

**Midtown Oakville Transportation and Stormwater
Municipal Class EA Final Report June 2014**

**APPENDIX D
ENVIRONMENTAL CONDITIONS**

APPENDIX D1
Natural Heritage Report

March 2014 by LGL Limited

NATURAL HERITAGE REPORT

MIDTOWN OAKVILLE CLASS ENVIRONMENTAL ASSESSMENT

prepared for:



prepared by:



March 2014

NATURAL HERITAGE REPORT

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1.0 INTRODUCTION

The Town of Oakville is undertaking a Schedule 'C' Municipal Class Environmental Assessment (EA) Study for the proposed improvements to the transportation network within Midtown Oakville. The study area is presented in **Figure 1**.

This Class EA Study is being conducted by Cole Engineering on behalf of the Town of Oakville. LGL Limited, as a sub-consultant to Cole Engineering, is providing natural heritage services. This Natural Heritage Report documents the results of data collection and analysis in the fall of 2013. It addresses the potential effects of this project on natural heritage features, including environmental protection measures.

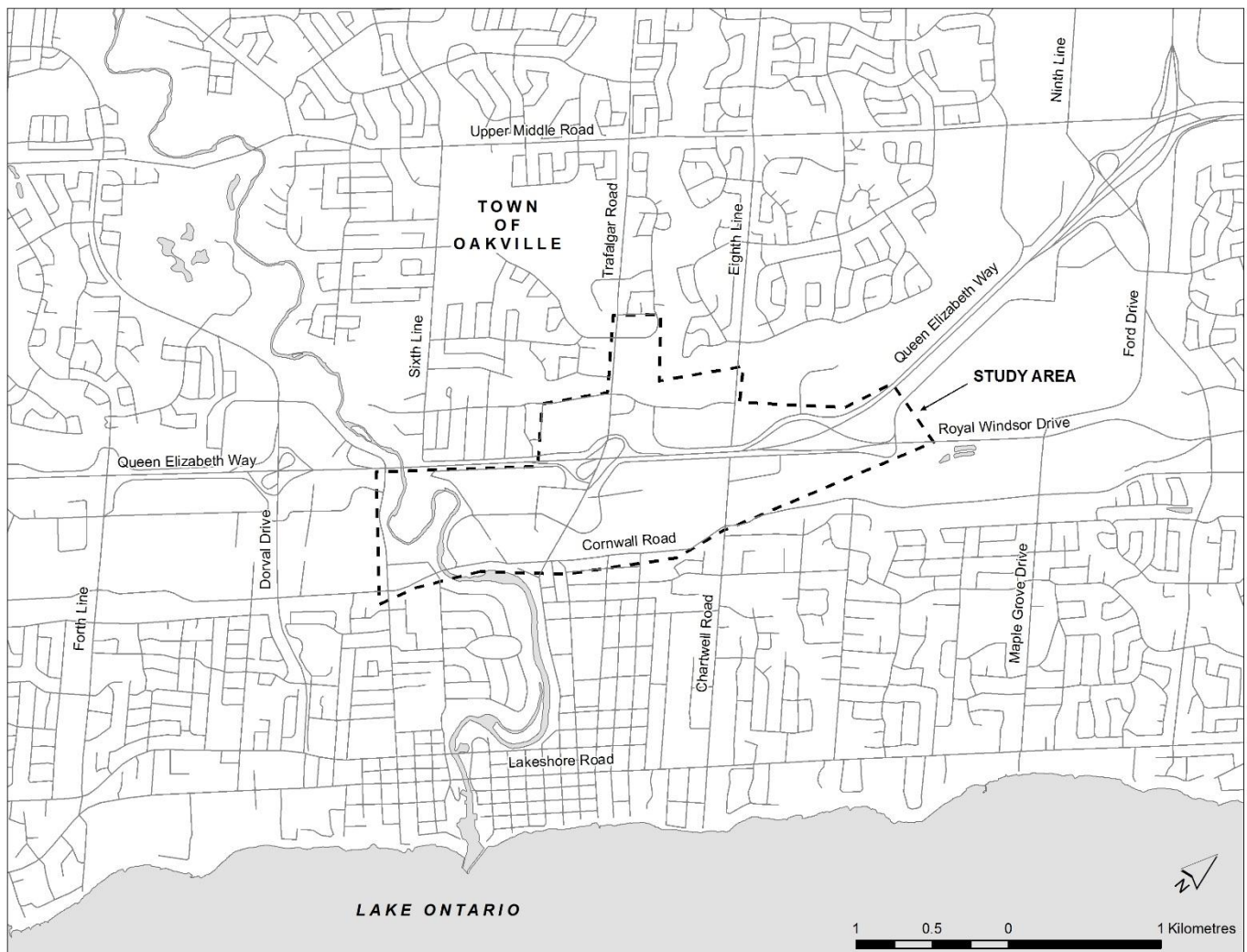


FIGURE 1. KEY PLAN

2.0 EXISTING CONDITIONS

The following discussion outlines the existing environmental conditions within the study area and identifies natural heritage areas and/or features of environmental sensitivity and/or significance.

2.1 Physiography and Soils

The study area is located within two distinct physiographic regions: the South Slope occupying the great majority of lands within the study area; and the Iroquois Plain which occupies a small portion in the extreme southern portions of study area (Chapman and Putnam 1984). Within the Town of Oakville, these physiographic regions are present as linear northeast-southwest bands that are generally parallel to the Lake Ontario shoreline. The Iroquois Plain predominantly consists of flat, sandy lowlands and represents land that was inundated by Lake Iroquois near the end of the last glaciation. Further inshore and higher in elevation, the South Slope predominantly consists of shale and till plains, with generally subdued topography that slopes gently to the southeast towards Lake Ontario. However, more pronounced topography is occasionally present along the Iroquois shoreline due to rivers that have cut through underlying soils to form valleys (Chapman and Putnam 1984).

The soils within the study limits include Chingacousy clay loam, Oneida clay loam, Jeddo clay loam, and Brady sandy loam (Gillespie, Wicklund and Miller 1971). These soils are described below.

2.1.1 Chingacousy clay loam

Chingacousy soils are the imperfectly drained members of the Oneida catena. The parent material of this soil is limestone, with some evident amounts of shale. Areas with this soil series are typically smooth and gently sloping. In the study area, Chingacousy soils are found north of the QEW between Trafalgar Road and the eastern extent of the study area, and north to the Morrison-Wedgewood Diversion Channel (Gillespie, Wicklund and Miller 1971).

2.1.2 Oneida clay loam

Oneida soils are the moderately well-drained members of the Oneida catena. These soils have developed on fine textured glacial till, and is largely composed of ice-ground materials from underlying rock formations. Areas with this soil series can vary widely, however in the Town of Oakville are typically found on smooth oval ridges rising above the level plain, having slopes generally less than 7%. In the study area, Oneida soils are found north of the QEW, immediately east of Trafalgar Road and north of the Morrison-Wedgewood Diversion Channel (Gillespie, Wicklund and Miller 1971).

2.1.3 Jeddo clay loam

Jeddo soils are the poorly drained members of the Oneida catena. The parent mineral of this soil is a slightly stony calcareous clay till. Areas with this soil series range from a loam to clay loam, and are mainly found in narrow, shallow drainage basins or in the depressional areas associated with undulating topography. In the study area, Jeddo soils are found north of the QEW in current and former riparian areas east and west of Eighth Line (Gillespie, Wicklund and Miller 1971).

2.1.4 Brady sandy loam

Brady soils are imperfectly drained soils that have developed in calcareous sands that were initially laid down as delta deposits. Areas with these soils are found along the shore of present-day Lake Ontario on level or gently sloping topography. In the study area, Brady soils are found in the extreme southeast of the study area, present only near the intersection of South Service Road East and Royal Windsor Drive (Gillespie, Wicklund and Miller 1971).

2.2 Aquatic Habitats and Communities

The study area is located within the Sixteen Mile Creek and Oakville East Urban Creeks watersheds, which are both under the jurisdiction of Conservation Halton (CH) and the Ministry of Natural Resources (MNR) Aurora District. A total of four main watercourses have been identified as being affected or within close proximity of the preferred alignment of the proposed improvements within midtown Oakville. The watercourses include; Tributary 1 of Lower Morrison Creek, Tributary 2 of Lower Morrison Creek, the Morrison-Wedgewood Diversion Channel, Lower Wedgewood Creek (Tributary 1 QEW ditch system, Tributary 1, Tributary 2, Tributary 3 and Tributary 4 of Lower Wedgewood Creek).

Lower Morrison Creek and Lower Wedgewood Creek listed above are located within the Oakville East Urban Creeks watershed. The Morrison-Wedgewood diversion channel occurs within the Sixteen Mile Creek watershed.

Background Data

LGL conducted a secondary source review to identify the fish community within the watershed. The secondary source review included species at risk screening through aquatic species at risk mapping (DFO/OMNR/CH, 2013), the Natural Heritage Information Centre (NHIC) Biodiversity Explorer database (MNR 2012), correspondence with Halton Conservation regarding fish sensitivity and fisheries collection records in the study area watercourses, and a review of available Fisheries Management Plans for Creeks within the jurisdiction of Conservation Halton (Conservation Halton 2005, 2009). A summary of the fish communities present within the watercourses in the vicinity of the study area is presented in **Table 1**.









Field Investigations

An LGL fisheries specialist visited the Oakville Midtown Study area on October 8 and October 10, 2013 to observe and document existing aquatic habitat conditions. The weather conditions during the October site visits were similar both days, sunny and 15°C with slight west winds of less than 5 km/h.

The fish habitat was assessed approximately 50 m upstream and 100 m downstream of the impacted area, where applicable and accessible. Physical habitat features were surveyed in sufficient detail to enable mapping and identification of key habitat types. The physical habitat attributes assessed included: (a) instream cover, (b) bank stability, (c) substrate characteristics, (d) stream dimensions, (e) barriers, (f) stream morphology, (g) terrain characteristics, (h) stream canopy cover, (i) stream gradient, (j) aquatic vegetation, (k) ground water seepage areas, and (l) general comments. Where accessible, dip net sampling to confirm fish presence was conducted. Results from LGL fisheries sampling are presented with the CH fisheries data in **Table 1**. **Figure 2** presents the location of the crossings and an aquatic habitat summary is presented below. Representative photographs of the crossings were taken and are provided in **Appendix A**.



LEGEND

-  Study Area
-  Permanent Flow
-  Intermittent Flow
-  Fish Habitat
-  Indirect Fish Habitat
-  Not Fish Habitat
-  Watercourse Not Assessed
-  Flow Direction

Data Source: LGL Limited.



FISHERIES



Project: TA8087	Figure: 2
Date: January, 2014	Prepared By: MWF
Scale: 1 : 12,000	Checked By: GNK

**TABLE 1.
 HISTORICAL FISH COLLECTION RECORDS WITHIN THE TOWN OF OAKVILLE**

Scientific Name	Common Name	Lower Morrison Creek	Lower Wedgewood Creek	Morrison- Wedgewood Diversion Channel	COSEWIC	SARA	MNR	Provincial
<i>Semotilus atromaculatus</i>	Creek Chub	-	y,x	X	-	-	-	S5
<i>Rhinichthys atratulus</i>	Blacknose Dace	-	x	X	-	-	-	S5
<i>Carassius auratus</i>	Goldfish	-	-	X	-	-	-	S5

Note: x = Station Data provided by personal correspondence (Conservation Halton, 2012), Report- Urban Creeks and Supplemental Monitoring, (Conservation Halton 2009)
 y= LGL Sampling Year (2013), Sampling conducted with dipnet

Provincial S Rank The codes provided in this column are further defined in **Appendix C**.

COSEWIC Committee on the Status of Endangered Wildlife in Canada
 END – Endangered
 THR – Threatened
 SC – Special Concern
 NAR – Not at Risk

Legal Status This column indicates which legislation the species is regulated under (Ontario *Endangered Species Act*, or the Canada *Species at Risk Act*), including the schedule number that identifies the level of protection.

ESA - Endangered Species Act
 END – Endangered
 THR – Threatened
 SC – Special Concern
 NAR – Not at Risk

SARA – Species at Risk Act
 EXP – Extirpated
 END – Endangered
 THR – Threatened
 SC – Special Concern
 NAR – Not at Risk

The acronyms used in this species list are further defined in **Appendix C**.

2.2.1 Tributary 1 of Lower Morrison Creek

This tributary originates from an open footed box culvert approximately 5 m in width which outlets in a south easterly direction from South Service Road East. The inlet to this culvert was not identified but based on air photo interpretation appears to be piped underground for a large distance. This channel flows along the surface for approximately 40 m before being conveyed through another two culverts, one underneath the rail tracks (an approximate 4 m wide concrete box culvert), and another beneath a parking lot (twin, approximate 1.5 m each CSP's) for approximately 60 m before the channel opens up again.

This creek supports permanent flows, and appears to convey large volumes of stormwater during rain events. The wetted channel averages 2 m in width and 20-30 cm in depth. Run and riffle morphology are prominent features within the channel, with no pool habitat identified within the reach. Bankfull measurements that approximate 4 m in width and 50 cm in depth appear to be conveyed thorough this section. Substrates include sand, gravel, cobble, and boulders. Riparian vegetation is high and is dominated by phragmites, and has some, although limited tree cover. Instream cover is relatively low and provided by some undercut banks, overhanging vegetation, and old silt fence and sand bags which appear to be left from previous culvert works. Erosion appears low to moderate, due to the abundance of riparian vegetation supporting the banks.

