Minimal habitats exist along this watercourse. Most of the remaining habitats along Alternative A1 consisted of cultural meadows. Any natural fauna along this route was limited to narrow riparian sections found along the Black Creek tributaries crossing Highway 407 on the east and west sides of Jane Street. Only local urbanized wildlife would be expected to inhabit the areas along the corridor.

Segment B

The dominant wildlife habitat on the north side of the transitway was approximately 90% cultural meadow. Most of the natural fauna occurred around the Don River where it splits into two tributaries. The habitat extending west from the Don River to the CNR tracks and east to Centre Street is primarily cultural woodlot and cultural thicket. Mammal tracks along the banks and throughout the woodlots indicated that the area is being used as a wildlife corridor to the bridge that crosses under Highway 407. An Eastern Phoebe (*Sayornis phoebe*) nest was found on the northwest corner of the bridge. Although no direct breeding bird evidence could be found in the cultural thickets and woodlots surrounding the river and in the expansive area west of the river, habitat in this section of the route is characteristic of the type used by numerous species of breeding migratory birds. Westminster Creek and the East Don River showed little evidence of wildlife activity.

TABLE 6.
WILDLIFE HABITAT ASSESSMENT SUMMARY

Area Name	GPS Location	Type of Habitat	Significant Wildlife Habitat				Comments
			Seasonal Concentration of Animals	Rare Vegetation Communities or Specialised Habitats to Wildlife	Designated Species of Conservation Concern	Animal Movement Corridors	
Tributary 1 of Black Creek	0617198 4849654	riparian vegetation and urban development	<ul style="list-style-type: none">• none evident	<ul style="list-style-type: none">• none present	<ul style="list-style-type: none">• no species of conservation concern were recorded	<ul style="list-style-type: none">• none evident	<ul style="list-style-type: none">• habitat mainly grasses on steep hillsides• Barn Swallow nests inside culvert
Black Creek	0618728 4850108	north side: CUW1, CUM1-1 south side: riparian (cattails and grasses)	<ul style="list-style-type: none">• breeding area for waterfowl in storm water management pond• possible staging area for waterfowl in storm water management pond	<ul style="list-style-type: none">• none present	<ul style="list-style-type: none">• no species of conservation concern were recorded	<ul style="list-style-type: none">• none evident	<ul style="list-style-type: none">• north end of upstream connected to storm water management pond (35 m west)• small field and wood lot on northeast side of stream
Black Creek	0618958 4848881	west side: riparian east side: manicured grasses and man-made pond	<ul style="list-style-type: none">• none evident	<ul style="list-style-type: none">• foraging area for birds and mammals	<ul style="list-style-type: none">• no species of conservation concern were recorded	<ul style="list-style-type: none">• local animal movement corridor	<ul style="list-style-type: none">• open field, grassy shoreline and some tree cover on west side of Jane Street• Beechwood Cemetery: manicured grasses, trees and pond on east side• Barn Swallows nesting under bridge
Tributary 2 of Black Creek	0619013 4848639	riparian	<ul style="list-style-type: none">• none evident	<ul style="list-style-type: none">• none present	<ul style="list-style-type: none">• no species of conservation concern were recorded	<ul style="list-style-type: none">• none evident	<ul style="list-style-type: none">• cattails, grasses and few trees• storm water management pond just south of stream on east side of Hwy 7
Tributary 1 of the West Don River	0620844 4850818	north side: CUM1-1 south side: riparian and urban	<ul style="list-style-type: none">• none evident	<ul style="list-style-type: none">• none present	<ul style="list-style-type: none">• no species of conservation concern were recorded	<ul style="list-style-type: none">• none evident	<ul style="list-style-type: none">• residential area
West Don River	0621972 4851300	north side: FOD7-3 south side: riparian	<ul style="list-style-type: none">• landbird migratory stopover area• raptor winter roosting area	<ul style="list-style-type: none">• forested area with three vegetation layers and a continuous canopy• river bisects forested area• foraging area for birds and mammals	<ul style="list-style-type: none">• no species of conservation concern were recorded	<ul style="list-style-type: none">• local animal movement corridor• migratory corridor for birds (layered vegetation, lots of ground cover and water source)	<ul style="list-style-type: none">• lots of diverse habitat surrounding stream• mature forests and open field on north side• young trees, bushes, grasses on south side• asphalt pedestrian walkway runs along stream on east side• Long-eared Owls roosting over winter• heavily concentrated migratory area
Westminster Creek	0622971 4851517	north side: mostly urban with narrow riparian zone south side: urban	<ul style="list-style-type: none">• none evident	<ul style="list-style-type: none">• none present	<ul style="list-style-type: none">• no species of conservation concern were recorded	<ul style="list-style-type: none">• none evident	<ul style="list-style-type: none">• cattails and phragmites surround narrow stream on north side of Centre Street• residence and business mall right beside stream on east and west sides
Tributary 1 of the East Don River	0624406 4853612	riparian	<ul style="list-style-type: none">• landbird migratory stop over area	<ul style="list-style-type: none">• forested area with two vegetation layers• stream bisects forested area• foraging area for birds and mammals	<ul style="list-style-type: none">• no species of conservation concern were recorded	<ul style="list-style-type: none">• none evident	<ul style="list-style-type: none">• upstream grasses and mature forests• downstream grasses, cattails, open field and mature forest

TABLE 6.
WILDLIFE HABITAT ASSESSMENT SUMMARY

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			Seasonal Concentration of Animals	Rare Vegetation Communities or Specialised Habitats to Wildlife	Designated Species of Conservation Concern	Animal Movement Corridors	
Baker’s Woods	0623796 4854042	FOD5	<ul style="list-style-type: none">landbird migratory stopover area	<ul style="list-style-type: none">forested area with tall, enclosed canopy (i.e. reduces soil drying), which can provide ideal conditions for Northern Red-backed Salamanders (<i>Plethodon cinereus</i>)foraging area for birds and mammals	<ul style="list-style-type: none">no species of conservation concern were recorded	<ul style="list-style-type: none">significant animal movement corridormigratory corridor for birds	<ul style="list-style-type: none">forest has little understory vegetation due to its maturitylimited species diversity, provides refuge for species present
Tributary 2 of the East Don River	0624721 4854200	riparian	<ul style="list-style-type: none">possible shorebird stop over area	<ul style="list-style-type: none">none present	<ul style="list-style-type: none">no species of conservation concern were recorded	<ul style="list-style-type: none">local animal movement corridor	<ul style="list-style-type: none">north side: grasses and Richmond Hill Golf and Country Clubsouth side: grasses, cattails and storm water management pond
East Don River	0625223 4854326	riparian	<ul style="list-style-type: none">none evident	<ul style="list-style-type: none">none present	<ul style="list-style-type: none">no species of conservation concern were recorded	<ul style="list-style-type: none">local animal movement corridor	<ul style="list-style-type: none">north side: grasses plus second bridge over dirt road and golf course on west side of streamsome larger trees surround stream about 50 m upstreamRough-winged Swallows nesting on southeast side of bridge under Hwy 7
Pomona Creek	0626246 4854907	riparian	<ul style="list-style-type: none">none evident	<ul style="list-style-type: none">none present	<ul style="list-style-type: none">no species of conservation concern were recorded	<ul style="list-style-type: none">local animal movement corridor	<ul style="list-style-type: none">grasses and cattails surround streamsmall marsh about 20 m south of stream on west side of Yonge Street
Tributary of Pomona Creek	0626732 4855103	urban	<ul style="list-style-type: none">none evident	<ul style="list-style-type: none">none present	<ul style="list-style-type: none">no species of conservation concern were recorded	<ul style="list-style-type: none">local animal movement corridor	<ul style="list-style-type: none">corridor under Hwy 7 & 407 by railway
German Mills Creek	0628419 4855369	north side: FOD7-3 south side: CUW1	<ul style="list-style-type: none">none evident	<ul style="list-style-type: none">none present	<ul style="list-style-type: none">no species of conservation concern were recorded	<ul style="list-style-type: none">local animal movement corridor	<ul style="list-style-type: none">partially woodedeast/west Hwy 407 (407) corridor located to the south
Tributary of German Mills Creek	0628767 4855406	north side: urban south side: cultivated field	<ul style="list-style-type: none">none evident	<ul style="list-style-type: none">none present	<ul style="list-style-type: none">no species of conservation concern were recorded	<ul style="list-style-type: none">none evident	
Tributary 1 of German Mills Creek	0629536 4855662	north side: FOD7-3 south side: urban, riparian (herbaceous)	<ul style="list-style-type: none">none evident	<ul style="list-style-type: none">none present	<ul style="list-style-type: none">no species of conservation concern were recorded	<ul style="list-style-type: none">local animal movement corridor	<ul style="list-style-type: none">wooded in part to north and southlandscaped swamp to south, beyond right-of-way
Tributary 2 of German Mills Creek	0630557 4856061	north side: MAS2-1 south side: urban, riparian (cattails)	<ul style="list-style-type: none">none evident	<ul style="list-style-type: none">none present	<ul style="list-style-type: none">no species of conservation concern were recorded	<ul style="list-style-type: none">none evident	<ul style="list-style-type: none">small culvertwetland habitat upstream
Tributary of the Lower Rouge River	0634839 4856682	urban/rural/developing, riparian (herbaceous)	<ul style="list-style-type: none">none evident	<ul style="list-style-type: none">none present	<ul style="list-style-type: none">no species of conservation concern were recorded	<ul style="list-style-type: none">none evident	

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			Seasonal Concentration of Animals	Rare Vegetation Communities or Specialised Habitats to Wildlife	Designated Species of Conservation Concern	Animal Movement Corridors	
Tributary of the Lower Rouge River	0635902 4856995	urban/rural/ developing, ditch (herbaceous)	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• commercial industrial setting

West of Bathurst Street until the end of Segment B, just west of Yonge Street., the habitat is primarily cultural meadow with two East Don River tributary crossings under Highway 407 between Bathurst Street and Hunter's Point Drive. Both flow south from the east and west ends of the Richmond Hill Golf and Country Club. The west tributary flows into the lowland just south of Highway 7 creating a shallow cattail marsh habitat. This area was not accessible due to the high fencing surrounding this area. No evidence of wildlife could be obtained at this time for this area. The east tributary was surrounded by cultural meadow. A double box culvert under Highway 7 was a major wildlife corridor for the area. Numerous tracks from red fox (tracks and faeces), raccoon, muskrat, mink and white-tailed deer were observed inside the culverts and along the East Don River tributary banks under the Highway 407. This corridor connected habitat on the golf course and the areas of cultural meadows, cultural thickets and forest located south of Highway 407.

Segment C

The 407 Transitway west of Yonge Street, north of Highway 7, travels predominately through an urban area with commercial land uses. A small section of the route crosses through a deciduous forest surrounding Pomona Creek, northwest of the Highway 7/Yonge Street intersection. Wildlife present would be primarily species commonly found in urban areas. The only natural heritage area is located around Pomona Creek in the northwest corner of Highway 7 and Yonge Street. The rest of the watercourse is piped through the intersection underground. Wildlife around this natural area could not be determined at the time of field investigations, given weather conditions.

