

City of Hamilton

Ecological Characterization &
Natural Heritage Assessment

Bridge 451 – Hwy. 5 E, 120 m east of Mill Street South



Completed in association with C. Portt & Associates

September, 2015



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1. INTRODUCTION

Dougan & Associates was retained by the City of Hamilton in 2014 to complete an ecological characterization and natural heritage assessment for **Bridge 451 – Hwy. 5 E, 120 m east of Mill Street South**. This bridge is located in an urban setting in a busy area of downtown Waterdown. Beneath the bridge there is an active railroad corridor and Grindstone Creek. The bridge is within the jurisdiction of Conservation Halton (CH).

The purpose of this report is to identify and discuss the significance of ecological features and functions in the vicinity of bridge 451 that could be impacted by possible future repair or replacement of the bridge.

This report was prepared to provide information to City staff and may be submitted to CH as necessary in association with approvals for future repair or replacement of bridge 451. Where used in association with future projects, the information provided in the report should be used as background context, and depending on the time line for such projects, additional fieldwork may be required. No bridge work had been proposed at the time this study began, however during the duration of the study some construction was proposed and an EA has been initiated.

This characterization and natural heritage assessment report will

- outline the results of the background studies, field investigations, evaluation of significance, and description of key natural heritage functions, and
- identify ecological sensitivities that need to be addressed as part of the on-going EA work that will be conducted for the bridge project.

2. METHODS

2.1. BACKGROUND STUDY METHODS

During the initial phase of the background study, scope clarification was needed. This was accomplished primarily through review of the *Conservation Authority Baseline Ecological Assessment Requirements for Municipal Class Environmental Assessments*, and communications with the City and CH.

The study area was established including a 120 m radius around the bridge point. The 120 m radius was chosen based on Ontario's natural heritage policy. The Provincial Policy Statement (2014) prohibits development or site alteration on natural heritage features or their *adjacent lands* unless it can be demonstrated that there will be no negative impact on the natural features or their ecological functions. The Natural Heritage Reference Manual (OMNR, 2010), defines the size of *adjacent lands* for each type of natural heritage feature, specifying 120 m for all feature types relevant to this study area. The 120 m study area will therefore ensure coverage of any natural heritage features present with the potential to be impacted by future bridge work.

Further background studies included discussion with CH and a review of existing mapping and documents related to the bridge 451 study area. Ortho-rectified aerial photography was examined to determine the general character of the natural features in the study area. The Ontario Ministry of Natural Resources and Forestry (MNR), Guelph District was contacted (Art Timmerman, Management Biologist) for background fish community and aquatic habitat information for the vicinity of Bridge 451. A Natural Heritage Information Centre query was conducted for the Bridge 451 location to determine if aquatic species at risk were present. The Hamilton-Wentworth Natural Areas Inventory Watershed Summaries (Hamilton Naturalist's Club, 1995) and the Hamilton Natural Areas Inventory Project, 3rd Edition (Schwetz, 2014a +b) were also checked for relevant information.

A query of the Ministry of Natural Resources, Natural Heritage Information Centre (NHIC) online database was also completed in order to check for any known species at risk occurrences in the vicinity of bridge 451.

See Figure 1 for the bridge location and study area.

2.2. FIELD STUDY METHODS

Field studies completed are described below. Table 1 provides a summary of all field visits to the bridge 451 study area.

Table 1. Field Survey Dates

Date	Task	Staff
23 July 2014	Initial site visit/fish habitat characterization	George Coker
29 July 2014	Roadside ELC assessment (property access not yet granted)	Wendy Frise, Kristen Beauchamp
30 July 2014	Detailed fish habitat characterization	George Coker
11 Aug 2014	ELC assessment, late summer botanical	Wendy Frise, Kristen Beauchamp
9 Oct 2014	Electrofishing	George Coker; Jim Reid
28 Apr 2015	Nocturnal amphibian call survey	Dylan White
20 May 2015	ELC assessment, spring botanical	Wendy Frise, Kristen Beauchamp
20 May 2015	Spring fish habitat check	George Coker
7 May 2015	Reptile active search	Dylan White
26 May 2015	Breeding Bird Survey #1	Ian Richards
31 May 2015	Nocturnal amphibian call survey	Dylan White
5 June 2015	Breeding Bird Survey #2	Ian Richards
15 June 2015	Nocturnal amphibian call survey	Dylan White
25 June 2015	ELC assessment, early summer botanical	Wendy Frise, Kristen Beauchamp
15 July 2015	Odonate survey	Karl Konze
31 July 2015	Reptile active search	Dylan White

ELC & Vascular Plant Species Inventory

The purpose of this inventory was to document the distribution and abundance of plants and plant communities within the study areas. A total of three seasonal visits were made to document flora and characterize plant communities. Due to weather conditions in 2014 the species recorded during the late summer survey were species that would typically be recorded during a fall survey. Ecological Land Classification (ELC) of the vegetation communities was conducted based on the protocol of the

Ecological Land Classification System for Southern Ontario, first approximation (Lee et al., 1998). Plant communities were classified to Vegetation Type wherever possible, and alternatively to Ecosite when the vegetation community observed did not fit any specific Vegetation Type available in the ELC system.

Breeding Bird Surveys

The purpose of these surveys was to develop a comprehensive list of breeding birds present within the study area with a special focus on Bobolink and Eastern Meadowlark; to determine abundance, distribution, and habitat use of the species present. Breeding bird surveys were conducted on May 26 and June 5, 2015, following the protocols outlined by the Ontario Breeding Bird Atlas (Cadman et al., 2007). This protocol stipulates that the surveys be conducted between sunrise and 10:00 a.m., between May 24 and July 12, during appropriate weather conditions (i.e. light winds, no heavy rains).

Table 2. Breeding Bird Survey Details

Date	Observer	Time	Weather Conditions	Purpose
May 26, 2015	Ian Richards	09:15 – 09:55	Partly cloudy, calm, 22 °C	Breeding Bird Survey #1
June 5, 2015	Ian Richards	09:20 – 10:00	Clear, calm, 20 °C	Breeding Bird Survey #2

Amphibian Surveys

The purpose of these surveys was to develop a comprehensive list of amphibians (frogs and toads) present within the study area; to determine the abundance, distribution, and habitat use of the species present. Nocturnal Amphibian Call Surveys (NACS) were conducted within the study area in accordance with the Marsh Monitoring Program (MMP) (Bird Studies Canada 2009) protocol. NACS were conducted starting at least one half hour after sunset on April 28, May 31 and June 15, 2015. Survey dates were selected to ensure weather conditions within the acceptable ranges described by the MMP where possible. Temperatures were unseasonably low during the May survey period (May 15 to May 31) with one half of the nights within the period dropping below the acceptable temperature range. The May survey was initially scheduled for May 19, but then postponed due to poor weather conditions. The survey was then conducted on the last day of the seasonal window (May 31) despite continued cool and windy weather. A third visit was conducted on June 15 to ensure coverage of mid to late season breeders. Detailed survey information is provided in Table 3.

Table 3. Amphibian Survey Details

Date	Surveyor	Station ID	Start Time (p.m.)	Noise Index (as per NAAMP)	Wind (Beaufort Scale)	Temperature (°C)	Precipitation
28 April 2015	Dylan White	B451	8:50	3	Start: 1	Start: 13.2	None
					End: 1	End: 10.5	
31 May 2015	Dylan White	B451	9:30	3	Start: 3	Start: 7.0	Light Rain
					End: 3	End: 6.0	
15 June 2015	Dylan White	B451	10:05	3	Start: 1	Start: 23.6	None
					End: 1	End: 21.8	
Noise Index as per North American Amphibian Monitoring Program (NAAMP) Frog call survey instructions http://www.massnaamp.org/online_docs/NAAMP%20MA%20Ddatasheet%202012.pdf							
Code	Indicator						
0	No appreciable effect (e.g. owl calling)						
1	Slightly affecting sampling (e.g. distant traffic, dog barking, 1 car passing)						

2	Moderately affecting sampling (e.g. nearby traffic, 2 – 5 cars passing)	
3	Seriously affecting sampling (e.g. continuous traffic nearby, 6 – 10 cars passing)	
4	Profoundly affecting sampling (e.g. continuous traffic passing, construction noise)	
Beaufort Wind Scale as described according to the MMP (BSC, 2009)		
Code	Wind Speed (kph)	Indicator
0	0 – 2	Calm; smoke rises vertically
1	3 – 5	Light air movement; smoke drifts
2	6 – 11	Slight breeze; wind felt on face, leaves rustle
3	12 – 19	Gentle breeze; leaves and small twigs in constant motion
4	20 – 30	Moderate breeze; small branches are moved, raises dust & loose paper
5	31 – 39	Fresh breeze; small trees in leaf begin to sway; crested wavelets form
6	40 – 50	Strong breeze; large branches in motion.