Immediately upstream of the railway culvert (the 4 m wide box culvert), a flowing ditch discharges from the east into this Tributary of Morrison Creek. This ditch measures approximately 40 cm in width and averages 10-20 cm in depth. This ditch is lined with phragmites and flows parallel in a westerly direction for approximately 150 m. A pipe outlet exists at the east end of this ditch and at the time of the site visit was providing all of the flow. Based on observations from the October site visit, this ditch appears to provide indirect fish habitat.

This reach of the channel was dip-netted, and yielded no catch. In addition, no fish were observed, and fisheries station data from (CH, 2011) had no capture records from this watercourse. Although, no barriers to fish movement were observed within the area surveyed (with the exception of the twin CSP's which may function as a seasonal barrier), this watercourse should be classified as permanent warmwater fish habitat of low sensitivity.

To the northeast of this watercourse there appears to be a depression. This was dry and not connected to the ditch during the October site visit. This depression based on observations does not support fish habitat, although should be reevaluated during a spring visit to confirm this statement. In addition, there is a circular area in the centre of Midtown Oakville that is within the Conservation Halton Regulation Limit. The lands within the regulation limit are scrubland which has been graded and or/stripped in the recent past.

2.2.2 Tributary 2 of Lower Morrison Creek

This tributary originates to the north of North Service Road East as a channelized valley feature that flows adjacent to commercial and industrial parking lots. A formal, although dry channel was identified to approximately 150 m upstream of North Service Road. This channel is assumed to be wetted on an ephemeral basis, and appears to solely discharge surface flows. Approximately 50 m upstream of North Service Road and downstream of this point, the channel was wetted during the October site visit. Due to the presence of watercress identified within the channel, it appears this tributary receives groundwater contribution in addition to surface conveyance within this approximate 50 m length of channel. During the October site visit, however, the majority of flow for this tributary was outletting from a small ~250mm pipe approximately 10 m upstream of North Service Road East. This pipe appears to receive flow from the manicured ditch to the east, upstream of North Service Road East. Downstream of this pipe

outlet, before the channel is conveyed underneath North Service Road, the wetted width averages 1.5 m and 20 cm in depth with bankfull averaging 3 m wide and 25 cm deep respectively. Riffle/run morphology defines this small section. Generally throughout this channel, riparian and instream cover are high and provided by tree, shrub and cattail cover.

This channel is conveyed south via a ~4m box culvert. It outlets south of South Service Road East and continues south in a relatively channelized valley, entrenched approximately 2 m along the east bank for approximately 100 m. Tributary 2 of Lower Morrison Creek throughout this section of channel averages 2 m in width and 20 cm in depth. Bankfull measurements average 4 m in width and 40 cm in depth. 100 m downstream of South Service Road East, the channel meanders slightly, but still appears to have been possibly historically diverted to flow adjacent to the industrial buildings and parking lots in the vicinity. This valley however, is highly shaded due to the heavy tree/shrub cover. In-stream cover throughout is also high due to the abundance of instream woody debris in the form of log jams and overgrown shrubs. Flow appears very flashy in this watercourse due to several instances of severely eroding and undercut banks. In many locations chunks of concrete were noted along the banks and appear have been used for bank stabilization. Substrates in this section are generally coarse and include gravel, cobble, and shale. The channel is piped underneath parking lots and or driveway entrances in several locations as the creek flows south towards the CN rail right of way. Morphology throughout is runs and riffles, with pool habitat very limited or absent. This watercourse continues in a southerly direction and is piped underneath the CN right of way, and a commercial strip and parking lot for approximately 150 m. It flows open for an additional 10 m, then piped again underneath Cornwall Road for an additional 50 m as it exits the study area. Dipnet sampling and visual surveys were conducted throughout this reach and no fish were seen or captured.

Ultimately, due to the length of area this creek is piped underground it likely functions as a complete barrier to fish movement, in addition to the poor quality habitat within the study area, this creek within the study area should be classified as indirect fish habitat.

2.2.3 Morrison-Wedgewood Diversion Channel

The Morrison-Wedgewood Diversion channel is a concrete lined drain which was constructed in the 1960's to divert Morrison and Wedgewood Creeks, and other watercourses away from the residential areas and into Sixteen Mile Creek. This drain spans 4.19 km and drains an approximate 8,000 ha area (Conservation Halton, 2013). This drain is of extremely poor quality fish habitat and appears to have been designed for maximum flow conveyance. This channel directs flow in a general westerly direction toward Sixteen Mile Creek. Within the area of impact, the concrete channel spans approximately 7 m across and during the October site visit, the wetted channel measured approximately 1.5 m wide and 10-30 cm in depth. The bottom and banks of the channel are concrete, and banks are steeply sloping ~45 degrees. The only diversity of substrate that occurs within this drain is where the blocks abut; coarse substrates including gravel cobble and sand, have accumulated. Both riparian and instream cover is virtually non-existent. Flow is rapid, and no formal morphology can exist. Immediately downstream of Trafalgar Road, the channel drops rapidly ~2 m along a concrete ramp of sheet flow. This functions as a complete barrier to fish movement. At this point in the channel, East Morrison Creek, which is piped to the upstream, outlets into the Morrison Wedgewood Diversion Channel.

The Morrison-Wedgewood Diversion Channel directly supports low quality warmwater fish habitat of low sensitivity. This channel indirectly contributes flow to Sixteen Mile Creek which is managed as Redside Dace (*Clinostomus elongatus*) and Silver Shiner (*Notropis photogenis*) habitat.

2.2.4 Tributary of Lower Wedgewood Creek (QEW Ditch System)

The westerly tributary (ditch feature 1) of Lower Wedgewood Creek is an ephemeral system which appears to only flow during storm events and is only contributed by surface flow. This tributary flows in a general southerly direction with flow contribution from the ditch system to the north of North Service Road, and some ditch contribution from the west and east. All branches of this tributary were dry or slightly wetted during the October site visit. These channels have very little definition, and are dominated by terrestrial vegetation and silt substrate. The main channel within this system has been treated with rip rap. This ditch system flows south underneath the QEW via a ~400mm CSP which presents a complete barrier to fish movement.

Ditch feature 2 flows in a general southerly direction and also appears to be ephemeral. This ditch appears to only discharge surface flow and was dry during the October site visit. It appears to accept the majority of flow from a crushed ~750 mm CSP from north of the North service Road. This channel also has very little definition and the majority of the reach has been treated with rip rap. This tributary is directed south, underneath the QEW via a ~4m wide box culvert. This tributary is enclosed for approximately 90m and therefore likely functions as a complete barrier to fish movement.

These two ditches converge and cross the south service road in a southeasterly direction. The channel is directed east at this point and then appears to end as a wetted depression approximately 50 m west of where ditch feature 3 crosses the south service road. A spring visit is highly recommended to determine if this tributary continues to end in a depression or provides indirect fish habitat to Tributary 1 of Lower Wedgewood Creek. This channel is directed along the south of the South Service Road, and the vegetation along this channel is dominated by phragmites, and terrestrial grasses/herbaceous species.

Ditch feature 3 appears to also receive the majority of its flow from a ditch to the northwest of the North Service Road, in addition to a roadside ditch along the QEW. The ditch to the north of the North Service Road is grassed, and manicured through the channel. The contributing ditch from the east is vegetated with phragmites. This feature is directed south, underneath the QEW for approximately 70 m, flows open again for approximately 40 m, then piped again underneath South Service Road East.

Because ditch feature 3 contributes directly to fish habitat downstream of South Service Road east, the ditch feature from south of the QEW where it is piped underneath the QEW on-ramp should be classified as indirect fish habitat. The remaining watercourse features to the north of the QEW, have no potential for direct fish habitat. However, it is recommended all these reaches are re-evaluated during the spring freshet to confidently determine the potential for supporting seasonal fish habitat.

2.2.5 Tributary 1 of Lower Wedgewood Creek

Tributary 1 receives the majority of its flow from the QEW ditch feature 3. Flow from ditch feature 3 is conveyed south, underneath South Service Road East via a 1500mm CSP which is perched, undercut and appears to function as a complete barrier to fish movement. A small pool occurs at the outlet of this culvert, which measures approximately 3 m in width and 20-30 cm in depth. This channel continues south for approximately 20 m before sharply bending east and flows channelized to follow the CN Right of way. The south flowing section of this watercourse is heavily shaded and generally characterized with shallow runs/riffles with shale substrates and high gradient in some areas which appear to provide seasonal barriers to fish movement. Other substrates within this corridor include rubble, gravel, sand and silt. Moderate erosion is also apparent throughout this reach. The channel baseflow averages 1.5 m in width and 5-10 cm in depth. Bankfull measures approximately 1.7 m in width and 40 cm depth.

Where the channel bends east, a ditch feature to the west appears to periodically contribute some flow and during this assessment, although dry, may provide seasonal fish habitat. This ditch feature should be reevaluated during the spring freshet to determine the potential to provide seasonal fish habitat.

Tributary 1 of Lower Wedgewood Creek, where the watercourse runs east parallel to the CN rail system, develops more stagnant morphology. Tree and shrub cover are lacking along this channel. Riparian cover during the site visit was high and provided by phragmites and cattails and the occasional shrub. In stream cover was relatively low and also provided by phragmites. Substrates are generally fine, and consist of silt and organic material. Throughout this section, the channel averages 1.5 m in width and 20 cm in depth. Bankfull averages 2.5 m in width and 35 cm in depth. Little to no erosion was apparent throughout this section, although the south bank in some areas is protected by gabion baskets.

The channel continues in an easterly direction and receives input from tributary 2 of Lower Wedgewood Creek approximately 135 m west of The Canadian Road. This section of channel is slightly wider and averages 2 m in width and 30 cm in depth. Substrates are more diverse and include silt, gravel, sand, organic and rubble. Both banks are stabilized with gabion baskets which measure approximately 2-3 m in height. As a result, both riparian and instream cover are very low. Also, like upstream, morphology consists of exclusively flats. Approximately 35 m downstream of the convergence with Tributary 2, this watercourse is conveyed underground for approximately 100 m via a ~A 4 m wide box culvert. Downstream of the outlet of the box culvert it was noted that the culvert is 75% filled with substrates, which may accelerate flow during storm events. The channel flows open within a 2.5 m wide channel in which averages 30 cm in depth before outletting into an online pond approximately 40 m downstream of the culvert outlet. There is a pool at the culvert outlet which measures 4 m wide and 40 cm in depth. The remaining channel is comprised of flat morphology. Substrates though this section include; silt, rubble, gravel and organic. Some erosion was apparent along both banks, although both banks are well vegetated with shrub species and cattails.

This online pond measures approximately 200 m x 40 m. This pond is wetted year round and possesses an abundance of submergent, emergent and floating aquatic vegetation. It appears relatively shallow with the depth around the fringe averaging 30 cm in depth with silt and organic material as the primary substrate types.

Visual surveys and dip net sampling to determine presence of fish was conducted throughout the entire reach of Tributary 1 of Lower Wedgewood Creek within the study area. No fish were observed or dip netted within this channel during the October site visit. The entire reach of Tributary 1 of Lower Wedgewood Creek although is of very poor quality, should be classified as warmwater fish habitat of low sensitivity.

2.2.6 Tributary 2 of Lower Wedgewood Creek

This tributary originates as a convergence of several ditch features which occur surrounding a parking lot to the West of The Canadian Road. Many of these features are simply depressions which are grassed and manicured through. The features converge within a large phragmites corridor to the North of Royal Windsor Drive and cross south, underneath Royal Windsor Drive via a ~3 m wide box culvert. This section of Tributary 2 appeared dry during the October site visit. Downstream of Royal Windsor Drive, this channel continues south through a corridor of phragmites, connects to two additional ditch features and continues south, underneath South Service Road via a ~750 mm CSP. This channel converges with Tributary 1 of Lower Wedgewood Creek directly south of South Service Road. Tributary 2 of Lower Wedgewood Creek had trickle flow south of Royal Windsor Drive during the October site visit. This tributary has no defining features and substrates consist of primarily silt and organic materials. This tributary was determined to provide indirect fish habitat during the October site visit. A spring visit is

highly recommended for this watercourse to determine if this channel and adjoining ditch features provide seasonal fish habitat.

2.2.7 Tributary 3 of Lower Wedgewood Creek

This tributary originates as a ditch feature which flows in a generally southerly direction, between the QEW and Periphery Road. This tributary was dry during the site visit, including the section south of Royal Windsor Drive where the tributary converges with the pond feature. No defining features were identified. The entire reach within the study area was defined by a corridor of phragmites and substrates consisting of silt and organic materials. Since this tributary is directly linked to fish habitat, the entire reach should be classified as indirect fish habitat. A spring visit is highly recommended for this watercourse to determine if this feature provide seasonal fish habitat.

2.2.8 Tributary 4 of Lower Wedgewood Creek

This tributary originates to the north of the study area and flows in a southerly direction, parallel to two parking lots. Due to access restrictions to the north of Royal Windsor Drive, this creek was only assessed from the roadside. Upstream (north) of Royal Windsor drive, Tributary 4 of Lower Wedgewood creek appears to be permanently flowing through a vegetated corridor consisting of trees and shrub species with substrates consisting of rubble and silt. The crossing structure which directs flow underneath Royal Windsor Drive functions as a complete barrier to fish movement. This structure drops the elevation of the creek significantly at the north side of Royal Windsor Drive, and directs flow underneath the road. Downstream of Royal Windsor Drive, this channel outlets from a box culvert, approximately 2.5 m in width. The average channel dimensions though this section are approximately 1.5 m in width and 20 cm depth. Bankfull dimensions are 2.5 m and 30 cm respectively. Substrates though this section consist of rubble, silt, gravel and sand. This channel is well shaded with phragmites, trees and shrubs. In-stream cover is also high and provided by overhanging *Phragmites* and rubble. Morphology throughout this section consists of flats and runs with little to no pool habitat present. This watercourse outlets into the pond feature to the east of South Service Road approximately 20 m downstream of the culvert outlet. A single species, Creek Chub (*Semotilus atromaculatus*) was captured from Tributary 4, downstream of Royal Windsor Drive during dip net sampling. The channel upstream of Royal Windsor Drive should be classified as indirect fish habitat due to the barrier to fish movement present, and downstream of Royal Windsor Drive should be classified as warmwater fish habitat of low sensitivity.

