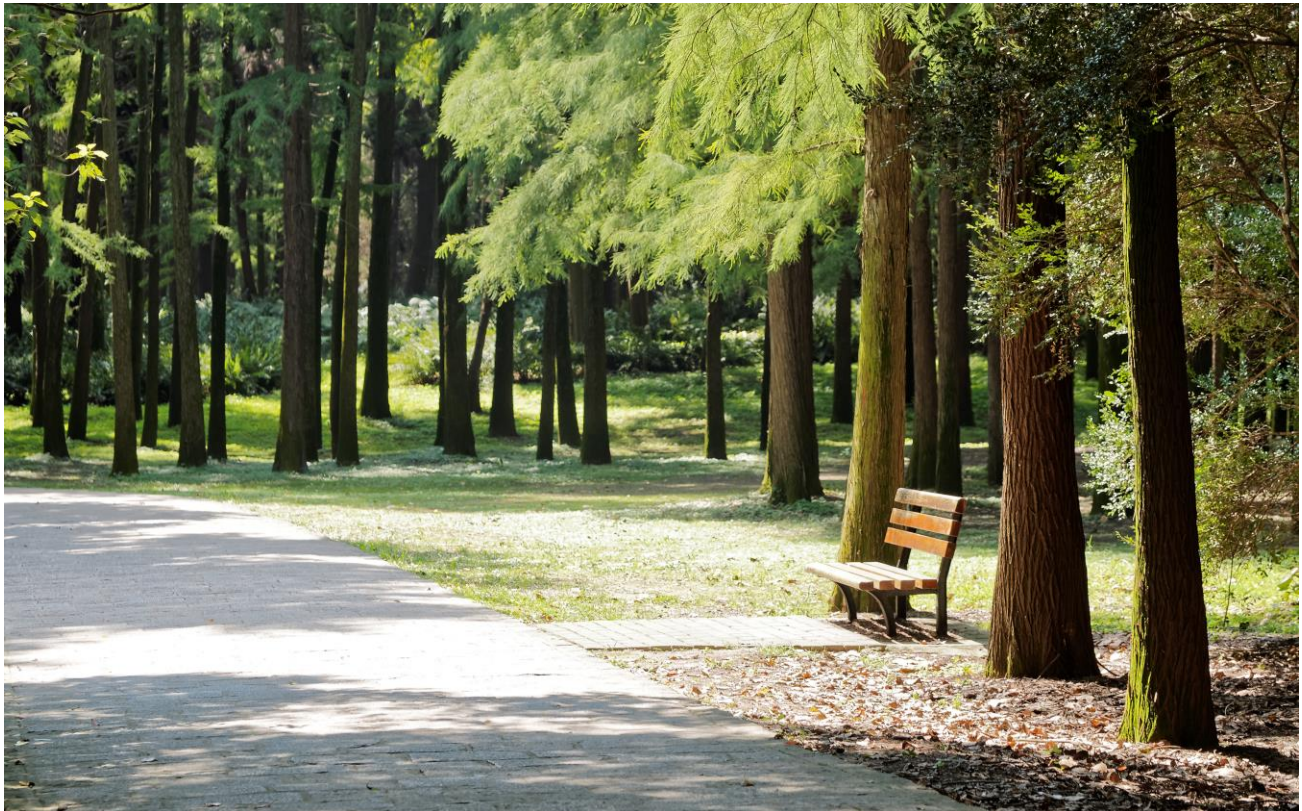


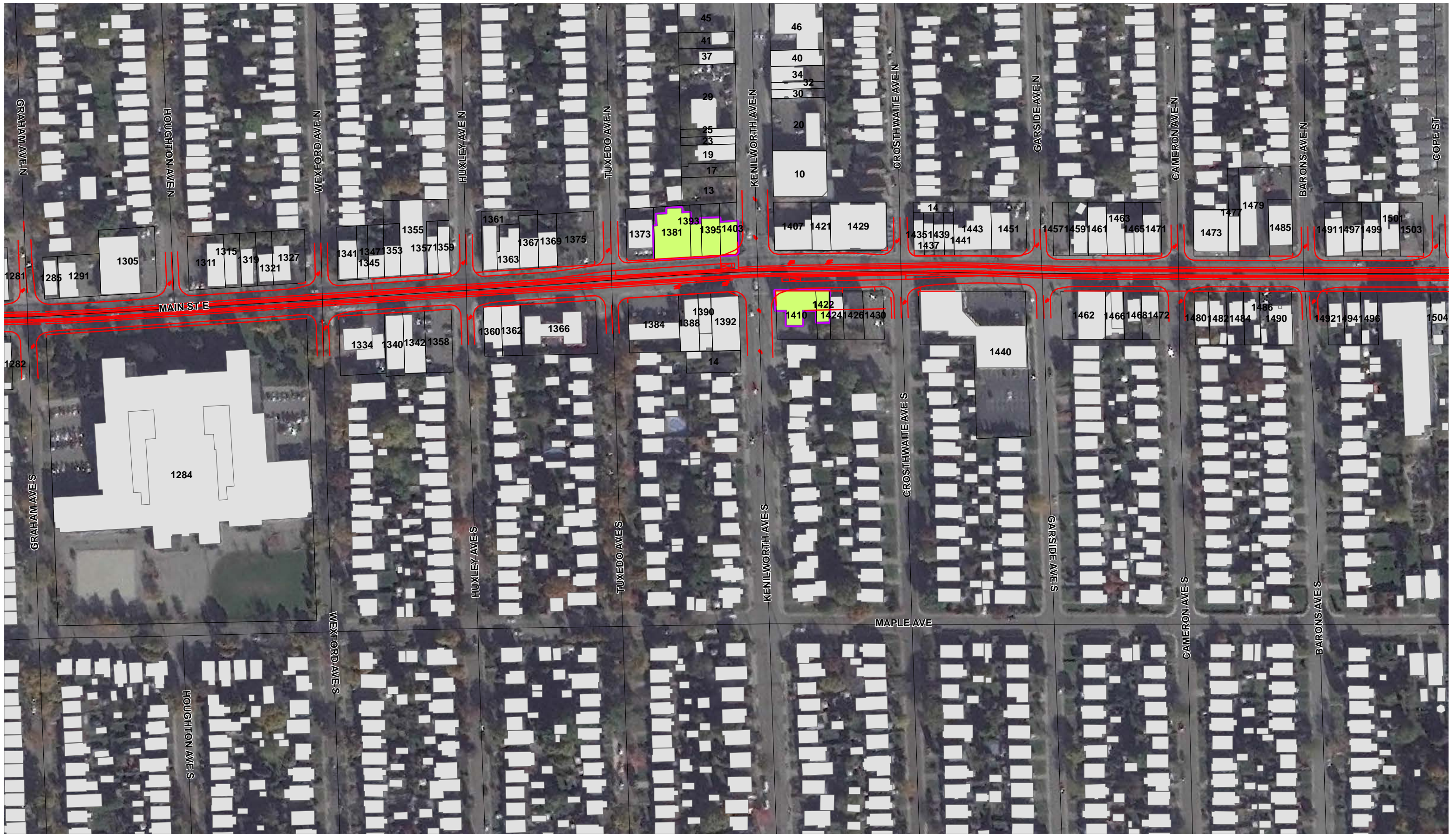
APPENDIX C: TECHNICAL SUPPORTING DOCUMENTS