Reptile Surveys

The purpose of these surveys was to establish what species of reptiles (primarily snakes) are present on the site, and their local abundances and suspected habitat usages. An active hand search was conducted on May 7, 2015 in the vicinity of the bridge and within the seasonal and temperature ranges outlined by the MNRF Guelph District Milksnake Survey Protocol (OMNR, 2013). The active hand search protocol involved the removal of cover objects (rocks, woody debris and anthropogenic debris), examination of the sheltered habitat underneath, and then replacement of the cover object. In addition to direct examination of cover objects, potential herpetofauna basking areas, foraging habitat and movement corridors were inspected visually using high quality 8 x 42 binoculars. The survey involved meandering walking transects throughout all habitat types within the study area. Detailed survey information is provided in Table 4.

Table 4. Reptile Survey Details

Date	Observer	Time	Weather Conditions	Purpose
May 7, 2015	Dylan White	10:15 – 12:45	Mainly sunny, calm, 23 °C	Active Hand Search Survey
July 31, 2015	Dylan White	12:50 – 13:45	Sunny, calm, 25 °C	Active Hand Search Survey

Odonate Survey

The purpose of the survey was to document the diversity and abundance of odonate species (i.e. damselflies and dragonflies) along Grindstone Creek, at and within close proximity of the bridge structure. Odonates spend the majority of their lives within waterbodies (including wetlands, lakes and creeks) and are therefore more susceptible to impacts than other nearby terrestrial species. Local conservation ranks also exist for this group (Curry, 2014) allowing for a more complete understanding of local fauna and their potential presence and status. Special attention was paid to documenting the possible presence of Arrowhead Spiketail (*Cordulegaster obliqua*), a provincially rare dragonfly species, last reported from the general vicinity in 1931. Arrowhead Spiketails typically inhabit small and shallow, seepage-fed forest streams that are at least partially shaded (Jones, et al., 2008). They are active in June and July.

A single odonate survey was conducted on July 15, 2015, between 5:05 and 5:35 p.m. Weather conditions were sunny (approx. 25% cloud cover) with only light wind. The temperature was

approximately 23 °C and humidity was low. The creek was mostly in shadow at the time of the survey. An area extending 120 m upstream and downstream along Grindstone Creek was surveyed.

Fish Community and Habitat Assessment

The purpose of this assessment was to document the distribution and abundance of fish communities and the associated habitats. The site was visited on four occasions (Table 1) and the aquatic habitat was characterized from 100 m upstream to 170 m downstream of bridge 451. Existing conditions were documented with hand-drawn field maps and digital photographs. Substrate was characterized in the field using a modified Wentworth (1922) scale. A hand-held Garmin GPSmap76CSx unit was used to georeference all observations and photographs. Selected photographs are provided in Appendix 3.

Electrofishing was conducted on October 9, 2014, using a Halltech 2000 backpack electrofisher. All captured fish were identified in the field and released at the point of capture. A field collection report (FCR) documenting the fish collection was submitted to the MNRF Guelph District office.

Incidental Wildlife

All wildlife species observed by surveyors, regardless of the purpose of the survey, were duly recorded for inclusion in this study.

3. BACKGROUND STUDY FINDINGS

3.1. LANDSCAPE CONTEXT

Bridge 451 is located in an urban area of Waterdown, west of the Niagara Escarpment. The bridge provides access for Hwy 5 through Waterdown, extending parallel to the 403 and connecting Waterdown to Burlington and Oakville. The bridge overtops Grindstone Creek and an active railway corridor. This bridge is located in the north end of the Norfolk sand plain physiographic region. The Norfolk sand plain, which extends southward to Lake Erie, is an area of glacially deposited sands and silts. Surface water in the region generally drains southward to Lake Erie except for an area in the north end, which is a tributary of the Grand River. Substrates in the region include coarse plainfield sand and grey brown luvisols in the fox series. Agriculture is a main land use in this region. The region is known for specialized crops that can withstand well-drained sandy soils such as tobacco, peanuts, blueberries and ginseng (Chapman & Putman, 1984).

The study area is located within the Deciduous Forest Region, characterized by deciduous forests similar to those found in the Eastern United States. The most common tree species in this region include Beech, Sugar Maple, Basswood, Red Maple, Red Oak, White Oak and Bur Oak (Rowe, 1972). The property is a part of the MNR Grimsby Ecodistrict 7E-3. Nineteen percent of this ecodistrict remains in natural cover, which is primarily comprised of sand plain forest and till plain forest. Three quarters of existing wetlands in the ecodistrict are swamp. Globally rare limestone talus and tallgrass prairie vegetation communities have been documented within this ecodistrict (Henson & Brodribb, 2005).

The Hamilton Nature Counts Natural Areas Inventory (Schwetz, 2014a) provides a site summary for the Grindstone Creek Escarpment Valley (Flam-50); a 143 ha Environmentally Significant Area (ESA) which extends along the steep-sided Grindstone Creek valley corridor in association with the Niagara Escarpment. This natural area includes a portion of the study area along the creek south of the bridge. This area is characterized by upland deciduous forests, floodplain forests and marsh and the vegetation composition reflects a Carolinian influence. Forty eight significant flora and fauna species were recorded within this area including American Columbo (*Frasera caroliniensis*), Red Mulberry (*Morus rubra*), Monarch (*Danaus plexippus*), and Bobolink (*Dolichonyx oryzivorus*) (Schwetz, 2014a).

3.2. CONSERVATION HALTON DATA & MAPPING

A data license agreement was entered into with Conservation Halton and the following map layers and background data was obtained regarding the study area and surrounding lands:

- Watercourse map layer showing Grindstone Creek
- Floodplain map layer
- ELC vegetation communities map layer including community series data based on air photo interpretation.
- SAR points map layer showing one observation in the vicinity of the study area. Details of SAR records are provided in Appendix 4.
- Fisheries data which is further detailed in section 3.4

3.3. NHIC QUERY

An NHIC query was completed using the MNRF Make-a-Map online database (NHIC, 2015d). Two 1-km squares queried including 17NH8998 and 17NH8999. Results included 29 records in total, including 21 flora species, 4 fauna species and three natural area records. Details of flora and fauna records are provided in Appendix 4. Natural area records for the general area include:

- Niagara Escarpment Biosphere Reserve (International Biosphere Reserve)
- Lake Meded Valley Wetland Complex (Provincially Significant Wetland)
- Grindstone Creek (Earth Science ANSI, Provincial)

3.4. FISHERIES INFORMATION

Fisheries monitoring information for the vicinity of Bridge 451 was obtained from the Conservation Halton Long Term Environmental Monitoring Program Report (Conservation Halton, 2013) and is provided in Table 5.

Table 5. Grindstone Creek fish collection information from the vicinity Bridge 451 (Conservation Halton Monitoring Station GRN-16). Collected in 2011. Collection method was electrofisher.

Common name	Scientific name	Number collected
Creek Chub	<i>Semotilus atromaculatus</i>	4
Johnny Darter	<i>Etheostoma nigrum</i>	1
Longnose Dace	<i>Rhinichthys cataractae</i>	28

The fish collection information obtained from the files of the Guelph District MNRF office is summarized in Table 6.

Table 6. Grindstone Creek fish collection information from above the waterfalls in the vicinity of Waterdown Road, approximately 620 m downstream of Bridge 451. Collected on August 1, 1984. Collection method was electrofishing for 702 s, and the length of watercourse sampled was approximately 75 m.