2.2.9 Species at Risk

Based upon a review of the MNR Natural Heritage Information Centre–Biodiversity Explorer on-line database, Conservation Halton/Department of Fisheries and Oceans Species at Risk mapping, and personal correspondence with Conservation Halton in 2012, two species at risk: Redside Dace (*Clinostomus elongatus*) and Silver Shiner (*Notropis photogenis*) are identified by the DFO/MNR/CH as occurring within Sixteen Mile Creek. Redside Dace is provincially and federally listed as Endangered, and is regulated under the Ontario *Endangered Species Act* (ESA), which protects this species as well as its habitat. Redside Dace prefer small, slow moving streams that have abundant overhanging vegetation, groundwater inputs and sand or gravel substrate (MNR 2010). The Silver Shiner is provincially and federally listed as Threatened and is regulated under the ESA (recently added in January 2012), which protects this species as well as its habitat. Silver Shiners inhabit moderate to large clear streams with swift currents and moderate to high gradients (Government of Canada 2011).

2.3 Vegetation and Vegetation Communities

The geographical extent, composition, structure and function of the vegetation communities were identified through air photo interpretation and a field investigation. Air photos were interpreted to

determine the limits and characteristics of the vegetation communities in the study area. A field investigation of the vegetation communities in the potentially impacted portions of Midtown Oakville was conducted on September 19, 23 and 24, 2013 to the extent possible. The field investigation was carried out to ground truth the boundaries of the vegetation communities and to conduct a botanical survey. Areas within privately owned industrial land, railway land, and inaccessible lands along the QEW corridor were surveyed using roadside/fenceline surveys.

The vegetation communities were classified according to the *Ecological Land Classification for Southern Ontario: First Approximation and Its Application* (Lee *et al.* 1998). A plant list and a description of the general structure of vegetation were obtained during the field investigations. Plant species status was reviewed for Ontario (Oldham 2009), and Conservation Halton (Conservation Halton 2006). Vascular plant nomenclature follows Newmaster *et al.* (1998) with a few exceptions that have been updated to Newmaster *et al.* (2005).

2.3.1 Vegetation Communities

The study area consists of a mixture of cultural and wetland vegetation communities, including portions of vegetation communities that are already in a disturbed state as a result of the existing roadways, commercial, industrial, and residential land uses. Evidence of disturbance includes a high proportion of non-native plant species that are well adapted to persist in areas that are regularly disturbed including species that are adapted to high light conditions, limited soil moisture, and species that are tolerant of salt spray.

Five ELC vegetation community types were identified within the study limits during LGL's botanical survey including: Dry-Moist Old Field Meadow (CUM1-1a to t), Mineral Cultural Thicket (CUT1a to g), Mineral Cultural Woodland (CUW1a to d), Mineral Meadow Marsh (MAM2), and Cattail Mineral Shallow Marsh (MAS2-1). All of the vegetation communities identified within the study area are considered widespread and common in Ontario and are secure globally. These vegetation communities are delineated in **Figure 3** and are described in **Table 2**.

There are several areas that are not identified by an ELC classification such as areas of manicured grass (M) which include mown lawns, gardens and planted trees, and hedgerows (H) consisting of linear rows of planted trees and/or shrubs less than two trees in width.

2.3.3 Flora




A total of 152 plant species have been recorded within the study area. Seven of these plants could only be identified to genus due to a lack of property access at certain sites, and are not included in the following calculations. Of the 145 plant species identified, 59 (41%) plant species identified are native to Ontario and 86 (59%) plant species are considered introduced and non-native to Ontario. A list of vascular plants is presented in **Appendix B** which includes a description of provincial and local species of concern.

2.3.3 Species at Risk and Provincially Rare Species

No plant species that are regulated under the Ontario *Endangered Species Act* or the Canada *Species at Risk Act* were encountered during LGL's botanical investigation within the subject area (those plant species regulated as Endangered, Threatened, or Special Concern).



LEGEND

-  Study Area
-  Watercourse
- Vegetation Communities
-  Vegetation Community Boundary
- CU** Cultural
- CUM** Cultural Meadow
- CUM-1 (a-f)** Dry-Moist Old Field Meadow Type
- CUT1 (a-g)** Mineral Cultural Thicket Ecosite
- CUW** Cultural Woodland
- CUW1** Mineral Cultural Woodland Ecosite
- FOD** Deciduous Forest
- FOD1-1** Dry-Fresh Red Oak Deciduous Forest Type
- FOD2-2** Dry-Fresh Oak-Hickory Deciduous Forest Type
- FOD2-4** Dry-Fresh Oak-Harwood Deciduous Forest Type
- FOD3-3** Dry-Fresh Sugar Maple-Oak Deciduous Forest Type
- FOM** Mixed Forest
- MAM** Meadow Marsh
- MAM2** Mineral Meadow Marsh Ecosite
- MAS2-1** Cattail Mineral Shallow Marsh Type
- SWD** Deciduous Swamp
- SWT2-6** Meadowsweet Mineral Thicket Swamp Type

Data Source: LGL Limited.



NATURAL HERITAGE



Project: TA8087	Figure: 3
Date: February, 2014	Prepared By: MWF
Scale: 1 : 12,000	Checked By: GNK

TABLE 2. SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Community Characteristics
WETLAND			
MAS	Shallow Marsh		
MAS2-1	Cattail Mineral Shallow Marsh	Emergent trees/shrubs: includes staghorn sumac (<i>Rhus hirta</i>), and Russian olive (<i>Elaeagnus angustifolia</i>). Ground cover: includes narrow-leaved cattail (<i>Typha angustifolia</i>), biennial wormwood (<i>Artemisia biennis</i>), and Canada goldenrod (<i>Solidago canadensis</i>).	<ul style="list-style-type: none"> • Tree and shrub cover ≤25% with variable flooding regimes (water depth <2m) (MA). • Water up to 2 m deep (S). • Parent mineral material or mineral soil (2). • Hydrophytic emergent macrophyte cover dominated by cattail (<i>Typha</i>)(-1).
MAM	Meadow Marsh		
MAM2	Mineral Meadow Marsh	Emergent trees/shrubs: includes common buckthorn (<i>Rhamnus cathartica</i>), willow (<i>Salix sp.</i>), and white mulberry (<i>Morus alba</i>). Ground cover: includes reed-canary grass (<i>Phalaris arundinacea</i>), narrow-leaved cattail, and biennial wormwood.	<ul style="list-style-type: none"> • Tree and shrub cover ≤25% with variable flooding regimes (water depth <2m) (MA). • Species less tolerant of prolonged flooding (M). • Parent mineral material or mineral soil (2).
TERRESTRIAL – CULTURAL			
CUM	Cultural Meadow		
CUM1-1 (a to t)	Dry-Moist Old Field Meadow	Emergent trees/shrubs: includes common buckthorn, Manitoba maple (<i>Acer negundo</i>), Russian olive (<i>Elaeagnus angustifolia</i>), black walnut (<i>Juglans nigra</i>), and staghorn sumac. Ground cover: includes Canada goldenrod, awnless brome, quack grass (<i>Elymus repens</i>), Canada thistle (<i>Cirsium arvense</i>), reed-canary grass, wild teasel (<i>Dipsacus fullonum ssp. sylvestris</i>), and white sweet-clover (<i>Melilotus alba</i>).	<ul style="list-style-type: none"> • Cultural community resulting from, or maintained by, cultural or anthropogenic- based disturbance (CU). • Tree cover and shrub cover < 25 % (M). • Parent mineral material or mineral soil (1). • This community can occur on a wide range of soil moisture regimes (Dry-Moist). Grasses and forbs are dominant (-1).
CUT	Cultural Thicket		
CUT1 (a to g)	Mineral Cultural Thicket	Emergent trees/shrubs: includes common buckthorn, Manitoba maple (<i>Acer negundo</i>), red ash (<i>Fraxinus pennsylvanica</i>), Russian olive (<i>Elaeagnus angustifolia</i>), black walnut (<i>Juglans nigra</i>), and staghorn sumac. Ground cover: includes common reed (<i>Phragmites australis</i>), riverbank grape (<i>Vitis riparia</i>), Kentucky bluegrass (<i>Poa pratensis ssp. pratensis</i>), Canada thistle (<i>Cirsium arvense</i>), reed-canary grass, wild teasel (<i>Dipsacus fullonum ssp. sylvestris</i>).	<ul style="list-style-type: none"> • Cultural community resulting from, or maintained by, cultural or anthropogenic- based disturbance (CU). • Tree cover < 25% and shrub cover > 25 % (T). • Parent mineral material or mineral soil (1). • Pioneer community resulting from, or maintained by, anthropogenic-based influences.
CUW	Cultural Woodland		

CUW1 (a to d)	Mineral Cultural Woodland	<p>Emergent trees/shrubs: includes silver maple (<i>Acer saccharinum</i>), willows (<i>Salix sp.</i>), common buckthorn, green ash (<i>Fraxinus pennsylvanica</i>), black locust (<i>Robinia pseudo-acacia</i>), honey locust (<i>Gleditsia triacanthos</i>), and Scot's pine (<i>Pinus sylvestris</i>).</p> <p>Ground cover: includes Canada goldenrod, riverbank grape (<i>Vitis riparia</i>), false Virginia creeper (<i>Parthenocissus vitacea</i>), awnless brome, Kentucky bluegrass (<i>Poa pratensis ssp. pratensis</i>), and New England aster (<i>Sympyhotrichum novae-angliae</i>).</p>	<ul style="list-style-type: none"> • Cultural community resulting from, or maintained by, cultural or anthropogenic- based disturbance (CU). • 35% < tree cover < 60% (W). • This community can occur on a wide range of soil moisture regimes (Dry-Moist) (-1). • Pioneer community resulting from, or maintained by, anthropogenic-based influences.
Other*			
M	Manicured grasses and planted shrubs and/or trees	Areas where large expanses of grass/shrubs/trees are maintained and/or planted.	
H	Hedgerows	Linear rows of planted trees and/or shrubs.	

* Not identified as an ELC vegetation community by Lee, H., W. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. *Ecological Land Classification for Southern Ontario: First Approximation and Its Application*. Natural Heritage Information Centre.

No native provincially rare plant species were identified during LGL’s botanical investigation within the study area (regulated as S-Rank S1-S3). Honey locust (*Gleditsia triacanthos*) has been assigned S-Rank S2 and was identified in three vegetation communities (CUM1-1e, CUW1b, and CUW1d), however all individuals observed were thornless, a feature diagnostic of cultural origin. A description of provincial species ranks is provided in **Appendix C**.

2.3.4 Locally Rare and Uncommon Plants

One species, common juniper (*Juniperus communis*) is considered rare in Halton Region and one species is considered uncommon, eastern redcedar (*Juniperus virginiana*). Common juniper was found in the CUM1-1e and CUM1-1k vegetation communities. Eastern redcedar was found in five different vegetation communities, CUM1-1f, CUM1-1g, CUM1-1i, CUT1e, and CUW1d.

It is unknown whether common juniper and eastern redcedar individuals are naturally-occurring or of cultural origin, as both species are commonly used in landscaping practices.

2.4 Wildlife and Wildlife Habitat

Field investigations within the Midtown Oakville study area, Town of Oakville, were conducted on September 25 and 27, 2013. The purpose of the field investigations was to document wildlife and wildlife habitat and to characterize the nature, extent, and significance of animal usage within the study limits. Direct observations, calls, tracks, scats, and runways were used to record wildlife present within the study area. Weather conditions on September 25, 2013 included mostly clear skies and little wind with a temperature of 17 °C. Weather Conditions on September 27, 2013 included mostly clear skies and little wind with a temperature of 16 °C.

2.4.1 Wildlife Habitat

Wildlife and wildlife habitat was found to be distributed across the entire study area; however, given the mixed land uses within this area (e.g., urban development, agriculture, highways and rail), natural heritage features were generally restricted to drainage features, marsh communities, cultural thicket and old field meadow habitat. East of White Oaks Boulevard and north of Iroquois Shore Road, in the northern portion of the study area, Morrison Creek and associated valleyland habitats provide the least

disturbed habitat for wildlife within the study area. Other drainage features, including Lower Wedgewood Creek and Lower Morrison Creek, also provide some capacity for wildlife utilization; however, natural areas associated with these features are limited and they are highly disturbed by surrounding land uses and consequently provide only marginal wildlife habitat. A fallow agricultural field was present east of the intersection of Eight Line and Iroquois Shore Road. Extensive areas of manicured grass were present across the study area and generally associated with the commercial development. No significant wildlife movement or passage corridors were documented in the study area. However, all culverts which convey water across highway infrastructure may offer some opportunity for wildlife movement. No nests of migratory bird species were identified within culverts/bridges.

Overall, natural areas within the study area are restricted to several areas, and where present, support a low diversity of wildlife species. Wildlife species identified within the study area are generally considered urban or tolerant of anthropogenic features and disturbance.