APPENDIX C-3: ECOLOGY REPORT

PART 3/4

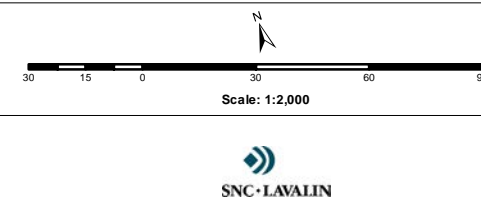
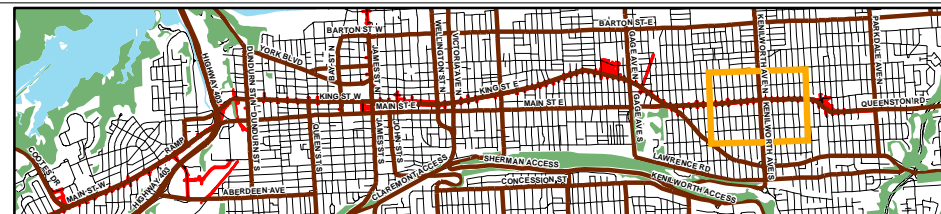






**Legend**

Potential SAR	Acquisition	Proposed LRT Line
No Potential	No	Road
Potential	Yes	Drainage

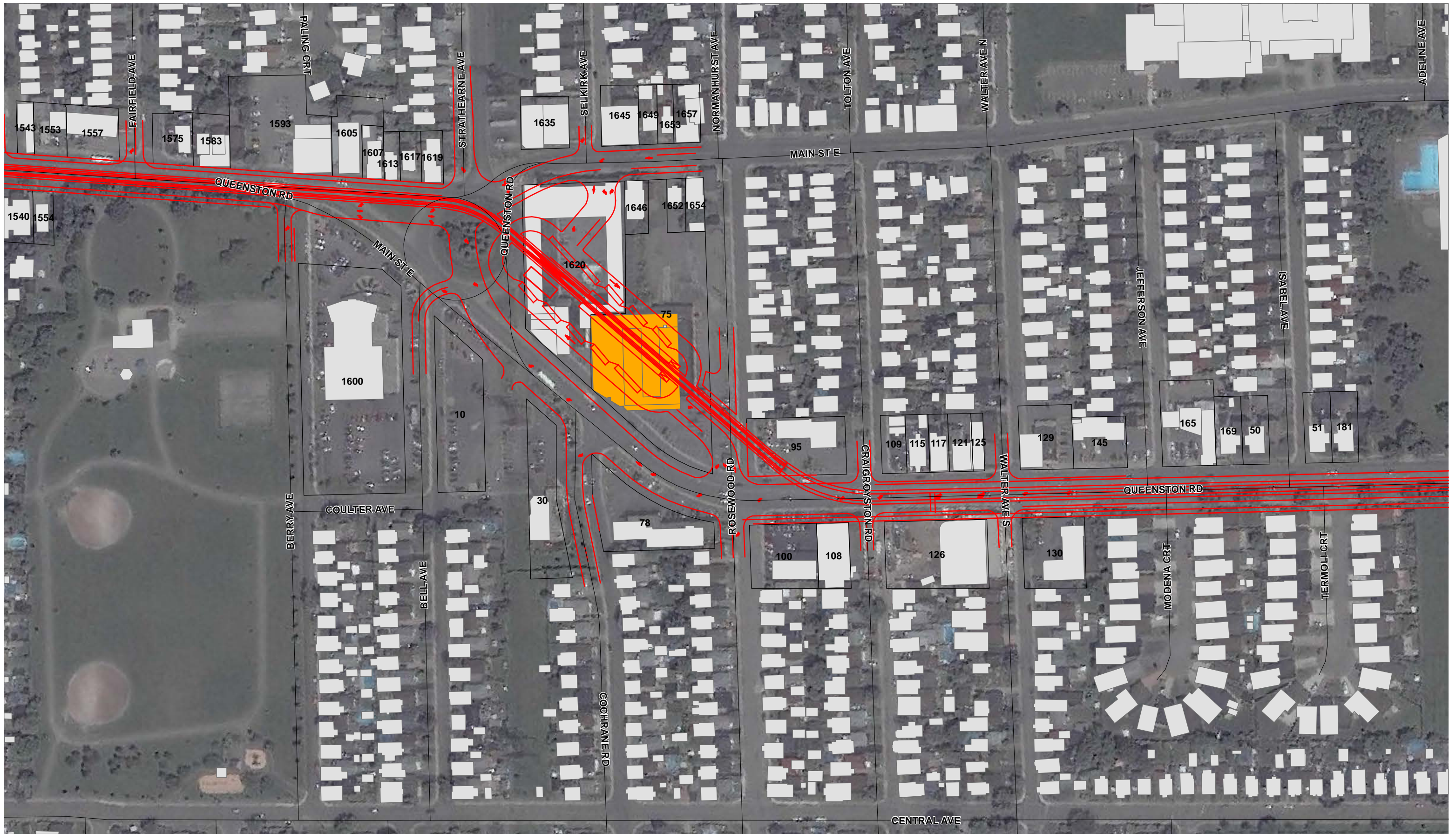


**Hamilton LRT Environmental Assessment Addendum  
Ecological Update  
Wildlife SAR Surveys**

Potential SAR Structures (Chimney Swift/Myotis)

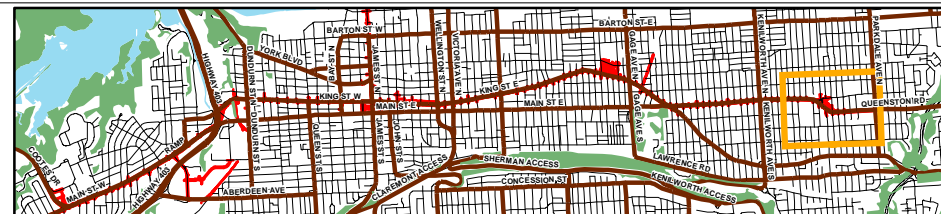
Date: 2016/10/13	File Number: 638045	Sub Code: ENVR
Figure:	<b>3.8</b>	Rev. <b>0</b>





**Legend**

- |                      |                   |                   |
|----------------------|-------------------|-------------------|
| <b>Potential SAR</b> | <b>Aquisition</b> | Proposed LRT Line |
| No Potential         | No                | Road              |
| Potential            | Yes               | Drainage          |



**Hamilton LRT Environmental Assessment Addendum  
Ecological Update  
Wildlife SAR Surveys**

Potential SAR Structures (Chimney Swift/Myotis)

Date: 2016/10/13	File Number: 638045	Sub Code: ENVR
Figure:	<b>3.9</b>	Rev. <b>0</b>



### 3.3.4 Significant Wildlife Habitat

Wildlife habitat is defined as areas where plants, animals, and other organisms live and find adequate amounts of food, water, shelter, and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual life cycle; and areas which are important to migratory or non-migratory species (OMMAH, 2014).