Common name	Scientific name	Number collected
White Sucker	<i>Catostomus commersonii</i>	unknown
Blacknose Dace	<i>Rhinichthys atratulus</i>	unknown
Creek Chub	<i>Semotilus atromaculatus</i>	3
Largemouth Bass	<i>Micropterus salmoides</i>	1
Pumpkinseed	<i>Lepomis gibbosus</i>	6

The Grindstone Creek Watershed Aquatic Habitat Inventory and Assessment (Appendix 3 of the Grindstone Creek Watershed Study (HRCA, 1998) characterizes the section of Grindstone Creek that contains Bridge 451 (Parkside Drive downstream approximately 2 km through the town of Waterdown to the waterfalls) as a moderate to fast-flowing warmwater/coolwater watercourse that is within a steep-walled forested valley. This valley has been altered by the installation of a railway many years ago (HRCA, 1998). Instream cover consists of snags, undercuts and scattered boulders, and shade cover is good (HRCA, 1998). Fish species most often recorded include Blacknose Dace, Longnose Dace, Creek Chub, and White Sucker (HRCA, 1998). Other species include Central Mudminnow (*Umbra limi*), Largemouth Bass, Johnny Darter, Common Shiner (*Luxilus cornutus*), Finescale Dace (*Chrosomus neogaeus*), Brassy Minnow (*Hybognathus hankinsoni*), Fathead Minnow (*Pimephales promelas*), Bluntnose Minnow (*Pimephales notatus*), Pearl Dace (*Margariscus margarita*), and Common Carp (*Cyprinus carpio*)(HRCA, 1998).

4. FIELD STUDY FINDINGS

4.1. VEGETATION RESOURCES

4.1.1. ELC VEGETATION COMMUNITIES

The study area contains an assemblage of vegetation community types within a rural/agricultural context. Field surveys have recorded a total of 12 vegetation polygons representing 3 Ecological Land Classification (ELC) vegetation community types. One additional vegetation type not included in the ELC system has been added to accurately describe the study area; ANTH – Anthropogenic.

All vegetation community types found on the site are considered to be relatively common within the Southern Ontario landscape except for polygon 12, which has been classified as Fresh - Moist Black Walnut Lowland Deciduous Forest (FOD7-4). This vegetation community type was flagged as significant because it has a rarity rank of S2S3 for Ontario (NHIC, 2015c). Black Walnut is very common in floodplain habitats in southern Ontario and so the Natural Heritage Information Centre (NHIC) has been contacted for previous projects regarding this community type. Based on past discussions with

NHIC, it is our understanding that intact floodplain habitats are extremely rare in southern Ontario, and the majority of them are degraded. Floodplain habitats are naturally disturbed by annual flooding and ice scour; undesirable or invasive species are spread by the flowing waters of riparian systems and they tend to be very tolerant and adapted to disturbance, including those associated with storm water inputs in urban and agricultural areas. NHIC staff referred us to a draft Fact Sheet (Fact Sheet STRD11) from the *Southern Treed Ecosystems of Ontario (Draft)* (Lee, 2006), a working document in preparation intended to update the ELC System for southern Ontario. The fact sheet describes the S2S3 ranked Black Walnut-Green Ash/White Avens Forest in greater detail than the ELC manual (Lee et al., 2008). Polygon 12 in the study area has some elements of the rare community but lacks key native species including Black Maple (*Acer saccharum ssp. nigrum*), Hackberry (*Celtis occidentalis*), Bitternut Hickory (*Carya cordiformis*), and Virginia Knotweed (*Polygonum virginanum*). Therefore, we believe that Polygon 12 represents a disturbed natural forest area of mixed deciduous character that is not the S2S3 ranked community described in NHIC documents. Therefore, we believe that although Polygon 12 is accurately classified as FOD7-4 under the 1997 ELC system, it represents a disturbed natural forest area and is not the S2S3 ranked community described in more recent NHIC documents.

Table 7 provides a summary of the ELC findings and Figure 2 illustrates vegetation community polygon locations.

Table 7. ELC Vegetation Community Descriptions

ELC Polygon #	Vegetation Community Code/ Name	Area within Study Area (ha) / % of Study Area	Description
1, 2, 3, 4, 5, 6, 13	ANTH/ Anthropogenic	3.0/ 67%	The majority of the study area is mapped as anthropogenic, which includes roads, residential lots, commercial buildings and parking lots. The anthropogenic area south west of the bridge is primarily commercial buildings in downtown Waterdown and is essentially devoid of natural vegetation. The anthropogenic area north east of the bridge is primarily residential lots with lawns and scattered mature trees. These areas were surveyed from the roadside only. Trees noted include Sugar Maple (<i>Acer saccharum</i>), Eastern White Cedar (<i>Thuja occidentalis</i>), Manitoba Maple (<i>Acer negundo</i>), Norway Spruce (<i>Picea abies</i>), European Larch (<i>Larix decidua</i>), Blue Spruce (<i>Picea pungens</i>).
8,9	ANTH/ Anthropogenic Inclusion: CUM/ Dry – Moist Old Field Meadow	0.3/ 6%	These two polygons represent an active rail corridor including the rail line and strip of cultural meadow along both sides. The rail line extends parallel with the watercourse and under bridge 451. Species in the cultural meadow include Wild Red Raspberry (<i>Rubus idaeus ssp. strigosus</i>), Riverbank Grape (<i>Vitis riparia</i>), Wild Carrot (<i>Daucus carota</i>), Fuller’s Teasel (<i>Dipsacus fullonum</i>), Canada Goldenrod (<i>Solidago canadensis</i>), Canada Thistle (<i>Cirsium arvense</i>), Black Knapweed (<i>Centaurea nigra</i>), and Common Scouring-rush (<i>Equisetum hyemale</i>).

ELC Polygon #	Vegetation Community Code/ Name	Area within Study Area (ha) / % of Study Area	Description
7	FOD5/ Dry – Fresh Sugar Maple Deciduous Forest	0.4/ 8%	This community includes a treed slope from the rail corridor up to the residential back yards to the north east. An area signed as Board Street includes a short pull-off for cars and a trail down the slope. This small forested area has a canopy of Sugar Maple, Green Ash (<i>Fraxinus pennsylvanica</i>), White Ash (<i>Fraxinus americana</i>), Norway Maple (<i>Acer platanoides</i>) and Manitoba Maple (<i>Acer negundo</i>). The understory contains Thicket Creeper (<i>Parthenocissus inserta</i>), Choke Cherry (<i>Prunus virginiana</i>) and Tartarian Honeysuckle (<i>Lonicera tatarica</i>). The ground layer has an abundance of non-native invasives such as Garlic Mustard (<i>Alliaria petiolata</i>), Dame's Rocket (<i>Hesperis matronalis</i>) and Periwinkle (<i>Vinca minor</i>). It also contains native species such as Bloodroot (<i>Sanguinaria canadensis</i>) and Broad-leaved Enchanter's Nightshade (<i>Circaea canadensis</i>). A patch of Skunk Cabbage (<i>Symplocarpus foetidus</i>) was noted at the base of the slope; this species often indicates areas of ground water seepage.
10	FOD5/ Dry – Fresh Sugar Maple Deciduous Forest	0.2/ 4%	This very small forested community is a steep valley slope including the watercourse at its base and extending upward to an apartment building and parking lot. The canopy is of Sugar Maple, Black Walnut (<i>Juglans nigra</i>), Green Ash and Black Locust (<i>Robina pseudoacacia</i>). The sparsely vegetated understory and ground layers included Riverbank Grape, Thicket Creeper, Staghorn Sumac (<i>Rhus typhina</i>), Black Knapweed, Canada Goldenrod, Common St. John's-wort (<i>Hypericum perforatum</i>) and Colt's-foot (<i>Tussilago farfara</i>). Species noted at the bottom of the slope associated with the creek include Spotted Jewelweed (<i>Impatiens capensis</i>), White Vervain (<i>Verbena urticifolia</i>) and one small patch of Cut-leaved Coneflower (<i>Rudbeckia laciniata</i>).
11	CUW1/ Mineral Cultural Woodland	0.2/ 4%	This community includes a treed slope from the rail corridor up to the residential back yards to the north east. This area is highly disturbed and has substrates of bare soil and gravel which are very dry except at the base of the slope. The canopy contains Black Walnut, Norway Maple and Manitoba Maple. The understory contains a few individual Common Lilac (<i>Syringa vulgaris</i>) and Choke Cherry. The very sparse ground layer include Wild Carrot, Canada Goldenrod and Kentucky Bluegrass (<i>Poa pratensis</i>). At the base of the slope there is a small wet patch of Narrow-leaved Cattail (<i>Typha angustifolia</i>) and European Reed (<i>Phragmites australis</i> ssp. <i>australis</i>).
12	FOD7-4/ Fresh – Moist Black Walnut Lowland Deciduous Forest	0.5/ 10%	This is the largest natural community, and has greater ecological diversity as compared to the other communities in the study area. This polygon includes the watercourse at the base and the valley slope up to a commercial parking lot. This portion of the valley slope has more complex microtopography than the other portions of the slope (polygons 7, 10, 11), which are shorter and steeper. Piles of dumped woody debris and garden waste were noted near the parking lot at the top of the slope. The canopy contained Black Walnut, Sugar Maple, Green Ash, Norway Maple and Horse Chestnut (<i>Aesculus hippocastanum</i>). This forest also contains a more diverse forest structure, with tree seedlings and saplings in its lower layers, fallen woody debris and standing snags. The ground layer contained a mix of native and non-native species such as Garlic Mustard, Japanese Knotweed (<i>Fallopia japonica</i>), Swallow-wort (<i>Cynanchum</i> sp.), Spotted Joe Pye Weed (<i>Eutrochium maculatum</i> var. <i>maculatum</i>), Cursed Buttercup (<i>Ranunculus sceleratus</i>), White Avens (<i>Geum canadense</i>), Canada Clearweed (<i>Pilea pumila</i>), Jack-in-the-pulpit (<i>Arisaema triphyllum</i>), and Early Meadow-rue (<i>Thalictrum dioicum</i>).