Segment D

Over 90% of the area adjacent to the proposed 407 Transitway is comprised of cultural meadow. Two natural areas occur around both tributaries of German Mills Creek that cross under Highway 7 and Highway 407 just east of Bayview Avenue and west of Leslie Street. The Bayview Avenue tributary was surrounded by marsh and cultural thickets. Many tracks along the creek and down the side road on the east side of the creek indicated the area is a useful corridor and feeding area for species such as Eastern cottontail (*Sylvilagus floridanus*), red fox, white-tailed deer and raccoon. The large corrugated steel pipe culvert under Highway 7 did not contain any migratory bird nests and did not show evidence that mammals were crossing through it. The marsh habitat looked as if it would contain breeding migratory birds. Red-tailed Hawks were staging in this area. The creek tributary just west of Leslie Street was surrounded by a small cultural woodlot. Mammals may use this area as a protective wildlife corridor. No other evidence was found in this area, given the time of year and weather conditions.

Segment E

This area is comprised primarily of cultural meadows with urban areas along Burncrest Road and west of Rodick Road and one major section of mixed natural habitat on the east side Rodick Road. The proposed 407 Transitway crosses the bus depot along Burncrest Avenue and the trucking depot just west of Rodick Road. This route also travels the edge of a couple of ponds at Leslie Street and Highway 404. The small cattail marsh at the west end of Burncrest Road is evidence of the German Mills Creek tributary. The mixed natural area just east of Rodick Road consisted of cultural meadow, cultural thicket, cultural woodlots and meadow marsh. This area contained the most wildlife diversity along the whole route. The variety of habitats, combined with nests found in the area, indicated the seasonal presence of Brown Thrasher (*Toxostoma rufum*), Gray Catbird (*Dumetella carolinensis*), American Robin, Song Sparrow (*Melospiza melodia*), Willow Flycatcher (*Empidonax traillii*), American Goldfinch and Mourning Dove (*Zenaida macroura*). Mammal trails and tracks indicated that the area is used as a wildlife corridor. Minimal wildlife evidence however, was found along the remaining section of this segment. In the cattail marsh area at Burncrest Road a Red-tailed Hawk was observed hunting. This marsh also looked suitable for marsh breeding birds, mammals and some herpetofauna in the spring and summer seasons.

Segment F

The area is comprised primarily of cultural meadow, urban and agricultural land uses with three tributary crossings of the Rouge River/Beaver Creek. A small patch of natural habitat exists along the Tributary of Beaver Creek crossing under Highway 407 just west of Warden Avenue. The other two tributaries (Markham Centre Tributary and Kennedy Tributary of the Lower Rouge River) flow between Warden Avenue and Kennedy Road. Any natural habitats around the Lower Rouge River tributary, where the proposed 407 Transitway crosses north back over Highway may have been removed due to recent construction activities. The Kennedy Tributary, between the Unionville Transit Station and the YMCA building, was surrounded by cultural meadow in a very urbanized setting and was dry at the time of LGL's field investigations. The end of the proposed 407 Transitway, just east of Kennedy Road, is comprised of agricultural fields. The only wildlife recorded at this time was the staging Red-tailed Hawks seen around the areas of the Unionville Transit Station and YMCA building. The three tributaries may be used by mammals as travel corridors but no evidence was found.

3.5.2 Fauna

Based on previous work undertaken by LGL Limited along the neighbouring Highway 7 right-of-way (LGL 2003) and including fieldwork undertaken in 2008 within the proposed alignments, to date 126 species of birds, 23 species of mammals, and 10 species of herpetofauna have been identified through secondary source data. **Appendix B** presents wildlife documented in the study area through field investigations and secondary sources of information.

3.5.3 Species at Risk

Background information indicated that of the 159 wildlife species recorded within the study area, six are regulated under the provincial *Endangered Species Act, 2007* (ESA) and the federal *Species at Risk Act* (SARA). The presence of these species is based on a review of secondary source data and available habitats within the study area. The Milk Snake (*Lampropeltis triangulum*) and Snapping Turtle (*Chelydra serpentina*) are listed as special concern under both acts. The Canada Warbler (*Wilsonia canadensis*) and Golden-winged Warbler (*Vermivora chrysoptera*) are listed as special concern under ESA, 2007 and threatened under SARA. The Chimney Swift (*Chaetura pelagica*) is listed as threatened under both acts. The Bobolink (*Dolichonyx oryzivorus*) is listed as threatened under the ESA. Field investigations during the Detail Design phase should place an emphasis on confirming presence/absence and distribution of these six species within the study area.

A review of the available database information from the MNR Biodiversity Explorer (NHIC) indicate that an additional three rare species may be found within the study area. Blanding's Turtle (*Emydoidea blandingii*) and Musk Turtle (*Sternotherus odoratus*) are listed as threatened under ESA, 2007 and SARA and Jefferson X Blue-spotted Salamander, Jefferson genome dominates (*Ambystoma* hybrid pop) is listed as endangered under ESA, 2007 and threatened under SARA. Last observed dates are 1986, 1982 and 1978 respectively for these element occurrences. A Blanding's Turtle (*Emydoidea blandingii*) individual was documented in the West Don River in 2010 by a local resident within the study area. The stretch of the West Don River the Blanding's Turtle was documented in does not contain habitat suitable for this species. However, approximately 1.2 km upstream, the Keffer Marsh provides habitat suitable for the species. Field investigations during the Detail Design phase should place an emphasis on confirming presence/absence and distribution of these three species within the study area.

Evidence for numerous birds protected under the *Migratory Birds Convention Act* (MBCA) was found. Some of the proposed routes come close to several bridges and culverts on Highway 407 and Highway 7 where evidence of migratory birds nesting was noted. Two of these species, Cliff Swallow and Eastern Phoebe, have a strong nesting fidelity for the same site each year and will likely return there to nest each spring. Many of the mammal species recorded are protected under the *Fish and Wildlife Conservation Act*

(FWCA). They are regular travellers of the wildlife corridors found along the creek and river systems. No herpetofauna were recorded. The Toronto and Region Conservation Authority (TRCA) also gives protection to many of the wildlife species recorded.

Three species of significance were noted within the vicinity of the study area: Rough-legged Hawk (*Buteo lagopus*), Northern Shrike (*Lanius excubitor*), and Milk Snake. Rough-legged Hawk is designated by MNR as a non-breeding migrant/vagrant with a SRank of S1B (extremely rare breeding occurrence). Northern Shrike is designated by MNR as a non-breeding migrant/vagrant with a SRank of S2S3B (very rare to uncommon breeding occurrence).

Sixty-four birds have been identified by Bird Studies Canada (BSC) as species of conservation priority (Couturier 1999). Thirty-six birds and one amphibian have been identified by TRCA as species of concern within TRCA's jurisdiction (TRCA 2001).

Twelve birds, one mammal (northern short-tailed shrew), one amphibian (northern red-backed salamander), and two reptiles (midland painted turtle and milk snake) are regulated under the *Fish and Wildlife Conservation Act* and 103 birds are regulated under the *Migratory Birds Convention Act*.

3.5.4 Sensitivity/Significance

Only small areas of wildlife and wildlife habitat were found along the proposed routes of the 407 Transitway. Most of the preferred alternatives are within urbanized areas, cultural meadows and agricultural fields. However, these fragmented natural areas, found either around the tributaries or in small natural heritage patches along Highway 407, contain wildlife activity. Since most of the habitats along the transitway have been disturbed, the few remaining natural areas have become more significant as they are the only areas that are considered safe for wildlife breeding and wildlife corridors.

3.6 Designated Natural Areas

Designated natural areas include areas identified for protection by the OMNR, TRCA and upper tier and lower tier municipalities. The location of designated areas is presented in **Figures 2A and 2B**.

3.6.1 Environmental Significant/Sensitive Areas

One Environmentally Significant/Sensitive Area (ESA) exists in the study area. Baker's Woods (ESA #128), an approximately 35 ha tract of Dry-Fresh Sugar Maple Deciduous Forest (FOD5), is located in the northwest corner of the intersection of Highway 7 and Bathurst Street in the City of Vaughan.

3.6.2 Provincially Significant Wetlands

There are no Provincially Significant Wetlands (PSWs) located in the study area.

3.6.3 Areas of Natural and Scientific Interest

One Area of Natural and Scientific Interest (ANSI) exists in the study area. Baker's Woods, a provincially significant ANSI, is located in the northwest corner of the intersection of Highway 7 and Bathurst Street in the City of Vaughan.

3.6.4 Woodlots

Very few woodlots exist within the study area. The most significant woodlot within the study area is Baker's Woods.

3.6.5 Natural Corridors

Wooded areas along watercourses in the study area act as corridors for wildlife tolerant of an urban environment. These areas allow for wildlife movement along the watercourses to and from more protected areas surrounding the study area such as ESAs and ANSIs. The study area is highly urbanized and very few natural areas in locations other than along watercourses are linked together.

3.6.6 Rouge Park North Management Plan

The Rouge Park North Management Plan includes valleylands surrounding the Rouge River to the north of Highway 407 between Woodbine Avenue and Warden Avenue and valleylands surrounding the main branch and tributaries of the Rouge River to the northwest, northeast and southeast of the intersection of Highway 407 and Kennedy Road. The Rouge Park North Management Plan includes valleylands surrounding Beaver Creek north of Highway 407 to the east of Woodbine Avenue. According to the Rouge Park North Management Plan, valleylands surrounding the Rouge River to the north of Highway 407 between Woodbine Avenue and Warden Avenue are designated ‘Special Management Zones.’ According to the Rouge Park North Management Plan, land surrounding Walden Pond to the northwest of the intersection of Highway 7 and Kennedy Road is designated a ‘Natural Area.’

3.6.7 Natural Heritage System

According to the Regional Municipality of York Official Plan, lands surrounding the Humber River, Don River, Rouge River and their tributaries are designated as part of the Regional Greenlands System, and are designated Environmental Policy Areas and Conservation Areas – Regional Forests. These natural heritage features are connected to other regional natural heritage features north of the study area and provide linkages that facilitate wildlife movement.

According to the City of Vaughan Official Plan, lands surrounding Black Creek, Don River and the East Don River are designated ‘Major Open Space and Valley Lands.’

Within the Town of Richmond Hill ‘Hazards Lands’ surround a tributary of the East Don River northwest of Highway 407 and Yonge Street and German Mills Creek northeast of Highway 407 and Bayview Avenue. Land designated ‘Major Open Space’ is located midway between Valley Mede Drive and West Beaver Creek Road.

According to the Town of Markham Official Plan, lands surrounding the East Don River, German Mills Creek and two tributaries of German Mills Creek, Beaver Creek, Rouge River, and two tributaries of the Rouge River are designated ‘Hazard Lands/Valleylands.’ Land designated ‘Special Policy Area’ is associated with ‘Hazard Lands/Valleylands’ of the Rouge River within/adjacent to the study area at Main Street (Unionville), and Kennedy Road.

4.0 PROJECT DESCRIPTION

The purpose of this project is to provide a high-speed cross-regional transit facility meeting the current MTO 407 Transitway Design Standards and to be constructed in a separate right-of-way that parallels Highway 407 ETR. The scope of work includes the following:

- 23 km of two-way transit runningway;
- seven stations with platforms/enclosures and vertical circulation elements including amenities such as Passenger Pick Up/Drop Off (PPUDO), bus transfer bays, park-and-ride areas, passenger information and fare collection systems;
- an Operations and Maintenance Facility located between Highway 400 and Jane Street to accommodate an initial bus rapid transit (BRT) fleet with provision for future conversion to light rail transit (LRT);
- local auto and bus access to and egress from the stations;
- grade separation and retaining structures where required;
- a stormwater management system;
- illumination in station areas and at structures;
- right-of-way security fencing; and,
- Intelligent Transportation System (ITS) components.