Wildlife habitat is referred to as significant if it is ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System (OMMAH, 2014).

Guidelines and criteria for the identification of significant wildlife are detailed in the Significant Wildlife Habitat Technical Guide (OMNR, 2000), Draft Ecoregion 7E Significant Wildlife Habitat Criterion Schedule (MNR, 2012), and the Natural Heritage Reference Manual (OMNR, 2009). Significant wildlife habitat is described under four main categories:

- › Seasonal concentrations of animals;
- › Rare vegetation communities or specialized habitats for wildlife;
- › Wildlife movement corridors; and
- › Habitats of Species of Conservation Concern.

#### 3.3.4.1 Seasonal Concentrations of Animals

Areas of seasonal concentrations of animals are defined as “areas where animals occur in relatively high densities at specific periods in their life cycle and/or particular seasons.” At these times, species are vulnerable to ecological interferences or weather impacts. Areas of seasonal concentration are typically small in comparison to the larger habitat areas used by species at other times of the year. Examples include migrant stopover areas for birds, winter deer yards, bird breeding colonies, amphibian concentration areas, and hibernacula for snakes or bats. The identification of habitats associated with seasonal concentrations of species is typically based on known occurrences (MNR, 2009).

An assessment was carried out to determine the potential for wildlife concentration areas on the OMSF Site. Resources and protocols outlined in the OMNR Significant Wildlife Habitat Technical Guide (2000) and Draft Ecoregion 7E Significant Wildlife Habitat Criterion Schedule (MNR, 2012) were utilized to evaluate the potential for species concentration area occurrence.

#### 3.3.4.2 Rare Vegetation Communities/Specialized Habitats for Wildlife

Rare or specialized habitats include rare vegetation communities or concentrations of rare plant species. These specialized areas may also support rare animal species. The majority of tree cover on the OMSF tablelands consists of common species such as Manitoba Maple and Siberian Elm with typical meadow species found in previously disturbed areas such as grasses and Common Reed while the forest of the Chedoke Creek valley consists of Sugar Maple, Basswood, Green Ash, Manitoba Maple and a variety of shrubs and herbaceous vegetation. Further, the Study Area lacked significant old growth forest features which, if present, might provide specialized habitats and food sources for other species dependent on these features. None of the vegetation communities identified on the Site are designated as rare or threatened in this region.

Other specialized habitats include Waterfowl Nesting Areas, Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat, Woodland Raptor Nesting Habitat, Turtle Nesting Areas, Seeps and Springs, and



Amphibian Breeding Habitats. The Study Area does not fit the criteria for any of the above specialized habitats.

#### 3.3.4.3 Animal Movement Corridors

Animal Movement Corridors are used by wildlife to move from one habitat to another, and are important to ensure genetic diversity in populations, to allow seasonal migration of animals, and to allow animals to move throughout their home range from feeding areas to cover areas. Animal movement corridors can occur at various scales; from deer moving between summer and winter grounds across a landscape, to amphibians moving between breeding habitat and feeding areas within a single vegetation unit.

Animal Movement Corridors are considered where confirmed or candidate Significant Wildlife Habitat has been identified by MNRF or the planning authority based on documented evidence of a habitat identified within the criterion schedules or the Significant Wildlife Habitat Technical Guide (2000). Given that no Significant Wildlife Habitat has been identified within the Study Area, and given that no large scale animal movement corridors for deer have been identified through a review of background documentation, consultation with MNRF, or field work conducted to date, a corridor analysis is not presented here. The Chedoke Creek valley is located within the OMSF lands and may serve to concentrate animal movement and this valley will not be disturbed during construction at the OMSF.

#### 3.3.4.4 Habitats of Species of Conservation Concern

Species of Conservation Concern generally include the groups listed below:

- › Species defined as Special Concern in Ontario;
- › Species that are listed as rare or historical in Ontario based on records kept by the NHIC;
- › Species whose populations are known to be experiencing significant declines in Ontario; and Species that have a high percentage of their global population in Ontario and are rare or uncommon in the subject area.

A geographical search for rare or special concern species presence and associated habitat was conducted using the NHIC database (OMNR, 2011). Of the thirty-six (36) element occurrences recorded for the area searched, only one (1) is a species of conservation concern (Woodland Vole (*Microtus pinetorum*)) and it does appear on the SARO list and in **Table 3.2**. NHIC records for all 36 element occurrences are provided in **Appendix C.3**, but are not discussed further within this report.

A review of aerial photographs, available habitat types within the general area, the Ontario Breeding Bird Atlas (OBBA) (Cadman et al, 2007), the Ontario Reptile and Amphibian Atlas (Ontario Nature, 2011), and the Atlas of Mammals (Dobbyn, 1994) were completed to determine potential for species of Conservation Concern. In addition to the Endangered and Threatened species addressed in Section 3.2.3, there is also potential for several species of Special Concern, including Canada Warbler (*Wilsonia canadensis*), Common Nighthawk (*Chordeiles minor*), Eastern Wood-pewee (*Contopus virens*), and Wood Thrush (*Hylocichla mustelina*), Eastern Ribbon Snake (*Thamnophis sauritus*), Milksnake (*Lampropeltis triangulum*), Woodland Vole, Monarch (*Danaus plexippus*), and Snapping Turtle (*Chelydra serpentina*), within the study area. An assessment of the habitat potential for the above-mentioned species of conservation concern on the Site is provided in **Table 3.2**.



Table 3.2: Species of Conservation Concern Habitat Potential Assessment

Common Name	ESA	SARA	Preferred Habitat	Habitat Potential	Field Observations
<b>Canada Warbler</b>	SC	THR	Wide range of coniferous and deciduous forests with well-developed shrub layer and structurally complex forest floor.	No	Species not observed. There is no suitable habitat for this species.
<b>Common Nighthawk</b>	SC	SC	Open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs.	Yes	Species not observed. Suitable habitat is located on the OMSF lands as is open land with some rocky, gravelly soils.
<b>Louisiana Waterthrush</b>	SC	SC	Prefers wooded ravines with running streams; also woodlands swamps; large tracts of mature deciduous or mixed forests; canopy cover is essential; has strong affinity to nest sites; nests on ground.	No	Species not observed and there is no suitable habitat for this species.
<b>Peregrine Falcon</b>	SC	THR	Rock cliffs, crags, especially situated near water; tall buildings in urban centre.	Yes	Species not observed. A pair of Peregrine Falcons has nested on the Sheraton Hamilton Hotel for 20 years.
<b>Short Eared Owl</b>	SC	SC	Generally prefers a wide variety of open habitats, including grasslands, peat bogs, marshes, sand-sage concentrations, old pastures and agricultural fields.	No	Species not observed. Suitable habitat does not exist on site.
<b>Yellow-breasted Chat</b>	SC	SC	Thickets, tall tangles of shrubbery beside streams, ponds; overgrown bushy clearings with deciduous thickets; nests above ground in bush, vines etc.	No	Species not observed and there is no suitable habitat for this species.
<b>Milksnake</b>	SC	SC	Farmlands, meadows, hardwood or aspen stands; pine forest with brushy or woody cover; river bottoms or bog woods.	No	Species not observed. Suitable habitat exists within the OMSF.
<b>Northern Map Turtle</b>	SC	SC	The Northern Map Turtle inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as rocks and logs) and exposure to the sun for at least part of the day.	No	Species not observed and there is no suitable habitat for this species.
<b>Northern Ribbonsnake</b>	SC	SC	Wetlands, shorelines of lakes and rivers – generally near forests.	No	Species not observed. Suitable habitat exists within the OMSF.
<b>Snapping Turtle</b>	SC	SC	The preferred habitat of the species is characterized by slow-moving water with a soft mud bottom and dense aquatic vegetation. Established populations are most often located in ponds, sloughs, shallow bays or river edges, and slow streams, or areas combining several of these wetland habitats.	No	Species not observed and there is no suitable habitat for this species.
<b>Woodland Vole</b>	SC	SC	Generally associated with deciduous forests in the areas of soft, friable, often sandy soil beneath deep humus, where it can burrow easily.	No	Species not observed and there is no suitable habitat for this species.