4.1.2. VASCULAR PLANTS

A species list of vascular plants recorded during 2014/2015 site visits has been compiled for the study area. The full list is provided in Appendix 1 including associated status information (native or introduced; conservation status for the City of Hamilton (Goodban, 2014), Ontario, and Canada. Table 8 provides a summary of the vegetation survey findings.

Table 8. Summary of Vegetation Survey Findings

Criteria	#	Notes
Total # of Vascular Plant Species	109	
Number of species identified to species level	102	The additional 7 species were identified to genus level
Number (%) of native species: Number (%) of non-native species	52 (51%): 50 (49%)	Calculations of native/non-native species were completed based on the inventory of species identified to species level.
Number of species of global, national or provincial significance	0	No species of global, national or provincial significance were observed in the study area.
Number of locally significant species	4	<u>Ranked rare (H) for the City of Hamilton:</u> Canada Wildrye, Canada Rush and Spring Forget-me-not <u>Ranked uncommon (h) for the City of Hamilton:</u> Cut-leaved Coneflower
Coefficient of Conservatism:		
Average CC	1.9	Coefficient of Conservatism is a value (0 to 10) assigned to native species in Ontario based on its degree of fidelity to a specific vegetation community type. The lower this value, the more likely the plant is to be found in a wide variety of plant community types including disturbed sites. The presence of plants with a coefficient of conservatism of 9 or 10 indicates later-successional native plants that have undergone only minor disturbance. This calculation was based on the total number of species for which a cc value was available. Although a few more conservative species are present on this site, there are many species representing disturbed conditions, leading to the low average score.
High CC (7-10)	4 (4%)	
Mid CC (4-6)	20 (21%)	
Low CC (0-3)	73 (75%)	

109 vascular plant species were recorded for the study area. Of these, 102 were identified to species level including 52 (51%) native species and 50 (49%) introduced species. This is a relatively high proportion of introduced species, which may be attributed to the urban setting and high level of human disturbance in and surrounding the study area.

No species of global, national or provincial significance were observed. Four species of local significance were recorded. Canada Wildrye was recorded as a rare occurrence in polygon 10. Canada Rush was observed in polygon 7 in the wetter areas near the toe of the slope. One individual Spring Forget-me-not was found on the upper slope of polygon 12. A small cluster of Cut-leaved Coneflower was observed in polygon 10 between the watercourse and the rail corridor.

4.2. WILDLIFE RESOURCES

4.2.1. BREEDING BIRDS

Eleven species of birds were detected during the breeding bird surveys, with 7 species recorded on May 26 and 9 on June 5. Of the 11 species observed, 9 of them were likely breeding on-site or in the

local area, with 2 of them – Canada Goose and American Crow – noted flying or foraging over the site only. Two of the species potentially breeding on the site are considered non-native (introduced): European Starling and House Sparrow. None of the 11 species are considered Species at Risk (SAR), either federally (COSEWIC, 2014) or provincially (OMNRF 2015). At a provincial level, all of the observed native breeding species have been assigned a Srank of either S4 or S5 by the Natural Heritage Information Centre (NHIC, 2015b), which indicates that their provincial populations are “apparently secure” or “secure”, respectively (NHIC, 2015a).

At a regional level, none of the 11 species recorded have been assigned any significance, such as by Partners in Flight (OPIF, 2008).

At a local level, all of the potentially breeding species are considered common to abundant and widespread in the City of Hamilton (Smith, 2014). Also, none of the species recorded are considered area sensitive by the Ontario Ministry of Natural Resources and Forestry (OMNR, 2000), indicating that they do not require large areas of suitable habitat for their long-term survival and are therefore less sensitive to development.

The highest level of breeding evidence obtained during the surveys was “probable” breeding (OBBA 2001). This was evidenced by the observation of pairs of birds (code P) or territorial males (code T), which is defined as a singing male being present at the same location at least seven days apart). This evidence was the highest level obtained for 7 species. The next highest level of breeding evidence was “possible” breeding (Cadman *et al.*, 2007), as seen with singing males (code S) or birds being present in appropriate breeding habitat during the breeding season (code H). This evidence was the highest breeding level for 3 species, with 1 of these (Gray Catbird) detected singing (S), and 1 (Downy Woodpecker) being present in suitable habitat (H), but not singing or displaying territoriality.

For application of the Migratory Birds Convention Act (Government of Canada, 1994a,b), 7 of the 11 species recorded as at least possibly breeding are protected by the Act. As such, it means that it is illegal to harm or kill these species, or to harm or destroy their nests and nesting habitat. The 4 species that are afforded no protection from the Act are Blue Jay, American Crow, European Starling, and House Sparrow.

For full details on the breeding bird surveys for this site, please see Appendix 2.

4.2.2. AMPHIBIANS

Bridge 451 crosses the fast-flowing Grindstone Creek within a highly developed urban area. No amphibian breeding habitat is present within the study area, however during the June 15 survey, approximately 12 Gray Treefrogs (*Hyla versicolor*) were heard calling approximately 400 m north-east of the bridge.

4.2.3. REPTILES

The reptile active hand searches detected the presence of two herpetofaunal species; Eastern Red-backed Salamander (*Plethodon cinereus*) and Eastern Gartersnake (*Thamnophis sirtalis sirtalis*). Both are

considered to be locally abundant in Hamilton (Zammit, 2014) and neither are listed as a federal or provincial Species at Risk (COSEWIC, 2014; OMNRF, 2015).

Six Eastern Red-backed Salamanders were observed during the active inspection of woody debris on the forest floor along the slopes of Grindstone Creek (Polygon 7). Both colour phases were observed; the common 'red-back' phase (3) as well as the less abundant 'lead-back' phase (3) (Harding, 1997; Petranka, 1998), which may indicate a more robust salamander population than if only one phase were present. One Eastern Gartersnake was observed basking on Board St. in ELC polygon 7.