4.1 Project Components

4.1.1 Runningway

The running way will be a two lane fully grade separated facility with two-way traffic. Initially the runningway will support bus rapid transit (BRT), with a pavement width of 7.0 m. Outside shoulder width will be 2.5 m, with 1 m rounding. The posted speed along the runningway will be 110 km/hr and 60 km/hr through the stations.

4.1.2 Stations

The central section of the Transitway includes seven stations providing the functions listed at the following locations:

- Jane Station – connects with TTC Spadina Subway Extension and serves the Vaughan Regional Centre;
- GO Barrie (Concord) Station – connects with Barrie GO rail line at future station;
- Bathurst Station – provides ‘park-and-ride’ capacity near the Yonge Street mobility hub and East Vaughan residential growth areas;
- Yonge Station – connects with future TTC Yonge Street Subway, Richmond Hill GO line and serves Richmond Hill Regional Centre;
- Leslie Station – serves the Beaver Creek/Highway 404 Business Parks;
- Woodbine/Rodick Station – provides ‘park-and-ride’, more uniform station spacing and serves the West Markham Centre; and,
- Kennedy Station – connects with Stouffville GO rail line and serves the Markham Regional Centre.

4.1.3 Operations and Maintenance Facility

The facility for the central section would be the primary major maintenance and storage facility for the Transitway. It should be designed for servicing 100 buses to accommodate future fleet expansion. The logical location for the facility is MTO's protected site at the junction of Highway 407 and Highway 400. This location is the only remaining site with adequate land area in the Central Section and it also benefits from the absence of sensitive land uses such as residential areas in the surrounding environment which consists mainly of compatible light industrial uses and road/rail transportation corridors. The analysis recommended that the site be planned with protection to maintain and store an equal number of vehicles that would be required for 400-series highway services currently operating or planned for the future expanded inter-regional bus transit network such as GO Transit operations. This approach of sharing the facility and site by more than one corridor fleet would result in the development of a more optimum facility nearer the typical more common industry capacity of about 150-200 vehicles.

5.0 IMPACT ASSESSMENT AND ENVIRONMENTAL PROTECTION

Impacts on the natural heritage resources associated with the 407 Transitway will, in some situations, be unavoidable. This type of scenario includes areas such as 'work zones' at stations and construction of the runningway and structures at intersections. The magnitude or significance of these impacts is directly correlated to the significance of the natural heritage feature that will be disturbed and with the effectiveness of the mitigation that will be applied.

The following sections of this report address the potential impacts and recommended mitigation measures with respect to the natural heritage resources associated with the 407 Transitway project.

5.1 Vegetation and Vegetation Communities

Implementation of the 407 Transitway project has the potential to result in impacts to vegetation and vegetation communities. Effects on vegetation related to the Highway 407 Transitway and associated facilities may include:

- displacement or loss of vegetation and vegetation communities as a result of the proposed development in relation to the construction of the transitway and transitway stations which includes grading, the construction of bridges, and the installation of culverts;
- disturbance to vegetation through edge effects (windthrow, changes in light conditions, and invasion by exotic plant species), and drainage modifications; and,
- displacement of rare, threatened or endangered vegetation or significant vegetation communities.

To estimate the quantity of vegetation that will be removed/displaced at a specific impacted area, a GIS application was used to evaluate the extent of overlap of the route and accompanying stations, with the relevant vegetation communities. To complete this analysis two GIS layers were used: one of the layers was the engineered drawings that represented the 'limits of construction' along the Highway 407 corridor, and the second layer was the ELC boundaries that defined the various vegetation communities within the study area. The results of the evaluation using the GIS application are illustrated on **Figures 3a-b** which illustrates the technically preferred alignment, stations and vegetation communities delineated by the LGL botanist.

5.1.1 Displacement/Loss of Vegetation and Vegetation Communities

The loss of vegetation and vegetation communities has been broken out into two categories, the preferred alignment for the Highway 407 Transitway, and the associated stations. Overall, there will be a loss of 73.06 ha of vegetated lands which includes a 47.99 ha loss due to the preferred alignment, and a 25.07 ha loss due to the stations. Collectively, this will result in impacts to both terrestrial and wetland habitat.

This loss of habitat could result in impacts to the TRCA's Natural Heritage System. The TRCA has identified all of the natural cover in its region. The Natural Heritage System represents natural features that have been evaluated and assessed based on habitat quality as well as species presence. This work has been undertaken, in part, to help direct land use policy, strategic planning and environmental decision-making. Subsequently, an evaluation of any potential impacts to the TRCA Natural Heritage System will be undertaken during the detailed design phase.

Impacts to wetland communities within the study area will primarily be to wetlands which have developed due to the presence of drainage ditches, have been created due to concentrated development which has resulted with increased runoff in localized areas, as well as wetlands in low grade areas along the hydro corridors. These wetland vegetation communities include meadow and shallow marshes, swamp thickets, and mixed and deciduous swamps. However, the function of these wetlands, as well as habitat qualities still provide a valuable function that includes flood mitigation, and habitat for more sensitive wildlife species. It is expected that post-construction, new wetland areas will be created due to changes in drainage related to the construction of the transitway and its related components, but mitigation should be outlined at the detailed design phase.

The following is a detailed breakdown of vegetation community loss first by alignment which is further broken out into Segments (A to F) as noted in **Section 2.0**, and then by each of the seven associated transitway stations.

Alignment

Segment A – Highway 400 to east of Keele Street

A total of 18 separate ELC vegetation communities, representative of five ELC vegetation types have been identified by LGL Limited along the transitway corridor from Highway 400 to east of Keele Street (Segment A). Along Segment A, a total loss of 7.32 ha of land is expected. This land is comprised of 12 cultural meadows (CUM1-1), three cultural woodlands (CUW1), one cultural savannah (CUS1), one Forb Mineral Meadow Marsh (MAM2-10) and one Cattail Mineral Shallow Marsh (MAS2-1).

All of the vegetation communities located along Segment A are provincially secure. Sixteen of the existing vegetation communities that will be impacted are cultural communities which will result in a total loss of 7.06 ha of land. Culturally influenced vegetation communities are disturbed environments, generally a result of previous disturbance activities such as a land clearing for infrastructure and development, and non-native plant species are often dominant. A total loss of 0.16 ha of the Forb Mineral Meadow Marsh (MAM2-10) and 0.10 ha of the Cattail Mineral Shallow Marsh is (MAM2-1) expected. The MAM 2-10 community has a high proportion of non-native species including purple loosestrife (*Lythrum salicaria*) and American stinging nettle (*Urtica dioica* ssp. *gracilis*), and has also been subjected to disturbance activities in the past. The loss of wetland plant species within these vegetation communities is expected to be minor as all of the plants species identified have populations that are abundant and secure within Ontario.

Due to the disturbed nature of the vegetation communities along Segment A, and that all of the plant species within those communities have secure populations within Ontario, vegetation losses are expected to be minor.

Segment B – East of Keele Street to West of Yonge Street

A total of 23 separate ELC vegetation communities, representative of eight ELC vegetation types have been identified by LGL Limited along the proposed transitway corridor from east of Keele Street to east of Dufferin Street (Segment B). Along Segment B, a total loss of 18 ha of land is expected. This land is comprised of eight cultural meadows (CUM1-1), three cultural thickets (CUT1), three cultural woodlands

(CUW1), one cultural savannah (CUS1), one mixed swamp (SWM), one Forb Mineral Meadow Marsh (MAM2-10), three Reed-canary Grass Mineral Meadow Marshes (MAM2-2), two Cattail Mineral Shallow Marshes (MAS2-1), and one Fresh-Moist Lowland Deciduous Forest (FOD7).

All of the vegetation communities located along Segment B are provincially secure. Fifteen of the existing vegetation communities that will be impacted are cultural communities which will result in a total loss of 12.89 ha of land. Culturally influenced vegetation communities are disturbed environments, generally a result of previous disturbance activities such as land clearing for infrastructure and development, and non-native plant species are often dominant. A total loss of 4.99 ha of wetlands is expected which includes impacts to three meadow marshes (MAM2-2), two shallow marshes (MAS2-1) and one mixed swamp (SWM). One of the meadow marshes will be completely removed while the other two will only be partially impacted. The loss of wetland plant species within these vegetation communities is expected to be minor as all of the plants species identified have populations that are abundant and secure within Ontario. In addition, a total loss of 0.32 ha of the deciduous forest (FOD7) is expected due to the preferred alignment. There is also a landscape nursery along Segment B that will be partially impacted with a loss of 0.22 ha of land. Overall, due to the disturbed nature of the vegetation communities, and that all of the plant species within the vegetation communities along Segment B have secure populations within Ontario, vegetation losses are expected to be minor. However, the loss of wetland function (i.e., recharge, etc.) should be addressed.

Segment C – West of Yonge Street to West of Bayview Avenue

A total of six separate ELC vegetation communities, representative of three ELC vegetation types have been identified by LGL Limited along the preferred alignment connecting the transitway corridor from west of Yonge Street to west of Bayview Avenue. Along this segment, a total loss of 2.98 ha of land is expected. This land is comprised of four cultural meadows (CUM1-1), two cultural thickets (CUT1).

Culturally influenced vegetation communities are disturbed environments, generally a result of previous disturbance activities such as land clearing for infrastructure and development, and non-native plant species are often dominant.

Segment D – West of Bayview Avenue to West of Leslie Avenue

A total of ten separate ELC vegetation communities, representative of six ELC vegetation types, have been identified by LGL Limited along the preferred alignment connecting the transitway corridor from west of Bayview Avenue to west of Leslie Street. Along Segment D, a total loss of 6.3 ha of land is expected. This land is comprised of four cultural meadows (CUM1-1), two cultural thickets (CUT1), one cultural woodland (CUW1), one Fresh-Moist Lowland Deciduous Forest (FOD7), one Reed-canary Grass Mineral Meadow Marshes (MAM2-2), and one Cattail Mineral Shallow Marsh (MAS2-1).

All of the vegetation communities located along Segment D are provincially secure. Seven of the existing vegetation communities that will be impacted are cultural communities which where a total loss of 6.07 ha of land is expected. Culturally influenced vegetation communities are disturbed environments, generally a result of previous disturbance activities such as land clearing for infrastructure and development, and non-native plant species are often dominant. A total loss of 0.26 ha of wetlands is expected including a portion of the meadow marsh (MAM2-2) and a portion of the shallow marsh (MAS2-2). Overall, the loss of wetland plant species within these vegetation communities is expected to be minor as all of the plants species identified have populations that are abundant and secure within Ontario, and populations of those plants will still persist in the remaining portions of habitat. A total of 0.001 ha of deciduous forest (FOD7) will also be removed. This impact will likely result in the removal of a portion of a community edge, which generally tends to be dominated by non-native plant species.