Common Name	ESA	SARA	Preferred Habitat	Habitat Potential	Field Observations
<b>Monarch Butterfly</b>	SC	SC	Exist primarily wherever milkweed ( <i>Asclepius</i> ) and wildflowers (such as Goldenrod, asters, and Purple Loosestrife) exist. This includes abandoned farmland, along roadsides, and other open spaces where these plants grow.	Yes	Species was observed. Suitable habitat exists along the edges of the OMSF.
<b>West Virginia White</b>	SC	SC	Lives in moist, deciduous woodlands. Larvae feed exclusively on toothwort ( <i>Dentaria diphylla</i> ; <i>Dentaria X maxima</i> ).	No	Species not observed. Suitable habitat does not exist on the OMSF.
<b>Broad Beech Fern</b>	SC	SC	Generally inhabits shady areas of beech and maple forests where the soils are moist or wet.	No	Species not observed. Suitable habitat does not exist on the OMSF.
<b>Butternut</b>	END	END	Generally found as a minor component in deciduous forests. It grows best in rich, moist and well drained soils in valleys, slopes, or along streams.	Yes	Species was observed in the forest units at the northern portion of the property, outside of the proposed development footprint.
<b>Few-flowered Club-rush</b>	SC	END	Generally found in Dry Fresh Oak deciduous forests and Dry Fresh Oak - Maple- Hickory deciduous forests (only found on RBG property).	No	Species not observed. Suitable habitat does not exist on the OMSF.
<b>Green Dragon</b>	SC	SC	Generally grows in damp deciduous forests and along streams.	No	Species not observed. Suitable habitat does not exist on the OMSF.

### 3.4 Fisheries and Aquatic Resources

Chedoke Creek is the only watercourse within the study area. This watercourse is located within the western study area limits generally following the alignment of Highway 403 and flows in a general southeasterly direction (see **Figure 3.1**). The Creek is not impacted by the development of the B-Line which will run over a channelized section along Main Street. The western portion of the OMSF is the only other section where development encroaches on the creek system, but in this reach the creek flows underground through the entire study area (See **Figure 4.1**).

Chedoke Creek discharges directly to Cootes Paradise which is located at the western end of Burlington Bay. There are numerous barriers (man-made and natural) on Chedoke Creek that would prevent the upstream passage of fish to the study area.

To confirm background conditions and the sensitivity of fish and fish habitat reported by others, a field investigation was conducted on June 16, 2016 to fully characterize and assess habitat features present within Chedoke Creek and included:

- › Documented information on stream type, substrate, morphology, bank stability,
- › In-stream cover, near shore cover vegetation, migratory obstructions and presence of any critical habitat (i.e., spawning, nursery or over-wintering habitat).



The field investigation study area for the watercourse crossings included the proposed B-Line corridor, plus 50m upstream and 200m downstream of the assumed right-of-way of the corridor.

Fish community sampling and inventory was not completed as background data was deemed sufficient for the assessment of the fish community present at the watercourses in the study area. Information reported on fish species present is primarily from MNR historical fish collection records available and the Hamilton Harbour and Watershed Fisheries Management Plan (Bowlby et al, 2009). The timing of the field investigations in the spring was considered appropriate to confirm and assess existing physical (e.g., flow regime, temperature) and biotic (e.g., aquatic vegetation) habitat conditions, and specific fish use of interest.

The fish habitat assessment was conducted utilizing the methods outlined in the MNR Ontario Stream Assessment Protocol (Les Stanfield, 2013). Information recorded includes:

- › Watercourse size, flow (permanent/intermittent) and thermal regime (coldwater/warmwater);
- › Physical channel dimensions and characteristics – width, depth (including bankfull and wetted widths and depths), substrate type, bank stability/erosion, channel morphology and evidence of any groundwater seepage or upwelling areas;
- › In-stream/overhead cover opportunities (e.g., woody debris, undercut banks, vegetation);
- › Riparian vegetation;
- › Physical barriers to fish movement in the vicinity of the crossings;
- › Identification of potential critical or specialized habitat areas or features (i.e., potential spawning, nursery or over-wintering habitat); and,
- › Observations of habitat alterations/land use (i.e., channel modification, potential pollutant sources).

Information from the review of background data sources and field investigation will be utilized to characterize the habitat in the study area and, more specifically, functions and attributes of the watercourse reach to be affected by the proposed development. Attributes to be used for assessing the sensitivity of fish and fish habitat will include: species sensitivity; species dependence on habitat; rarity; and habitat resiliency.

### 3.4.1 Biophysical Characteristics of Chedoke Creek

Chedoke Creek is a warmwater permanent watercourse that originates south of the proposed B-Line corridor and is conveyed through a large concrete channel within the study area. Chedoke Creek continues to flow north into Cootes Paradise, which is in close proximity to the project study area.

The Hamilton Harbour and Watershed Fisheries Management Plan (2009) has classified Chedoke Creek as a small warmwater riverine system. The fisheries management objective for this system is to maintain the capacity for native coolwater and warmwater fish (e.g., minnows and darters). However, if it is possible to lower the stream temperatures, through stormwater management and habitat restoration initiatives, to convert a warmwater stream to a coldwater stream, then priority should be given to cool/cold water species, such as Brook trout (*Salvelinus fontinalis*), where the physical habitat determines.

Chedoke Creek is a highly urbanized and degraded watercourse with respect to habitat and water quality. Much of its length has been straightened and channelized and a significant length of stream is conveyed underground beneath Aberdeen Avenue and again under Main Street, King Street West and Highway 403. Chedoke Creek is also conveyed underground through the the OMSF via two culverts; a concrete culvert and a short CSP culvert. The stream daylight downstream of the metal recycling facility that is

located on Frid Street. The culvert outlet is perched approximately 0.4m and represents a barrier to the upstream passage of fish. Downstream of this culvert, to the north of the OMSF, the stream is approximately 2.5 to 3m in width with water depths of approximately 0.2m and there is another barrier to fish passage downstream of the culvert outlet in the form of a natural bedrock ledge.