4.2.4. ODONATES

Three species of damselflies and dragonflies were documented during the July 15, 2015 field survey. This included 10 Ebony Jewelwing (*Calopteryx maculata*), 2 female Common Whitetail (*Plathemis lydia*), and 1 male White-faced Meadowhawk (*Sympetrum obtrusum*). One additional unidentified Meadowhawk species (*Sympetrum sp.*) was observed. All three of the identified species have a provincial conservation rank of S5, or "secure" (NHIC, 2015b). Similarly, all three are considered "common" in Halton Region (Rothfels, 2006) and Hamilton Region (Curry, 2014). As indicated above, low diversity and numbers of odonates were observed. This was likely because there was little suitable breeding habitat present in the area. For example, the creek margins were mostly rocky with little wetland habitat, the shaded forested western slope extended down to the water's edge, and the east side of the creek is bordered by a relatively narrow band of shrubs.

4.2.5. FISH & AQUATIC HABITAT

Grindstone Creek is approximately 5 - 8 m wide, and had a flow of approximately 0.5 m³/s when examined on July 30, 2014. It is a moderately swift flowing watercourse that has apparently been straightened to the west side of the valley to accommodate railway tracks (Photographs 1 and 2). The banks of the watercourse have also apparently been lined with boulders and rip-rap, and the bed is mainly boulders and cobble. Consequently, habitat is fairly uniform upstream (Photographs 2 and 3) and downstream (Photograph 4) of bridge 451, with the exception of a slower flowing portion a short distance downstream of the bridge (Photograph 5). Approximately 140 m downstream from bridge 451, Grindstone Creek makes an abrupt left turn through a concrete-bottomed bridge structure (Photograph 6) and then passes over a vertical concrete falls that was 90 cm high on July 30, 2014 (Photograph 7). The vertical height of these falls, plus the flat concrete substrate upstream of the fall's crest, would make this a barrier to upstream migration for most fishes under most flow conditions. The coarse substrates throughout the section of watercourse examined, plus the fallen trees and exposed roots along the banks, provide significant amounts of instream cover for fish and aquatic invertebrates. The fish species captured during this study in the vicinity of bridge 451 are listed in Table 9.

Table 9. Grindstone Creek fish collected by C. Portt and Associates staff in the vicinity of Bridge 451. October 9, 2014. 725 seconds of electrofishing effort was expended along a 90 m length of watercourse beneath and upstream of the bridge.

Common name	Scientific name	Number collected
White Sucker	<i>Catostomus commersonii</i>	6 (juveniles + 1 YOY)
Creek Chub	<i>Semotilus atromaculatus</i>	11
Longnose Dace	<i>Rhinichthys cataractae</i>	20
Blacknose dace	<i>Rhinichthys atratulus</i>	5
Johnny Darter	<i>Etheostoma nigrum</i>	1

No rare or critical aquatic habitats were identified at the bridge location, and the type of habitat in the immediate vicinity of bridge 451 occurs upstream and downstream of the bridge in the reach examined. Overall, the low habitat diversity, but high amount of instream cover, supports a low to medium diversity fish community of at least 7 species (combination of Tables 5, 6 and 9) in the general vicinity of bridge 451.

Of the fish that are, or have been, known to occur in the vicinity of Bridge 451, none are listed under the Federal Species at Risk Act (SARA, 2002) or are considered to be at risk under the Ontario Endangered Species Act (ESA, 2007). However, a couple of fishes (Brassy Minnow and Pearl Dace) are considered uncommon in Hamilton, and one (Finescale Dace) is considered rare in Hamilton (Schwetz, 2014a). All three of these prefer coolwater habitats with gentle or no flow, and Brassy Minnow and Finescale Dace also prefer boggy conditions with soft detritus substrate and aquatic vegetation (Scott and Crossman 1973). These habitat conditions do not exist in the vicinity of Bridge 451, and consequently these fish have not been collected in close proximity to the bridge. The habitat beneath and surrounding Bridge 451 may provide spawning habitat for the common species found there, such as White Sucker, Creek Chub, Longnose Dace and Blacknose Dace, but these same types of habitat occur in ample amounts upstream and downstream of the bridge location and are not considered limiting.

4.2.6. INCIDENTAL WILDLIFE

Wildlife species documented incidentally during the various field surveys at or near the bridge included the following:

Table 10. Incidental Wildlife Observations

Date	Surveyor	Observations
7 May 2015	Dylan White	<ul style="list-style-type: none"> Northern Flicker (<i>Colaptes auratus</i>), Black-capped Chickadee (<i>Poecile atricapillus</i>)
20 May 2015	Wendy Frise & Kristen Bouchard	<ul style="list-style-type: none"> Raccoon (<i>Procyon lotor</i>) tracks observed in ELC polygon 12
26 May 2015	Ian Richards	<ul style="list-style-type: none"> An American Toad (<i>Anaxyrus americanus</i>) was observed on the railroad tracks during the May 26, 2015 breeding bird survey.
31 July 2015	Dylan White	<ul style="list-style-type: none"> American Goldfinch (<i>Carduelis tristis</i>), Cedar Waxwing (<i>Bombus cedrorum</i>)

All of the identified wildlife species listed above are considered common within the southern Ontario landscape and Hamilton Region (Schwetz, 2014a).

5. NATURAL HERITAGE ASSESSMENT

Natural heritage features and functions, based on the Natural Heritage Reference Manual (OMNR, 2010), have been identified for the bridge and adjacent lands. The table below provides details of this assessment. Natural heritage features are mapped on Figure 3.

Table 11. Natural Heritage Assessment Findings

Feature/Function	Present?	Discussion
Significant Habitat of Endangered and Threatened Species	No	No significant habitat of endangered or threatened species was identified in the study area.
Significant Wetlands and Significant Coastal Wetlands	No	No significant wetlands were identified in the study area.
Significant Woodlands	No	The NHRM defers to local planning authorities to define Significant Woodlands within their jurisdictions. The City of Hamilton Rural Official Plan, Schedule B-2 shows that there are no Significant Woodlands in the study area (City of Hamilton, 2012).
Significant Valleylands	Possible	<p>The NHRM defers to local planning authorities to define Significant Valleylands within their jurisdictions. The City of Hamilton Rural Official Plan glossary defines Significant Valleylands as “a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year which is ecologically important in terms of features, functions, representation, or amount, and contributes to the quality and diversity of an identifiable geographic area or natural heritage system” (City of Hamilton, 2012). Based on this definition, the slopes flanking the watercourse would be likely candidates for Significant Valley designation.</p> <p><i>Implications:</i> Significant Valleyland designation and boundaries may need to be examined further by City staff to ensure future bridge work does not cause negative impacts to the feature.</p>
Significant Wildlife Habitat	Yes	<p>The NHRM defers to local planning authorities to define SWH within their jurisdictions. SWH as defined in the glossary of the Rural Hamilton Official Plan, (and Greenbelt Plan (2005)), as “areas where plants, animals and other organisms live and find adequate amounts of food, water, shelter and space needed to sustain their populations. Wildlife habitat is significant where it is ecologically important in terms of features, functions, representation, or amount and contributes to the quality and diversity of a Natural Heritage System. Significant wildlife habitat areas are defined as consisting of one or more of the following:</p> <ul style="list-style-type: none"> a. Critical habitat areas that provide for seasonal concentrations of animals; b. Wildlife movement corridors; c. Rare vegetation communities or specialized habitats for wildlife; and/or d. Habitats for species of conservation concern including provincially and federally threatened, endangered, special concern species, and locally rare species. <p><i>MNR identifies criteria, as amended from time to time for the forgoing.”</i></p> <p>Each of these 4 criteria were assessed for the study area and findings are as follows:</p>