No Significant Wildlife Habitat, as identified by the Town of Oakville Official Plan (Town of Oakville 2009) or based on criteria outlined in the Ontario Ministry of Natural Resources Significant Wildlife Habitat Technical Guide (OMNR 2000) has been identified within the proposed Midtown Oakville study area.

2.4.2 Fauna

Based on field observations, a total of 14 species of wildlife could be verified in the study area. The majority of these recordings came from identification (through calls and sightings) of bird species and mammalian signs. An additional 20 species of wildlife have been recorded as present within the study area based on a review of secondary data sources and an analysis of existing habitat conditions. A summary of wildlife species documented in the study area during field investigations and through a review of secondary sources is presented in **Table 3**.

Herpetofauna Species

A single herpetofauna species was observed within the study area during LGL's field investigations. A single Eastern Gartersnake (*Thamnophis sirtalis*) was observed within the Morrison Creek valleylands. Three additional species including Northern Leopard Frog (*Lithobates pipiens*), Green Frog (*Rana clamitans*) and American Toad (*Bufo americanus*) have been identified as present within the study area based on a review of secondary data sources and an analysis of existing habitat conditions.

Overall, herpetofauna use of habitats within the study area is expected to be limited, but most prevalent within aquatic (meadow marsh and shallow marsh) and adjacent riparian habitats.

Bird Species

Fourteen bird species were observed within the study area during LGL's field investigations. An additional 12 species of bird have been identified as present within the study area based on a review of secondary data sources and an analysis of existing habitat conditions. Bird species identified within the study area are species that typically inhabit open country, forest edge, agricultural and urban/anthropogenic habitat types. Generally, the species identified are tolerant of anthropogenic features and disturbance. Old field meadow, cultural thicket and agricultural areas provide habitats to support bird species such as Mourning Dove (*Zenaidra macroura*), Song Sparrow (*Melospiza melodia*), Northern Mockingbird (*Mimus polyglottos*), Killdeer (*Charadrius vociferus*), Savannah Sparrow (*Passerculus sandwichensis*) and American Goldfinch (*Carduelis tristis*). Highly anthropogenic communities, such as manicured grass and commercial areas provide habitat for highly adaptable/introduced species such as European Starling (*Sturnus vulgaris*), Canada Goose (*Branta canadensis*), Red-winged Blackbird and Brown-headed Cowbird (*Molothrus ater*).

TABLE 3. WILDLIFE SPECIES DOCUMENTED WITHIN THE STUDY AREA

Wildlife	Scientific Name	Common Name	Species Status under Legislation/ Local Sensitivity				Source of Species Identification	
			Federal SARA	Ontario ESA	Local	Legal Status	LGL ¹	Other ²
Herpetofauna	<i>Anaxyrus americanus</i>	American Toad			A			*
	<i>Lithobates clamitans</i>	Green Frog			A			*
	<i>Lithobates pipiens</i>	Northern Leopard Frog			A			*
	<i>Thamnophis sirtalis</i>	Eastern Gartersnake			A		*	
Birds	<i>Anas platyrhynchos</i>	Mallard			N/A	MBCA		*
	<i>Branta canadensis</i>	Canada Goose			I	MBCA	*	
	<i>Charadrius vociferus</i>	Killdeer			N/A	MBCA	*	
	<i>Actitis macularius</i>	Spotted Sandpiper			N/A, BSC	MBCA		*
	<i>Columba livia</i>	Rock Dove			I			*
	<i>Zenaida macroura</i>	Mourning Dove			N/A	MBCA	*	
	<i>Picoides pubescens</i>	Downy Woodpecker			N/A	MBCA		*
	<i>Cyanocitta cristata</i>	Blue Jay			A	FWCA(P)	*	
	<i>Corvus brachyrhynchos</i>	American Crow			C		*	
	<i>Poecile atricapillus</i>	Black-capped Chickadee			A, BSC	MBCA		*
	<i>Mimus polyglottos</i>	Northern Mockingbird			U, BSC	MBCA	*	
	<i>Sturnus vulgaris</i>	European Starling			I		*	
	<i>Bombycilla cedrorum</i>	Cedar Waxwing			C	MBCA	*	
	<i>Dendroica petechia</i>	Yellow Warbler			N/A	MBCA		*
	<i>Passerculus sandwichensis</i>	Savannah Sparrow			N/A, BSC	MBCA		*
	<i>Melospiza melodia</i>	Song Sparrow			N/A	MBCA		*
	<i>Cardinalis cardinalis</i>	Northern Cardinal			N/A	MBCA	*	
	<i>Agelaius phoeniceus</i>	Red-winged Blackbird			N/A			*
	<i>Quiscalus quiscula</i>	Common Grackle			N/A			*
	<i>Molothrus ater</i>	Brown-headed Cowbird			N/A			*
<i>Carpodacus mexicanus</i>	House Finch			I	MBCA	*		
<i>Carduelis tristis</i>	American Goldfinch			N/A, BSC	MBCA	*		

TABLE 3. WILDLIFE SPECIES DOCUMENTED WITHIN THE STUDY AREA

	<i>Passer domesticus</i>	House Sparrow			I			*
Mammals	<i>Didelphis virginiana</i>	Virginia Opossum			C	FWCA(F)		*
	<i>Sylvilagus floridanus</i>	Eastern Cottontail			C	FWCA(G)		*
	<i>Sciurus carolinensis</i>	Eastern Gray Squirrel			N/A	FWCA(G)	*	
	<i>Microtus pennsylvanicus</i>	Meadow Vole			C			*
	<i>Canis latrans</i>	Coyote			C	FWCA(F)	*	
	<i>Vulpes vulpes</i>	Red Fox			C	FWCA(F)		*
	<i>Procyon lotor</i>	Northern Raccoon			C	FWCA(F)	*	

All acronyms used in this table are defined in **Appendix C** (Acronyms and Definitions Used in Species Lists).

Legislation Referenced in the Table:

SARA – Federal *Species at Risk Act*

ESA – Ontario *Endangered Species Act, 2007*

MBCA – *Migratory Bird Convention Act*

FWCA – *Fish and Wildlife Conservation Act*

Local Ranks:

BSC – Bird Studies Canada, Species of Conservation Priority.

CH – Conservation Halton Ranking – C= Common, A= Abundant, U= Uncommon, I= Introduced.

Source of Species Identification:

¹Species recorded within the study area during detail design field investigations – September 2013 (LGL 2013).

²Species identified as likely to utilize the study area based on an analysis of existing habitat and secondary source data.

Five priority species for conservation (as identified by Bird Studies Canada) have been identified as present within the study area based on field observations and a review of secondary data sources and an analysis of existing habitat conditions. Priority species for conservation identified within the study area include: Spotted Sandpiper (*Actitis macularius*), Black-capped Chickadee (*Poecile atricapillus*), American Goldfinch, Northern Mockingbird and Savannah Sparrow. Within the study area, these species are likely to be present within cultural meadow, agricultural and anthropogenic areas.

Mammal Species

Three mammal species were identified during field investigations within the study area. Northern racoon (*Procyon lotor*) and coyote (*Canis latrans*) tracks and scats were noted along riparian habitats of Morrison Creek. Eastern gray squirrels (*Sciurus carolinensis*) were commonly observed across the study area. An additional four mammal species have been identified as present within the study area based on a review of secondary data sources and an analysis of existing habitat conditions. The mammal species identified represent an assemblage that readily utilizes human influenced landscapes. No significant mammal movement corridors were identified within the study area. However, several culverts which convey water across existing highway infrastructure may offer some opportunity for wildlife movement.

2.4.3 Species at Risk

Fifteen species of bird are protected under the *Migratory Birds Convention Act* (MBCA) and a single bird species is protected under the *Fish and Wildlife Conservation Act* (FWCA). Five bird species identified within the study area are recommended by Bird Studies Canada as priority species for conservation. Five of seven species of mammal identified within the study area are offered protection under the FWCA. One wildlife species, the Northern Mockingbird, is ranked 'uncommon' by Conservation Halton. Despite the 'uncommon' classification by Conservation Halton, the Northern Mockingbird population is considered secure. The remaining of wildlife species documented within the study area are ranked 'common' or 'abundant' by Conservation Halton.

Of the 34 wildlife species recorded within the study area, none are regulated under the Ontario *Endangered Species Act, 2007* (ESA) or the federal *Species at Risk Act* (SARA). A number of species at risk have been identified as historically present within the Town of Oakville, based on records from the Natural Heritage Information Centre (NHIC) Biodiversity Explorer database, as presented in the Town of Oakville Transportation Master Plan - Natural Environment Opportunities and Constraints Report (LGL 2012). A number of the rare species element occurrence records listed on the NHIC database within the Town of Oakville are dated and do not reflect current existing conditions. Furthermore, the highly disturbed nature of the natural heritage features present within the Midtown Oakville study area result in only limited potential for presence of species at risk. Four species at risk have been identified as potentially present within the Midtown Oakville study area. The species, their respective habitat requirements and likelihood of each species at risk being present within the study area is discussed below.

2.4.3.1 Milksnake

The Milksnake (*Lampropeltis triangulum*) is found in a wide variety of habitats (Harding 1997). The Milksnake is known to inhabit areas heavily disturbed by humans (e.g. farmland, urban parks and residential areas). The last occurrence record listed on the NHIC database within the Town of Oakville is dated 1996, however much more recent records within the town exist. Exact distribution of potentially suitable Milksnake habitat is difficult to determine; however, greenspace (valleylands, open country habitat types etc.) and agricultural lands within the Midtown Oakville study area may contain Milksnake.

2.4.3.2 Bobolink

Bobolink was not listed on the NHIC database; however, the species has a broad distribution across southern Ontario and regularly occupies grassland communities, old fields and agricultural lands. Bobolinks were previously documented in the north Oakville area by LGL in 1998/1999 (LGL 2000). In

the absence of comprehensive breeding bird surveys being undertaken within the study area, exact distribution of Bobolink is difficult to determine; however, agricultural lands and select old fields and meadow habitat areas within the Midtown Oakville study area may have potential for Bobolink occurrence.

2.4.3.3 Eastern Meadowlark

Eastern Meadowlark was not listed on the NHIC database; however, the species has a broad distribution across southern Ontario and was recently listed and is regulated as ‘Threatened’ under the ESA, effective January 14, 2011. The Eastern Meadowlark, formerly a prairie species, has adapted to agricultural practices of the European settlers (hayfields, pastures etc.). As farming practices have become more efficient, Eastern Meadowlark numbers have declined. In the absence of comprehensive breeding bird surveys being undertaken within the study area, exact distribution of Eastern Meadowlark is difficult to determine; however, agricultural lands and select old fields and meadow habitat areas within the Midtown Oakville study area may have potential for Eastern Meadowlark occurrence.

2.4.3.4 Barn Swallow

Barn Swallow was not listed in the NHIC database; however, this species was recently listed as ‘Threatened’ effective January 14, 2012. The Barn Swallow has a broad distribution across Ontario and generally builds mud nests on bridges, walls, ledges and barns, and typically forages in open areas such as agricultural lands, meadows or over water (Cadman et al. 2007). Decline in Barn Swallow numbers is not well understood at this time; however, habitat destruction, decline in insect populations and scarcity of suitable nesting sites are all considered to be contributing factors. No Barn Swallow nests were identified within bridge or culvert structures; however, given the seasonal timing of the field investigations (outside of the breeding bird window), it was not possible to determine if Barn Swallows are nesting within the study area. Potentially suitable foraging habitat for Barn Swallow was identified within the study area (e.g. agricultural fields and open country habitat types).

2.5 Designated Natural Areas

Designated natural areas include areas identified for protection by the Ontario Ministry of Natural Resources (OMNR), Conservation Halton, the Town of Oakville, and Halton Region. A review of the Halton Region Official Plan (2006) and the Town of Oakville Official Plan (2009) indicate that there are no Provincially Significant Wetlands (PSWs), Areas of Natural and Scientific Interest (ANSIs), or Environmentally Sensitive Areas (ESAs) located within 120 m of the study area.

Several of the study area’s natural features exist within the HRCA Regulation Limit, including watercourses and riparian communities associated with Lower Morrison Creek Tributaries 1 and 2, Lower Wedgewood Creek Tributaries 1 to 4, the Morrison-Wedgewood Diversion Channel, and components of the QEW Ditch System. An additional HRCA Regulated Area is present south of the existing eastern terminus of Davis Road, a small wetland feature discussed in detail in **Section 4.3.2**.

Conservation Halton GIS mapping (obtained from Halton Region) depicts a candidate significant woodland adjacent to Morrison Creek north of the Morrison-Wedgewood Diversion Channel that is present within the impact area (CUW1d). See **Section 4.5** for details regarding anticipated environmental impacts to the candidate significant woodland polygon.

3.0 PROJECT DESCRIPTION

The Town of Oakville is planning improvements to the existing transportation network in Midtown Oakville. The road system needs to accommodate the projected increase in vehicular and pedestrian activities. The planned road network improvements (preferred options) are described below and presented in **Figure 4**. The road network improvements shown in Figure 4 represent the road right-of-way, including the road platform and the grading limits.

Iroquois Shore Road

Iroquois Shore Road will be widened from a 2 lane to 4 lane road cross section from the intersection of North Service Road to Eighth Line. Cycle lanes will be provided in each direction from the intersection of Trafalgar Road to Eighth Line.