**Photo 3.2: Chedoke Creek and natural bedrock ledge**

Chedoke Creek is characterized as having permanent flow.

The stream morphology consists of flats (60%), riffles (20%) and pools (20%) with substrate consisting of cobble, gravel, sand and silt. Fish habitat features include riffle-pool sequences, scattered small boulders, in-stream woody debris, undercut banks and over-hanging vegetation.

The riparian zone is well shaded by trees and herbaceous vegetation consisting of: Sugar Maple, Red Oak, American Beech, Basswood, Green Ash, Ironwood and Black Cherry. Shrubs in this community are predominantly Choke Cherry, with occasional Witch-hazel and Common Buckthorn. Herbaceous vegetation was fairly sparse and consisted mainly of grass and goldenrod species.

### 3.4.2 Fish Community

Chedoke Creek is located within the Spencer Creek watershed. The fish community of the Spencer Creek watershed is very diverse, with 44 species of fish recorded (**Appendix B.3**). However, the fish community



of Chedoke Creek is very limited due to the altered and degraded nature of the habitat conditions. According to the Hamilton Harbour and Watershed Fisheries Management Plan (2009) the fish community of Chedoke Creek is comprised of the following warmwater species: Creek Chub (*Semotilus atromaculatus*), Brook Stickleback (*Culaea inconstans*) and Pumpkinseed (*Lepomis gibbosus*).

The reach within the OMSF does not contribute directly to the fish habitat potential of the system, but does provide indirect fish habitat in terms of allochthonous (food) matter inputs to downstream habitats. Downstream reaches are connected directly to Cootes Paradise and likely provide overall general habitat for feeding, rearing and over-wintering.

### 3.4.3 Aquatic Species at Risk

The designation of species of national significance is given by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The designation of species of Provincial significance is made by the MNRF and is based on recommendations made by the Committee on the Status of Species at Risk in Ontario (COSSARO).

From the review of the federal Department of Fisheries and Oceans Canada (DFO) “Distribution of Aquatic Species at Risk” mapping for the study area, there is two designated aquatic Species at Risk (Redside Dace (*Clinostomus elongates*) and American Eel (*Anguilla rostrata*) that have historically been known to occur in Chedoke Creek within the B-Line corridor. Reside dace is designated nationally “Endangered” by the COSEWIC, and was recently (February 2009) up-listed provincially to “Endangered” by the COSSARO. Under the federal *Species at Risk Act* (SARA), Redside dace is considered to be of “Special Concern” (Schedule 3), and this species is listed as “Endangered” under the *Ontario Endangered Species Act* (2007). American Eel is listed as “Endangered” provincially by COSSARO. American Eel is not listed on the federal *Species at Risk Act* (SARA).

Although Redside Dace and American Eel have been historically present in Chedoke Creek, and are currently identified on DFO’s Aquatic Species at Risk mapping for the creek, fish community surveys and current habitat conditions at the B-Line crossing indicate that these two species are no longer considered present in Chedoke Creek. The MNRF has prepared a recovery strategy for Redside Dace and American Eel and is responsible for their protection under the *Endangered Species Act*. As part of this study, Hamilton Conservation Authority confirmed that Redside Dace is not considered to be present in Chedoke Creek (Shari Faulkenham, HCA Ecologist, pers comm 2010).

### 3.4.4 Critical Fish Habitat

The study limits were reviewed for the potential presence of critical habitat (i.e. spawning areas, groundwater discharge, nursery habitat, seasonal refugia, etc.). There is no evidence of critical fish habitat within this reach of Chedoke Creek.

### 3.4.5 Thermal Regime

Chedoke Creek supports a poor quality warmwater fish community. The DFO Ontario restricted activity timing windows for the protection of warmwater fish and fish habitat states that in-water works are prohibited from March 15 to July 15.

### 3.4.6 Sensitivity/Significance

As part of the aquatic habitat assessment for the project, a determination of fish and fish habitat sensitivity for Chedoke Creek was completed. This categorization of sensitivity encompassed both fish

species and fish habitat, and their inter-relationships and dependencies. While an understanding of the component species and habitat requirements are important to assessing sensitivity, the interactions at the fish community and overall aquatic ecosystem level must be integrated in the analysis. The attributes used for assessing the sensitivity of fish and fish habitat included (**Table 3.3**):

1. Species Sensitivity;
2. Species' Dependence on Habitat;
3. Rarity;
4. Habitat Resiliency.

The above attributes and process for determining fish habitat sensitivity are consistent with approach documented in the *Practitioners Guide to the Risk Management Framework for DFO Habitat Management Staff* (DFO, 2013).

Within the study area, Chedoke Creek supports a non-diverse warmwater fish community. Chedoke Creek has also experienced impacts from urbanization and historical agriculture which has resulted in channelization of long reaches of the stream, portions of the stream have been piped underground and the downstream reaches of Chedoke Creek have been lined with concrete.

**Table 3.3: Attributes for Determining the Sensitivity of Fish and Fish Habitat**

Attribute	Description
Species Sensitivity	The fish community present is able to adjust to changing conditions in the environment.
Species Dependence on Habitat	No migratory fish present; feeding and rearing habitat.
Rarity	No Species at Risk.
Habitat Resiliency	Warmwater thermal regime suitable for cyprinids. The system is stable and resilient to change. The flow regime is permanent.

From the SNC-Lavalin assessment and above approach for determining sensitivity, Chedoke Creek is considered to support fish/fish habitat of “Low Sensitivity”. Key factors in this determination include presence of resilient warmwater species/community (e.g., Creek Chub), they are resilient to change and perturbation, the habitat and species assemblage is prevalent in the system; the watercourse is warmwater and high habitat resiliency or ability to tolerate or recover from changes in environmental conditions, such as flow and thermal regime.



## 4 IMPACT ASSESSMENT AND MITIGATION MEASURES

### 4.1 Overview

Potential impacts and mitigation measures have been previously discussed in the A and B Line Environmental Study Reports (Stear Davies Gleave, 2011b and 2011c). The potential impacts and mitigation measures discussed herein are related to the changes in the route alignment and the addition of the OMSF to the study area.

### 4.2 Vegetation

#### 4.2.1 Direct Impacts to Vegetation Communities

The construction of the proposed Hamilton A and B-Line (including the OMSF) will have impacts to both natural and culturally impacted vegetation communities (forest, cultural communities). This section presents the anticipated removals based on the current design grading limits for the proposed works.

**Table 4.1** and **Table 4.2** outline removals based on ELC category at each of the Cathedral Park, and OMSF Locations. These removals are shown graphically on **Figure 4.1** and **Figure 4.2** on the following pages.