Segment E – West of Leslie Avenue to West of Warden Avenue

A total of 17 separate ELC vegetation communities, representative of six ELC vegetation types, have been identified by LGL Limited along the preferred alignment connecting the transitway corridor from west of Leslie Avenue to West of Warden Avenue. Along this segment, a total loss of 4.71 ha of land is expected. This area is comprised of eight cultural meadows (CUM1-1), five cultural thickets (CUT1), two cultural woodland (CUW1), one Green Ash Mineral Deciduous Swamp (SWD2-2), and one Cattail Mineral Shallow Marsh (MAS2-1).

All of the vegetation communities along Segment E are provincially secure. Fifteen of the existing vegetation communities that will be impacted are cultural communities which will result in a total loss of 4.58 ha of land. Culturally influenced vegetation communities are disturbed environments, generally a result of previous disturbance activities such as land clearing for infrastructure and development, and these vegetation communities are often dominated by non-native species. A total loss of 0.13 ha of wetland is expected to the shallow marsh (MA2-1) and the deciduous swamp (SWD2-2). Overall, the loss of wetland plant species within these vegetation communities is expected to be minor as all of the plants species identified have populations that are abundant and secure within Ontario or are non-native. However, the SWD2-2 vegetation community located east of Woodbine Avenue is considered significant for wildlife due to its relatively large forest cover and a high water table.

Segment F – West of Warden Avenue to East of Kennedy Road.

A total of 15 separate ELC vegetation communities, representative of five ELC vegetation types have been identified by LGL Limited along the transitway corridor from west of Warden Avenue to east of Kennedy Road. Along Segment F, a total loss of 8.61 ha of land is expected. This land is comprised of seven cultural meadows (CUM1-1), one cultural thickets (CUT1), two cultural woodlands (CUW1), one shallow marsh (MAS2), three Cattail Mineral Shallow Marshes (MAS2-1), and one Open Aquatic community.

All of the vegetation communities located along Segment F are provincially secure. Ten of the existing vegetation communities that will be impacted are cultural communities which will result in a total loss of 8.15 ha. Culturally influenced vegetation communities are disturbed environments, generally a result of previous disturbance activities such as land clearing for infrastructure and development, and non-native plant species are often dominant. A total loss of 0.35 ha of wetlands is expected which consists of four shallow marsh communities (MAS2 and MAS2-1). Only a small portion of these wetlands will be impacted due to the preferred alignment. Overall, the loss of wetland plant species within the portions of the vegetation communities where removals are expected, will be minor. The plants species identified within the impact zone have populations that are abundant and secure within Ontario, and populations of these plants will still persist in the remaining portions of habitat.

An Open Aquatic community (OAO) was also identified within Segment G and a total loss of 0.10 ha of this area is expected due to the 407 Transitway alignment.

Stations

Jane Station

One vegetation community has been identified by LGL Limited within expected footprint for this station which is identified as a cultural meadow (CUM1-1). A total loss of 0.28 ha of land is expected. This vegetation community is provincially secure. Culturally influenced vegetation communities are disturbed environments, generally a result of previous disturbance activities such as land clearing for infrastructure and development, and non-native plant species are often comprised predominately of non-native species. Only a small portion of the cultural meadow will be impacted due to the Jane Station, consequently, vegetation losses are expected to be minor.

GO Barrie (Concord) Station

A total of six separate ELC vegetation communities, representative of four ELC vegetation types have been identified by LGL Limited within the expected footprint for this station. A total loss of 4.53 ha of land is expected. This land is comprised of one cultural meadow (CUM1-1), two cultural thickets (CUT1), two cultural woodlands (CUW1) and one Fresh-Moist Lowland Deciduous Forest (FOD7).

All of the vegetation communities within the GO Barrie/Concord Station footprint are provincially secure. Five of the existing vegetation communities that will be impacted are cultural communities which will result in a total loss of 2.89 ha of land. Culturally influenced vegetation communities are disturbed environments, generally a result of previous disturbance activities such as land clearing for infrastructure and development, and non-native plant species are often dominant. A total of 1.55 ha of the deciduous forest (FOD7) will be removed. Compensation for native trees removed from this community is recommended. There is also a landscape nursery within the Barrie Station footprint that will be partially impacted with a total loss of 0.10 ha of land. Overall, due to the disturbed nature of the vegetation communities, and that all of the plant species within those communities have secure populations within Ontario, vegetation losses are expected to be minor.

Bathurst Station

One vegetation community has been identified by LGL Limited within the expected footprint for the Bathurst Station which is identified as a cultural meadow (CUM1-1). A total loss of 5.55 ha of land is expected. This vegetation community is provincially secure. Culturally influenced vegetation communities are disturbed environments, generally a result of previous disturbance activities such as land clearing for infrastructure and development, and non-native plant species are often dominant. Despite the large area of land that will be impacted due to the Bathurst Station vegetation losses are expected to be minor in part due to the fact that the populations of plant species identified within the portion of the cultural meadow that will be impacted, will still persist in the remaining portions of habitat.

Yonge Station

The 407 Transitway station at this location is proposed to be underground. Therefore, no impacts are anticipated from this station.

Leslie Station

A total of four separate ELC vegetation communities have been identified by LGL Limited within the expected footprint for the Leslie Station. As a result of the Leslie Station, a total loss of 4.63 ha of land is expected. This land is comprised of one cultural meadow (CUM1-1), one cultural thicket (CUT1), one cultural savannah (CUS1), and one cultural woodland (CUW1). Culturally influenced vegetation communities are disturbed environments, generally a result of previous disturbance activities such as land clearing for infrastructure and development, and non-native plant species are often dominant. All of the vegetation communities and plant species within the Leslie Station footprint are provincially secure. Due to the disturbed nature of the vegetation communities, and that all of those vegetation communities and plant species are provincially secure, vegetation losses are expected to be minor.

Woodbine/Rodick Station

A total of six separate ELC vegetation communities, representative of five ELC vegetation types have been identified by LGL Limited within the Woodbine/Rodick Station of which a total of 2.67 ha of lands will be impacted. This land is comprised of one cultural meadow (CUM1-1), one cultural thicket (CUT1), two cultural woodlands (CUW1), one Cattail Mineral Shallow Marsh (MAS2-1), and one Green Ash Mineral Deciduous Swamp (SWD2-2)

All of the vegetation communities within the Woodbine/Rodick Station are provincially secure. Four of the existing vegetation communities that will be impacted are cultural communities and a loss of a total of 2.04 ha, is expected. Culturally influenced vegetation communities are disturbed environments, generally a result of previous disturbance activities such as land clearing for infrastructure and development, and non-native plant species are often dominant. Due to the disturbed nature of the vegetation communities, and that the culturally influenced communities and plant species identified within are provincially secure, vegetation losses are expected to be minor. A total loss of 0.63 ha of wetlands is expected including a shallow marsh (MAS-1) and a deciduous swamp (SWD2-2). Only a small portion of each of these two wetland communities will be impacted as a result of the Woodbine/Rodick Station. The loss of wetland plant species within these vegetation communities is expected to be minor as all of the plant species identified have populations that are abundant and secure within Ontario. However, the SWD2-2 vegetation community located east of Woodbine Avenue is significant for wildlife due to its relatively large forest cover and a high water table.

Kennedy Station

A total of three separate ELC vegetation communities have been identified by LGL Limited within the expected footprint for this Station. A total loss of 7.38 ha of land is expected. This land is comprised of one cultural meadow (CUM1-1), one shallow marsh (MAS2), and one Cattail Mineral Shallow Marsh (MAS2-1). Most of the lands to be impacted are comprised of the cultural meadow (CUM1-1) which covers 7.05 ha. Culturally influenced vegetation communities are disturbed environments, generally a result of previous disturbance activities such as land clearing for infrastructure and development, and non-native plants are often dominant.

A total loss of 0.33 ha of land within shallow marshes (MAS2 and MAS2-1), is expected. More recently since the original botanical survey, an existing parking lot has been expanded along the north side of Highway 407. This construction might have already impacted the MAS2 community. Overall, the loss of wetland plant species within these vegetation communities is expected to be minor as all of the plant species identified have populations that are abundant and secure within Ontario or are non-native.

5.1.2 Flora

As a result of the vegetation survey 152 plants were identified to species, of which 67 species (44%) are considered introduced and non-native to Ontario. Introduced species were dominant within the existing right-of-way and in cultural communities. Native species were mostly confined to natural and forested areas.

Species at Risk

No plant species that are regulated under the provincial *Endangered Species Act* (2007) or the federal *Species at Risk Act* were encountered during LGL's botanical investigation. However, a review of the plant species data revealed that eleven regionally and/or locally rare plant species within the York Region and TRCA jurisdictions, were identified within the study area. These species include: red pine, swamp rose, hairy aster, eastern buttonbush, ninebark, white spruce, tall cord grass, Virginia stickweed (*Hackelia virginiana*), one-seeded bur-cucumber (*Sicyos angulatus*), black walnut (*Juglans nigra*), and red cedar. All of these plant species have populations that are apparently secure or secure (S4 or S5) within Ontario.

Riparian areas within the preferred transitway alignment support very few forested communities. The wetland communities are usually associated with drainage ditch and low grade areas along the hydro corridors. Occasionally some regionally and/or locally rare species are present within the cultural, forest and wetland communities. Plants that will be removed due to the proposed 407 Transitway are further discussed below.

Plant Species within Cultural Communities

Overall, the culturally influenced vegetation communities, CUM1-1, CUT1, CUS1 and CUW1, were dominated by non-native plant species. These disturbed vegetation communities had low plant diversity due to the presence of a hydro corridor and the surrounding industrial land uses. However, several regionally and/or locally rare plant species including swamp rose, hairy aster, ninebark, white spruce and red cedar, were identified within the CUM1-1 communities near Jane Street, Keele Street, Dufferin Street, southwest of Centre Street, Bayview Avenue, and Kennedy Road. Hairy aster, ninebark and narrow-leaved meadow-sweet are present within the CUT1 communities near Leslie Street, southwest of Centre Street. Swamp rose, ninebark and white spruce were identified in the CUS1 communities near Keele Street and Leslie Street. Similarly, red pine, swamp rose, ninebark and red cedar were identified within the CUW1 communities located near Centre Street and Yonge Street, and near the West Don River. Impacts to those cultural communities noted above will result in the removal of several of the regionally and/or locally significant plant species. Generally, only one or two individuals of those species were identified.

Plant Species within Wetland Communities

Most wetland communities including SWT2, SWD2-2, MAM2-10, MAS2 and MAS2-1 are associated with a watercourse, or are a result of culvert based drainage and so are not naturally occurring. These vegetation communities were narrow and disturbed due to the surrounding land uses including agriculture, industry and hydro corridors. Several regionally and/or locally rare plant species including eastern buttonbush, ninebark and tall cord grass are present within the MAS2 and MAS2-1 communities near Jane Street and Warden Avenue.

5.1.3 Summary of Vegetation Community and Vegetation Loss

The cumulative loss of vegetation along the transitway and stations is 73.3 ha. This accounts for 19.8% of the total of natural areas (370.22 ha) delineated by the LGL botanist within the Highway 407 study area. The majority of land that will be impacted consists of cultural communities including cultural meadow, cultural thicket, cultural savannah, and cultural woodland. Overall, these communities are a result of previous disturbance activities. Most of the disturbance to these vegetation communities will be along the community edges. There are several wetland communities that will be impacted, including the complete loss of several small wetlands, and the removal of community edges of several other wetlands including the deciduous swamp (SWD2-2). Several regionally and/or locally significant plants will be removed, these species include swamp rose, hairy aster, tall cord grass, eastern buttonbush, ninebark, white spruce and red cedar. Overall, it is reasonable to state that the quantity of vegetation loss at any one specific location is expected to be minor.