Royal Windsor Drive Interchange

Royal Windsor Drive Interchange improvements will include the following:

- Royal Windsor Drive will be widened from a 2 lane to 4 lane divided road cross section and extended to the intersection of Eighth Line. Cycle lanes will be provided in each direction between the intersection of Canadian Road and Eighth Line. The existing Royal Windsor Drive structure will be widened to accommodate the new road cross section and a new structure will also be provided across the North Service Road.
- New E-NS Off Ramp will be provided from the QEW to Royal Windsor Drive
- New NS-E On Ramp will be provided from Royal Windsor Drive to the QEW
- The W-NS Off Ramp will be realigned to accommodate a new button hook ramp from the QEW to Oakville Midtown. The existing South Service Road will be terminated with a cul-de-sac to accommodate the W-NS ramp alignment.








Midtown Core Improvements

Midtown Core Improvements will include the following:

- New W-Cross Off Ramp will be provided from the QEW to Oakville Midtown. A new underpass structure will be provided at Trafalgar Road.
- The W-NS ramp will be realigned to accommodate a new ramp alignment to Midtown Oakville.
- The South Service Road will be realigned between Lyons Lane and Argus Road to accommodate a new ramp alignment to Midtown Oakville.
- Cross Avenue will be realigned and extended from the intersection of Argus Road to Royal Windsor Drive. The road cross section will include general purpose lanes. A new structure will be provided across the realigned W-NS ramp at Royal Windsor Drive Interchange.
- New 4 lane road cross section will be provided from the intersection of White Oaks Boulevard and Trafalgar Road. The road cross section will include 2 general purpose lanes and 2 transit priority lanes. A new structure will be provided across the QEW and the Morrison-Wedgwood diversion channel.



LEGEND

-  Study Area
-  Watercourse
- Preferred Options
-  Combined Option 5
-  Iroquois Shore 2
-  Royal Windsor Drive 2
-  Pedestrian Crossing 2
-  Trafalgar

Data Source: LGL Limited.



PREFERRED OPTIONS



Project: TA8087	Figure: 4
Date: March, 2014	Prepared By: MWF
Scale: 1 : 12,000	Checked By: GNK

4.0 IMPACT ASSESSMENT AND ENVIRONMENTAL PROTECTION

The road network improvements (preferred options) are planned within a highly urban setting, consisting primarily of commercial and industrial properties, and lands adjacent to existing road and railway infrastructure. All parts of the study area have been exposed to high levels of disturbance and are either subject to or adjacent to areas with high volumes of pedestrian and vehicular traffic. Aquatic and terrestrial communities in the vicinity of proposed improvements show evidence of strong cultural influence, and general conditions (such as ecosystem productivity, biodiversity, and species composition) are reflective of anthropogenic impacts.

The planned road network improvements (detailed in **Section 3.0**) include expansion of existing roads, construction of new roads, and construction of public transportation infrastructure between Cross Avenue and the Ford Assembly Plant lands south of the Queen Elizabeth Way (QEW), and between Trafalgar Road and the vicinity of Eighth Line north of the QEW (**Figure 4**). Below is a summary of planned road network components, associated natural features, and anticipated extent of impacts to those features. A detailed description of anticipated impacts natural features is provided in **Section 4.2** through **Section 4.5**.

Cross Avenue Extension to Royal Windsor Drive:

The Cross Avenue Extension spanning from west of Trafalgar Road to the planned intersection with South Service Road East near the Royal Windsor Drive interchange involves two watercourse interactions. The extension will cross Tributary 2 of Lower Morrison Creek, impacting indirect warmwater fish habitat but will likely not affect direct fish habitat downstream. Tributary 1 of Lower Wedgewood Creek functions as direct warmwater fish habitat, and may be subject to direct interaction and “*Serious Harm*” to its fisheries. The extension may also be present within riparian areas associated with Tributary 1 of Lower Morrison Creek, considered direct warmwater fish habitat of low sensitivity. The extension passes through manicured lands, cultural meadow, cultural thicket, and cultural woodland, and will involve vegetation removal and community fragmentation. Due to current high levels of disturbance, impacts to vegetation communities, wildlife and wildlife habitat are expected to be low. A small meadow marsh within the central portion of the extension will incur vegetation removal, however it does not meet the size requirements of a wetland feature regulated by the HRCA (0.5 ha) or the minimum size required for an OWES (Ontario Wetland Evaluation System) evaluation (2.0 ha).

Trafalgar Road Interchange Improvements:

Improvements to South Service Road East and its extensions to Trafalgar Road, Argus Road, and the QEW onramp do not interact directly or indirectly with any watercourses. The proposed infrastructure passes through manicured lands and cultural meadow and will involve vegetation removal and community fragmentation. Due to current high levels of disturbance including dense vehicular and pedestrian traffic, impacts to vegetation communities, wildlife and wildlife habitat are expected to be low.

North South Connection and White Oaks Boulevard:

A largely new road incorporating the westernmost section of North Service Road East will be constructed from the Cross Avenue extension, across the QEW, and split at its northern terminus to intercept Trafalgar Road at White Oaks Boulevard. The proposed construction will cross the Morrison-Wedgewood Diversion Channel, a channelized watercourse considered direct warmwater fish habitat of low sensitivity, and may be subject to direct interaction and “*Serious Harm*” to its fisheries. The proposed construction passes through manicured lands, cultural meadow, cultural thicket, and cultural woodland, and will involve vegetation removal and community fragmentation. Due to current high levels of disturbance including dense vehicular and pedestrian traffic, impacts to vegetation communities, wildlife and wildlife habitat are expected to be low. HRCA GIS mapping (obtained from Halton Region) depicts a candidate significant woodland directly north of the Morrison-Wedgewood Diversion Channel bisected by the proposed construction. The portion that falls within the limits of construction however, is

a woodland of cultural origin. See **Section 4.5** for further detail and recommendations regarding this candidate significant woodland feature.

Iroquois Shore Road:

Improvements to Iroquois Shore Road between Trafalgar Road and Eighth Line will involve a widening from two to four lanes. The proposed improvements do not interact directly or indirectly with any watercourses, and will involve vegetation removal from manicured lawns only. Impacts to vegetation and wildlife communities are expected to be minimal.

Royal Windsor Drive Interchange:

Improvements to the Royal Windsor Drive Interchange network will include improvements south of the QEW adjacent to South Service Road East, The Canadian Road, and Royal Windsor Drive, and north of the QEW in the vicinity of North Service Road east. The improvements will involve encroachment upon Tributary 1 of Lower Wedgewood Creek, which functions as direct warmwater fish habitat, and may be subject to direct interaction and “*Serious Harm*” to its fisheries. A series of ditches (QEW Ditch System) are present within the vicinity of road improvements, however they do not function as fish habitat and therefore fisheries will not be impacted by construction activities. The proposed infrastructure passes through manicured lands, cultural meadow, and cultural thicket and will involve vegetation removal and community fragmentation. Due to current high levels of disturbance including dense vehicular traffic, impacts to vegetation communities, wildlife and wildlife habitat are expected to be low.

4.1 Physiography and Soils

The study area is located primarily within the South Slope and partially within the Iroquois Plain (Chapman and Putnam 1984). The South Slope predominantly consists of shale and till plains, and the Iroquois Plain predominantly consists of flat, sandy lowlands.

Soil disturbance within the study area will be limited to the previously disturbed areas, with some exceptions, where grading will be required in natural areas. Impacts resulting from any excavating or cut and fill operations will be temporary in nature. Erosion and sedimentation mitigation measures will be implemented prior to and during the construction phase.

These control measures will include:

- limiting the geographical extent and duration that soils are exposed to the elements;
- implementing standard erosion and sedimentation control measures in accordance with Ontario Provincial Standard Specification (OPSS) 577 Construction Specification for Temporary Erosion and Sediment Control Measures and the Greater Golden Horseshoe Conservation Authorities’ Erosion and Sediment Control Guideline for Urban Construction. These standard measures include: silt fence placed along the margins of areas of soil disturbance; applying conventional seed and mulch and/or erosion control blanket in areas of soil disturbance to provide adequate slope protection and long term slope stabilization; and,
- managing surface water outside of work areas to prevent water from coming in contact with exposed soils.

Monitoring of these erosion and sedimentation control measures during and after construction will be implemented to ensure their effectiveness. These environmental measures will greatly reduce/minimize adverse environmental impacts.

4.2 Fisheries and Aquatic Ecosystems

Many of the watercourses within the study area either directly support fish habitat or support indirect fish habitat. Because of the presence of fish habitat, any work has the potential to result in “*Serious Harm*” to fish. See **Figure 5** for a depiction of planned road network improvements in relation to aquatic ecosystem components within the study area.

The Department of Fisheries and Oceans (DFO) interprets “*Serious Harm*” as

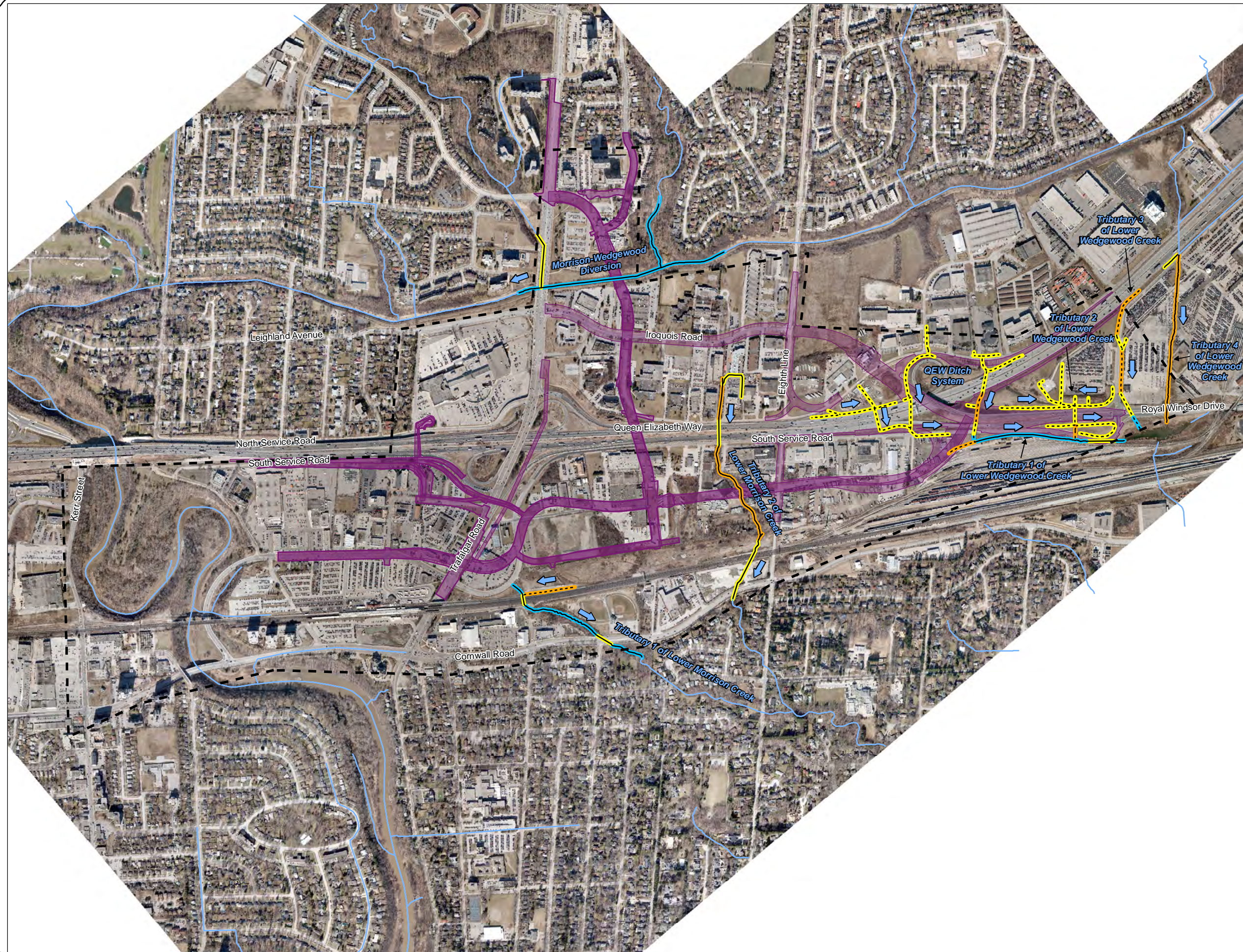
- the **death of fish**;
- a **permanent alteration** to fish habitat of a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes; and,
- the **destruction of fish habitat** of a spatial scale, duration, or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes.

As a result of recent changes to the *Fisheries Act* the Department of Fisheries and Oceans (DFO), has implemented a new screening process to assess which was once classified as harmful alteration, disruption or destruction (HADD) to fish habitat, now termed “*Serious Harm*” to fish. Previously, all screenings in the Conservation Halton (CH) jurisdiction were done by that organization under an agreement with DFO. Now, DFO has developed a set of criteria to be used to screen a project. Projects that meet criteria outlined by DFO do not require a screening under the new process and can be self-assessed; however, works are still required to avoid causing serious harm to fish by following best practices such as those described below, in **Section 4.2.1**.










The net environmental effects of the project on fish habitat, based on the level of detail for Municipal Class EA planning design, are summarized in **Table 4** and discussed herein. The following sections provide an assessment of these potential effects, whether they may require DFO screening and to recommend environmental protection and mitigation measures.

Based on the planning design drawings presented, the watercourses which appear to be affected by the preferred design include Tributary 1 of Lower Morrison Creek, Tributary 2 of Morrison Creek, Tributary 1 of Lower Wedgewood Creek, Tributary 1 of Lower Wedgewood Creek (Ditch feature 3) and the Morrison-Wedgewood Diversion Channel.