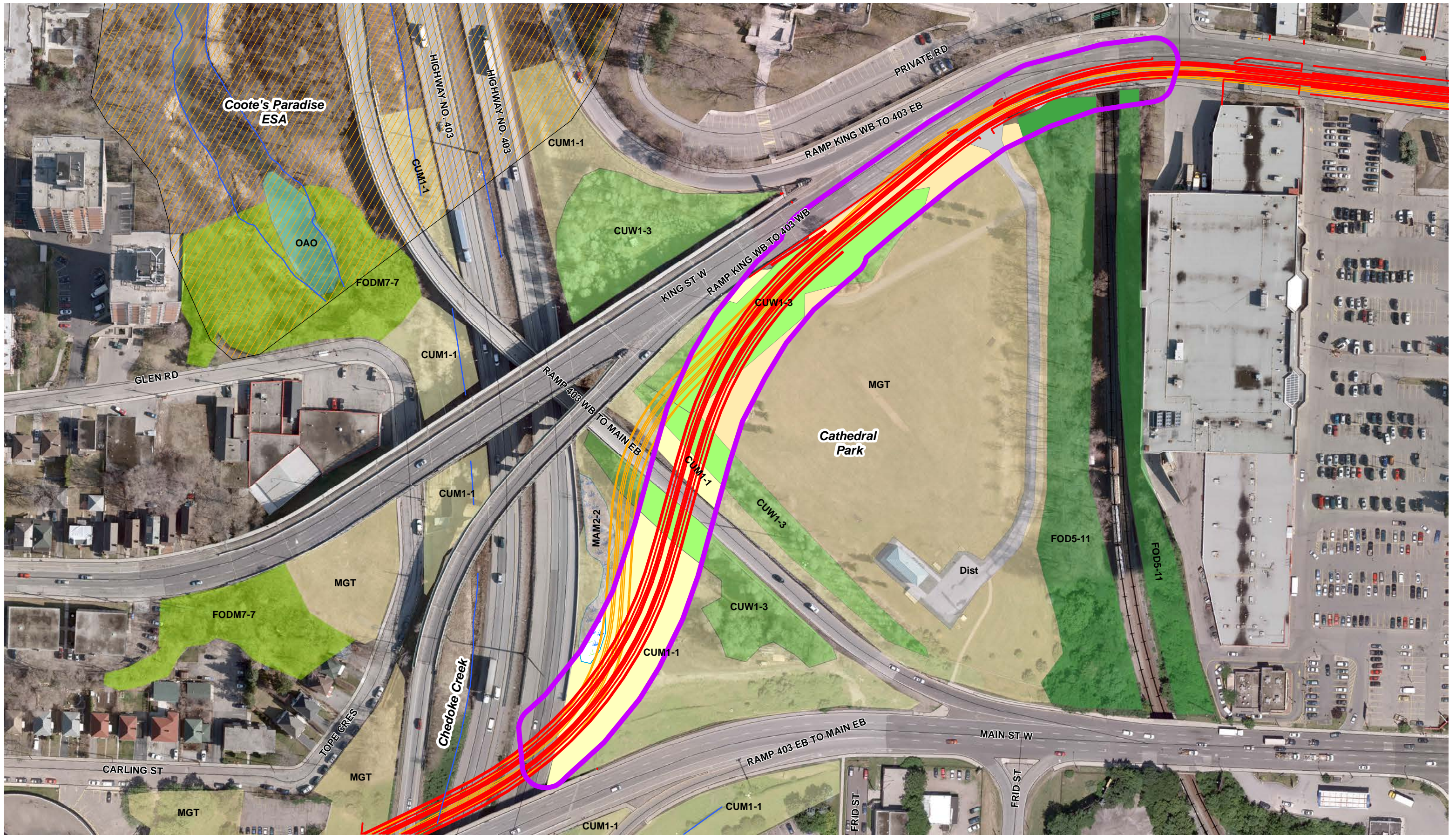
Table 4.1: Project Vegetation Type Removals by Area (Cathedral Park)

Vegetation Type	Removals (ha)
CUM1-1	0.34
MAM2-2	0.01
CUW1-3	0.35
FOD5-11	0.04
MGT	0.16
<b>Total</b>	<b>0.9</b>

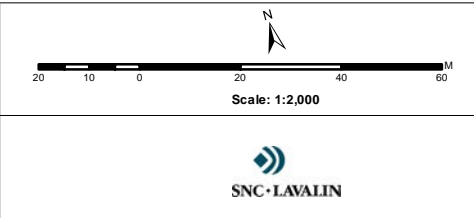
Table 4.2: Project Vegetation Type Removals by Area (OMSF)

Vegetation Type	Removals (ha)
CUM1-1	2.90
CUT1-1	0.49
CUW	0.32
FOD4	0.77
<b>Total</b>	<b>4.49</b>





Legend	
<b>ELC Designations</b>	
FODM7-7: Fresh Moist Manitoba Maple Lowland Deciduous Forest	MAM2-2: Reed Canary Grass Meadow Marsh
FOD5-11: Dry Fresh Silver Maple Deciduous Forest*	OAO: Open Aquatic
CUW1-3: Dry Fresh Manitoba Maple Mineral Cultural Woodlot*	MGT: Manicured Grass/Trees
CUM1-1: Dry Moist Old Field Cultural Meadow	Dist: Disturbed
OMSF_Removals_BufferPoly	Coote's Paradise ESA
Proposed LRT B-Line 2016	Road
Proposed LRT B-Line 2010	Drainage



<b>Hamilton LRT Environmental Assessment Addendum Ecological Update Vegetation Classification</b>		
<b>Cathedral Park Vegetation Removals</b>		
Date: 2016/10/13	File Number: 638045	Sub Code: ENVR
Figure:	<b>4.1</b>	Rev. <b>0</b>





**Legend**

**Removals - ELC Designations**

- CUM1-1: Dry Moist Old Field Cultural Meadow
- FOD-4: Dry Fresh Deciduous Forest
- CUT1-1: Sumac Cultural Thicket

CUW: Cultural Woodlot

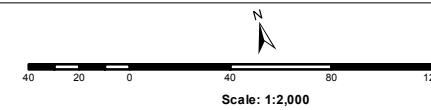
Butternut

Operations Maintenance Facility

Proposed LRT B-Line 2016

Road

Drainage



**Hamilton LRT Environmental Assessment Addendum**  
**Ecological Update**  
**Vegetation Classification**  
**Operations Maintenance Facility (OMSF)**  
**Vegetation Removals**

Date: 2017/02/15

File Number: 638045

Sub Code: ENVR

Figure:

**4.2**

Rev. **0**



#### 4.2.2 Indirect Impacts to Vegetation Communities

In addition to the direct impacts as a result of construction activities, the construction of the will have indirect impacts to vegetation communities both during construction operations phases. These indirect impacts include:

- › Release of construction-generated sediment to vegetation areas;
- › Vegetation clearing/damage beyond the working area. This may include additional vegetation removals associated with grading encroachment into vegetated slopes;
- › Damage to adjacent vegetation from tree felling and/or grubbing;
- › Spills of contaminants, fuels, other materials that may reach natural areas;
- › Creation of opportunities for invasive species at the edges of the forest community associated with the Chedoke Creek valley; and,
- › Changes in drainage patterns (groundwater and/or surface runoff flow) that can affect dependant vegetation areas adjacent to the development area. Obstruction of existing surface/subsurface drainage patterns can result in upstream and downstream vegetation dieback/condition changes. Increase in downstream runoff can result in erosion effects on receiving vegetation.