5.1.4 Compensation

Regionally and locally significant plants should be transplanted from vegetation communities that will be impacted due to the proposed 407 Transitway and associated stations. Where possible, these plants should be transplanted into the newly created edges of those impacted communities, but outside the limit of disturbance. Transplants of naturally occurring plant species can include white spruce and red cedar trees that are less than 5 cm diameter at breast height (DBH), and buttonbush and ninebark shrubs, swamp rose, tall cord grass, and hairy aster. Additional plantings of other native tree, shrub, and herb species should also be used to help manage newly created edges. Newly exposed vegetation community edges provide pathways for non-native species dispersal, and provide better conditions for non-native species to out-compete those native species that still persist along those newly exposed edges. Where trees and/or shrubs are too large to be transplanted, compensation should be provided to replace those displaced species. A common practice for replacement is to provide 1.5 times replacement for each 10 cm DBH of tree lost, and a ratio of 2:1 for shrub species. A higher replacement value is to compensate for the

potential loss of seedlings. Transplants and compensation plantings should be planted in habitat similar to the conditions in which those species currently exist.

Compensation for wetland habitat should, in part, consist of plantings of native wetland species within areas where drainage alterations will result in seasonally flooded area. Any proposed stormwater ponds should be planted only with native trees, shrubs and ground flora. During detail design a qualified landscape architect should be consulted to provide detailed plans which should be implemented by a qualified native landscape company. A narrow portion of the Green Ash Mineral Deciduous Swamp (SWD2-2), at the southeast corner of Highway 407 and Woodbine Avenue, will be impacted due to the construction of the Transitway and Woodbine/Rodick Station. Red ash is the dominant tree both in the canopy and understorey, and the ground cover is dominated by broad-leaved cattail (*Typha latifolia*). Efforts should be made to minimize any impacts to this swamp, and to this end, erosion control fencing should be erected along its southern, western and eastern boundaries to provide protection from sediment transport during construction. Elevations of adjacent lands should be such that the local hydrology, post-construction, still maintains this area as a deciduous swamp. Edge management, post-construction should be undertaken to mitigate the spread of invasive species along the newly created edges.

Non-native invasive plants can establish in natural areas displacing native plant species over time. Efforts to control non-native species that have become established, as well as prevent the establishment of new non-native plants is important to maintain the health and diversity of natural ecological systems. Recommended mitigation measures include:

- the restoration of disturbed areas post-construction using only native plant species that once established can help to mitigate the establishment of non-native plant species;
- where there are dense patches of common buckthorn (*Rhamnus cathartica*), swallow-wort (*Cynanchum rossicum*) or garlic mustard (*Alliaria petiolata*), the appropriate removal and control of these species by a qualified specialist, would benefit the ecological integrity of the surrounding natural features;
- no invasive, non-native ornamentals plants should be used for landscaping (e.g., Norway maple, purple loosestrife, Japanese knotweed, Japanese honeysuckle, etc.); and

5.1.5 Potential Construction-related Impacts

Impacts from construction may be associated with equipment operating in areas designated for protection. Areas designated for protection should be clearly shown on all construction plans, this information should be conveyed to ensure construction plans and mitigation methods are followed. Special care should be taken during construction to minimize impacts to existing wetland vegetation communities including swamps, meadow marsh and shallow marsh communities and riparian habitat. Wherever possible, regionally and/or locally rare species should be avoided. Mitigation measures such as transplanting those more uncommon plant species should be taken into consideration.

Siltation of natural vegetation arising from soil erosion of exposed soils can arise if appropriate sediment control is not undertaken. An approved sediment control plan should be in place prior to the start of construction. The proposed erosion control measures should be implemented prior to the commencement of construction activities, they should be monitored regularly (more frequently during periods of rainfall or snow melt in early spring), and fencing should be repaired or replaced in a timely manner where damage has occurred due to construction activities or where they have become ineffective due to silt build-up. The following environmental protection measures, designed to reduce or minimize impacts vegetation communities and vegetation, should be taken into consideration.

Mitigation

- The timing of construction should be planned to avoid excessive impacts to natural features (i.e., avoid periods of heavy rainfall or snow melt in early spring);
- grading should be reduced to the minimum extent possible;
- on steep slopes (e.g., greater than 3:1) erosion blankets should be used to stabilize the soils and to encourage the establishment of vegetative cover;
- soil disturbance and disturbance of the existing vegetation on-site should be limited to only those areas requiring grading or excavation;
- natural features designated for protection should be clearly identified (including individual trees where applicable) and fenced (1 m outside the canopy edge) to ensure no construction traffic, equipment or materials storage intrude on these areas, or cause compaction of the soils;
- stockpiling of soil should be done away from protected natural areas particularly watercourses and wetlands and additional silt fencing used to prevent sediment transport;
- any fill used on site should consist of native soils;
- any portion of riparian habitat adjacent to watercourses or any portion of wetlands that are not to be impacted but are inadvertently damaged or removed as a result of construction, should be immediately replaced with comparable native plant material;
- perimeter silt fencing of a size and type capable of containing runoff should be installed down slope of all construction areas to slow down and filter surface water runoff;
- exposed soils should be re-vegetated as soon as possible and re-vegetation should be completed prior to the onset of winter with native plant species;
- prepare restoration and enhancement plans that will meet or exceed TRCA standards that will offset vegetation losses and achieve a net gain in vegetation area, attributes and functions;
- prepare edge management plans for areas where encroachment on vegetation communities will occur; and,
- prepare planting plans to include the use of native and salt-tolerant vegetation species.

Arborist reports, tree protection plans, edge management plans, landscape restoration plans and suitable compensation for vegetation losses should be prepared during detail design in consultation with the TRCA and York Region.

5.2 Aquatic Habitat and Communities

The Department of Fisheries and Oceans (DFO) is responsible for the administration of the federal *Fisheries Act* which prohibits the harmful alteration, disruption or destruction (HADD) of fish habitat under Section 35 of the Act. Ultimately, during detail design DFO will review this project with regard to impacts to fish habitat with reference to the *Ministry of Transportation (MTO)/Department of Fisheries and Oceans Canada (DFO)/Ontario Ministry of Natural Resources (OMNR) Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings* (2006). With the final design criteria completed, the proponent will screen the potential for HADD at each of the watercourse locations and provide documentation to DFO using the MTO/DFO/OMNR Environmental Guide for Fish and Fish Habitat (June 2009) at which time DFO will provide commentary.

Some of the watercourse crossings (East Don River and Tributaries 1 and 2) are likely to support Redside Dace which is regulated under the provincial *Endangered Species Act, 2007*. As such, permitting for the proposed activities may be required from the MNR. The MNR Aurora District office Species at Risk Biologist should be consulted at the initiation of the detail design assignment to determine the permitting requirements.

5.2.1 Watercourse Crossings

There are 16 watercourses in total along the 407 Transitway alignment that will need to be crossed. From west to east these watercourses are:

Segment A

- 1) Tributary 1 of Black Creek east of Highway 400 (H1);
- 2) Black Creek east of Jane Street (H4);
- 3) Tributary 2 of Black Creek east of Jane Street (H5);

Segment B

- 4) Tributary 1 of the West Don River east of GO Barrie line (D1);
- 5) West Don River west of Centre Street (D3);
- 6) Westminster Creek west of Dufferin Street and Highway 7 (D17);
- 7) Tributary 1 of East Don River west of Bathurst Street (D22);
- 8) Tributary 2 of East Don River east of Bathurst Street (D6);
- 9) East Don River west of Yonge Street (D7);

Segment C

- 10) Pomona Mills Creek west of CNR Bala (D8);

Segment D

- 11) German Mills Creek east of Bayview Street and Highway 407 (D12);
- 12) Tributary 1 of German Mills Creek west of Leslie Street (D14);

Segment E

- 13) Tributary 2 of German Mills Creek, Highway 404/Highway 407 (D15);

Segment F

- 14) Tributary of Beaver Creek west of Warden Avenue (R8);
- 15) Markham Centre Tributary of the Rouge River east of Warden Avenue (R6); and
- 16) Kennedy Tributary of the Rouge River west of Kennedy Road (R7).

New structures are proposed at some of these crossings as part of the proposed works associated with the 407 Transitway, but are not required at other watercourse crossings. In general terms, any project that involves road widening and associated bridge/culvert improvements or new structures over a watercourse, drainage modifications or generation of stormwater runoff has the potential to result in a harmful alteration, disruption or destruction (HADD) of fish habitat due to the following effects:

- displacement of fish or fish habitat;
- disruption to fish and fish habitat through changes to water quality and quantity, alterations to base flow, changes in water temperature and barriers to fish passage; and,
- displacement of fish species at risk or critical fish habitat.

Segment A

Within Segment A, three watercourse crossings are present: Tributary 1 Black Creek, Tributary 2 of Black Creek and the main Black Creek channel. The new structures proposed will consist of a 6 x 3.5 x 34 m open bottom culvert at Tributary 1 and a 60 m bridge span across Black Creek. The relatively large size of the proposed structures and the low sensitivity of the fish communities at each of these watercourses should not result in a HADD. Black Creek and tributaries have been classified as warmwater systems with a low sensitivity. No alteration of the structure crossing Tributary 2 will be required due to the location of the proposed 407 Transitway within the existing Highway 407 ROW.

Segment B

Segment B includes a crossing of Tributary 1 of the West Don River, the West Don River, Westminster Creek, Tributary 1 of the East Don River, Tributary 2 of the East Don River and the East Don River.

At the West Don River several crossings are proposed in an area that is currently considered to be in the floodplain. To minimize encroachment of the 407 Transitway into the floodplain, the construction of vertical walls or elevated structures should be considered.

The crossing of Tributary 1 of the West Don River will consist of a 34 m span bridge and the West Don River crossing will consist of a 40 m span bridge. The structure proposed for the crossing of Westminster Creek will consist of 29 m span bridge. These span widths indicate that the new structures will likely not result in a HADD due to their minimal impact to the existing channel. Some additional mitigation/restoration measures may be required to enhance the local aquatic/riparian habitat conditions. The West Don River and the tributaries are warmwater systems that generally support a tolerant fisheries community and are considered of low sensitivity.

The 407 Transitway will cross Tributary 1 of the East Don River over an existing culvert; therefore, no new culverts/structures will be required at this location. The crossing of Tributary 2 of the East Don River will consist of a 56.4 m span bridge and the East Don River crossing will consist of a 90 m span bridge. These span widths indicate that the new structures will likely not result in a HADD due to their minimal impact to the existing channel. Some additional mitigation/restoration measures may be required to enhance the local aquatic/riparian habitat conditions.