Feature/Function	Present?	Discussion
		<p>a. <u>Critical habitat areas that provide for seasonal concentrations of animals</u>: For the study area these may include land bird migratory stopover areas and snake hibernaculum. The migratory bird habitat onsite is just over 5km away from Lake Ontario but the habitat is contiguous with habitat within 5km of the lake so likely this category would apply. Surveys did not specifically record any snake hibernaculum, however it is possible that occur in rocky areas near the creek edge.</p> <p>b. <u>Wildlife movement corridor</u>: Grindstone creek provides a corridor for the movement of aquatic wildlife. The riparian corridor of terrestrial vegetation is also situated appropriately to function as a wildlife movement corridor.</p> <p>c. <u>Rare vegetation communities or specialized habitats for wildlife</u>: No rare vegetation communities are present in the study area (see discussion about the FOD7-4 vegetation community in section 4.1.1). Other specialized habitats that, although unconfirmed, may be present given the habitat present in the study area include turtle wintering area, turtle nesting habitat, and/or Mink denning sites.</p> <p>d. <u>Habitats for species of conservation concern including provincially and federally threatened, endangered, special concern species, and locally rare species</u>: Habitat for a number of species of conservation concern were observed in the study area. No species of provincial or federal concern were observed and thus no habitat for such species can be confirmed. Species of local concern include 4 species total. Vegetation species ranked as rare or uncommon in the City of Hamilton include: Canada Wildrye, Canada Rush, Spring Forget-me-not, and Cut-leaved Coneflower.</p> <p><i>Implications</i>: Future bridge work should be designed minimize disturbances to wildlife habitat. Removal of vegetation should be limited wherever possible. If future bridge work will require removal of vegetation or encroachment into polygons 7, 10, 11 or 12 more detailed surveys may necessary to confirm the presence/absence of SWH at that time (i.e. snake hibernacula, turtle nesting, mink denning etc) to ensure it is not negatively impacted. Seasonal timing of construction work may be a key factor to avoiding negative impacts to specific species groups (i.e. breeding birds, turtle nesting, fish spawning, etc.). Ideal construction timing would need to be considered at the time when bridge work is proposed.</p>
Significant Areas of Natural and Scientific Interest	No	According to the Rural Hamilton Official Plan Schedules B-1 and B-7, there are no ANSIs in or near the study area (City of Hamilton, 2012).
Fish Habitat	Yes	<p>The Fisheries Act (1985) defines Fish Habitat as “<i>spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes</i>”. Grindstone Creek is known fish habitat and the findings of this study support this.</p> <p><i>Implications</i>: Future bridge work should be carried out in a way that avoids harm to fish habitat. The aquatic habitat and fish species at the bridge location are not sensitive to activities associated with repair or replacement of</p>

Feature/Function	Present?	Discussion
		Bridge 451, and with the proper mitigation measures (e.g. seasonal inwater work timing restrictions, bmp for the prevention of soil and other deleterious substances from entering the water during construction, no placement of fill or the temporary or permanent increase in existing footprint below the High Water Mark) the repair or replacement of Bridge 451 will not impair fish habitat or harm fish

In addition to the PPS categories assessed above other natural heritage designations relevant to the study area include the designation of “Niagara Escarpment Plan Area” as shown on the Rural Hamilton Official Plan, Schedule B. Natural Heritage System. The Niagara Escarpment Plan Map #56 (Niagara Escarpment Commission, 2012), indicates that the study area contains lands designated as urban and Escarpment Natural Area. The Escarpment Natural Area designation includes features which are in a relatively natural state and associated features (such as stream valleys). The Niagara Escarpment Plan (Niagara Escarpment Commission, 2005), considered these areas the most significant natural and scenic areas of the Escarpment. Future bridge work should aim to avoid impacts to the area designated as Escarpment Natural Area, which essentially includes the treed stream valley.

6. CONCLUSIONS

Detailed field surveys of flora, fauna and their associated habitats have been completed. An assessment of natural heritage features and functions has also been completed. The implications of the findings of these assessments have been discussed with regard to possible future repair or replacement of bridge 451. Key findings are as follows:

Key findings of the field surveys:

- All vegetation community types found on the site are considered to be relatively common within the Southern Ontario landscape. The most notable vegetation community is polygon 12, a Fresh – Moist Black Walnut Lowland Deciduous Forest which is the largest and most intact natural vegetation community within the study area.
- 109 vascular plant species were recorded for the study area. Of these, 102 were identified to species level including 52 (51%) native species and 50 (49%) introduced species. No plant species national or provincial significance were observed, however four locally significant plant species were recorded including Canada Wildrye, Canada Rush, Spring Forget-me-not, and Cut-leaved Coneflower.
- Breeding bird surveys recorded 11 species, none of which have conservation status at the national, provincial, regional or local level. Seven of these species are however, subject to the Migratory Bird Conservation Act.
- No amphibian habitat is present in the study area; however, 12 Gray Treefrogs were heard calling approximately 400 m north-east of the bridge during NACS.
- The reptile active hand searches detected the presence of two herpetofaunal species; Eastern Red-backed Salamander and Eastern Gartersnake. Both are considered to be locally abundant in Hamilton (Zammit, 2014) and neither are listed as a federal or provincial Species at Risk (COSEWIC, 2015; OMNRF, 2015).

- Odonate surveys recorded 3 species of damselflies and dragonflies including Ebony Jewelwing, Common Whitetail, and White-faced Meadowhawk. None of these species are considered species of regional or local conservation concern. Low diversity and numbers of odonates present are likely attributable to the minimal breeding habitat present in the area.
- Aquatic habitat in Grindstone Creek in the vicinity of the bridge is low diversity, but does provide a high amount of instream cover. Aquatic habitat in the immediate vicinity of the bridge supports a low to medium diversity fish community of at least 7 species. Though a number of the fishes known to occur in the vicinity of the bridge could utilize the habitat at the immediate bridge location for spawning, the same or similar habitat is common throughout this portion of Grindstone Creek, and is not limiting. None of the fish species known to occur in the vicinity of Bridge 451 are considered at risk.

Key findings of the NH assessment:

- Natural heritage features/functions associated with the study area include: Significant Wildlife Habitat, Fish Habitat, and potentially Significant Valleylands.
- Additionally, a portion of the study area is designated as *Escarpment Natural Area* and is subject to the Niagara Escarpment Plan.

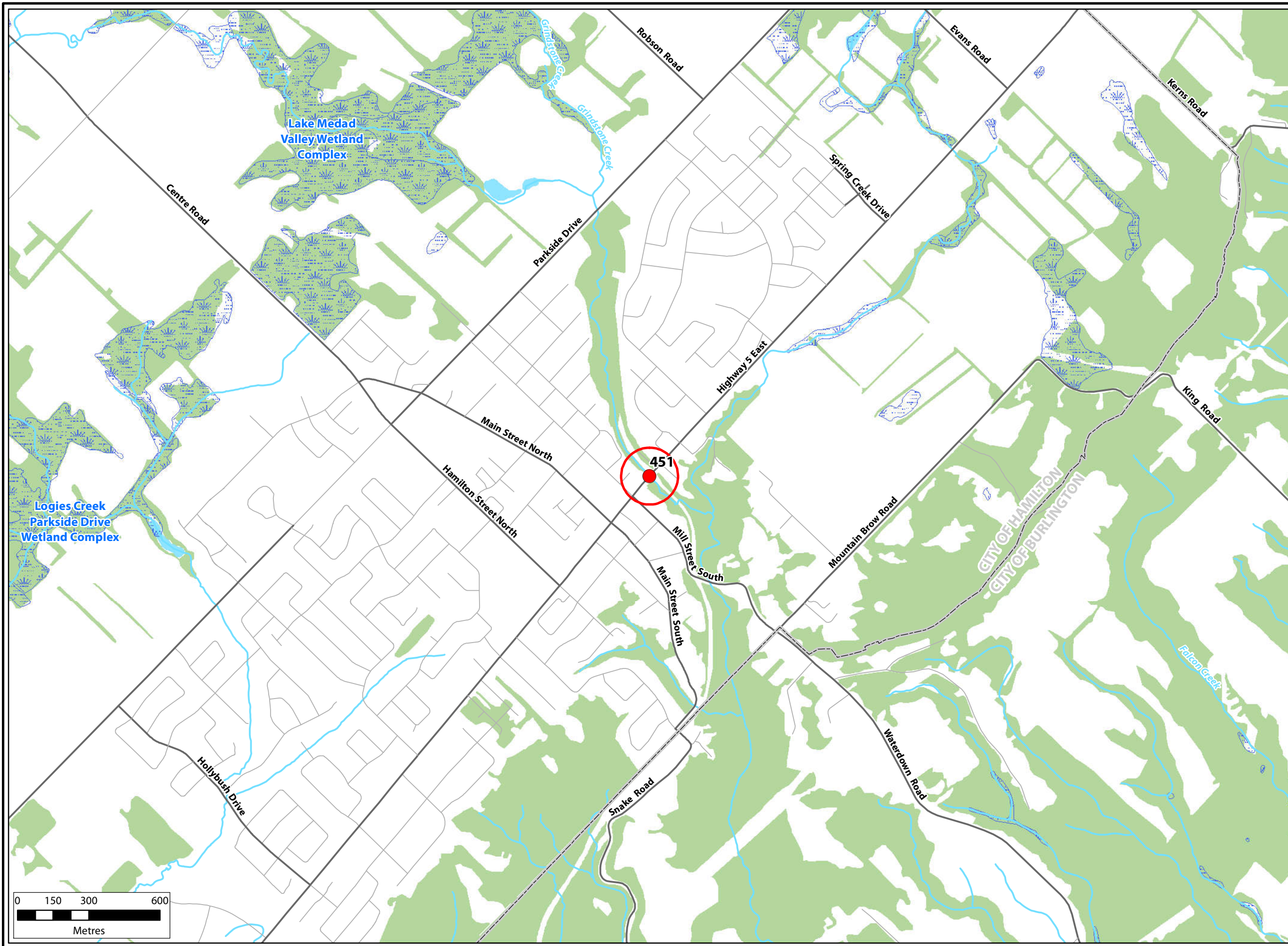
This report has provided a detailed picture of the natural heritage resources associated with bridge 451 and can be used to inform future bridge repair or replacement work to ensure this work is in compliance with natural heritage legislation and these valuable ecological resources are protected from negative impacts.