#### 4.2.3 Vegetation Mitigation Measures

In order to minimize the potential for negative impacts to vegetation communities adjacent to the development area for the proposed OMSF development the following general mitigation measures are recommended:

- › Install temporary erosion and sediment control measures prior to construction, and maintain throughout construction.
- › Routinely inspect sediment and erosion control measures, including after storm events, and repair as required.
- › Any dewatering effluent (if dewatering is required) as result of the proposed works will be treated (filter bags, sediment traps) as needed to ensure it does not transport excess sediment into vegetated areas.
- › Stabilize and re-vegetate exposed surfaces as soon as possible.
- › Clearly delineate vegetation clearing limits on both construction drawings and in the field, and field confirm with the contractor prior to clearing and grading. Equipment, materials and other construction activities will not be permitted in these zones.
- › Vegetation that does not require removal for purposes of the construction will be protected through the installation and maintenance of temporary vegetation protection measures (e.g. temporary fencing).
- › Given that butternut was found in the wooded area to the north of the OMSF. A focused butternut survey/health assessment should be conducted as part of the tree inventory during detailed design to determine the potential for destruction/encroachment. If found, the permitting procedures outlined in Section 5.1 would apply.
- › Trees to be removed will be felled into the proposed area of disturbance (and away from watercourses) to avoid impacts to vegetation outside of the project footprint.
- › Tree grubbing will be restricted to the required activity zone. Where possible, tree stumps will be cut flush to the ground and grubbing will be avoided to minimize soil disturbance, particularly in erosion prone areas.
- › Undertake tree management activities as required for safety and health of the balance of the vegetation unit.

- › Unnecessary traffic, dumping and storage of materials over tree roots will be avoided. Vehicle maintenance and fueling will be carried offsite, or at a dedicated area away from the top of bank. Refueling should not be permitted within 30 m of any watercourse, or the top of bank areas.

The above mitigation measures will be outlined in contract specifications and operational constraints, and on the Detail Design drawings for the Project.

## 4.3 Wildlife

The following section provides a summary of anticipated impacts to wildlife and wildlife habitat within the study area as a result of the construction of the Hamilton LRT and construction work at the OMSF. These impacts are considered against the general wildlife habitat function of the project area, where mitigation takes into consideration local and resident wildlife communities often comprised of the most urban tolerant species.

Potential effects to wildlife or their habitat as a result of the proposed works include:

- › Direct removal of available habitat for resident species;
- › Construction disturbance to adjacent habitat and communities;
- › Potential for incidental killing or harm to local and resident wildlife species;
- › Artificial lighting can change animal behaviour (nocturnal foraging, migration movements, light attraction or repulsion, social interactions, etc.);
- › Animal/vehicle conflicts may occur where there are existing migratory corridors such as along linear landscape features such as valleys and anywhere with low topographic complexity.

### 4.3.1 Wildlife Mitigation Measures

To minimize impacts to wildlife and their habitat during construction the following mitigation measures should be implemented:

- › Minimize habitat removal through minimizing access, staging, storage and grading footprints;
- › Avoid harassment to wildlife species during all stages of construction;
- › Construction zone should be walked at a slow pace to flush any animals out of the area prior to silt fence installation;
- › Workers should be trained on the potential for mammal species to move through the project area and should remain vigilant and alert to the presence of wildlife in the work area;
- › Install temporary erosion and sediment control measures prior to construction, and maintain throughout construction;
- › Routinely inspect sediment and erosion control measures, including after storm events, and repair as required;
- › Any dewatering effluent (if dewatering is required) as result of the proposed works will be treated (filter bags, sediment traps) as needed to ensure it does not transport excess sediment into vegetated areas;
- › Stabilize and re-vegetate exposed surfaces as soon as possible. Construction activities must adhere to the *Migratory Birds Convention Act* which states that no tree cutting can take place from April 1 to August 31 in any given year;
- › If tree removal cannot occur outside of the migratory bird nesting window then undertake a pre-clearing nesting bird survey by a competent avian biologist;



- › Ensure the construction areas are delineated by fencing (e.g. silt fencing) to exclude wildlife from entering the work areas; and
- › All construction vehicle movement should be at a slow pace to avoid trampling.

## 4.4 Fisheries and Aquatic Resources

Indirect impacts to fish and fish habitat are possible due to land and water based construction activities near Chedoke Creek (e.g., release of silt as a result of poor sediment controls, or fuel spills) as well as construction access roads. The aquatic habitat effects analysis focused on the evaluation of the fisheries and aquatic habitats with respect to the effects from construction activities and the operation of the facility.

Other potential effects to fish and fish habitat that are applicable to the project include:

- › Discharge of sediment to a watercourse from earth/spoil stockpiles, grading and excavation activities associated with highway reconstruction and culvert works resulting in the impairment of water quality and/or physical damage to habitat;
- › Changes to groundwater discharge to the creek;
- › Release of fuel, oil, grease contaminants from mobile equipment resulting in unacceptable contaminant concentrations in receiving watercourse; and
- › Change to sensitive life stages/process (i.e., spawning) if in-water works are not timed appropriately.

### 4.4.1 Aquatic Mitigation Measures

To address the potential impact to fish and fish habitat, the following key design and construction mitigation measures with respect to the works in the Study Area and will be incorporated in the construction contract through the Detail Design drawings and contract documentation:

- › Design and install native woody vegetation and groundcover to pre-construction conditions or better.
- › Design and implement erosion and sediment controls to prevent erosion of exposed soils and migration of sediment to watercourse.
- › Store, handle and dispose of all excess materials in a manner that prevents their entry to a watercourse.
- › Operate, maintain and store (e.g., fuel, lubricates) all equipment and materials in a manner that prevents the entry of any deleterious substances to the watercourse.
- › Maintain existing ground cover such as grasses or other low lying vegetation within the valley, particularly on the banks of Chedoke Creek and in close proximity to surface water features and other sensitive areas.
- › Properly maintain erosion control measures, including following storms events, until all construction work has been completed and the site has been stabilized.
- › Refuel and maintain vehicles and equipment at the staging areas or other pre-designated locations which are a minimum of 30 metres removed from the surface water system.

## 5 CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE STUDIES

A detailed Species at Risk assessment should be undertaken during the Detailed Design component of the study for Chimney Swift and Bats, and undertaken in consultation with MNRF using approved protocols for Chimney Swift and Bats. All sightings of threatened, endangered or extirpated species protected under the ESA along with natural and wildlife concentration areas that are observed will be reported Ontario to the Natural Heritage Information Centre (NHIC).

Chimneys that appeared to be suitable for Chimney Swift were noted in this report however a full Chimney Swift survey following the Bird Studies Canada Swiftwatch Protocol (Bird Studies Canada, 2015) was not conducted. Chimney Swift nesting surveys must be conducted between May 15 and September 15. The best time for observation is during June and July, 30-45 minutes prior to sunset when nesting Swifts return to the chimneys for the evening to care for the young, August and September for roosting. A Chimney Swift survey should be carried out by a qualified avian biologist.