The East Don River is a coldwater system that supports a wide variety of fish species, including migratory salmonids that generally are highly sensitive to impacts. Tributary 1 and Tributary 2 of the East Don River and the East Don River have been identified by the DFO/TRCA Aquatic Species at Risk Mapping (May 2010) as Redside Dace habitat. Redside Dace typically inhabit coolwater systems with relatively clean and clear flow conditions. This species requires a high level of mitigation and protection measure as it is highly sensitive to impacts. While no in-water work is required at these watercourse crossings, MNR should be approached during detail design to determine if a permit under the Endangered Species Act will be required due to the potential presence of Redside Dace.

Segment C

Segment C includes Pomona Mills Creek. No new structures are proposed at Pomona Mills Creek as the proposed transitway alignment will be located above the existing crossing. The Pomona Mills Creek is a coldwater system that supports a wide variety of fish species that are generally highly sensitive to impacts. No permits are anticipated to be required as no structures or other works are proposed at this location.

Segment D

Segment D includes German Mills Creek and Tributary 1 of German Mills Creek. New structures are required at German Mills Creek and at Tributary 1 of German Mills Creek. The structure proposed for Tributary 1 will consist of a 30 m span bridge. The structure proposed at German Mills Creek will consist of a 40 m span bridge. German Mills Creek is a coldwater system and therefore has a high sensitivity. Tributary 1 of German Mills Creek is a warmwater system of low sensitivity. The bridge structures proposed at these locations will likely negate any possibility of a HADD occurring.

Segment E

Segment E includes Tributary 2 of German Mills Creek. No new structure is required at Tributary 2 of German Mills Creek due to the enclosed nature of the watercourse at the location of the proposed transitway. Tributary 2 of German Mills Creek is a warmwater system of low sensitivity.

Segment F

Segment F includes a Tributary of Beaver Creek, and the Markham Centre and Kennedy Road Tributaries of the Rouge River.

A 30 m span bridge is proposed at the Tributary of Beaver Creek crossing which will span the channel and floodplain to reduce the possibility of the structure being deemed a HADD. This watercourse is a warmwater system and is moderately sensitive.

A 17.1 m span bridge is proposed at the Markham Centre Tributary of the Rouge River. No in-water work is anticipated at this location, so a HADD can likely be avoided. The 407 Transitway will travel under the Kennedy Road Tributary of the Rouge River. If the crossing is constructed by tunnelling, no in-water work will be required. If cut-and-cover construction is required, the channel will likely be modified and may result in a HADD. These two watercourses are warmwater systems that are of moderate sensitivity.

The Transitway to the west of the proposed Woodbine/Rodick Station will require a crossing of a small intermittent watercourse. This watercourse flows in a northerly direction into a poorly defined swale within the woodland swamp adjacent to Highway 407. The swale eventually flows into the Tributary of Beaver Creek (R8) and as such likely supports a seasonal warmwater fish community. The new crossing structure will likely not constitute a HADD, due to the seasonal nature of the warmwater fish community in this channel which makes this a low sensitivity system. Further analysis of this channel and the design of the crossing will need to be addressed at the detail design stage. The new transitway route just east and west of Rodick Road will be directly adjacent to the woodland swale identified above. A re-alignment of the Tributary of Beaver Creek, west of the station may be required to minimize the risk of flooding to the station if changes to the transitway alignment are not possible. The proposed stormwater management pond for this station is located in the hydro corridor. A watercourse re-alignment would be required to make space for the stormwater management pond.

The channel realignment may constitute a HADD and negotiations with TRCA and DFO on design, mitigation and compensation issues will be required. A detailed analysis of this scenario and potential options to prevent a channel realignment will be addressed during detail design.

5.2.2 Mitigation Measures

Mitigation measures pre-, during and post-construction should prevent any deleterious impacts to these systems. To reduce the potential for alteration of fish habitat, the following environmental mitigation measures will be implemented:

- delineate work areas with construction fencing to minimize the area of disturbance;
- restrict the use of heavy equipment on watercourse banks;
- prohibit the use of heavy equipment in the watercourse;
- place silt fence along margins in areas of soil disturbance;
- monitor and maintain erosion and sedimentation control measures during construction to ensure their effectiveness;
- apply seed and mulch, tackifier and/or erosion control blanket in areas of soil disturbance to provide adequate slope protection and long-term slope stabilization; and,
- implement good housekeeping practices related to materials storage/stockpiling, equipment fuelling/maintenance, etc. during construction.

These environmental protection measures will greatly reduce the potential for adverse effects to fish and fish habitat located along the 407 Transitway corridor.

Grading plans for the stations are not yet available. Given their close proximity to watercourses, grading plans are required to confirm the constructability of stormwater management ponds, to avoid encroachment into the floodplains, and to ensure that the ponds are set high enough to avoid back-water effects from the watercourses into the stormwater management ponds.

The East Don River, German Mills Creek and Pomona Mills Creek support a coldwater fish community that is highly sensitive to impacts. Coldwater systems require a construction timing window from July 1 – September 15 (work allowed) to protect the local fish communities. SWM facilities proposed to outlet to these systems should explore opportunities to reduce thermal impacts during the summer period. This could include enhanced infiltration measures, shading of outfalls and ponds, drawing water from deep portions of the ponds or other treatment options (bio-retention units, oil and grit separators, grassed swales, etc.). These mitigation measures should also be considered at the three watercourses where Redside Dace are present (East Don River and Tributaries 1 and 2 of the East Don River).

The remaining watercourses are warmwater systems of low sensitivity that support tolerant communities of warmwater fish species posing a low constraint/sensitivity. The general construction timing window for these watercourses for in-water work is from July 1 – March 31 (work allowed).

5.2.3 Species at Risk

All species historically recorded within or near the study area are considered to be either very common in Ontario (provincial rank of S5), common (provincial rank of S4) or non-native (provincial rank of SE) with the exception of American Brook Lamprey (*Lampetra appendix*) (provincial rank of S3). One aquatic species, Redside Dace is designated as Endangered both provincially and federally and is regulated by the provincial *Endangered Species Act, 2007*. This species has been identified in the East Don River and the two tributaries of the East Don River. The Redside Dace is a coolwater species that is highly sensitive to impacts.

5.3 Wildlife and Wildlife Habitat

The 407 Transitway project has the potential to result in displacement of and disturbance to wildlife and wildlife habitat. Effects on wildlife related to the 407 Transitway project can be categorized into five main areas of concern including:

- displacement of wildlife and wildlife habitat;
- barrier effects on wildlife passage;
- wildlife/vehicle conflicts;
- disturbance to wildlife from noise, light and visual intrusion; and,
- displacement of wildlife species at risk.

The existing land use along the 407 Transitway corridor is primarily industrial or commercial, with some smaller areas of residential backing onto the corridor between Dufferin Street and Yonge Street. With the exception of the valley corridors along Black Creek, the West and East Don Rivers, German Mills Creek, Beaver Creek, and the Rouge River, terrestrial wildlife habitat is minimal and the habitat that is present is provided by cultural meadows, cultural thickets, cultural woodlands and isolated forested parcels. Most of the available wildlife habitat that is adjacent to the 407 Transitway can be characterized as being of poor quality, low structural diversity and low habitat diversity. Baker's Woods, a relatively large forest remnant that provides high quality wildlife habitat is located north of Highway 7 at Bathurst Street. The 407 Transitway at this location is located south of Highway 7; therefore, no encroachment on this important natural heritage feature will occur.

5.3.1 Displacement of Wildlife Habitat

The 407 Transitway will be built on previously undeveloped lands in a dedicated corridor from Highway 400 to Kennedy Road. The 23 km of transitway and seven stations will displace approximately 73.06 ha of potential wildlife habitat. The runningway will displace approximately 47.99 ha and the stations 25.07 ha of potential habitat.

The overall poor quality, low structural diversity and low habitat diversity of the wildlife habitat and the type of species supported by these isolated patches of vegetation, reduces the level of significance attributable to the loss. Wildlife species present in these areas are represented primarily by small mammals and small, migratory and resident passerine birds; species that are tolerant of human disturbance. During construction, these wildlife species will be temporarily displaced but will re-establish to the available habitat once operation of the 407 Transitway is established.

5.3.2 Barriers Effects on Wildlife Passage

Barriers to wildlife passage will be created as a result of the 407 Transitway; however, given the urban nature of the study area, the 407 Transitway is not expected to have a major impact on wildlife passage. Existing wildlife corridors located at watercourse crossings and along rail line corridors will be maintained and restrictions to wildlife movement through these areas will not occur.

5.3.3 Wildlife Vehicle Conflicts

The addition of approximately 12 m of pavement for the runningway will introduce a travel surface that will result in an increased risk of mortality for selected wildlife species that may elect to cross the transitway. While the introduction of a paved runningway will not prohibit crossing of the transitway by small and large animals, it poses a hazard to some of these species by introducing an exposure to vehicle

conflicts. The increase in wildlife mortality resulting in the construction and operation of the transitway is expected to be minor.

5.3.4 Disturbance to Wildlife from Noise, Light and Visual Intrusion

Noise, light and visual intrusion may alter wildlife activities, patterns and behaviours. In urban settings, wildlife are generally acclimatized to the urban conditions and only those species that are tolerant of human activities remain. Given the extent of urbanization in the study area, the tolerance of the wildlife assemblage to human activities and the limited zone of influence of the 407 Transitway, disturbance to wildlife from noise, light and visual intrusion is expected to be minor.

5.3.5 Displacement of Wildlife Species at Risk

Secondary source records report seven wildlife species recorded in the 407 Transitway study area that are regulated under the provincial *Endangered Species Act*, 2007 and the federal *Species at Risk Act*. Potential impacts to these species resulting from the proposed transitway will be assessed during the detail design phase. Potential impacts could include the removal of significant habitat, and changes to species abundance and distribution within the study area.

Numerous birds located within the project limits are listed under the *Migratory Birds Convention Act* (MBCA). The MBCA prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or the damaging, destroying, removing or disturbing of nests. To meet the requirements of the MBCA, no vegetation removals should occur during the nesting season. With several exceptions, this includes the period from April 1 to July 31. This timing restriction will also protect the birds listed under the *Fish and Wildlife Conservation Act* (FWCA).

5.4 Designated Natural Areas

Designated natural areas include areas identified for protection by the MNR, TRCA and upper and lower tier municipalities.

There is one Environmentally Significant Area (ESA) in the study area: Baker's Woods – ESA 128, located in the northwest corner of Highway 7 and Bathurst Street. This ESA is also designated a Life Science – Area of Natural and Scientific Interest. This ESA/ANSI will not be impacted by the transitway.

There are no Provincially Significant Wetlands (PSWs) located within the study area.

The Rouge Park North Management Plan includes valleylands surrounding the Rouge River to the north of Highway 407 between Woodbine Avenue and Warden Avenue and valleylands surrounding the main branch and tributaries of the Rouge River to the northwest, northeast and southeast of the intersection of Highway 407 and Kennedy Road. The Rouge Park North Management Plan includes valleylands surrounding Beaver Creek north of Highway 407 to the east of Woodbine Avenue. According to the Rouge Park North Management Plan, valleylands surrounding the Rouge River to the north of Highway 407 between Woodbine Avenue and Warden Avenue are designated 'Special Management Zones.' Impacts to natural heritage features within the Rouge Park North Management Plan lands should be minimized to the extent possible.