The remaining watercourses mentioned in the existing conditions (Tributaries 2, 3 and 4 of Lower Wedgewood Creek) are located beyond the zone of influence of the preferred option or do not provide fish habitat. Standard best management practices in **Section 4.2.1** are still to be implemented at the above watercourses during construction to avoid deleterious effects to fish and fish habitat outside of the area of works.



LEGEND

-  Study Area
-  Permanent Flow
-  Intermittent Flow
-  Fish Habitat
-  Indirect Fish Habitat
-  Not Fish Habitat
-  Watercourse Not Assessed
-  Flow Direction
-  Impact Area

Data Source: LGL Limited.



AQUATIC ECOSYSTEM IMPACT AREAS



Project: TA8087	Figure: 5
Date: March, 2014	Prepared By: MWF
Scale: 1 : 12,000	Checked By: GNK

TABLE 4. SUMMARY OF IMPACTS AND SITE-SPECIFIC MITIGATION

Name	Fish Habitat	Existing Works	Proposed Works	Net Environmental Effects	DFO Screening	Site Specific Mitigation
Tributary 1 of Lower Morrison Creek	Direct, Warmwater	None	<ul style="list-style-type: none"> Unknown (Appears to encroach on riparian area) 	<ul style="list-style-type: none"> Potential Removal of Riparian Vegetation. 	<ul style="list-style-type: none"> Unlikely to be exempt, the proposed work at this watercourse will likely encroach on the watercourse and may consist of the removal of riparian vegetation. 	<ul style="list-style-type: none"> If realignment is required, natural channel design measures should be incorporated. Maintain existing seasonal groundwater or wetland surface flows.
Tributary 2 of Lower Morrison Creek	Indirect, Warmwater	None	<ul style="list-style-type: none"> Crossing Structure 	<ul style="list-style-type: none"> Alteration of indirect fish habitat resulting from installation of a new crossing structure. 	<ul style="list-style-type: none"> Likely to be exempt, this watercourse does not contain fish at any time of the year. A new structure will likely be proposed to span this watercourse. 	<ul style="list-style-type: none"> Maintain feature form and flow
Tributary 1 of Lower Wedgewood Creek	Direct, Warmwater	None	<ul style="list-style-type: none"> Unknown 	<ul style="list-style-type: none"> Alteration of direct fish habitat resulting from works. 	<ul style="list-style-type: none"> Unlikely to be exempt, proposed work appears to require alteration of direct fish habitat . 	<ul style="list-style-type: none"> If realignment is required, natural channel design measures should be incorporated. Maintain existing seasonal groundwater or wetland surface flows.
QEW Ditch System (Ditch Feature 3)	Indirect, Warmwater	None	<ul style="list-style-type: none"> Unknown 	<ul style="list-style-type: none"> Alteration of indirect fish habitat resulting from new on-ramp construction. 	<ul style="list-style-type: none"> Likely to be exempt, proposed work appears to 	<ul style="list-style-type: none"> Replicate functions by lot level

TABLE 4. SUMMARY OF IMPACTS AND SITE-SPECIFIC MITIGATION

Name	Fish Habitat	Existing Works	Proposed Works	Net Environmental Effects	DFO Screening	Site Specific Mitigation
					require alteration of indirect fish habitat.	conveyance measures or low impact stormwater options.
Morrison Wedgewood Diversion Channel	Direct, Warmwater	None	<ul style="list-style-type: none"> • Crossing Structure 	<ul style="list-style-type: none"> • Alteration of direct fish habitat resulting from the installation of a new crossing structure 	<ul style="list-style-type: none"> • Likely to be exempt, given the new structure design follows the site specific mitigation measures. • May be subject to MNR Screening for effects to Species at Risk. 	<ul style="list-style-type: none"> • Crossing structure should clear span the watercourse. • No earth fill placed below the high water mark.

Tributary 1 of Lower Morrison Creek

The proposed footprint of the road may encroach on the riparian habitat of this tributary. This may affect or have the potential to affect direct warmwater fish habitat of low sensitivity. The footprint does not appear to also affect the ditch feature which contributes flow from east of the channel. Proposed works adjacent to this feature will be subject to mitigation measures described below, beginning in **Section 4.2.1**. Works are likely subject to DFO screening to determine if “*Serious Harm*” to fish will occur from the proposed works depending on the nature of the work being done in the vicinity of the channel. Site specific mitigation in addition to general mitigation measures at Tributary 1 of Lower Morrison Creek should include maintaining the existing seasonal groundwater or wetland surface flows. If works are to directly affect the channel and realignment is required, natural channel design should be incorporated.

The wetted depression and CH regulated areas which occur to the northeast of this channel are expected to be affected by the road improvements. As shown in **Figure 2**, and described above in **Section 2.2.1**, there is a circular area in the centre of Midtown Oakville that is within the Conservation Halton Regulation Limit and a small, wet depression is also present within this area, which is not fish habitat. According to the preferred design, a road will cross this depression and regulation limit, and a permit will likely be required under O. Reg. 162/06. Environmental mitigation measures would be at the discretion of Conservation Halton and depend on the nature of the regulated area.

Tributary 2 of Lower Morrison Creek

The proposed road footprint appears to directly affect Tributary 2 of Lower Morrison Creek. The proposed work will cross this feature and will result in alterations to indirect warmwater fish habitat. The alteration to this watercourse will likely not affect downstream fish habitat given mitigation measures described below, beginning in **Section 4.2.1** are followed. Works also are likely to be exempt from DFO screening to determine if “*Serious Harm*” to fish will occur from the proposed works due to the indirect habitat classification. Site specific mitigation in addition to general mitigation measures at Tributary 2 of Lower Morrison Creek should include maintaining the form and flow of the watercourse feature.

Tributary 1 of Lower Wedgewood Creek

The proposed new road structures have the potential to affect the west (upstream) section of Tributary 1 of Lower Wedgewood. It is unknown what the specific impacts will be (if any), however, based on the EA design drawings, the new road footprint will encroach on this watercourse. This tributary is direct warmwater fish habitat and therefore, any work has the potential to result in a “*Serious Harm*” to fish and will therefore will be subject to mitigation measures described below, beginning in **Section 4.2.1**. Works also are likely subject to DFO screening and site specific mitigation measures. Site specific mitigation in addition to general mitigation measures at Tributary 1 of Lower Wedgewood Creek should include maintaining existing seasonal groundwater or wetland surface flows. If realignment is required for works, natural channel design measures should be incorporated.

QEW Ditch System (Ditch Feature 3)

The proposed new road structure has the potential to affect the Tributary of Lower Wedgewood Creek Ditch Feature 3. It is unknown what the specific impacts will be (if any). However, this tributary is classified as indirect warmwater fish habitat and therefore, any work has the potential to result in “*Serious Harm*” to fish and will therefore be subject to mitigation measures described below, beginning in **Section 4.2.1**. Works also are likely to be exempt from DFO screening to determine if “*Serious Harm*” to fish will occur from the proposed works due to the indirect habitat classification. Site specific mitigation in

addition to general mitigation measures at this watercourse should include the replication of functions via lot level conveyance measures or the implementation of low impact stormwater options.

Morrison-Wedgewood Diversion Channel

The proposed new road structure appears to directly affect the Morrison-Wedgewood Diversion Channel. The proposed work will cross this feature and will result the alteration of direct warmwater fish habitat; therefore it has the potential to result in “*Serious Harm*” to fish. As described above in **Section 2.2.3.**, the Morrison-Wedgewood Diversion Channel within the study area is warmwater fish habitat of low sensitivity; however, this channel indirectly contributes flow to Sixteen Mile Creek which is managed as Redside Dace (*Clinostomus elongatus*) and Silver Shiner (*Notropis photogenis*) habitat.

Works at this crossing are likely to be exempt from DFO screening to determine if “*Serious Harm*” to fish will occur from the proposed works, given the following conditions are met; the crossing structure should clear span the watercourse, and no earth fill is to be placed below the high water mark. This crossing is also subject to general mitigation measures described below, beginning in **Section 4.2.1.**

The proposed works should be reviewed by MNR to determine if an ESA 17(2)(c) Permit will be required under the Endangered Species Act, 2007 due to the presence of Redside Dace downstream in Sixteen Mile Creek. The fish community found in this section of the Morrison-Wedgewood Diversion Channel is isolated from the downstream fishery by a large drop occurring at Trafalgar Road.

Process for Determination of Serious Harm to Fish

“*Serious Harm*” to fish can be assessed based on the following effects:

- temporary disruption or permanent loss of site-specific habitat;
- changes to water quality and quantity;
- changes in water temperature; and,
- barriers to fish passage.

In cases where DFO Screening is not required, the following best management practices are still to be followed to avoid “*Serious Harm*” to fish.

4.2.1 Temporary Disruption or Permanent Loss of Site-Specific Habitat

Some of the proposed improvement works may involve in-water work. At all locations where in-water work is proposed, cofferdams (pea gravel bags, sheetpiles, etc.) will be used to isolate the work area from the watercourse to enable work to be done in-the-dry. Flow will be maintained through either damming and pumping or a flume. If possible, work should be done during the driest part of the year when no flow is present. This will minimize disturbance to fish habitat at the site and downstream. To further reduce the potential for Serious Harm, the following environmental protection measures will be implemented:

- no in-water work (or work on watercourse banks) will be permitted from April 1 to June 30 to protect spawning warmwater fish, incubating eggs and fry emergence;
- work areas will be delineated with construction fencing to minimize the area of disturbance;
- best management practices and special provisions will be employed to reduce impacts during construction;

- appropriate sediment control structures will be installed prior to and maintained during construction to prevent entry of sediments into the watercourse: these controls will be dynamic and may evolve with the project if site conditions warrant;
- where cofferdams are to be employed, dewatering effluent will be treated prior to discharge to receiving watercourse;
- cofferdams will be constructed using pea gravel bags, sheet piling or other appropriate material to isolate the work area: flow will be maintained at all stations;
- only clean material free of particulate matter will be placed in the watercourse;
- fish isolated by construction activities (if present) will be captured and safely released to the watercourse;
- good housekeeping practices related to materials storage/stockpiling, equipment fuelling/maintenance, etc. will be implemented during construction;
- disturbed riparian areas will be vegetated and/or covered with an erosion control blanket as quickly as possible to stabilize the banks and minimize the potential for erosion and sedimentation;
- no construction machinery or vehicles will cross any watercourse at any time during construction; and,
- all debris/materials associated with works will be contained and prevented from entering the watercourse.

These environmental protection measures will greatly reduce the potential for adverse effects to fish and fish habitat resulting from construction activities and are in addition to those outlined in **Table 4**.

4.2.2 Temporary Change to Water Quality

The construction associated with the proposed works has the potential to alter water quality through on-site erosion of exposed materials and the subsequent impairment of downstream water quality with sediments and other contaminants.

Changes to water quality will be mitigated through the isolation of the works areas behind cofferdams, the treatment of effluent from dewatering prior to its release back into the receiving watercourses and the deployment and maintenance of standard erosion and sediment controls (silt fencing, straw bale flow checks, etc.) which will prevent sediments from reaching the watercourses from exposed soils upslope. In addition, all exposed areas will be vegetated as quickly as possible once work is completed.

4.2.3 Changes in Water Temperature

The thermal regime of a receiving watercourse may be altered by removal of riparian vegetation that shades the watercourse. Coldwater or coolwater streams are usually considered more sensitive to changes in water temperature than warmwater streams. All watercourses affected within this study area are classified as warmwater.

As stated above, any riparian vegetation that is negatively affected by the proposed works will be replaced as soon as possible following completion of works. It is expected that temperatures will not increase as a result of the proposed works.

4.2.4 Barriers to Fish Passage

All new culverts/bridges will be designed to maintain fish passage within the watercourse.

4.2.5 Restoration/Enhancement

General restoration/enhancement of the riparian areas of all affected watercourses within the study area will be undertaken. This restoration/enhancement will include, but not be limited to, the replacement of existing vegetation types and densities to mimic existing natural conditions. These replacements may include herbaceous species (through seeding), shrub plantings (through live staking) and tree plantings. Where trees currently exist, native tree plantings will occur at a ratio of at least 2:1 to provide shading and allochthonous inputs to the watercourses.

4.3 Vegetation and Vegetation Communities

Clearing of vegetation will be required to accommodate for the proposed improvements to the transportation network in Midtown Oakville. Construction will result in the removal of approximately 12.53 ha of naturalized and/or planted areas. The largest impact will be to lands that have been anthropogenically influenced including cultural vegetation communities and manicured areas. Of these lands, a total of 8.85 ha and 3.55 ha, respectively, will be removed. No forest communities will be removed as a result of the proposed improvements. A total of 0.13 ha of wetland vegetation will be removed due to construction. **Table 5** provides a summary of the vegetation removal required for the improvements to Midtown Oakville. See **Figure 6** for a depiction of planned road network improvements in relation to natural heritage features within the study area.

TABLE 5. IMPACTS TO VEGETATION COMMUNITIES WITHIN THE STUDY AREA





Vegetation Community	Total Area (ha) to be Impacted
Dry- Moist Old Field Meadow (CUM1-1a to t)	7.32
Mineral Cultural Thicket (CUT1a to g)	1.00
Mineral Cultural Woodland (CUW1a to d)	0.53
Cattail Mineral Shallow Marsh (MAS2-1)	0
Mineral Meadow Marsh (MAM2)	0.13
Manicured (M)	3.55
Hedgerow (H)	0
Total Area (ha) of Impacted Lands	12.53

4.3.1 Cultural

As noted in **Table 5** the largest impact will occur to the cultural communities with a removal of 8.85 ha. The impacts to the cultural communities will primarily involve the removal of narrow strips of cultural meadow adjacent to existing commercial buildings and in close proximity to QEW on-ramps/off-ramps. Larger sections of cultural vegetation will be removed near the rail yards at the southern extent of the study area and to the north of the QEW east of Eighth Line. Overall, impacts resulting in the loss of vegetation within these cultural communities are considered to be minor. Cultural communities typically persist in areas that are regularly disturbed, and as a result, generally contain a high proportion of invasive and non-native plant species that are tolerant of these conditions.