Some of the buildings that have been identified for removal along Line A and B may provide suitable habitat for the Little Brown Myotis. Surveys for bat roosting habitat or bat hibernacula were not conducted as the building removals have not been finalized. A comprehensive survey, approved in consultation with the MNRF for bats will be required for all buildings that will be removed for construction of the LRT and these surveys will include:

- › An interior search for evidence of bat roosting such as checking the attics for evidence of guano and/or the bats themselves roosting during the day;
- › Observing the chimney soot clean-out (usually on older buildings) looking for evidence such as guano, skeletons, skulls etc. that would suggest bats are utilizing the chimney for roosting;
- › Detailed searches of the building exteriors where bats could be roosting between cracks in the brick, soffits or the general façade of the building; and,
- › It is also recommended to conduct evening exit surveys at each building whereby observers are positioned around the building 30-45 minutes before sunset and one hour after sunset to observe any bats that may be exiting the building to forage at night.

One vegetation SAR was observed during field investigations. Butternut was located in the deciduous forest units along the Chedokee Creek valley at the northern end of the study area. It is noted that this area is outside the proposed limits of development for the OMSF, but given that the scope of the current surveys was focused on vegetation classification and general vegetation survey, there is a potential for more butternut to be found in this area. A focused butternut/health assessment survey should be conducted within suitable vegetated areas, within 50m of all potential disturbances, as part of the tree inventory during detailed design. Potential permitting requirements are outlined below in section 5.1.

Though Barn Swallow were observed foraging within the OMSF lands, and the Barn Swallow were observed displaying active nesting behaviour and are currently nesting within the adjacent Canadian Drawn Steel Company buildings. No other suitable nesting structures or activity was observed within the Study Area. Consideration of the timing window restricting construction activities between April and May should be considered during Detailed design.

## 5.1 Potential Permitting Requirements

Where the City of Hamilton does not have authority to issue permits (i.e., where there is provincial or federal interest), all works must be completed in accordance with applicable legislation including, but not necessarily limited to the following legislation:

**Endangered Species Act (ESA)** – Under section 9 of the ESA, species are afforded protection providing they are listed as Threatened, Endangered, or Extirpated on the Species at Risk in Ontario list. Section 10 of the ESA is in place to protect habitat of Threatened or Endangered species only; where no damage is permitted to the habitat of those species. A preliminary screening should be completed in consultation with the Ministry of Natural Resources (MNR); if the screening indicates the potential presence of a species protected under the ESA, there is a requirement to complete Information Gathering Forms to further assess the need for permitting under the ESA.

**Migratory Bird Convention Act** – Provides protection for (listed) migratory birds in Canada through the conservation of populations, individuals, and their nests.

**Fish and Wildlife Act** – Generally a hunting compliance document, this act lists specially protected species in Ontario, including mammals, birds, herpetofauna, and invertebrates. “A person shall not hunt or trap specially protected wildlife or any bird that belongs to a species that is wild by nature and is not a game bird”. This includes the nests and eggs of birds not covered under the Migratory Bird Convention Act.

**Planning Act** – Through the Planning Act, the Provincial Policy Statement states both that “Development and site alteration shall not be permitted in significant habitat of endangered species and threatened species” (2.1.3, [a]) and “Development and site alteration shall not be permitted in significant wildlife habitat (2.1.4, [d]), unless it has been demonstrated that there will be no negative impacts...”.

In addition to the above legislation, the Chedokee Creek floodplain is within the regulated areas of the City of Hamilton’s Woodland Conservation Bylaw (R00-54) and HRCA’s Ontario Regulation 150/06, and permits will be required prior to initiation of the project works.

The vegetation communities to be affected by the project works are narrow, fragmented habitats with significant invasive plant composition. Restoration and compensation plans for the total natural/naturalized area determined to be removed will be prepared to meet the requirements of the HRCA and the Urban Forestry department of the City of Hamilton.

Three species listed under the Ontario *Endangered Species Act* list have been identified to have either known sightings or habitat in and in close proximity to the proposed study area. The species include:

- › Butternut,
- › Little Brown Myotis, and
- › Chimney Swift).
- › Barn Swallow

The following permits and/or actions will need to be conducted during detailed design and preconstruction activities.



## Butternut

Butternut has been observed in the deciduous forest units to the north of the OMSF site. Prior to any works taking place that might affect the Butternut trees the following steps must be followed:

- A qualified Butternut assessor must determine the health of the trees;
- Send the health assessment report to the MNRF for a 30 day review period;
- After the 30 day review period the trees can be removed or harmed if:
  - They are Category 1 trees (non-retainable);
  - A maximum of 10 Category 2 trees (retainable) are to be removed/harmed in accordance with O.Reg 242/08;
  - Trees that have been categorized as Category 3 (archivable) cannot be removed.

According to O.Reg 242/08 Butternut trees are divided into 3 categories:

- Category 1: in the advanced stages of disease as a result of butternut canker (“non-retainable”)
- Category 2: the tree does not have butternut canker or disease is not as advanced (“retainable”)
- Category 3: could be useful in determining how to prevent or resist butternut canker (“archivable”)

If any activities that will impact ten (10) or fewer Category 2 Butternut trees than the activity can registered with the MNRF by submitting a Notice of Butternut Impact Form to the MNRF Registry and completing compensation plantings and monitoring as spelled out in O.Reg 242/08 (section 23.7). If more than ten (10) Category 2 Butternut trees, or any Category 3 trees will be impacted by any activity then a 17 (2)(c) permit under the *Endangered Species Act* will be required.

## Little Brown Myotis

Any forested area that is classified as FOD/FOM/FOC/SWD/SWC/SWM are all considered SAR bat habitat unless proven otherwise (through examination of presence/absence of species by bioacoustic monitoring and presence/absence of suitable cavities for roosting).

If SAR bats are determined to be present then a 17(2)(c) permit under the *Endangered Species Act* will be required. Extensive consultation with the MNRF will be required (avoidance alternatives, overall benefit permits). Applying for an Overall Benefits permit typically require a year or more to get approval.

## Chimney Swift

Chimney Swift does not require permitting under the ESA but the project must be registered with the MNRF and there are certain steps to take which includes:

- › Register the work with the MNRF (Notice of Activity);
- › A Chimney Swift Mitigation and Monitoring Plan must be prepared;
- › Describe the chimney and your activity (before you begin);
- › Estimate the number of chimney swift using the chimney (before you begin);
- › List the steps you took to minimize effects on chimney swift;
- › Describe what you did to create habitat; and
- › The habitat must be monitored for 3 years include information collected during monitoring.

The mitigation/monitoring plan must be prepared before any work begins and this record must be kept for 5 years after the work has been completed.

### **Barn Swallow**

Though Barn Swallow were observed foraging within the OMSF lands, and the Barn Swallow were observed displaying active nesting behaviour and are currently nesting within the adjacent Canadian Drawn Steel Company buildings. There are no nesting structures within the Study Area. At this time there are no permitting requirements for the removal of Barn Swallow foraging habitat. A review of applicable permitting requirements should be conducted during Detailed Design in direct consultation with the MNRF to determine if a permit is required for the removal of foraging habitat.