According to the Regional Municipality of York Official Plan, lands surrounding the Humber River, Don River, Rouge River and their tributaries are designated as part of the Regional Greenlands System, and are designated Environmental Policy Areas and Conservation Areas – Regional Forests. Impacts to natural heritage features within the Regional Greenlands System should be minimized to the extent possible.

6.0 MONITORING

A monitoring plan will be prepared during detail design to determine the effectiveness of mitigation/compensation measures and to ensure compliance with environmental legislation, permits, approvals and EA conditions. The monitoring plan will be prepared in consultation with TRCA, MNR, MOE and other regulatory agencies.

During construction, an environmental inspector will make frequent random site visits for the duration of work at the water crossing locations. The environmental inspector will be responsible for delineating work areas, ensuring that erosion and sedimentation control measures are functional and that the provisions related to fisheries and watercourse protection are met. Post-construction monitoring, if prescribed, will determine the effectiveness of environmental protection and mitigation measures, identify problem areas and recommend corrective measures.

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APPENDIX A
WORKING VASCULAR PLANT LIST

<p align="center">Appendix A Working Vascular Plant List</p>	
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Appendix A Working Vascular Plant List																																														
Scientific Name		Common Name	GRank	SRank	MNR	COSEWIC	TRCA	York - Riley	York - Varga	ELC Community																																				
										FOM5A	FOD7A	FOD7B	CUM1-1	CUT1A	CUT1B	CUT1C	CUT1D	CUT1E	CUT1F	CUT1G	CUT1H	CUT1I	CUT1J	CUT1K	CUS1A	CUS1B	CUS1C	CUS1D	CUS1E	CUM1A	CUM1B	CUM1C	CUM1D	CUM1E	CUM1F	CUM1G	CUM1H	CUM1I	CUM1J	CUM1K	CUM1L	SMD2-2	SWT2A	SWT2B	MAM2-2A	MAM2-10
*	<i>Elaeagnus angustifolia</i>	Russian olive	G?	SE3			L+	X	X				X	X		X											X																			
*	<i>Elaeagnus umbellata</i>	Russian olive	G?	SE3			L+		X				X			X	X		X	X	X		X				X	X							X											
	LYTHRACEAE	LOOSESTRIFE FAMILY																																												
*	<i>Lythrum salicaria</i>	purple loosestrife	G5	SE5			L+	X	X				X	X	X							X	X										X		X	X	X	X	X	X	X	X				X
	ONAGRACEAE	EVENING-PRIMROSE FAMILY																																												
	<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	yellowish enchanter's nightshade	G5T5	S5			L5	X	X																			X																		
*	<i>Epilobium hirsutum</i>	great hairy willow-herb	G?	SE5			L+	X	X																											X										
	<i>Oenothera biennis</i>	common evening-primrose	G5	S5			L5	X	U				X		X	X								X		X													X	X						
	CORNACEAE	DOGWOOD FAMILY																																												
	<i>Cornus sericea</i> ssp. <i>sericea</i>	red-osier dogwood	G5	S5			L5	X	X		X		X		X	X	X		X				X	X		X				X	X		X	X				X	X	X	X			X	X	X
	CELASTRACEAE	STAFF-TREE FAMILY																																												
*	<i>Euonymus alata</i>	winged spindle tree	G?	SE2			L+	X	X			X															X																			
	RHAMNACEAE	BUCKTHORN FAMILY																																												
*	<i>Rhamnus cathartica</i>	common buckthorn	G?	SE5			L+	X	X	X	X	X	X	X	X	X			X		X		X	X				X	X	X	X	X	X	X	X			X								
	VITACEAE	GRAPE FAMILY																																												
	<i>Parthenocissus quinquefolia</i>	inserted Virginia-creeper	G5	S4?			L4	X	X	X		X	X										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	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																			X																		
	<i>Acer negundo</i>	manitoba maple	G5	S5			L+?	X	X	X		X	X		X	X	X		X			X	X	X				X	X	X	X		X	X	X	X		X			X					
*	<i>Acer platanoides</i>	norway maple	G?	SE5			L+	X	X		X	X	X				X				X							X		X																
	<i>Acer rubrum</i>	red maple	G5	S5			L4	X	X																																					
	<i>Acer saccharinum</i>	silver maple	G5	S5			L4	X	X																																					
	<i>Acer X freemanii</i>	freeman's maple					L3		X-SR	X	X	X	X										X			X										X	X			X					X	
	ANACARDIACEAE	SUMAC FAMILY																																												

<p align="center">Appendix A Working Vascular Plant List</p>	
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APPENDIX B
WIDLIFE SPECIES LIST

APPENDIX B
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA

Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status
Birds	<i>Podilymbus podiceps</i>	Pied-billed Grebe			BSC, TRCA (L3)	MBCA
	<i>Ardea herodias</i>	Great Blue Heron			TRCA (L3)	MBCA
	<i>Butorides virescens</i>	Green Heron			BSC, TRCA (L4)	MBCA
	<i>Branta canadensis</i>	Canada Goose			TRCA (L5)	MBCA
	<i>Anas platyrhynchos</i>	Mallard			TRCA (L5)	MBCA
	<i>Cathartes aura</i>	Turkey Vulture			BSC, TRCA (L4)	FWCA
	<i>Circus cyaneus</i>	Northern Harrier			TRCA (L3)	
	<i>Accipiter striatus</i>	Sharp-shinned Hawk			BSC, TRCA (L3)	FWCA
	<i>Accipiter cooperii</i>	Cooper's Hawk			BSC, TRCA (L4)	FWCA
	<i>Buteo platypterus</i>	Broad-winged Hawk			BSC, TRCA (L2)	FWCA
	<i>Buteo jamaicensis</i>	Red-tailed Hawk			TRCA (L5)	FWCA
	<i>Buteo lagopus</i>	Rough-legged Hawk				FWCA
	<i>Falco sparverius</i>	American Kestrel			BSC, TRCA (L4)	MBCA, FWCA
	<i>Bonasa umbellus</i>	Ruffed Grouse			BSC, TRCA (L2)	
	<i>Charadrius vociferus</i>	Killdeer			TRCA (L5)	MBCA
	<i>Tringa melanoleuca</i>	Greater Yellowlegs				MBCA
	<i>Tringa flavipes</i>	Lesser Yellowlegs				MBCA
	<i>Tringa solitaria</i>	Solitary Sandpiper				MBCA
	<i>Actitis macularia</i>	Spotted Sandpiper			BSC, TRCA (L4)	MBCA
	<i>Gallinago gallinago</i>	Wilson's Snipe			BSC, TRCA (L3)	MBCA
	<i>Scolopax minor</i>	American Woodcock			BSC, TRCA (L3)	MBCA
	<i>Larus delawarensis</i>	Ring-billed Gull			TRCA (L4)	MBCA
	<i>Larus argentatus</i>	Herring Gull			TRCA (L3)	MBCA
	<i>Columba livia</i>	Rock Dove			TRCA (L+)	
	<i>Zenaida macroura</i>	Mourning Dove			TRCA (L5)	MBCA
	<i>Otus asio</i>	Eastern Screech-owl			TRCA (L4)	FWCA
	<i>Bubo virginianus</i>	Great Horned Owl			TRCA (L4)	FWCA
	<i>Chordeiles minor</i>	Common Nighthawk			BSC, TRCA (L3)	
	<i>Chaetura pelagica</i>	Chimney Swift			TRCA (L4)	MBCA
	<i>Archilochus colubris</i>	Ruby-throated Hummingbird			BSC, TRCA (L4)	MBCA
	<i>Ceryle alcyon</i>	Belted Kingfisher			TRCA (L4)	MBCA, FWCA
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker			BSC, TRCA (L3)	MBCA
	<i>Picoides pubescens</i>	Downy Woodpecker			TRCA (L5)	MBCA

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WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA

Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status
	<i>Picoides villosus</i>	Hairy Woodpecker			TRCA (L4)	MBCA
	<i>Colaptes auratus</i>	Northern Flicker			TRCA (L4)	MBCA
	<i>Dryocopus pileatus</i>	Pileated Woodpecker			BSC, TRCA (L3)	MBCA
	<i>Contopus virens</i>	Eastern Wood-pewee			TRCA (L4)	MBCA
	<i>Empidonax flaviventris</i>	Yellow-bellied Flycatcher				MBCA
	<i>Empidonax alnorum</i>	Alder Flycatcher			BSC, TRCA (L4)	MBCA
	<i>Empidonax traillii</i>	Willow Flycatcher			TRCA (L4)	MBCA
	<i>Empidonax minimus</i>	Least Flycatcher			TRCA (L4)	MBCA
	<i>Sayornis phoebe</i>	Eastern Phoebe			BSC, TRCA (L5)	MBCA
	<i>Myiarchus crinitus</i>	Great Crested Flycatcher			TRCA (L4)	MBCA
	<i>Tyrannus tyrannus</i>	Eastern Kingbird			BSC, TRCA (L4)	MBCA
	<i>Eremophila alpestris</i>	Horned Lark			BSC, TRCA (L4)	MBCA
	<i>Progne subis</i>	Purple Martin			BSC, TRCA (L4)	MBCA
	<i>Tachycineta bicolor</i>	Tree Swallow			TRCA (L4)	MBCA
	<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow			BSC, TRCA (L4)	MBCA
	<i>Riparia riparia</i>	Bank Swallow			BSC, TRCA (L4)	MBCA
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow			BSC, TRCA (L4)	MBCA
	<i>Hirundo rustica</i>	Barn Swallow			BSC, TRCA (L4)	MBCA
	<i>Cyanocitta cristata</i>	Blue Jay			TRCA (L5)	FWCA
	<i>Corvus brachyrhynchos</i>	American Crow			TRCA (L5)	FWCA
	<i>Poecile atricapillus</i>	Black-capped Chickadee			BSC, TRCA (L5)	MBCA
	<i>Sitta carolinensis</i>	White-breasted Nuthatch			TRCA (L4)	MBCA
	<i>Sitta canadensis</i>	Red-breasted Nuthatch			BSC, TRCA (L4)	MBCA
	<i>Certhia americana</i>	Brown Creeper			BSC, TRCA (L3)	MBCA
	<i>Troglodytes aedon</i>	House Wren			TRCA (L5)	MBCA
	<i>Troglodytes troglodytes</i>	Winter Wren			BSC, TRCA (L3)	MBCA
	<i>Regulus satrapa</i>	Golden-crowned Kinglet			BSC, TRCA (L3)	MBCA
	<i>Regulus calendula</i>	Ruby-crowned Kinglet			BSC, TRCA (L3)	MBCA
	<i>Poliophtila caerulea</i>	Blue-gray Gnatcatcher			TRCA (L4)	MBCA
	<i>Sialia sialis</i>	Eastern Bluebird			BSC, TRCA (L4)	MBCA
	<i>Catharus fuscescens</i>	Veery			BSC, TRCA (L3)	MBCA
	<i>Catharus ustulatus</i>	Swainson's Thrush			BSC	MBCA
	<i>Catharus guttatus</i>	Hermit Thrush			BSC, TRCA (L3)	MBCA
	<i>Hylocichla mustelina</i>	Wood Thrush			BSC, TRCA (L3)	MBCA