LEGEND

-  Study Area
-  Watercourse
-  Impact Area
- Vegetation Communities
-  Vegetation Community Boundary
- CU** Cultural
- CUM** Cultural Meadow
- CUM1-1 (a-f)** Dry-Moist Old Field Meadow Type
- CUT1 (a-g)** Mineral Cultural Thicket Ecosite
- CUW** Cultural Woodland
- CUW1** Mineral Cultural Woodland Ecosite
- FOD** Deciduous Forest
- FOD1-1** Dry-Fresh Red Oak Deciduous Forest Type
- FOD2-2** Dry-Fresh Oak-Hickory Deciduous Forest Type
- FOD2-4** Dry-Fresh Oak-Harwood Deciduous Forest Type
- FOD3-3** Dry-Fresh Sugar Maple-Oak Deciduous Forest Type
- FOM** Mixed Forest
- MAM** Meadow Marsh
- MAM2** Mineral Meadow Marsh Ecosite
- MAS2-1** Cattail Mineral Shallow Marsh Type
- SWD** Deciduous Swamp
- SWT2-3** Meadowsweet Mineral Thicket Swamp Type

Data Source: LGL Limited.



NATURAL HERITAGE IMPACT AREAS



Project: TA8087	Figure: 6
Date: March, 2014	Prepared By: MWF
Scale: 1 : 12,000	Checked By: GNK

Similarly, disturbance to vegetation within those cultural communities as a result of the road improvements is also considered to be minor since the vegetation located within and adjacent to the rights-of-way are tolerant and adaptable to regular disturbance activities, and will persist in areas adjacent to infrastructure, development and agriculture. It is expected that plant species displaced and/or disturbed within these communities due to the road improvements will re-colonize available lands adjacent to the new structure post-construction. Disturbance activities often serve to promote the establishment and/or spread of certain plant species such as those disturbance tolerant species identified within the existing rights-of-way.

4.3.2 Wetland

One wetland community will be impacted as a result of the improvements to the transportation network in Midtown Oakville. A total of 0.13 ha of a Mineral Meadow Marsh (MAM2) will be removed as a result of the proposed transportation network improvements. The Mineral Meadow Marsh (MAM2) is a total of 0.24 ha and does not meet the size requirements of a wetland feature regulated by the HRCA (0.5 ha) or the minimum size required for an OWES (Ontario Wetland Evaluation System) evaluation (2.0 ha).

The primary impact to the wetland communities will be within the southern portion of the study area south of Davis Road. The meadow marsh wetland community (MAM2) is composed mainly of common reed (*Phragmites australis*), the majority of which (0.13 ha of 0.24 ha) will be removed during the construction of the eastern extension of Cross Road.

LGL Limited underwent a separate October 2012 investigation of the lands immediately north of the Mineral Meadow Marsh (MAM2), as it had initially been described by HRCA regulation limit mapping as a significantly larger wetland than described above. The investigation found that the wetland was concentrated to the southwest portion of the natural feature. The remaining treed portion was composed almost entirely of large snags (ash (*Fraxinus sp.*) and a minor association of white elm (*Ulmus americana*)) with a dense buckthorn (*Rhamnus cathartica*) understory, indicating that once-suitable wetland conditions have since been negatively altered. These observations were confirmed during the September 2013 botanical investigations.

No vegetation will be removed from the shallow marsh wetland community (MAS2-1) however its close proximity to road construction activities on The Canadian Road may present a risk for indirect impacts.

4.3.3 Human Influenced Lands

Manicured lawns will also be impacted as a result of the improvements to the Midtown Oakville transportation network. As noted in **Table 5**, the largest impact to human influenced lands will be to manicured lands with a total removal of 3.55 ha. Hedgerows are present within close proximity to the study area, however none will be impacted by construction activities. The overall significance of the impact to these communities is considered to be low.

4.3.4 Disturbance/Displacement of Vegetation and Vegetation Communities

Disturbance to vegetation and vegetation communities includes the removal of portions of vegetation communities and the displacement of plants within those communities. Other disturbances related to construction activities include trampling, compaction and the increased spread of non-native plant species. With the completion of construction, it is expected that existing plant species will re-colonize vacant spaces within the study area.

The following environmental protection measures are designed to reduce vegetation removals, and to promote the establishment of native plant species, post construction. Environmental protection measures will be considered on a site-specific basis, and these should include:

- 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);
- natural features designated for protection should be clearly identified (including individual trees where applicable) and fenced (1 m outside the drip of trees) to ensure no construction traffic, equipment or materials storage intrude on these areas;
- stockpiling of soil should be done away from protected natural areas particularly watercourses and wetlands and additional silt fencing used to prevent sediment transport;
- where engineering standards can be met any fill used on site should consist of native soils;
- soil disturbance and disturbance of the existing vegetation on-site should be limited to only those areas requiring grading or excavation;
- any portion of riparian habitat adjacent to any waterbodies or any portion of wetlands that are not to be impacted but are inadvertently damaged 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; and,
- on steep slopes (e.g., greater than 3:1) erosion blankets should be used to stabilize the soils to encourage the establishment of vegetative cover.

Overall, minimizing the construction footprint, minimizing impacts to natural areas outside of the construction footprint, the use of native plant species especially those tolerant of disturbance activities including increased exposure to salt, will help to mitigate impacts related to construction activities associated with the works proposed within the study area.

4.3.5 Disturbance/Displacement of Rare, Threatened or Endangered Vegetation or Significant Vegetation Communities

No plant species that are regulated under the Ontario *Endangered Species Act* or the Canada *Species at Risk Act* were encountered during LGL's botanical investigation within the study area (those plants species regulated as Endangered, Threatened or Special Concern). Additionally, no provincially rare species or vegetation communities were identified during the botanical investigation.

As noted in **Section 2.3.4** there are two plant species identified by the HRCAs as uncommon or rare within Halton Region. Common juniper (*Juniperus communis*) is considered rare in Halton Region (known from 5 or fewer sites), and eastern redcedar (*Juniperus virginiana*) is considered uncommon in Halton Region (known from 6 to 15 sites); provincially these plants are ranked as secure. It is recommended that plants be retained, to the extent possible. However if impacts are unavoidable, it is recommended that any common juniper be flagged in the field and transplanted into protected areas prior to construction, or planted as seedlings and incorporated into landscaping as a part of construction. It is recommended that the same technique apply for eastern redcedar that measure less than 10 cm DBH (diameter at breast height). For those trees that are too large for transplanting, compensation should be provided at a ratio of 3:1 (i.e. three eastern redcedars at a minimum of 10 cm DBH should be planted for every one tree

removed). Compensation trees should be planted into the newly created edges of those impacted vegetation communities, but outside the limit of disturbance.

During the detail design phase, edge management plans, tree protection plans and an arborist report should be prepared to identify site-specific mitigation measures once the full extent of the project is better defined.

4.4 Wildlife and Wildlife Habitat

The proposed improvements to the transportation network in Midtown Oakville have the potential to result in the displacement of and disturbance to wildlife and wildlife habitat. Effects on wildlife related to these modifications may include:

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

4.4.1 Displacement of Wildlife and Wildlife Habitat

The proposed improvements to the transportation network in Midtown Oakville will take place within and beyond the existing transportation infrastructure present within the study area. The areas potentially impacted by the works described above consist of a mix of existing roads, commercial area, agricultural land and a variety of natural habitats. Impacts to old field and manicured habitat types are most notable (see **Section 4.1** and **Section 4.3**); however, these habitats types were found to contain a wildlife assemblage which is considered tolerant to human disturbance/anthropogenic influences. Limited negative effects are anticipated as habitats identified within the study area consist almost entirely of previously modified/disturbed wildlife habitat with low habitat diversity and limited habitat potential. The proposed improvements to the transportation network in Midtown Oakville are not expected to have any significant impact on wildlife and/or wildlife habitat. For an analysis of vegetation removal per vegetation (habitat) community refer to **Section 4.3**.

4.4.2 Barrier Effects on Wildlife Passage

The existing site conditions contain highly fragmented and low quality wildlife habitat. Despite the high level of disturbance, several local wildlife corridors may exist. The proposed improvements to the transportation network in Midtown Oakville will result in increased habitat fragmentation and pose potential barriers to wildlife movement within subject vegetation communities.

To minimize potential impacts to wildlife corridors, new culverts/bridges constructed at key wildlife movement areas should be designed to maintain wildlife passage across the local landscape. Key wildlife movement areas, a brief site description, target wildlife species and target openness ratios are summarized in **Table 6**. Wildlife passage design considerations are discussed in **Section 4.2.2.1**.

TABLE 6. KEY WILDLIFE MOVEMENT AREAS

Location	Watercourse	Description	Target Wildlife Group	Target OR
North of Iroquois Shore Road and East of Trafalgar Road	Morrison Creek/Wedgewood Creek Diversion Channel	East-west oriented concrete lined diversion channel. Vegetated riparian areas provide wildlife habitat. Morrison Creek valleylands (east of White Oaks Boulevard) contribute to local wildlife assemblage.	Small and large animals (northern racoon, Virginia opossum, coyote etc.)	0.6
South of South Service Road and west of Chartwell Road	Tributary 2 of Lower Morrison Creek	North-south oriented channel; however, additional natural areas (e.g., cultural woodland, cultural meadow) found in the vicinity of this crossing.	Small animals (northern racoon, Virginia opossum etc.)	0.05

4.4.2.1 Wildlife Passage Design Consideration

Openness ratio (OR) is a calculation which is used to determine the tunnel effect created by a structure and thus the likelihood wildlife species would utilize that structure. This evaluation is completed by analysing a structure’s component measurements (i.e., height x width / structure length). Generally, a greater openness ratio value is expected to increase the likelihood of wildlife utilization of a given structure or culvert. To maximize the openness ratio, structures should be designed to have a larger opening and the shortest length as possible, since wildlife species are more likely to enter a culvert if they can see light at the other end.

Minimum OR was determined by a review of secondary source data regarding wildlife passage at road crossings (Clevenger et al. 2001). The minimum OR for small animals should be 0.05 and the minimum OR for large animals (e.g., coyote and deer) should be 0.6. In addition, natural substrates should be used to encourage wildlife to utilize crossing structures. Ground cover should be continuous with the substrates found outside and adjacent to the structural entrances thereby encouraging animals to pass through the structure (Yanes et al. 1995).

Funnel and/or barrier fencing, in conjunction with an appropriately sized crossing structure can be used to guide wildlife to a given crossing structure and reduce road-mortality. However, some studies have found increases in road-mortality when funnel/barrier fencing was utilized (Mccollister and Van Manen 2010). Given the complexities of fence erection in heavily urbanized areas (such as the study area) installation of funnel/barrier fencing may not be feasible; however, the feasibility of funnel/barrier fencing should be further explored during the detail design phase of the project.

4.4.3 Wildlife/Vehicle Conflicts

The proposed improvements to the transportation network in Midtown Oakville will result in an increase in the extent of road network and consequently an increased risk of mortality for wildlife that elects to cross roads. The existing road network poses a potential barrier to wildlife movement. While the increase in extent of road network will result in increased exposure of wildlife to vehicle conflicts, the potential increase in wildlife mortality above existing conditions is considered minor.

4.4.4 Disturbance to Wildlife from Noise, Light and Visual Intrusion

Noise, light and visual intrusion may alter wildlife activities and patterns. In urban settings, such as the study area, wildlife has become acclimatized to urban conditions and only those fauna that are tolerant of human activities tend to persist. Given that wildlife found within the study area are acclimatized to the presence of road infrastructure and other anthropogenic influences, disturbance to wildlife from any increase in noise, light and visual intrusion are not expected to have any significant adverse effects.

Potential disturbance caused by light pollution from the proposed improvements to the transportation network can be mitigated by using reflectors to focus light beams onto the and away from natural heritage features adjacent to the road.

4.4.5 Potential Impacts to Migratory Birds

A number of bird species listed under the *Migratory Birds Convention Act* (MBCA) are located within the study area. The MBCA prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or the damaging, destroying, removing or disturbing of nests. While migratory insectivorous and non-game birds are protected year-round, migratory game birds are only protected from March 10 to September 1. To comply with the requirements of the MBCA, disturbance, clearing or disruption of vegetation where birds may be nesting should be completed outside the window of April 1 to July 31. In the event that these activities must be undertaken from April 1 to July 31, a nest survey will be conducted by a qualified avian biologist to identify and locate active nests of species covered by the MBCA. If an active nest is located, a mitigation plan shall be developed and provided to Environment Canada – Ontario Region for review prior to implementation. No nests of migratory bird species were found under bridge or culvert structures.

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

4.4.6.1 Milksnake

The NHIC Database lists records for Milksnake in the Town of Oakville from 1996, however much more recent records within the Town exist (see **Section 2.4.3.1**). The Milksnake is listed as ‘Special Concern’ under SARA and under the ESA. This species is not regulated under the ESA. Where Milksnake or their habitat may occur is difficult to determine; however, greenspaces such as valleylands and open country habitat types may contain Milksnake. Given the Milksnake’s habitat generalist nature, any habitat removal, with the exception of heavily urbanized areas, has the potential to result in removal of Milksnake habitat. No ESA or SARA permits would be required for potential impacts to Milksnake.