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Legend

- Bridge Location
 - ~ Watercourse (OHN)
 - ▭ Waterbody (OHN)
 - ▭ Wetland (MNRF)
 - ▭ Wooded Area (MNRF)
 - Study Area (120 m adjacent lands)
 - Municipal Boundary
- Roadclass**
- Expressway / Highway
 - Arterial
 - Local

Orthoimagery: City of Hamilton

**Bridge 451
Context Map**

PROJECT: DA12-075-02

CLIENT: City of Hamilton

DATE: AUGUST 2015

SCALE: 1:15,000

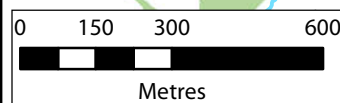
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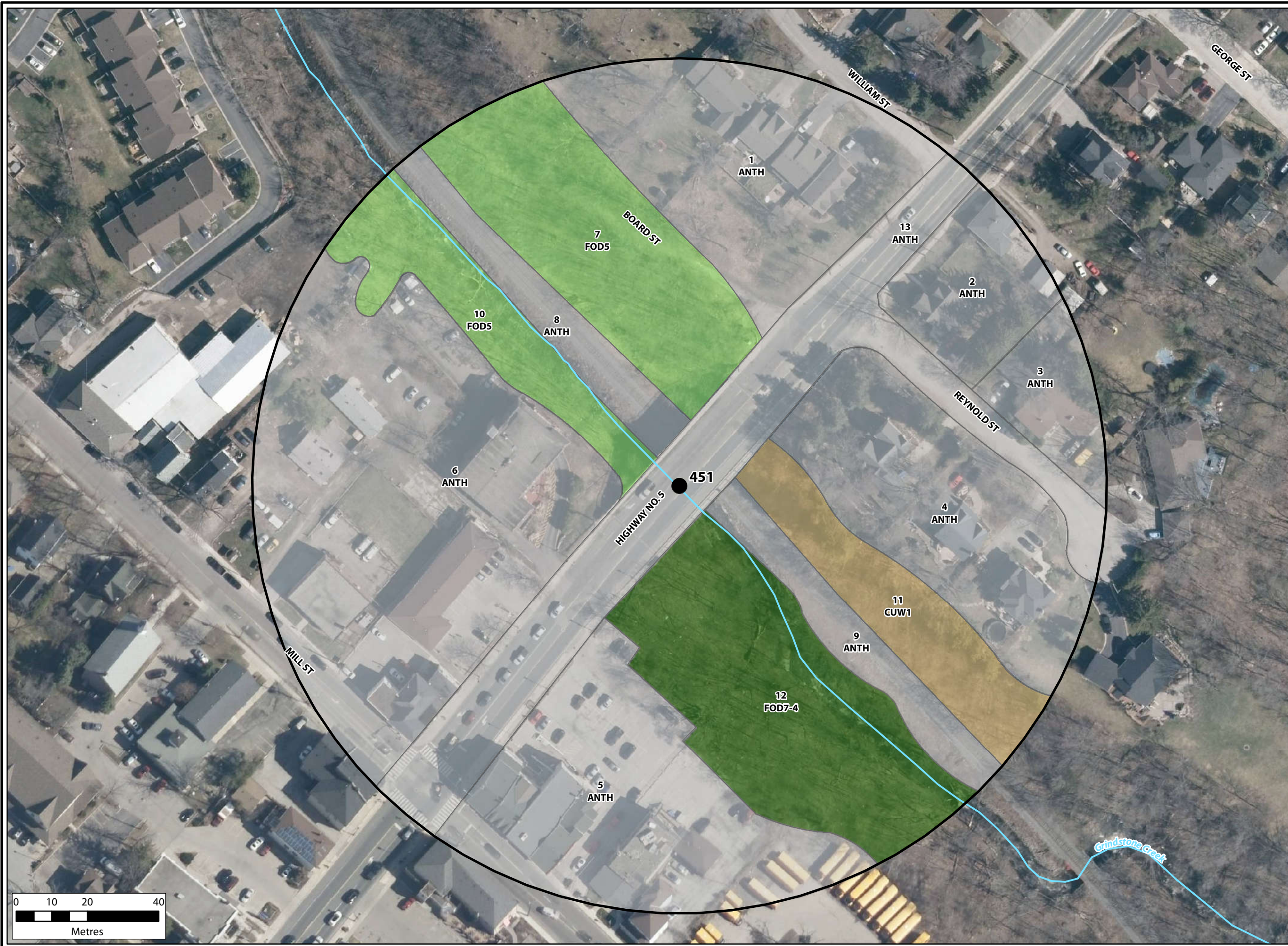
CHECKED BY: WF

Figure:

1

The information displayed on this map has been compiled from various sources. While every effort has been made to accurately depict the information, this map should not be relied on as being a precise indicator of locations, features, or roads, nor as a guide to navigation. MNR data provided by Queen's Printer of Ontario. Use of the data in any derivative product does not constitute an endorsement by the MNR or the Ontario Government of such products.





Legend

- Bridge Location
- ~ Watercourse
- Study Area (120 m adjacent lands)

Symbology

- ANTH - Anthropogenic (1, 2, 3, 4, 5, 6, 8, 9, 13)
- CUW1 - Mineral Cultural Woodland (11)
- FOD5 - Dry - Fresh Sugar Maple Deciduous (7, 10)
- FOD7-4 - Fresh - Moist Black Walnut Lowland Deciduous Forest (12)