APPENDIX B
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA

Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status
	<i>Turdus migratorius</i>	American Robin			TRCA (L5)	MBCA
	<i>Dumetella carolinensis</i>	Gray Catbird			BSC, TRCA (L4)	MBCA
	<i>Mimus polyglottos</i>	Northern Mockingbird			BSC, TRCA (L5)	
	<i>Toxostoma rufum</i>	Brown Thrasher			BSC, TRCA (L3)	MBCA
	<i>Bombycilla cedrorum</i>	Cedar Waxwing			TRCA (L5)	MBCA
	<i>Lanius excubitor</i>	Northern Shrike				MBCA
	<i>Sturnus vulgaris</i>	European Starling			TRCA (L+)	
	<i>Vireo solitarius</i>	Blue-headed Vireo			TRCA (L3)	MBCA
	<i>Vireo gilvus</i>	Warbling Vireo			TRCA (L5)	MBCA
	<i>Vireo philadelphicus</i>	Philadelphia Vireo				MBCA
	<i>Vireo olivaceus</i>	Red-eyed Vireo			TRCA (L4)	MBCA
	<i>Vermivora pinus</i>	Blue-winged Warbler			BSC, TRCA (L2)	MBCA
	<i>Vermivora chrysoptera</i>	Golden-winged Warbler			BSC, TRCA (L2)	MBCA
	<i>Vermivora peregrina</i>	Tennessee Warbler				MBCA
	<i>Vermivora ruficapilla</i>	Nashville Warbler			BSC, TRCA (L3)	MBCA
	<i>Dendroica petechia</i>	Yellow Warbler			TRCA (L5)	MBCA
	<i>Dendroica pensylvanica</i>	Chestnut-sided Warbler			BSC, TRCA (L3)	MBCA
	<i>Dendroica magnolia</i>	Magnolia Warbler			BSC, TRCA (L3)	MBCA
	<i>Dendroica tigrina</i>	Cape May Warbler				MBCA
	<i>Dendroica caerulescens</i>	Black-throated Blue Warbler			BSC, TRCA (L3)	MBCA
	<i>Dendroica coronata</i>	Yellow-rumped Warbler			BSC, TRCA (L3)	MBCA
	<i>Dendroica virens</i>	Black-throated Green Warbler			BSC, TRCA (L3)	MBCA
	<i>Dendroica fusca</i>	Blackburnian Warbler			BSC, TRCA (L3)	MBCA
	<i>Dendroica pinus</i>	Pine Warbler			BSC, TRCA (L3)	MBCA
	<i>Dendroica palmarum palmarum</i>	Western Palm Warbler				MBCA
	<i>Dendroica castanea</i>	Bay-breasted Warbler				MBCA
	<i>Dendroica striata</i>	Blackpoll Warbler				MBCA
	<i>Mniotilta varia</i>	Black-and-white Warbler			BSC, TRCA (L2)	MBCA
	<i>Setophaga ruticilla</i>	American Redstart			BSC, TRCA (L3)	MBCA
	<i>Seiurus aurocapillus</i>	Ovenbird			BSC, TRCA (L3)	MBCA
	<i>Seiurus noveboracensis</i>	Northern Waterthrush			BSC, TRCA (L3)	MBCA
	<i>Oporornis philadelphia</i>	Mourning Warbler			BSC, TRCA (L3)	MBCA
	<i>Geothlypis trichas</i>	Common Yellowthroat			TRCA (L4)	MBCA
	<i>Wilsonia pusilla</i>	Wilson's Warbler				MBCA

APPENDIX B
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA

Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status
	<i>Wilsonia canadensis</i>	Canada Warbler			BSC, TRCA (L2)	MBCA
	<i>Cardinalis cardinalis</i>	Northern Cardinal			TRCA (L5)	MBCA
	<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak			TRCA (L4)	MBCA
	<i>Passerina cyanea</i>	Indigo Bunting			TRCA (L4)	MBCA
	<i>Pipilo erythrophthalmus</i>	Eastern Towhee			BSC, TRCA (L3)	MBCA
	<i>Spizella arborea</i>	American Tree Sparrow				MBCA
	<i>Spizella passerina</i>	Chipping Sparrow			TRCA (L5)	MBCA
	<i>Spizella pusilla</i>	Field Sparrow			BSC, TRCA (L4)	MBCA
	<i>Passerculus sandwichensis</i>	Savannah Sparrow			BSC, TRCA (L4)	MBCA
	<i>Ammodramus savannarum</i>	Grasshopper Sparrow			BSC, TRCA (L2)	MBCA
	<i>Melospiza melodia</i>	Song Sparrow			TRCA (L5)	
	<i>Melospiza georgiana</i>	Swamp Sparrow			BSC, TRCA (L4)	MBCA
	<i>Zonotrichia albicollis</i>	White-throated Sparrow			BSC, TRCA (L3)	MBCA
	<i>Zonotrichia leucophrys</i>	White-crowned Sparrow				MBCA
	<i>Junco hyemalis</i>	Dark-eyed Junco			BSC	MBCA
	<i>Dolichonyx oryzivorus</i>	Bobolink			BSC, TRCA (L3)	MBCA
	<i>Agelaius phoeniceus</i>	Red-winged Blackbird			TRCA (L5)	
	<i>Sturnella magna</i>	Eastern Meadowlark			BSC, TRCA (L4)	
	<i>Quiscalus quiscula</i>	Common Grackle			TRCA (L5)	
	<i>Molothrus ater</i>	Brown-headed Cowbird			TRCA (L5)	
	<i>Icterus galbula</i>	Baltimore Oriole			TRCA (L5)	MBCA
	<i>Carpodacus mexicanus</i>	House Finch			TRCA (L+)	MBCA
	<i>Carduelis tristis</i>	American Goldfinch			BSC, TRCA (L5)	MBCA
	<i>Passer domesticus</i>	House Sparrow			TRCA (L+)	
Mammals	<i>Didelphis virginiana</i>	Virginia Opossum			TRCA (L4)	
	<i>Blarina brevicauda</i>	Northern Short-tailed Shrew			TRCA (L4)	FWCA
	<i>Sylvilagus floridanus</i>	Eastern Cottontail			TRCA (L4)	
	<i>Tamias striatus</i>	Eastern Chipmunk			TRCA (L4)	
	<i>Marmota monax</i>	Woodchuck			TRCA (L4)	
	<i>Sciurus carolinensis</i>	Grey Squirrel			TRCA (L5)	
	<i>Tamiasciurus hudsonicus</i>	Red Squirrel			TRCA (L4)	
	<i>Castor canadensis</i>	Beaver			TRCA (L4)	
	<i>Peromyscus leucopus</i>	White-footed Mouse			TRCA (L5)	
	<i>Peromyscus maniculatus</i>	Deer Mouse			TRCA (L5)	

APPENDIX B
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA

Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status
	<i>Microtus pennsylvanicus</i>	Meadow Vole			TRCA (L4)	
	<i>Ondatra zibethicus</i>	Muskrat			TRCA (L4)	
	<i>Rattus norvegicus</i>	Norway Rat			TRCA (L+)	
	<i>Mus musculus</i>	House Mouse			TRCA (L+)	
	<i>Canis latrans</i>	Coyote			TRCA (L5)	
	<i>Canis familiaris</i>	Domestic Dog				
	<i>Vulpes vulpes</i>	Red Fox			TRCA (L4)	
	<i>Procyon lotor</i>	Raccoon			TRCA (L5)	
	<i>Felis catus</i>	Domestic Cat			TRCA (L+)	
	<i>Mustela erminea</i>	Ermine			TRCA (L3)	
	<i>Mustela vison</i>	Mink			TRCA (L4)	
	<i>Mephitis mephitis</i>	Striped Skunk			TRCA (L5)	
	<i>Odocoileus virginianus</i>	White-tailed Deer			TRCA (L4)	
Herpetofauna	<i>Plethodon cinereus</i>	Northern Red-backed Salamander			TRCA (L3)	FWCA
	<i>Bufo americanus</i>	American Toad			TRCA (L4)	
	<i>Pseudacris crucifer</i>	Spring Peeper			TRCA (L2)	
	<i>Pseudacris maculata</i>	Boreal Chorus Frog				
	<i>Rana pipiens</i>	Northern Leopard Frog			TRCA (L3)	
	<i>Rana clamitans</i>	Green Frog			TRCA (L4)	
	<i>Chelydra serpentina</i>	Snapping Turtle	SC	SC	TRCA (L2)	
	<i>Chrysemys picta marginata</i>	Midland Painted Turtle			TRCA (L3)	FWCA
	<i>Thamnophis sirtalis sirtalis</i>	Eastern Garter Snake				
	<i>Lampropeltis triangulum</i>	Milk Snake	SC	SC		FWCA

COSEWIC – Committee on the Status of Endangered Wildlife in Canada:

END – Endangered

THR – Threatened

SC – Special Concern

Local:

BSC – Bird Studies Canada Species of Conservation Priority

TRCA – Toronto and Region Conservation Authority Species of Concern

OMNR – Ontario Ministry of Natural Resources:

END – Endangered

THR – Threatened

VUL – Vulnerable

Legal Status:

MBCA - Migratory Birds Convention Act

SARA – Species at Risk Act

ESA – Endangered Species Act

FWCA – Fish and Wildlife Conservation Act (P) Protected Species (G) Game Species

APPENDIX C
ACRONYMS AND DEFINITIONS USED IN SPECIES LISTS

ACRONYMS AND DEFINITIONS USED IN SPECIES LISTS

Species Status

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) assesses 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 exists 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 <i>Endangered Species Act</i> .
Endangered (END)	A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's <i>Endangered Species Act</i> .
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 recommendation.

Species Rank

GRANK 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 include 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.

SRANK 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 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 lists 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 – Species or community is believed to be extirpated from Ontario.
SH	Possibly Extirpated – Species or community occurred historically in Ontario and there is some possibility that it may be rediscovered.
SNR	Unranked —Conservation status in Ontario not yet assessed
SU	Unrankable —Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA	Not Applicable —A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S#	Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

Regulated Species

SARA Species at Risk Act

The Canada *Species at Risk Act* provides a framework for actions across Canada to ensure the survival of wildlife species and the protection of our natural heritage. It sets out how to decide which species are a priority for action and what to do to protect a species. It identifies ways governments, organizations and individuals can work together, and it establishes penalties for a failure to obey the law. Regulated species are listed in Schedules 1, 2 and 3 of the Act.

Schedule 1 SARA (1) Species that are currently covered under the Act.

Schedule 2 SARA (2) Species that are endangered or threatened that have not been re-assessed by COSEWIC for inclusion on Schedule 1.

Schedule 3 SARA (3) Species that are of special concern that have not yet been re-assessed by COSEWIC for inclusion on Schedule 1.

ESA Endangered Species Act

The Ontario *Endangered Species Act* provides for the conservation, protection, restoration and propagation of species of fauna and flora of the Province of Ontario that are threatened with extinction. Regulated species are listed in Ontario Regulation 338.

Schedule 1 ESA (1) The species of fauna listed in Schedule 1 are declared to be threatened with extinction.

Schedule 2 ESA (2) The species of flora listed in Schedule 2 are declared to be threatened with extinction.

Local Status:

Level of Conservation Concern in York (Varga *et al.* 2000) and (Riley *et al.* 1989)

R - Rare

U - Uncommon

Toronto and Region Conservation Authority (TRCA) Regional Species Status

RANK	LEVEL OF CONSERVATION CONCERN IN TRCA REGION
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.