4.4.6.2 Bobolink

Bobolink was recently listed and is now regulated as ‘Threatened’ under the ESA. The Bobolink was not listed on the NHIC database; however, it is a species with a broad distribution across Ontario. Potentially suitable habitats which may support Bobolink have been identified within the Midtown Oakville study area (see **Section 2.4.3.2**). During detail design, field surveys conducted within the appropriate breeding bird season (June-July) and consultation with the MNR will be required to ensure compliance with the ESA.

4.4.6.3 Eastern Meadowlark

Eastern Meadowlark was recently listed and is now regulated as ‘Threatened’ under the ESA. The Eastern Meadowlark was not listed on the NHIC database; however, it is a species with a broad distribution across Ontario. Potentially suitable habitats which may support Eastern Meadowlark have been identified within the Midtown Oakville study area (see **Section 2.4.3.3**). During detail design, field surveys conducted within the appropriate breeding bird season (June-July) and consultation with the MNR will be required to ensure compliance with the ESA.

4.4.6.4 Barn Swallow

Barn Swallow was recently listed as ‘Threatened’, and effective January 14, 2012 Barn Swallow is now provincially regulated as ‘Threatened’ under the ESA. Potentially suitable habitats which may support Barn Swallow have been identified within the Midtown Oakville study area (see **Section 2.4.3.4**). During detail design, field surveys conducted within the appropriate breeding bird season (May-July) and consultation with the MNR will be required to ensure compliance with the ESA.

4.5 Designated Natural Areas

As noted in **Section 2.5**, no Provincially Significant Wetlands (PSWs), Areas of Natural and Scientific Interest (ANSIs) or Environmentally Significant/Sensitive Areas (ESAs) are located within 120 m of the study area. HRCA Regulated Areas are present within the limits of the planned road network improvements.

The candidate significant woodland located north of the Morrison-Wedgewood Diversion Channel is composed of a mosaic of deciduous forest (FOD), swamp thicket (SWT), and cultural woodland (CUW) vegetation communities, indicating a variety of land use histories within the woodland. The westernmost portion of the woodland extends toward Trafalgar Road in a “lobe” which is bisected by proposed roadway infrastructure in the planned road network improvements.

An onsite vegetation survey shows that the polygon in question (CUW1d) qualifies as a Mineral Cultural Woodland according to ELC methodology (Lee *et al.* 1998). Of the 50 vascular plant species identified within the polygon, 31 (62%) are considered introduced and non-native to Ontario. Thin canopy and sub-canopy layers (averaging between 10 m and 25 m in height) consist primarily of Silver Maple (*Acer saccharinum*), Green Ash (*Fraxinus pennsylvanica*), and a non-native variety of Honey Locust (*Gleditsia triachanthos*). A dense subcanopy layer (averaging between 2 m and 10 m in height) is present beneath, consisting primarily of Common Buckthorn (*Rhamnus cathartica*) with Silver Maple and Hawthorn (*Crataegus sp.*) associates. A complete list of vascular plants identified within the polygon is presented in **Appendix B**.

The planned road network improvements would result in a total of 0.11 hectares of vegetation removal from the cultural woodland “lobe” and would separate a small western fragment (0.16 hectares in size) from the remainder of the woodland. The community contains a high proportion of invasive and non-native plant species typically tolerant of environmental disturbances, and it is expected that plant species displaced and/or disturbed within these communities due to the road improvements will re-colonize available lands adjacent to the new structure post-construction. It is not anticipated that removal of and disturbance to a portion of the Mineral Cultural Woodland polygon will result in a significant impact to wildlife habitat and wildlife movement corridors, total biodiversity, or overall ecological viability of the greater candidate significant woodland.

It is our recommendation that given the poor condition of the western “lobe” portion of the candidate significant woodland, it is reasonable to pursue the planned road network improvements. Environmental protection measures described in **Section 4.3.4** should be considered to reduce the extent and intensity of impacts related to construction activities associated with the works proposed within the study area. An edge management plan and tree protection plan will be prepared during detail design to reduce the impacts to the portion of the vegetation community to remain.

5.0 MONITORING

An environmental inspector will monitor the site during construction to ensure that construction fencing, tree protection barriers and erosion and sedimentation control measures are installed correctly and remain functional.

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APPENDIX A
PHOTO APPENDIX - WATERCOURSES

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Tributary 1 of Lower Morrison Creek. Overlooking culvert outlet at South Service Road East (October 8, 2013).



Tributary 1 of Lower Morrison Creek. Looking downstream (south) from downstream of South Service Road. (October 8, 2013).



Ditch to the East of Tributary 1 of Lower Morrison Creek. Looking east (upstream) from East of the Tributary (October 8, 2013).



Tributary 2 of Lower Morrison Creek. Looking north (upstream) from north of North Service Road East (October 10, 2013).



Tributary 2 of Lower Morrison Creek. Overlooking channel from north of North Service Road East (October 10, 2013).



Tributary 2 of Lower Morrison Creek. Looking south (downstream) from approximately 100 m south of South Service Road East (October 8, 2013).

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Tributary 2 of Lower Morrison Creek. Looking south (downstream) north of Cornwall Road (October 8, 2013).



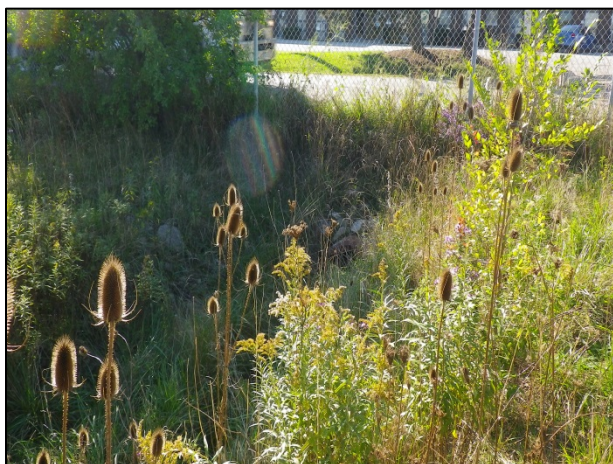
Morrison-Wedgewood Diversion Channel: Looking east (upstream) from approximately 250 m east of Trafalgar Road (October 8, 2013).



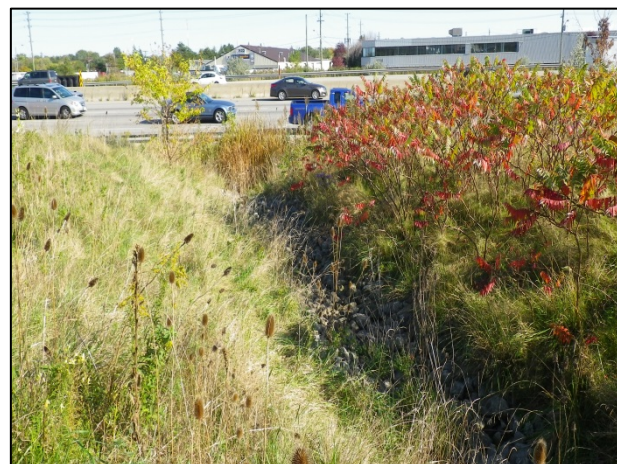
Morrison-Wedgewood Diversion Channel: Overlooking channel structure approximately 250 m east of Trafalgar Road (October 8, 2013).



Morrison-Wedgewood Diversion Channel: Overlooking piped tributary that converges with main channel just west of Trafalgar Road (October 8, 2013).



Ditch feature #1 of the QEW ditch system: Looking north (upstream) from south of North Service Road East (October 8, 2013).



Ditch feature #1 of the QEW ditch system: Overlooking channel from north of the QEW (October 8, 2013).

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Ditch feature #1 of the QEW ditch system: Looking south (downstream) at the QEW crossing structure (October 8, 2013).



Ditch feature #2: Looking north (upstream) from downstream of North Service Road East (October 8, 2013).



Ditch feature #2: Looking south (downstream) from downstream of North Service Road East (October 8, 2013).



Ditch feature #2: Looking south (downstream) from upstream of the QEW (October 8, 2013).



Ditch feature #3: Overlooking crossing structure and channel characteristics south of North Service Road East (October 8, 2013).



Tributary 1 of Lower Wedgewood Creek: Downstream of Ditch #1 and #2 convergence, south of South Service Road East (October 10, 2013).

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Ditch feature #3 : Looking north (upstream) from South Service Road East (October 10, 2013).



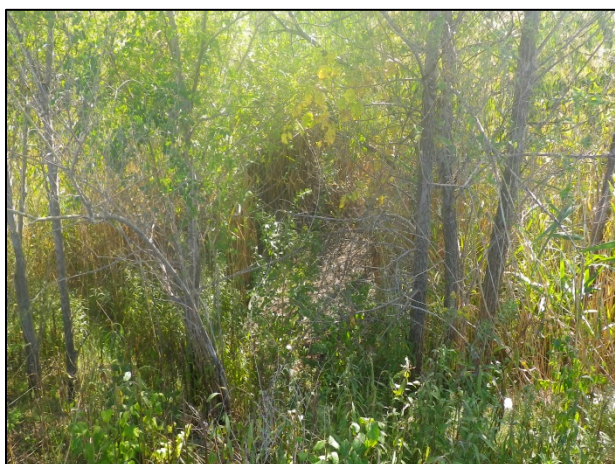
Tributary 1 of Lower Wedgewood Creek: Looking north (upstream) from south of South Service Road East where Ditch feature 3 outlets (October 10, 2013).



Tributary 1 of Lower Wedgewood Creek: Looking east (downstream) from south of South Service Road East (October 10, 2013).



Tributary 1 of Lower Wedgewood Creek: Looking east (downstream) from south of South Service Road East (October 10, 2013).



Tributary 2 of Lower Wedgewood Creek: Looking south (downstream) from south of Royal Windsor Drive.



Tributary 2 of Lower Wedgewood Creek : Looking north (upstream) from north of South Service Road East.

PHOTO APPENDIX Oakville Midtown EA



Tributary 1 of Lower Wedgewood Creek: Looking east (downstream), downstream of the convergence with tributary 2 (October 10, 2013).



Tributary 1 of Lower Wedgewood Creek: Looking west (upstream) from east of South Service Road (October 10, 2013).



Tributary 1 of Lower Wedgewood Creek: Looking east (downstream) from east of South Service Road (October 10, 2013).



Tributary 3 of Lower Wedgewood Creek: Looking north (upstream) from North of the QEW on ramp (October 10, 2013).



Tributary 3 of Lower Wedgewood Creek: Looking south (downstream) from south of Royal Windsor Drive (October 10, 2013).



Tributary 4 of Lower Wedgewood Creek: Looking north (upstream) from north of Royal Windsor Drive (October 10, 2013).

PHOTO APPENDIX Oakville Midtown EA



Tributary 4 of Lower Wedgewood Creek: Looking south (downstream) from south of Royal Windsor Drive (October 10, 2013).



Tributary 4 of Lower Wedgewood Creek: Looking south (downstream) from south of Royal Windsor Drive toward online pond (October 10, 2013).



Tributary 1 of Lower Wedgewood Creek:
Overlooking online pond where the Tributaries
converge east of South Service Road (October 10,
2013).

APPENDIX B
VASCULAR PLANT LIST

APPENDIX C
ACRONYMS AND DEFINITIONS USED IN SPECIES LISTS

APPENDIX C
ACRONYMS AND DEFINITIONS USED IN SPECIES LISTS

Species Rank

GRANK	Global Rank
<p>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.</p>	
Short Form	Definition
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
<p>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.</p>	
Short Form	Definition
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.

SRANK	Provincial Rank
<p>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.</p>	
Short Form	Definition
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).

COSEWIC	Committee on the Status of Endangered Wildlife in Canada
<p>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.</p>	
Status	Definition
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.	
Status	Definition
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 Status under Federal Legislation

SARA	Species at Risk Act
The Canada <i>Species at Risk Act</i> 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.

Species Status under Provincial Legislation

ESA		
Endangered Species Act		
The Ontario <i>Endangered Species Act</i> 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 No.	Short Form	Status
Schedule 1 ESA (1)	EXT	The species of flora and fauna listed in Schedule 1 are declared to be threatened with extinction.
Schedule 2 ESA (2)	EXP	The species of flora and fauna listed in Schedule 2 are declared to be extirpated.
Schedule 3 ESA (3)	END	The species of flora and fauna listed in Schedule 3 are declared to be endangered.
Schedule 4 ESA (4)	THR	The species of flora and fauna listed in Schedule 4 are declared to be threatened.
Schedule 5 ESA (5)	SC	The species of flora and fauna listed in Schedule 5 are declared to be special concern.

Local Species Status

Halton	
Conservation Halton	
A 2006 Natural Areas Inventory report was released by Conservation Halton with support from various other contributing agencies. The document assigns a rarity code to all native species, subspecies, and varieties that are rare or uncommon in Halton Region. Non-native species (introduced) are not assigned rarity codes and are denoted with the letter (I).	
Rank	Definition
R	Rare in Halton – known from five (5) or fewer sites.
U	Uncommon in Halton – known from six (6) to fifteen (15) sites.
?	Requires further review – potentially rare or uncommon taxa requiring further review (e.g. nomenclature/taxonomy, native status, etc.)
E	Apparently extirpated from Halton.
I	Introduced to Halton (non-native species).
I/N	Unclear if introduced (non-native) or native to Halton.