Orthoimagery: City of Hamilton

**Bridge 451
Vegetation Communities**

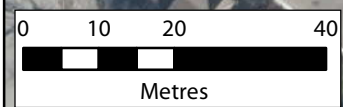
PROJECT: DA12-075-02

CLIENT: City of Hamilton

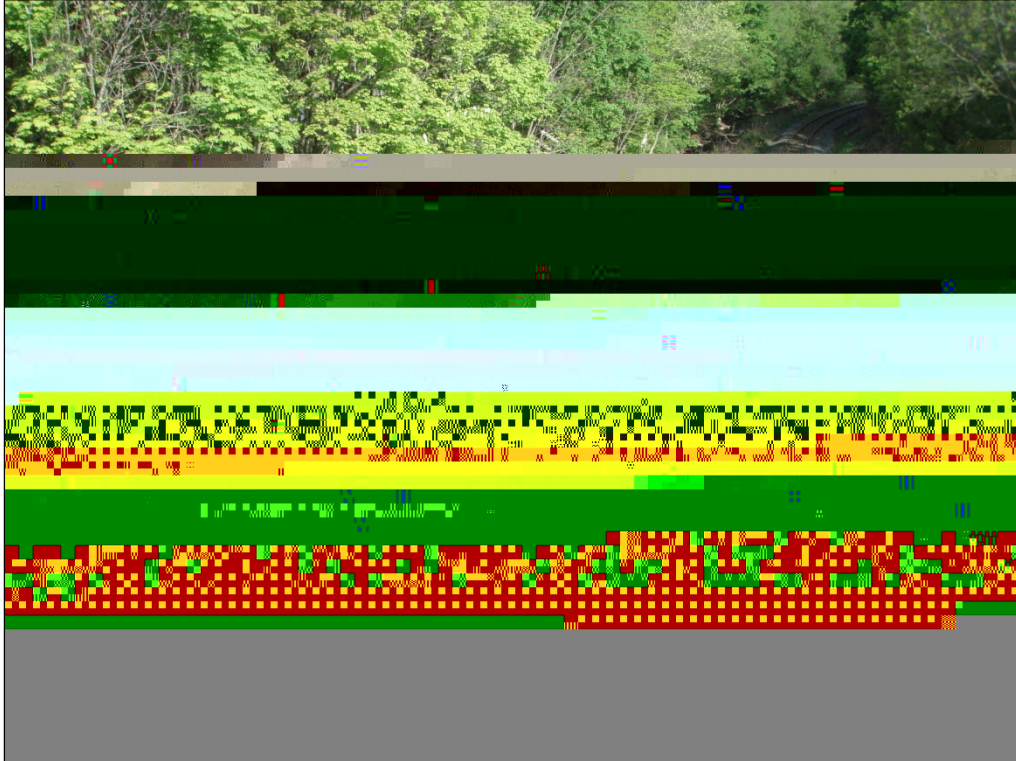
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	CHECKED BY: WF

Figure: **2**

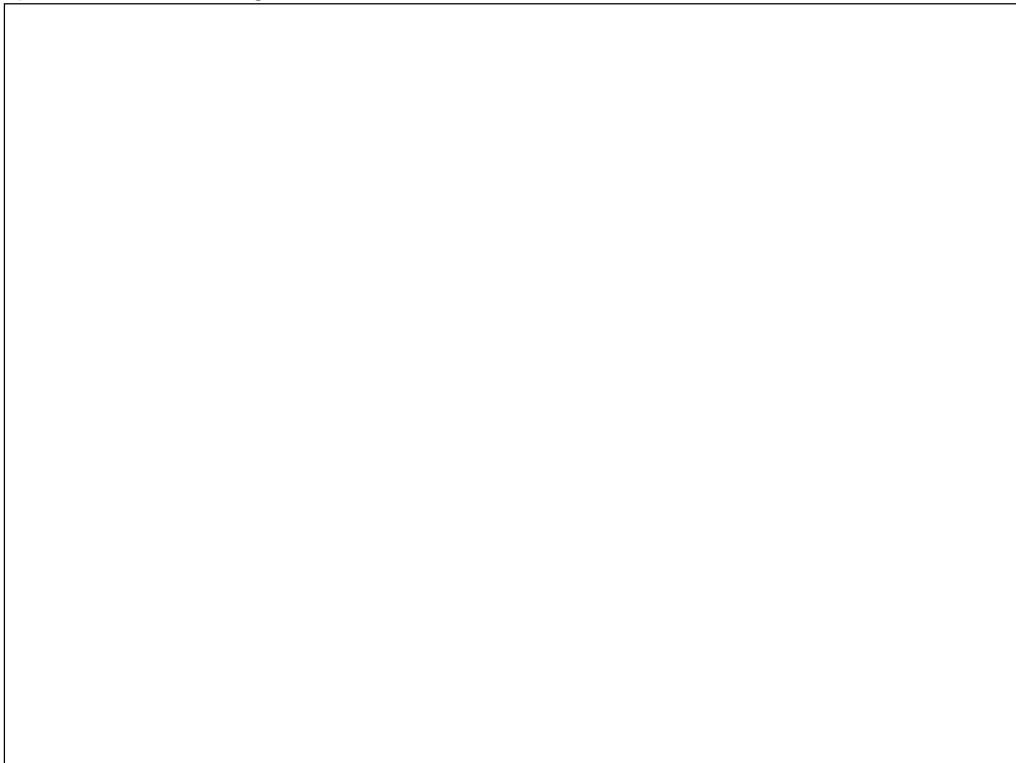
The information displayed on this map has been compiled from various sources. While every effort has been made to accurately depict the information, this map should not be relied on as being a precise indicator of locations, features, or roads, nor as a guide to navigation. MNR data provided by Queen's Printer of Ontario. Use of the data in any derivative product does not constitute an endorsement by the MNR or the Ontario Government of such products.



Photograph 1. May 20, 2015. View upstream from vantage point of Bridge 451, showing the railway tracks and the straightened Grindstone Creek.



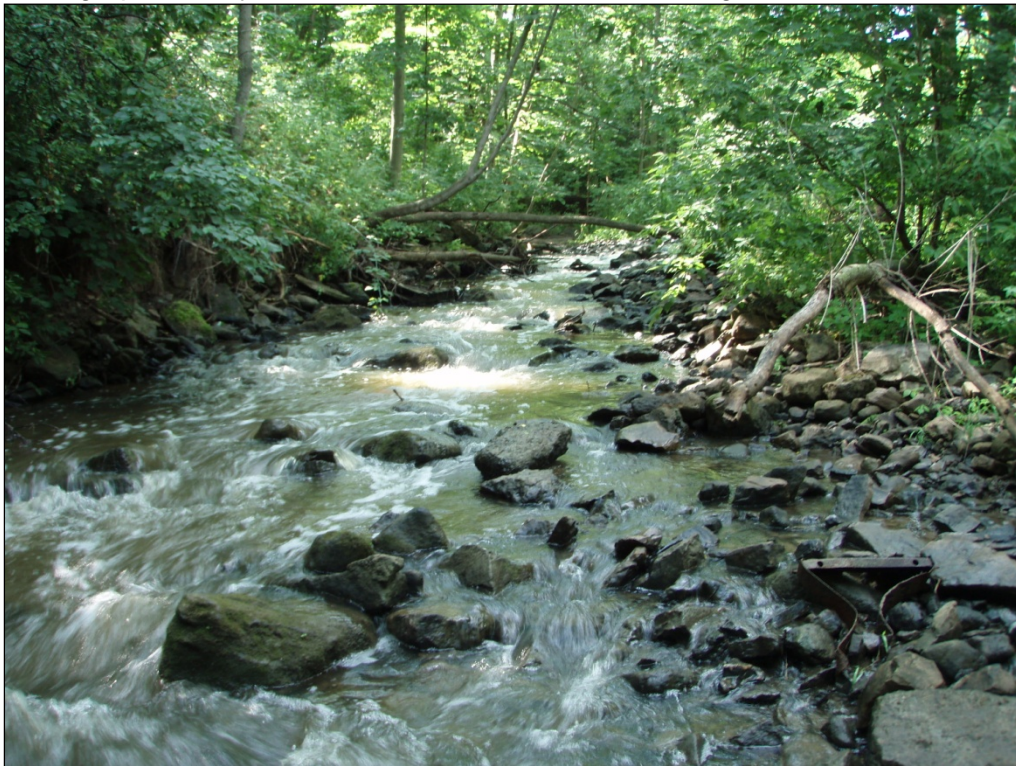
Photograph 2. July 30, 2014. View downstream from a location 95 m upstream from Bridge 451.



Photograph 3. July 30, 2014. Approximately 20 m downstream from Bridge 451.



Photograph 4. July 30, 2014. 70 m downstream of Bridge 451.



Photograph 5. July 30, 2014. Slower flowing and deeper section of watercourse, approximately 15 m downstream from Bridge 451.



Photograph 6. July 30, 2014. Bridge beneath railway tracks, approximately 140 m downstream of Bridge 451.



Photograph 7. July 30, 2014. Barrier to upstream fish movement, approximately 165 m downstream of Bridge 451.

